



SYAMA PRASAD MOOKERJEE PORT, KOLKATA
(Erstwhile Kolkata Port Trust)

KOLKATA DOCK SYSTEM
MECHANICAL & ELECTRICAL ENGINEERING DEPARTMENT
8, Garden Reach Road, Kolkata – 700 043

TENDER DOCUMENT

for

REHABILITATION OF BASCULE BRIDGE AT KDS, SMPK

Notice Inviting Tender No.: SMP/KDS/Mech/C/ADV/615 dated 06.09.2022

- Pre bid meeting : 12.10.2022 at 11.00 hrs.
- Start date of submission of e-tender : 12.10.2022 from 14.00 hrs
- Date of closing of online submission of Bid. : 14.11.2022 up to 15.00 hrs.
- Date of opening of bid : 14.11.2022 at 15.30 hrs.

Tender Fee: Rs. 11,800/- (Non-Refundable)

Chief Mechanical Engineer

TENDER DOCUMENT

SYAMA PRASAD MOOKERJEE PORT, KOLKATA (Erstwhile Kolkata Port Trust)

KOLKATA DOCK SYSTEM

e-TENDER FOR PROCURMENT “REHABILITATION OF BASCULE BRIDGE AT KDS, SMPK”

NOTICE INVITING TENDER No. SMP/KDS/Mech/C/ADV/615 dated 06.09.2022

TENDER NOTICE:

Mechanical & Electrical Engineering Department of Syama Prasad Mookerjee Port, Kolkata invites E-Tender under single stage two part system (Part I: Techno-Commercial Bid and Part II: Price Bid) for “REHABILITATION OF BASCULE BRIDGE AT KDS, SMPK”.

Bid Document may be downloaded from SMP, Kolkata website <https://smportkolkata.shipping.gov.in/> and <https://kopt.enivida.in/> portal. Corrigenda or clarifications, if any, shall be hosted on the above mentioned websites only.

SCHEDULE OF TENDER (SOT)

TENDER NO.	SMP/KDS/Mech/C/ADV/615 dated 06.09.2022
MODE OF TENDER	e-Procurement System (Online Part I - Techno-Commercial Bid and Part II - Price Bid through eNIVIDA Portal https://kopt.enivida.in/). The intending bidders are required to submit their offer electronically through e-Tendering Portal. No physical tender is acceptable by Kolkata Dock System.
Estimated value of Tender	Rs. 64,47,00,000/- (Rupees Sixty Four crore Forty Seven lakhs only)
i) Earnest Money Deposit	The intending bidders should submit Earnest Money of INR 74,47,000/- payable through DD / RTGS / NEFT / Bank Transfer etc.,) to be transferred on A/C: Syama Prasad Mookerjee Port, Kolkata A/c No: 067502000000491 IFSC: IOBA0000675 Bank Name: Indian Overseas Bank Branch Name: STRAND ROAD Branch
ii) Tender Document Fee (Non-refundable)	The intending bidders should submit Tender Document Fees of INR 11,800/- (Rupees Eleven thousand Eight hundred only) including 18% GST to SMPK through DD/Banker's Cheque/Pay Order in favour of Syama Prasad Mookerjee Port, Kolkata on any Scheduled Bank payable at Kolkata. payable through DD / RTGS / NEFT / Bank Transfer etc.,) to be transferred on A/C: Syama Prasad Mookerjee Port, Kolkata A/c No: 067502000000491 IFSC: IOBA0000675 Bank Name: Indian Overseas Bank Branch Name: STRAND ROAD Branch.

RailTel Tender Processing Fee (Nonrefundable)	Mode of Payment:- E-payment Only through Debit/Credit Card or Net Banking. Tender Processing Fee(TPF)- 0.1% of estimate cost (Minimum INR 750.00 and Maximum INR 7500.00) plus GST Registration Charges: INR 2000.00 + Applicable GST Per Year
Date of NIT available to parties to download	06.09.2022 at 18-00 hrs.
Date and time of Pre-Bid meeting (Online/offline)	12.10.2022 at 1100 hrs. to be held at the office of the Chief Mechanical Engineer, at 8, garden Reach Road, Kolkata -700043. Additionally, online meeting link will be uploaded at SMPK website where the NIT is hoisted.
Date of starting of online submission of bid (Techno-Commercial Bid and price Bid) through eNIVIDA Portal	12.10.2022 from 14-00 hrs.
Date of closing of online submission of Bid.	14.11.2022 at 15-00 hrs.
Date and time of opening of Techno-Commercial Bid	14.11.2022 at 15-30 hrs.
Date and time of opening of Price Bid	To be informed separately by letter or email or telephone.

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INSTRUCTIONS TO TENDERERS

This is an e-procurement event of Syama Prasad Mookerjee Port, Kolkata (Erstwhile Kolkata Port Trust) hereinafter referred to as SMPK. The e-procurement service provider is RailTel's eNIVIDA Portal.

You are requested to read the terms & conditions of this tender before submitting your online tender. Tenderers who do not comply with the conditions with documentary proof (wherever required) will not qualify in the Tender for opening of price bid.

1.	<p>Online tenders through RailTel's eNIVIDA Portal are invited by Syama Prasad Mookerjee Port, Kolkata from GST registered domestic Contractors for executing the work.</p> <p>The tender document through RailTel's eNIVIDA Portal is open from 06.09.2022 to 14.11.2022 and can be downloaded from the official website of SMP, Kolkata and through RailTel's eNIVIDA Portal.</p> <p>The complete tender document can be downloaded from Syama Prasad Mookerjee Port, Kolkata website: https://smportkolkata.shipping.gov.in/ and RailTel's eNIVIDA https://kopt.enivida.in/ and bidders are required to submit tender offer through RailTel's eNIVIDA Portal on or before the due date and time of submission.</p> <p>Bidders are requested to use internet Browsers Firefox version below 50 / Internet Explorer version 8 or above, and Java 8 Update 151 or 161. Further, bidders are requested to go through the following information and instructions available on the eNIVIDA Portal https://kopt.enivida.in/ before responding to this e-tender :</p> <ul style="list-style-type: none"> • Bidders Manual Kit • Help for Contractors • FAQ <p>The tender offer shall have to be submitted by the Tenderer only through RailTel's eNIVIDA Portal as explained in the tender document.</p>
2.	<p>The Techno-commercial Bid and the Price Bid shall have to be submitted online at https://kopt.enivida.in/</p> <p>(A). Part – I (Techno-Commercial bid): Would be opened electronically on specified date and time as given in the NIT. Bidder(s) can witness the opening of Techno-commercial Bid electronically.</p> <p>(B) Part – II (Price bid): Would be opened electronically of only those bidder(s) whose Part – I Techno-Commercial bid are acceptable by SMP, Kolkata. Such bidder(s) will be intimated the date of opening of Part II (Price bid) through valid e-mail/telephone/letter. Bidder(s) can witness the opening of Bids electronically.</p> <p>The tenderers are advised to offer their best possible rates. There would generally be no negotiations. Bidders are requested to submit their most competitive prices while submitting the price bid.</p>

3.	All entries in the tender should be entered in online Technical & Commercial Formats without any ambiguity.		
4.	<p>In case of any clarification, please contact SMP, Kolkata (before the scheduled time of the e- tender).</p> <p>Contact persons (SMP, Kolkata):</p> <table border="0"> <tr> <td> 1. Mr. Sourav Mitra Dy.Chief Mechanical Engineer-II Mobile No. 9674720040 Email: souravmitra@kolkataporttrust.gov.in </td><td> 2. Mr. S.Sinha Superintending Engineer Mobile No. 9674720086 Email: ssinha@kolkataporttrust.gov.in </td></tr> </table>	1. Mr. Sourav Mitra Dy.Chief Mechanical Engineer-II Mobile No. 9674720040 Email: souravmitra@kolkataporttrust.gov.in	2. Mr. S.Sinha Superintending Engineer Mobile No. 9674720086 Email: ssinha@kolkataporttrust.gov.in
1. Mr. Sourav Mitra Dy.Chief Mechanical Engineer-II Mobile No. 9674720040 Email: souravmitra@kolkataporttrust.gov.in	2. Mr. S.Sinha Superintending Engineer Mobile No. 9674720086 Email: ssinha@kolkataporttrust.gov.in		
5.	All notices /corrigendum and correspondence to the bidder(s) shall be sent by email only during the process till finalization of tender by SMP, Kolkata. Hence, the bidders are required to ensure that their corporate email I.D. provided is valid and updated at the stage of registration of vendor with RailTel's eNIVIDA portal (i.e. Service Provider). Bidders are also requested to ensure validity of their DSC (Digital Signature Certificate).		
6.	E-tender cannot be accessed after the due date and time mentioned in NIT.		
7.	<p>a) Tender Document Fee is non refundable. No interest will be paid on EMD. EMD of the unsuccessful bidder(s) will be refunded by SMPK. In case of the successful tenderer, this amount may be adjusted against the Security Deposit.</p> <p>b) An amount of Rs. 11,800/-(Rupees Eleven thousand Eight hundred only) and an amount of Rs.74,47,000/- (Rupees Seventy Four lakhs Forty Seven thousand only) as Tender Fee and Earnest Money Deposit respectively shall have to be deposited through Demand Draft/Banker's Cheque/Pay Order/ RTGS / NEFT / Bank Transfer etc.,) to be transferred on A/C: Syama Prasad Mookerjee Port, Kolkata A/c No: 067502000000491 IFSC: IOBA0000675 Bank Name: Indian Overseas Bank Branch Name: STRAND ROAD Branch or Bank Guarantee (only for EMD) as per clause no. 20 & 21 of Terms and Conditions of Tender (Annexure-B).</p> <p>c) Tender without the Earnest Money or depositing the Earnest Money in a manner other than what has been stipulated here-in-before or for an amount less than the specified amount would be considered as invalid tender and would be summarily rejected.</p> <p>d) The tenderer shall upload/provide the scanned copies of Demand Draft/Banker's Cheque/Pay Order / RTGS / NEFT / Bank Transfer Details/ valid NSIC/DIC certificate etc. as proof of payment towards cost of Bid documents and Earnest Money while submitting the tender electronically in the RailTel's eNIVIDA.</p> <p>e) Earnest Money Deposit & Tender Fee details are to be treated as essential documents and should be uploaded with the other essential documents.</p> <p>f) Details of cost of e-tender paper and EMD remitted should be entered by the participating vendor/contractor in the space provided in the e-tender as indicated hereunder:</p> <ol style="list-style-type: none"> Name of remitting vendor/contractor : Tender No. : Amount remitted : Date of remittance : Bank Draft / Cheque No. <p>g) The process involves Electronic Bidding for submission of Techno- Commercial Bid as well as Price Bid.</p> <p>h) The e-tender floor shall remain open from the pre-announced date & time and for as much duration as mentioned above.</p>		

	<p>i) All electronic bids submitted during the e-tender process shall be legally binding on the bidder. Any bid will be considered as valid bid if it fulfills all the terms and conditions of the Tender Document.</p> <p>j) It is mandatory that all the bids are submitted with digital signature certificate otherwise the same will not be accepted by the system.</p> <p>k) SMP, Kolkata reserves the right to cancel or reject or accept or withdraw or extend the tender in full or part as the case may be without assigning any reason thereof.</p> <p>l) No deviation of the terms and conditions of the tender document is acceptable. Submission of bid in the e-tender floor by any bidder confirms his acceptance of terms and conditions for the tender.</p> <p>m) Unit of Measure (UOM) is indicated in the e-tender Floor. Rate to be quoted in Indian Rupee Currency as per UOM indicated in the e-tender floor/tender document.</p>
8.	The e-tender shall be governed by the terms and conditions mentioned therein.
9.	No deviation to the technical and commercial terms & conditions are allowed.
10.	SMP, Kolkata has the right to cancel this e-tender or extend the due date of receipt of bid(s) without assigning any reason thereof.
11.	The bidders <u>must upload</u> all the documents required as per Pre-qualification criteria and the documents enlisted under techno-commercial bid and Price-bid, failing which the tender shall lead to disqualification. Any other document uploaded which is not required as per the terms of the NIT shall not be considered.
12.	The bid will be evaluated based on the filled-in technical and commercial formats uploaded.
13.	The documents uploaded by bidder(s) will be scrutinized. In case any of the information furnished by the bidder is found to be false during scrutiny, EMD of defaulting bidder(s) will be forfeited. Punitive action including suspension and banning of business can also be taken against defaulting bidders.
14	Price bid must be filled-up in EXCEL Sheet through eNIVIDA PORTAL (which is uploaded by SMP, Kolkata).
15	As per policy of Government of India to encourage 'Make in India' and promote manufacturing and production of goods and services in India, the provisions vide order no. P-45021/2/2017-PP (B.E-II) dated 04.06.2020 (copy attached) on the subject "Public Procurement (Preference to Make in India), Order 2017 – Revision" and subsequent amendments/revisions shall be fully applicable.
16	Bidders from a country sharing land border with India would be required to be registered with the Competent Authority as per the provisions contained in Office Memorandum bearing no. F.No.6/18/2019-PPD dated 23.07.2020 issued by Department of Expenditure, Public Procurement Division, Govt. of India.

Terms and Conditions of Tender

1. Pre-Qualification Criteria of the Tenderer: The Tenderers shall satisfy the following:-

(I) Technical capacity: Must have the experience of having successfully completed similar works during last **ten** years ending on 31.08.2022 as per the following guidelines:-

(i). Three similar completed works, each costing not less than 40% of the estimated cost
Or

(ii). Two similar completed works each costing not less than 50% of the estimated cost
Or

(iii). One similar completed work costing not less than 80% of the estimated cost

Here “**Similar Work**” means “**Construction/renovation/repair of Bascule bridge**”.

Intending tenderers either as a Single Entity or as a Joint Venture/Pre-bid collaboration/Tie up are eligible to participate in the tender.

If the intending tenderer as a single entity does not qualify with the above mentioned requisite credential, he may form a Joint Venture/Pre-bid collaboration/Tie up with another firm to participate in the tender.

In case of Joint Venture/Pre-bid Collaboration/Tie up of two firms, one of the firms must fulfil the Technical Capacity as per PQ criteria mentioned above with the responsibility of carrying out all technical aspects of the project including but not limited to design and drawing, selection of equipment/machinery, PG Test etc. and the other partner must fulfil the Financial capacity stipulated at para (II) in the following PQ criteria as well as must have experience of construction/renovation of steel bridge(road for vehicular use /rail) and completed work of steel bridge of minimum span of 24mtr. having width of 4.25 mtr. during the last 10 years ending on 31.08.2022.

Any foreign agency can participate in the tender only by making a Joint Venture/ Pre-bid collaboration/Tie up with Indian Firms fulfilling the terms and conditions of the Tender Document.

For Joint Venture, the tenderer shall submit a Power of Attorney as per format given in the tender document and for Pre-bid Collaboration/tie up, the tenderer shall submit the Memorandum of Understanding/Agreement duly signed by both the partners.

In this case, experience of the participating firm/s or his/their Associate(s) under the same parent company would be considered for pre-qualification.

(II) **Financial capacity** : Average annual financial turnover of the Tenderer himself during the last three years ending 31st March, 2022 viz. 2019-20, 2020- 21 and 2021-22, should be at least 30% of the estimated cost.

(III). Claims for fulfilling the above criteria viz. Technical and Financial Capacities must be supported with documents i.e., Work Order(s), Work Completion Certificate(s) from Client(s),

Audited Balance Sheets including Audit Reports and Profit and Loss Accounts for the last 3 years viz. 2019- 20, 2020-21 and 2021-22. ***In the event of non-submission of Audited Balance Sheet for the financial year ending 31.03.2022, the turnover for that financial year has to be submitted in lieu, duly certified by Chartered Accountant mentioning UDIN.***

2. In addition to above as mentioned in Sl.No.1, following scanned copies of self-attested documents are also required to be submitted online:

- a) Undertaking of the tenderer to be submitted in lieu of submission of signed copies of the Tender document in full, as per enclosed Pro-forma at Annexure-K.
- b) Copies of Audited Balance Sheets and Profit and Loss Accounts of the tenderer for the last 3 years viz. 2019-20, 2020-21 and 2021-22 are to be furnished. *Auditor should mention the UDIN.* In the event of non-submission of Audited Balance Sheet for the financial year ending 31.03.2022, the turnover for that financial year has to be submitted in lieu, duly certified by Chartered Accountant mentioning UDIN.
- c) Self attested documentary evidence of successful completion of similar work as proof of fulfilling the Pre-qualification Criteria of the tender. All applicable previous project references, including names of bridge or industry machinery owners and contact persons with phone numbers, must be submitted with the bid document as per Annexure-H.
- d) Copies of self attested valid GST Registration Certificate.
- e) Self attested valid Professional Tax Clearance Certificate/ up to date tax payment Challan, if applicable.
- f) Copy of self attested valid Trade License.
- g) Copy of self attested PAN Card issued from Income Tax Department.
- h) Copies of Income Tax Return of last 3 years viz. 2019-20, 2020-21 and 2021-22.
- i) Statement to confirm the status of the Tenderer – whether a Partnership Firm, Company or Proprietorship Firm. If demanded by SMP, Kolkata, the tenderer would be bound to furnish necessary documents in support of their statement in this regard.
- j) Details of registration under ESI Act.
 - (i) All intending tenderer at the time of tender shall disclose all necessary documents as to whether they are covered under ESI Act or not.
 - (ii) In case they are covered under ESI Act, they have to furnish the details of registration, failing which their tender would be liable to be cancelled.
 - (iii) In case they are not covered under ESI Act or exempted, they would furnish necessary documents along with an Affidavit in original affirmed before a First Class Judicial Magistrate on a Non Judicial Stamp Paper worth Rs.10/- to that effect as per enclosed Performa at Annexure-I.
 - (iv) In case they are not covered under ESI Act, they must additionally indemnify SMP, Kolkata against all damages and accident occurring to his labour in a Non-Judicial Stamp Paper worth Rs.50/-. The same should be submitted along with Techno-commercial Bid as per enclosed Performa at Annexure-J.
- k) Details of registration under EPF Act: Intending tenderers shall have to furnish the details of EPF Registration, failing which tender/offer would be liable to be cancelled. Documentary evidences in support of non-applicability of registration under EPF Act shall have to be furnished.
- l) Profile of the tenderer containing full name and office address of the Tenderer, names and designation of the officials of the Tenderer connected with the instant Tender, their land and mobile telephone nos., e-mail id and Fax No. etc. as per enclosed Pro-forma at Annexure-F.

- m) Declaration of the tenderer in the form of a COVERING LETTER that they have not been banned or delisted by any Govt. or Quasi-Govt. agencies or PSUs in India, as per enclosed Pro-forma at Annexure-G.
 - n) All intending bidder will have to enter into an Integrity Pact with the Port as per format given in GCC to be submitted on a Rs.50/- Non Judicial Stamp Paper and relevant Annexure-P. All blank spaces to be filled in as appropriate.
 - o) In case of Joint Venture, all members shall have to submit documents as per (a) to (n) *individually*. In case of Joint Venture with foreign agency, Indian partner has to submit documents as per (a) to (n) and the foreign partner shall submit all relevant document at Sr. No. (a) to (c), (i), (l) to (n) . The tender submitted in joint venture shall be guided by the Joint Venture Terms and Formats as per Annexure-N and Annexure-N1 to N6.
 - p) All intending single entity bidders shall have to submit Power of Attorney as per the format at Annexure-M.
3. All the documents as mentioned here-in-before shall have to be UPLOADED or submitted offline as the case may be. The tenderer should clearly understand that no information/indication as to price should be entered in the page of “Bill of Quantities” or elsewhere in the Techno-commercial Bid. Indication of price anywhere in any manner in the Techno-commercial part of the tender would lead to rejection of the offer.
 4. Price bid which must be filled-up in EXCEL SHEET IN PORTAL which is uploaded by SMP, Kolkata. No condition or conditional rebate should at all be indicated/mentioned in the Price Bid.
 5. Tenderers may note that non-submission of any of the aforesaid documents/non-fulfillment of any of the aforesaid criteria shall lead to disqualification of their offers.
 6. Techno-commercial bid would be opened on the aforesaid schedule date of opening the techno-commercial bids. Price Bids of only the qualified bidders shall be opened on a suitable date, to be intimated beforehand.
 7. The Trustees will not be responsible for any cost or expense incurred by the Tenderer in connection with preparation or submission of the tenders.
 8. In case of unscheduled holiday, Strike/Bandh etc. on the scheduled date of Site Inspection, Pre-bid Meeting, submission of bids, opening of Techno-commercial or Price Bid, the same time (as per the schedule) on the next working day will be considered as scheduled time for the purpose of Site Inspection, Pre-bid meeting, submission of bids, opening of Techno-commercial or Price Bid, as the case may be. Here, Trustees’ working day means Monday to Friday in between 9-30 hrs. to 17-30 hrs.
 9. Should there be any doubt or ambiguity as to the meaning of any portion of the tender document or if any further information is required, the same shall be clarified/amended by SMP, Kolkata in the Site Inspection and Pre-bid Meeting. No excuse of ignorance in this regard shall be accepted at a later date after the Pre-bid meeting. In the event of making any important clarification or amendment of terms of the tender, pursuant to the discussion in the Pre-bid meeting or otherwise, the same shall be hoisted in **SMP, Kolkata’s** website and <https://kopt.enivida.in/> only for information of all concerned and the same shall form a part of the Tender Document. The tenderers are requested to keep themselves informed of the development by visiting the said websites regularly. Such amendment(s) shall be binding upon them. **Any offer having deviation from SMP, Kolkata’s terms and conditions shall render such offer unacceptable to SMP, Kolkata. No alteration shall be made by the Tenderer in the tender document and the offer must be in accordance with the terms and conditions of the tender.** The prospective tenderers may inspect the site prior to the date of Site Inspection and Pre-bid Meeting in order to make themselves fully aware of the work, site and scope of work as mentioned in the tender. For attending the Pre-bid Meeting, the representatives of the tenderers should accompany proper authorizations letters from their respective organizations. The tenderers, however, before the Pre-bid meeting, can submit in the

form of letters their doubt or ambiguity as to the meaning of any portion of the tender document and can sought for further information, if any is required.

10. Supplier/Service Provider to confirm that the GST amount charged in Invoice is declared in its returns and payment of taxes is also made.
11. The supplier/service Provider agrees to comply with all applicable GST Laws, including GST acts, rules, regulations, procedures, circulars and interaction there under applicable in India from time to time and to ensure that such compliance is done within the time prescribed under such laws. Supplier/Service Provider should ensure accurate transaction details, as required by GST Laws are timely uploaded in GSTN. In case there is any mismatch between the uploaded in GSTN by supplier/service provider and details available with SMP, Kolkata, then payment to supplier/service provider to the extent of GST relating to the invoice/s under mismatch may be retained from due payment till such time SMPK is not sure that accurate tax amount is finally reflected in the GSTN to SMPK's account and is finally available to the SMP, Kolkata in terms of GST Laws and that the credit of GST taken by SMPK is not required to be reversed at a later date along with applicable interest.
12. SMP, Kolkata has the right to recover mandatory loss including interest and penalty suffered by it due to any non-compliance of tax law by the supplier/service provider. Any loss of input tax credit to SMP, Kolkata for the fault of supplier shall be recovered by SMPK by way of adjustment in consideration payable.
13. Supplementary invoices/debit note/credit note for price revision to enable SMP, Kolkata to claim tax benefit on the same shall be issued by you for a particular year before September of the succeeding financial year.
14. The purchase order/work order shall be void, if at any point of time you are found to be a blacklisted dealer as per GSTN rating system and further no payment shall be entertained.
15. The quoted rates would be kept valid for at least 120 days from the date of opening of the Techno-commercial Bid.
16. The Trustees' reserve the right to disqualify a tender in case they are satisfied that any bribe, commission, gift or advantage has been given, promised or offered by or on behalf of any of the tenderers to any officer, employee or representative of the Trustees or to any person on his or on their behalf in relation to acceptance of the tender.
17. The tenderers shall distinctly understand that they will be strictly required to conform to all the terms of the tender and the plea of custom prevailing will not in any case be accepted as an excuse on their part for infringing of any of the conditions and they shall refrain from sending revised or amended quotations, after the closing date and time of the tender.
18. The contract document shall be drawn in English language only. The contract shall be governed by all relevant Indian Acts as applicable only within the jurisdiction of High Court of Kolkata, West Bengal, India including the Acts like The Indian Contract Act, The Major Port Trusts Act, The Workmen's Compensation Act, The Minimum Wages Act, The Contract Labour (Regulation & Abolition) Act, The Dock Worker's Act, The Indian Arbitration & Conciliation Act, The Dock Safety Regulations, Act(s) or any other act, law, rule as may be applicable.
19. **Cost of the Tender:-** Tender Document Fee of Rs.11,800/-(Rupees Eleven thousand Eight hundred only) is to be submitted as indicated in Clause no.7(b) of "Instruction to tenderers" by Demand Draft/Banker's Cheque/Pay Order/RTGS / NEFT / Bank Transfer. In case of offline payment, the payment has to be made in favour of Syama Prasad Mookerjee Port, Kolkata, payable at Kolkata and the same has to be submitted to SMPK within 3 working days of opening of the techno-commercial bid. In case of RTGS/NEFT/Bank Transfer, the remittance to be made to A/C: Syama Prasad Mookerjee Port, Kolkata A/c No: 067502000000491 IFSC: IOBA0000675 Bank Name: Indian Overseas Bank Branch Name: STRAND ROAD Branch. However, a scanned copy of the Demand Draft/Banker's Cheque/Pay Order/RTGS / NEFT / Bank Transfer Details/ valid NSIC/DIC certificate etc. as proof of payment towards cost of Bid documents shall have to be uploaded under the part-I i.e. techno commercial part of the eTender.

20. **Earnest Money:-** Earnest Money deposit of Rs.74,47,000/-(Rupees Seventy Four lakhs Forty Seven thousand only) is to be submitted as indicated in Clause no.7(b) of “Instruction to tenderers” by Demand Draft/Banker’s Cheque/Pay Order/RTGS / NEFT / Bank Transfer/Bank Guarantee. In case of offline payment, the payment has to be made in favour of Syama Prasad Mookerjee Port, Kolkata, payable at Kolkata and the same has to be submitted to SMPK within 3 working days of opening of the techno-commercial bid. In case of RTGS/NEFT/Bank Transfer, the remittance to be made to A/C: Syama Prasad Mookerjee Port, Kolkata A/c No: 067502000000491 IFSC: IOBA0000675 Bank Name: Indian Overseas Bank Branch Name: STRAND ROAD Branch. However, a scanned copy of the Demand Draft/Banker’s Cheque/Pay Order/RTGS / NEFT / Bank Transfer Details/Bank Guarantee/ valid NSIC/DIC certificate etc. as proof of payment towards cost of Bid documents shall have to be uploaded under the part-I i.e. techno commercial part of the eTender. Alternatively, an amount of INR 10.0 Lakh (Rupees Ten Lakh) shall be paid by Banker’s Cheque / Demand Draft / Pay Order/RTGS/NEFT and the balance amount may be submitted in the form of a Bank Guarantee issued by any Indian nationalized bank, having branch at Kolkata in the prescribed format. In the event of issuing Bank Guarantee by any branch outside Kolkata, any Kolkata Branch of such Bank shall confirm the same and stand by for all the commitments under the Bank Guarantee. In all cases, any dispute regarding such Bank Guarantee will be adjudicated under the jurisdiction of The Calcutta High Court. Specimen EMD format is enclosed at Annexure-L. The Bank Guarantee shall remain valid for a period of 6 months from the scheduled date of opening of Part-I of the bid with a further claim period of one month.

Earnest Money of unsuccessful bidders will be refunded within 2 months of opening the Price bid or on finalization / acceptance of tender, whichever is earlier. If Price bid is opened before expiry of validity of Earnest Money Instrument, the same will be refunded to bidders other than the L-I bidder. EMD of L-I bidder will only be encashed. If Price bid cannot be opened for any reason before expiry date of Earnest Money Instrument, the bidder would be requested to extend the validity of the EMD Instrument within the validity period of the offer, failing which the EMD instrument would be encashed. Tender submitted without EMD shall not be considered.

After conclusion of Tender process, EMD of successful bidder will be returned without interest after submission of Security Deposit. However, the contractor may be allowed to convert the EMD as a part of Security Deposit. In case the successful bidder fails to accept the contract or fails to submit the Security Deposit, the EMD will be liable for forfeiture.

21. **Exemption:** Micro and Small Enterprise (MSEs) registered with NSIC (under Single Point Registration Scheme)/DIC(District Industries Centre) shall be exempted from payment of cost of Tender Document and depositing Earnest Money for which copies of valid MSE’s Certificate along with NSIC Certificate/DIC Certificate with list of items registered must be submitted in techno-commercial part of their offer for claim of such exemption otherwise their offer will be rejected. ***But all MSEs registered with NSIC /DIC are not exempted from depositing cost of tender document. Only those firms, having documents of such exemption for the whole tender work (as per Scope of Work) will be exempted.*** Documentary evidence must be submitted in techno-commercial part of Tender for claim of such exemption, failing which their tender would be summarily rejected.
22. **Scrutiny of e-tenderers:-** During the course of examination of the Techno-commercial Bid, the bidders, if asked for, shall furnish any or additional document(s) for the purpose of evaluation of his/their bids.
23. During evaluation of the tender, an offer shall be considered non-responsive in case:
- (i) the tender is not accompanied by requisite Tender Fee,
 - (ii) the tender is not accompanied by requisite Earnest Money Deposit

- (iii) the validity of the offer is less than the validity stipulated in the tender,
- (iv) the offer does not meet the Pre-qualification criteria of the tender,
- (v) the bidder submits conditional offer/impose own terms and conditions/does not accept tender terms and conditions of the tender in full.
- (vi) if the tender is conditional,
- (vii) if all the documents required as per NIT are not uploaded.

23.1. In addition to above, a bidder may be disqualified if

- a) the bidder provides misleading or false information in the statements and documents submitted,
- b) Record of unsatisfactory performance during the last seven years, such as abandoning of work or rescinding of contract for which the reasons are attributable to the non-performance of the contractor or inordinate delays in completion or financial bankruptcy etc.

The decision of SMP, Kolkata in this regard shall be final and binding on the Bidder.

- 24. **Disparity in quoted rate/amount:** Any disparity between the rate quoted in figures and that of in words, the rate quoted in words shall prevail.
- 25. Contract Price shall be firm and fixed price subject to variation in Indian duties and taxes but not subject to any escalation whatsoever.
- 26. The Contract Price shall not be subjected to any adjustment in respect of rise or fall in the cost of labour, materials, currency rate variation, devaluation or any other matter having implication on the cost of the execution of the Contract and adjustments for subsequent legislation, statute, ordinance, decree, law, regulation that may occur in the country of import of different component/s as required.
- 27. **Evaluation criteria:** Evaluation will be done on the basis of Grand total price including all charges excluding GST and other taxes and levies which would be payable as extra at actual
- 28. The Bidder having quoted on Sole bidder/Joint venture concept shall be responsible for the execution of the scope of work and be overall responsible for the integration, interfacing, co-ordination & completeness of the total scope of work including Performance Guarantee (PG) parameters specified in the technical specification.
- 29. Bidder shall confirm his visit and inspect the site, obtained all information required and satisfied himself regarding all matters stated above.
- 30. The Bidder will bear full responsibility for deductions and conclusions as to the nature and conditions under which the work is to be executed, including effect of climate, rainfall etc. Failure to do so shall not absolve the Bidder of his responsibilities about the proper execution of the job. Since the execution will be turnkey in nature, no claims for extra payments due to any special site conditions and ignorance of site conditions will be considered at any point of time hereafter.

During engineering stage, if any item or facility felt necessary to be included for proper functioning of the plant which has not been envisaged by the successful tenderer during bidding stage, the same shall also be provided by him without any extra claims on SMPK.

Approval of drawings by SMPK/Consultant will not absolve the successful tenderer of his contractual obligations and all functional requirement of the supplied system will be

fulfilled as per contract even if noticed at a later date, after the approval of drawings without any extra claim by him

The Bidder will ensure supply of engineering deliverables and all materials matching the overall project sequence.

31. The Bidder shall submit the following along with the bid.

i.) Overall bar-chart schedule:

The overall bar-chart schedule should be planned in weeks. The heads to be covered in the schedules shall broadly be as follows:

- a) Basic engineering & Approval
- b) Detail Design, Engineering & Approval.
- c) Submission and approval of drawings and manuals.
- d) Structural Work Schedule
- e) Mechanical Work Schedule
- f) Electrical work Schedule
- g) Delivery of equipments
- h) Installation/Erection of equipment
- i) Preliminary Acceptance Test (No Load Test)
- j) Trial- Run, Commissioning & Liquidation of defects crop-up during Commissioning
- k) Final Acceptance Test (PG Test).

32. The drawings enclosed with the tender document are indicative and for general guidance purpose only. The drawings are sufficient for the Bidder in assessing the nature and quality of work involved. No price increase on account of deviation from Bid drawings shall be admissible.

33. Bidder will develop his own system drawings/sections taking into account the overall Scope of work, interfacing requirement with existing system, operational and maintenance requirement of the Plant and overall technological requirement/ logistics. No price increase on account of deviation from Contract drawings shall be admissible.

34. All handling and transport charges of plant and equipment, raw materials / fabricated structures etc. including double handling as required for completion of the work in accordance with time schedule are deemed to be included in the scope of work of the Bidder.

35. SMPK reserves the right to accept or reject all or any of the offers without assigning any reason.

Minimum Technical Requirement (Scope of work, Specification and allied technical details)

1. INTRODUCTION

Since 1966 Syama Prasad Mookerjee Port , Kolkata (hereinafter referred to as SMPK) [erstwhile Kolkata Port Trust] operates an openable type double leaf rolling Bascule Bridge on the Circular Garden Reach Road. The bridge was installed to make smooth passage for public transport as well as cargo traffic of SMPK and surrounding industrial belt. The leaves of the Bridge are opened to make passage for cargo ships connecting two parts of Kidderpore Docks (KPD) called K.P. Dock -I & K.P.Dock-II. This is the most vital cargo evacuation route for Port traffic as well as different Industries & warehouses in the Garden Reach- Metiabruz Region leading to connecting western side of River Hooghly through Vidyasagar Setu. The bridge is also a lifeline for public Transport of vast area of Garden Reach - Metiabruz Region in south and Kolkata main city at East. This double leaf rolling Bascule Bridge was commissioned in November, 1966 by M/s. Waagner-Biro Bridge Systems AG of Austria.

2. BRIEF TECHNICAL DETAILS OF THE EXISTING ARRANGEMENT

- Span : 2x24 m, Width : 17.2 m, Weight of Steel : 1640 T (2 leaves including counterweights and mechanical installations)
- The bridge is operated electro-mechanically by hydraulic and mechanical gears and rack and pinion arrangement.
- This rack & pinion arrangement connects 4 no. Quadrant Girders (2 for each leaf).
- The Quadrant Girders are main connecting point 4 no. main cantilever girders of the bridge deck (2 for each leaf).

3. SCOPE OF WORK

The entire project is to be executed by the Contractor as a single entity or JV, as per the Scope of Work as detailed hereinafter.

The Contractor shall make available the requisite certificate of experience of all the personnel as mentioned below at an appropriate stage before initiating any activity related to this project by the same personnel. SMPK shall determine the acceptability of all submitted past experience for the requirements of this project over and above the criteria set in the pre-qualifying stage of the tender, if any, at an appropriate time as determined by SMPK.

The installation and adjustment of all machinery shall be by millwrights with at least 5 years of experience in this class of work.

Engage a properly qualified Electric Motor Service Vendor (EMSV) for main drive motor installation and testing and a Control Systems Vendor (CSV) for control system development, meeting all requirements described elsewhere in the Minimal Technical Requirements.

The span balance testing engineer shall have a minimum of five (5) years of experience in installing, recording, and analyzing strain gauge data for balancing bascule bridges or other similar

heavy duty industry projects. SMPK shall determine and approve of the related heavy duty industry projects as acceptably similar experience for this position.

Manufacturers for open gearing shall have ten (10) years of fabrication experience of large open gearing for heavy duty industry applications.

SMPK shall engage a Consultant for approving the Design, drawing and detailed engineering and calculations submitted by the Contractor.

SMPK shall also engage a Third Party Inspection Agency (hereinafter referred to as TPI), at its own discretion, for inspection of material/construction/installation/final commissioning/acceptance etc.

Certificate of Performance of machinery and items as mentioned under Scope of Work/MTR are to be provided during drawing /design/document vetting.

3.1. **STRUCTURAL**

A. Rack Frame Repairs

(a) Description: The inboard and outboard gusset plates and a portion of the of the north and south rack frames for the east and west bascule leaves shall be removed and new gusset plates shall be installed. The portion of the vertical rack frame member that connects to the lower chord shall be removed and trimmed to sound steel above the section loss. To allow for removal and installation of the new gusset plates, the concrete surrounding the bottom chord member shall be removed. Following installation of the new gusset plates, steel reinforcement shall be installed and adhesively anchored to the adjacent concrete.

The Contractor shall maintain alignment of the rack and pinion during the lower gusset plate repairs. The vertical alignment of the rack and pinion throughout the full opening range shall be 3mm -0/+1mm. During and through completion of the repairs the bridge shall remain in the closed position. After the repairs have been completed, the span may be opened to verify the vertical clearances throughout the full opening range have been maintained. The Contractor shall coordinate with the SMPK for allowable work schedules to perform the repairs.

(b) Measurement and Payment: The work as described in this section and as shown on the drawings shall be paid for under the pay item "RACK FRAME REPAIRS". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

B. Rack Frame Platform Repairs

(a) Description: The Contractor shall remove the rack frame access platforms and platform supports at the pinion level of the north and south rack frames at the east and west bascule piers. Install a new platform plate and supporting system as shown on the drawings and as indicated herein.

(b) Measurement and Payment: The work as described in this section and as shown on the drawings shall be paid for under the pay item "RACK FRAME PLATFORM REPAIRS". This item will be measured for payment on the basis of EACH rack frame platform location.

C. Live Load Shoe and Stopper Block Replacement

(a) Description: The upper and lower assemblies for the existing live load shoes at the northwest, northeast, southwest and southeast locations shall be removed and replaced with new live load shoes as indicated herein and as shown on the drawings. The Design-Build Team shall also remove the existing delaminated concrete to sound concrete and perform concrete spall repairs for the rehabilitated live load concrete support beams. Temporary closures of the bridge for vehicular and pedestrian traffic will be required to perform this work. The Contractor shall coordinate with the SMPK for allowable work schedules to perform the repairs. Either the upper or lower live load shoe shall have the capability of being shimmed for proper alignment. The alignment of the live load shoes shall be coordinated with the alignment of the center locks. See “Live Load Bearing and Center Lock Adjustment” in the Mechanical System section of these Minimum Technical Requirements for additional information. Additionally, all the 4 no. Stopper Blocks shall be removed and replaced with new Stopper Blocks.

(b) Measurement and Payment: The work as described in this section and as shown on the drawings shall be paid for under the pay item “LIVE LOAD BEARING REPLACEMENT”. This item will be measured for payment on the basis of EACH live load bearing that is removed and replaced.

D. Machinery House Support Repairs

(a) Description: The end connection angles at the counterweight end for the machinery house support beams at both the east and west machinery houses shall be removed and replaced with new connection angles as shown on the drawings and described herein. Temporary shoring columns shall be used to support the dead load of the machinery house support beams during removal and installation of new connection angles. The temporary shoring column shall be designed to remove the existing dead load from the machinery support beam prior to removal of the end connection angle. During and through completion of the repairs the bridge shall remain in the closed position. The Contractor shall coordinate with the SMPK for allowable work schedules to perform the repairs.

(b) Measurement and Payment: The work as described in this section and as shown on the drawings shall be paid for under the pay item “MACHINERY HOUSE SUPPORT REPAIRS”. This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work. No separate payment will be provided for the cost to provide temporary shoring of the existing machinery house support beams. The cost of the temporary shoring will be incidental to “MACHINERY HOUSE SUPPORT REPAIRS”.

E. Cross Girder 1 & 1' Repairs

(a) Description: Cross girders 1 & 1' have significant section loss on the toe side of the cross girder at the interface of the bottom flange and the web. The Contractor shall provide strengthening angles to repair the areas of section loss as shown on the drawings. The angle to flange connection shall be designed to sufficiently replace the shear area lost by section loss and to provide an adequate web to flange connection, considering locked in dead load stresses.

(b) Measurement and Payment: The work as described in this section and as shown on the drawings shall be paid for under the pay item “CROSS GIRDER 1 & 1' REPAIRS”. This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

F. Stringer Repairs

(a) Description: All cantilever stringers on the bascule leaf side of the heel joint at both the east and west ends shall be repaired as shown on the drawings. The Contractor shall provide strengthening angles to repair the areas of section loss as shown on the drawings. The angle to flange connection shall be designed to sufficiently replace the shear area lost by section loss and to provide an adequate web to flange connection, considering locked in dead load stresses.

(b) Measurement and Payment: The work as described in this section and as shown on the drawings shall be paid for under the pay item "STRINGER REPAIRS". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

G. Crack Repair at West Leaf Girder

(a) Description: Near the toe end of the south west bascule girder there is an approximate 30 cm crack propagation along the web and top flange fillet weld. The Contractor shall locate the crack tip and core drill a 25 mm diameter hole encompassing the crack tip. Dye penetrant testing shall be used to test the perimeter of the core hole to ensure the crack has been captured. If the crack tip has not been captured, the process shall be repeated until dye penetrant testing confirms the crack tip has been arrested.

(b) Measurement and Payment: The work as described in this section shall be paid for under the pay item "CRACK REPAIR AT WEST LEAF GIRDER". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

H. Heel Joint Bolt Replacement

(a) Description: At the roadway heel joints at the east and west ends of the bridge, there are bolts that have become loosened on the approach span side of the joint. The Design-Build Team shall remove the loose bolts and install new fully tightened high strength bolts. This work will require temporary traffic and pedestrian control to allow for construction access to the roadway side of the bolts.

(b) Measurement and Payment: The work as described in this section shall be paid for under the pay item "HEEL JOINT BOLT REPLACEMENT". This item will be measured on the basis of EACH bolt that is removed and replaced. The Resident Engineer shall provide judgment on the quantity of bolts that are to be removed and reinstalled during construction. No separate payment will be provided for the cost to provide temporary traffic and pedestrian control. The cost of the temporary traffic and pedestrian control will be incidental to "HEEL JOINT BOLT REPLACEMENT".

I. Cleaning and Painting

(a) Description: The Contractor shall clean and paint all structural steel adjacent to the structural steel repair locations listed herein and at all other locations of active steel corrosion and section loss on the structure. This item also includes cleaning and painting of new structural steel required for steel repairs. The limits of cleaning and painting beyond the required steel repairs shall be a minimum of 150 mm.

(b) Measurement and Payment: The work as described in this section shall be paid for under the pay item "CLEANING AND PAINTING". This item will be measured on the basis of SQUARE METER of steel that is cleaned and painted. The Resident Engineer

shall provide judgement on the locations of active steel corrosion and section loss that shall be cleaned and painted during construction.

J. Substructure Cavity Grouting

(a) Description: The Contractor shall assess the extent of cavity formation in the fender structure. Detail investigation is envisaged involving assessing the formation under the water level and the procedure of grouting to be done as per the drawings issued along with this report.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "GROUTING". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

K. Replacement of Footpath Planks

(a) Description: The footpath planks has to be replaced in entirety with sections shown as per the drawings. The Contractor has to verify the fitting of the footpath planks on the structure and the seating before the casting of the planks.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "FOOTPATH SLAB". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

L. Miscellaneous Repair/ Replacement

(a) Description: The ladders and the handrails of the structure has heavy wear and tear. The portion of the handrails damaged is needed to be replaced and the ladders into all the pits inside the bridge substructure need to be replaced.

(b) Any worn out concrete portion to be repaired.

(c) Inner structure of South-east side of the bridge to be repaired.

(d) Measurement and Payment: The work described in this section shall be paid for under the pay item "HANDRAILS", "STAIRCASES" and "ROADWAY JOINT". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

M. General Cleaning of Bascule Piers

(a) Description: The Contractor shall perform general cleaning in all areas of the east and west bascule piers and machinery houses. Cleaning operations shall consist of removing all dirt, debris and dust. Cleaning shall also consist of pressure washing surfaces. The runoff water from pressure washing shall be collected and disposed of in accordance with all Central, State and Local laws, rules and regulations.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "GENERAL CLEANING OF BASCULE PIERS". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

3.2. MECHANICAL

A. Span Drive Motors, Couplings, and Motor Brakes Replacement

(a) Description: The Contractor shall replace the span drive main electric motors and motor brakes. See Electrical Specifications for span drive motor details. The new motor brakes shall be installed in the same location as the existing motor brakes. The existing span drive motors and hydraulic drive units shall be removed, and the new motors shall be connected directly to the high speed shafts of the enclosed gear reducer.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "MECHANICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

B. Enclosed Gear Reducer Repairs

(a) Description: The span drive enclosed gear reducer shall be drained completely of its lubricating oil, flushed, and filled with new oil. The lubricating oil pumps shall be replaced.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "MECHANICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

C. Open Gearing Replacement

(a) Description: The north and south pinions in the final drive gearset on the east leaf shall be replaced. See plans for details.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "MECHANICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

D. Coupling Replacement

(a) Description: The cross shaft couplings shall be replaced where indicated. See plans for details.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "MECHANICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

E. New Machinery Brakes

(a) Description: The Contractor shall install new machinery brakes where indicated on the plans. The new brakes shall be sized according to AASHTO design specifications.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "MECHANICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

F. Tail Locks Refurbishing

- (a) Description: The Contractor shall clean and relubricate the tail lock actuators and assemblies.
- (b) Measurement and Payment: The work described in this section shall be paid for under the pay item "MECHANICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

G. Passive Center Locks Component Replacement

- (a) Description: The Contractor shall replace the strike plates, shims, and fasteners at the passive center locks.
- (b) Measurement and Payment: The work described in this section shall be paid for under the pay item "MECHANICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

H. Live Load Bearing and Center Lock Adjustments

- (a) Description: The Contractor shall adjust shims at all live load bearings and the passive center locks to achieve proper roadway alignment.
- (b) Measurement and Payment: The work described in this section shall be paid for under the pay item "MECHANICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

I. Span Balance Adjustment

- (a) Description: The Contractor shall adjust the span balance to the balance condition described herein. Span balancing shall consist of adding permanent weight to the toe end of the bascule leaves, in addition to adding or removing balance blocks in the counterweight pocket, as necessary, to maintain the minimum required for future adjustment.
- (b) Measurement and Payment: The work described in this section shall be paid for under the pay item "SPAN BALANCE ADJUSTMENT". This item will be measured for payment on the basis of the weight of steel in KILOGRAMS that is installed, including all materials, equipment, and workmanship to complete the work. For bidding purposes, it is assumed that a total of 10,000 kg of permanent weight shall be added to the bascule leaves, and 4,000 kgs of balance blocks will be required.

3.3. ELECTRICAL

A. Bridge Electrical Control System

- (a) Description: The Contractor shall remove the existing control system, including existing relays, cabinets, control consoles, and control devices and replace with a new bridge control system. The operating control shall include all new control devices for reliable operation of the span from the control house. The control system shall feature safety interlocks to prevent out-of-sequence operation of the span while providing bridge status indications on the control console(s).
- (b) Measurement and Payment: The work described in this section shall be paid for under the pay item "ELECTRICAL REHABILITATION". This item will not be measured and

will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

B. Power Distribution

(a) Description: The Contractor shall replace the existing power distribution, including breakers, motor control cabinets, motor starters, fuses, droop cables and all associated conduit and wiring. Motor control centers shall be provided on each pier to feed the associated machinery.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "ELECTRICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

C. Variable Frequency Drive

(a) Description: The Contractor shall replace the existing electric motors, coupled to the hydraulic power units, with inverter-duty motors compatible with variable frequency drives. New motor speed and torque controls will utilize AC flux vector technology controlled by the new electrical control system.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "ELECTRICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

D. Submarine Cables

(a) Description: The Contractor shall remove or abandoned in place (if permitted by SMPK) the existing submarine cables. New power and control submarine cables, including terminal cabinets, shall be installed to transmit power and control across the waterway from the control house (west pier) to the switch house (east pier).

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "ELECTRICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

E. Navigation Lighting

(a) Description: The Contractor shall replace the channel navigation lights located on the east and west leaf with new, LED swing-type units. New channel navigation lights shall be located on the nose of each leaf with accessibility for maintenance from the roadway. The Contractor shall install new fender navigation lights on the east and west pier, one facing up and one facing downstream, providing the location of the concrete piers during nighttime marine traffic.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item "ELECTRICAL REHABILITATION". This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

F. Interior and Exterior Maintenance Lighting

(a) Description: The Contractor shall replace all interior maintenance lighting fixtures located in the control house, switch house, machinery rooms, counterweight pits, and pier

tops, with LED units. Existing exterior flood lights located on top of the control house and in the counterweight pits shall be also be replaced.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item “ELECTRICAL REHABILITATION”. This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

G. Sump Pumps

(a) Description: The Contractor shall replace the existing sump pumps located in the west and east counterweight pit. Sump pumps shall be automatically controlled, regulating water level in the counterweight pits using float switches.

(b) Measurement and Payment: The work described in this section shall be paid for under the pay item “ELECTRICAL REHABILITATION”. This item will not be measured and will be based on the LUMP SUM cost to provide all materials, equipment and workmanship to complete the work.

3.4. The Grand Total Price quoted under Bill of Quantity shall include all obligations as enumerated in the Scope of Work and Minimum Technical Requirement in this Tender document except “Design, supply, delivery, installation and commissioning” of the following items and any other items of work as may be required for successful commissioning of the Bridge but not covered under the Scope of Work/Minimum Technical Requirement :-

3.4.1 Mechanical

- i.) Manual Drive Mechanism including Drive Shaft
- ii.) Main Drive Shaft
- iii.) Tooth Rack & Main Pinion
- iv.) Rolling Segment & Track Girder

However, inspection, cleaning, interface matching and other work required to be done on these items mentioned under 3.4.1, for successful commissioning of the whole bridge, is within the Grand Total Price quoted under Bill of Quantity.

In case of requirement of replacement/repair of the above mentioned components mentioned under 3.4.1 and any other items of work as may be required for successful commissioning of the Bridge but not covered under the Scope of Work/Minimum Technical Requirement, the same will be done as additional work and would be governed by the relevant terms & conditions as provided in the tender.

3.5. CONCRETE STRUCTURES

3.5.1 DESCRIPTION

The Contractor shall design, detail, fabricate, test, and install concrete repairs as described in these Minimum Technical Requirements. The Contractor shall produce Plans and Special Provisions in accordance with the Submittal Requirements described elsewhere in these Minimum Technical Requirements.

3.5.2 APPLICABLE STANDARDS

- A. Concrete repairs shall be designed in accordance with AASHTO LRFD Bridge Design Specifications, current edition.
- B. Comply with the standards and specifications as applicable provided elsewhere in these Minimum Technical Requirements.

3.5.3 GENERAL REQUIREMENTS

- A. Provide a minimum concrete cover of 50 mm.
- B. Chamfer exposed concrete edges 20mm x 20mm.

3.5.4 MATERIALS

- A. Cementitious Patching Concrete: Packaged, dry mix for repair of concrete.
 - a) Compressive Strength: not less than 27.5 MPa at 28 days when tested according to ASTM C109/C109M. A high early strength may be used at the live load bearing. The concrete for the live load bearing shall attain 21 MPa compressive strength prior to allowing live load back on the structure.
 - b) Use patching concrete that is recommended by the manufacturer for each applicable horizontal, vertical, or overhead use orientation.
 - c) Color and aggregate texture: Provide patching concrete and aggregates of colors and sizes necessary to produce patching concrete that matches existing, adjacent, and exposed concrete. Blend several aggregates if necessary to achieve suitable matches.
- B. Steel Reinforcement
 - a) Reinforcing Bars: ASTM A615/A615M, grade 420, deformed. Epoxy coat reinforcing bars in accordance with ASTM A775/A775M.
 - b) Epoxy Coated Welded Wire Reinforcement: ASTM A884/A884M, Class A Coated, Type 1, Plain Steel.
 - c) Bend reinforcement steel bars cold in the shop or in the field around a pin not less than 6 times the diameter of the bar. Do not bend reinforcing steel bars partially embedded in concrete or in mortar in dowel holes, except as permitted by the Resident Engineer.
 - d) Epoxy coating which is marred or damaged shall be repaired with an epoxy repair coating complying with ASTM A775/A775M.
- C. Formwork - furnish formwork and formwork accessories according to ACI 301.
- D. Concrete Anchors
 - a) Provide adhesive anchor bolts and reinforcement adhesive anchors conforming to one of the following systems or an approved equal:
 - i.) Hilti HIT-RE-500v3 as manufactured by Hilti, Inc.
 - ii.) Redhead A7+ as manufactured by ITW Commercial Construction
 - iii.) SET as manufactured by Simpson Strong-Tie Anchor Systems
 - b) Anchor bolts to be embedded in concrete shall be galvanized.
 - c) Anchors shall be installed per manufacturer's recommendations with a minimum embedment depth of 12 diameters for reinforcing steel and 9 diameters for threaded bolts.

E. Micro Concrete for Grouting and Pointing Concrete

- a) The micro-concrete shall be in accordance to EN 1504-6 & shall exhibit a compressive strength minimum of >40 MPa at 7 days and >55 MPa at 28 days, a flexural strength of >9 MPa after 28 days and adhesion to concrete substrate of >2.5 MPa after 28 days with an approximate fresh density of 2250kg/m³. Any other grout confirming to the standards can be used after due approval from the concerned authority. Anti washout admixture to be used with the micro concrete with 30% aggregate of 10mm and down size
- b) Pointing and plastering of bricks to be done with one-component, fibre-reinforced, thixotropic concrete that shall confirm to R3 category of structural repair mortars in accordance to EN 1504 admixed with anti washout admixture minimum 12.5mm thickness.

3.5.5 CONSTRUCTION

- A. Concrete Placement - comply with ACI 301 for measuring, batching, mixing, transporting, and placing, finishing and curing concrete.
- B. Micro Concrete Grouting - it is proposed to fill the fender cavities with anti washout material preferably shrinkage-compensated, free flowing micro concrete. Anti washout admixtures should be used to implement the same. Once the cavity is filled completely with gravity flow method, place shuttering for the horizontal part with a gap of 100-150mm. After which grouting needs to be done for the horizontal cavity from top with the help of a pipe until the cavity is fully filled.
- C. Fender Brick Pointing works
 - a) Pointing and plastering of bricks to be done with pointing material mentioned above.
 - b) Simultaneously fix plastic nozzles of 12mm diameter up to a depth of 100mm in a staggered manner with 500mm C/C distance and patch the PVC nozzle with grout after grouting process.
 - c) Patch repair the concrete structure above the brick structure with pointing concrete wherever required.
- D. Concrete Testing
 - a) Testing Agency: The Contractor shall engage a qualified independent testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement according to specified requirements.
 - b) Testing frequency: Tests shall be performed according to ACI 301. A minimum of one sample shall be obtained for each day's pour of each concrete mix.

3.6. STEEL STRUCTURES

3.6.1 DESCRIPTION

The Contractor shall design, detail, fabricate, test, and install structural steel repairs as described in these Minimum Technical Requirements. The Contractor shall produce Plans and Special Provisions in accordance with the Submittal Requirements described elsewhere in these Minimum Technical Requirements.

3.6.2 APPLICABLE STANDARDS

- A. Steel repairs shall be designed in accordance with AASHTO LRFD Bridge Design Specifications, current edition.
- B. Comply with the standards and specifications as applicable provided elsewhere in these Minimum Technical Requirements.

3.6.3 GENERAL REQUIREMENTS

- A. All welds shall be shop welds, unless shown on the plans as field welds.
- B. Provide Class B surface conditions for all high strength bolted connections.
- C. Bolts shall be placed with heads exposed to weather, except that for vertically positioned bolts, which have both head and nut exposed, the bolt shall be plated with the head above the nut.
- D. Use turn-of-the-nut method to install all high strength bolts.
- E. Fabricate and erect all steel in accordance with AASHTO LRFD Bridge Construction Specifications.
- F. Provide working drawings in accordance with AASHTO LRFD Bridge Construction Specifications.
- G. Rack frame platforms and rack frame platform supports shall be designed to withstand a live load of 4.75 kPa.
- H. Gusset plates for rack frame repairs shall be designed for the full load capacity of the connecting members.
- I. Hydraulic jacks shall be bypassed with shims at all times except during lifting or lowering operations.

3.6.4 MATERIALS

- A. Structural Steel plates and shapes shall conform to ASTM A709/A709M Grade 345, unless noted otherwise.
- B. All welding shall be in conformance with AWS D1.5, Bridge Welding Code.
- C. High strength bolts used as structural fasteners shall conform to ASTM F3125 Grade A325M, Type 1, unless noted otherwise. Provide hardware for the bolts as listed in ASTM F3125 as recommended or suitable for the bolt. All bolts and hardware shall be galvanized in accordance with ASTM B695 class 50.
- D. Rack platform plate shall conform to ASTM A786/A786M with a raised diamond 4-way pattern.

3.6.5 CONSTRUCTION

- A. Shop Inspection and Testing
 - a) The Contractor shall engage a qualified independent testing and inspection agency to perform shop tests and inspection and prepare test reports.
 - b) The independent testing agency shall be provided access to where structural steel work is being fabricated or produced to perform tests and inspections.
 - c) The fabricator shall correct deficiencies in work that test reports and inspection indicate does not comply with the Contract Documents.
 - d) Shop bolted connections shall be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
 - e) Welded connections shall be visually inspected and inspected according to AWS D1.5 at the testing agency's option:

- i.) Liquid Penetrant Inspection: Based on type of weld ASTM E165/E165M.
 - ii.) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - iii.) Ultrasonic Inspection: ASTM E164.
 - iv.) Radiographic Inspection: ASTM E94/E94M.
- f) Qualify welding procedures and personnel according to AWS D1.5, "Bridge Welding Code".

B. Field Quality Control

- a) The Contractor shall engage a qualified independent testing and inspection agency to inspect field welds and high-strength bolted connections.

C. Submittals

- a) Product Data: For each type of product indicated.
- b) Shop Drawings: Show fabrication of structural-steel components.
 - i.) Include details of cuts, connections, splices, camber, holes and other pertinent data.
 - ii.) Include embedment drawings.
 - iii.) Indicate welds by standard AWS symbols, distinguishing between shop and field welds, show size, length and type of each weld.
 - iv.) Indicate type, size and length of bolts, distinguishing between shop and field bolts. Identify slip-critical high-strength bolted connections.
 - v.) For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified Engineer responsible for their preparation.
 - vi.) Indicate fracture-critical members (FCM) on the shop drawings.
- c) Welding certificates.
- d) Qualification Data: For Installer, fabricator, Engineer and testing agency.
- e) Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
 - i.) Structural steel including chemical and physical properties.
 - ii.) Bolts, nuts and washers including mechanical properties and chemical analysis.
 - iii.) Shop primers.
 - iv.) Non-shrink grout.
 - v.) Source quality-control test reports.

3.7. STEEL CLEANING AND PAINTING

3.7.1 DESCRIPTION

The structural steel coating system shall consist of a three-coat paint system with a zinc rich primer, intermediate coat and top coat.

3.7.2 APPLICABLE STANDARDS

Comply with the standards and specifications as applicable provided elsewhere in these Minimum Technical Requirements.

3.7.3 GENERAL REQUIREMENTS

- A.** The top coat of the paint system shall closely match the color of the existing paint system.
- B.** All three coats of the paint system and thinners used for the paint system shall be furnished by the same coating material manufacturer.
- C.** Shop fabricated structural steel shall be coated in the fabrication shop with the same primer that will be used for the field painting.
- D.** Quality Control – shop and field applicators are required to conduct and document quality control inspection of the painting, including measurements of temperature, dew point, surface profile and paint thickness. Quality control personnel shall have access to applicable project specific requirements applicable to the coating system being applied.

3.7.4 MATERIALS

- A. Paint System**
 - a) Primer Coat – Epoxy Zinc Rich Primer – the coating material shall be an epoxy zinc-rich primer meeting the requirements of SSPC paint 20 (Type II) with a minimum 80% zinc content in the dry film with a dry film thickness of 3 to 5 mils at any point.
 - b) Intermediate Coat – Epoxy Polyamide – the coating material shall be a high build epoxy polyamide with a dry film thickness of 3 to 5 mils at any point that is compatible with the primer coat.
 - c) Finish Coat – Acrylic Polyurethane – the coating material shall be acrylic polyurethane paint with a dry film thickness of 3 to 5 mils at any point that is compatible with the intermediate coat.

3.7.5 CONSTRUCTION

- A.** The Contractor shall submit color samples of the proposed color to the SMPK for review and approval prior to painting. Tint undercoats the same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- B.** The Contractor shall submit the proposed 3-coat paint system including technical data sheets, dry film thickness, and the cleaning methods and equipment as approved by SMPK/TPI for review and approval prior to painting.
- C.** The Contractor shall provide an electric psychrometer and a magnetic coating thickness gauge for the exclusive use of the SMPK/TPI. The psychrometer and thickness gauge shall be furnished prior to the start of shop and field painting and will become the property of the SMPK. Testing equipment shall be new, in protective carrying cases and shall have instruction sheets enclosed.
- D.** Paints shall only be applied when temperature of surfaces to be painted and ambient temperatures are between 10 and 35 degrees Celsius.

- E. Do not apply paints in snow, rain, fog or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees Fahrenheit above the dew point; or to damp or wet surfaces.
- F. Paints shall be applied in accordance with manufacturer's written instructions and recommendations.
- G. Stripe paint corners, crevices, bolts, welds and sharp edges.
- H. For each coat in a paint system, products shall be recommended in writing by the topcoat manufacturer for use in paint system and on substrate indicated.
- I. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color and appearance.
- J. Rust, scale and dirt shall be thoroughly removed by approved methods of hand cleaning, power tools, or any combination of these methods. Hand cleaning to SSPC-SP2 may include the use of metal brushes, scrapers, chisels, hammers, or other effective means. Power tool cleaning to SSPC-SP3 may include wire brushes, impact tools, grinders, sanders, or any approved combination of these methods. Bristle or wood fiber brushes shall be used for removing loose dust. Cleaning shall be done to the complete satisfaction of the SMPK/TPI.

3.8. ELECTRICAL SYSTEM

3.8.1 DESCRIPTION

The Contractor shall design, detail, fabricate, test, install, program, and place into satisfactory and permanent operating condition the complete electrical power and controls system as described in these Minimum Technical Requirements. The Contractor shall produce Plans and Special Provisions in accordance with the Submittal Requirements described elsewhere in these Minimum Technical Requirements.

The work consists of providing all labor, materials, and equipment for the complete bridge electrical system rehabilitation as described herein and shown on the Plans, including all incidental work as shown and required by the Contract.

3.8.2 APPLICABLE STANDARDS

Comply with the standards and specifications as applicable provided elsewhere in these Minimum Technical Requirements.

3.8.3 DESIGN CRITERIA AND CHARACTERISTICS

Electrical equipment shall be selected, designed, fabricated, and installed in accordance with AASHTO Movable, the NEC, and meet all applicable standards provided elsewhere within the Minimum Technical Requirements.

The following provides a description of general operating features required for the electrical system. It does not represent an all-inclusive detailed scope of work, nor shall the Contractor be relieved of any obligation to provide a complete system that satisfies the requirements of the Bureau of Indian Standards (Electrical) BIS, AASHTO Movable, the NEC, these Minimum Technical Requirements, and other prevailing codes and requirements, as applicable.

- A. The Bascule Bridge shall be capable local operation from the bridge control house utilizing the control devices on the control console.
- B. The Bridge control system shall be accomplished by hardwired relay-based logic.

- C. The control system shall incorporate hardwired logic, interlocks, and other safety features so that operation cannot be performed out of the correct order. Keyed bypass switches shall be provided to override interlocks. The control system shall provide the bridge operator to operate the bridge with the following options and features, and as described in the Sequence of Operation descriptions and provided elsewhere within the Minimum Technical Requirements:
- a) Automatic Mode: Control system shall automatically raise the bridge from the seated position, providing live bridge angle indications. Bridge shall undergo a normal stop in the event of a minor fault and an emergency stop for a major fault.
 - b) Manual Mode: Control system shall allow the operator to manually control the bridge using selector switches on the console, while incorporating all safety interlocks. Manual mode shall not allow the operator to control the bridge out of the intended operating sequence unless bypass key switches are utilized.
 - c) Bypass key switches: Bypass key switches shall be provided to bypass safety features and to bypass various switching devices in the event of equipment failure or for maintenance purposes. Bypass key switches shall only be enabled in manual mode and used for troubleshooting or in emergency situations and proceeded with caution.
 - d) Indications: The control system shall provide visual and audible indications for limit switch tripping, bridge position, fault conditions, and including but not limited to what is provided on the Plans. All indications shall be provided on the control console to allow for safe operation of the span in manual operation mode.
 - e) Emergency Stop Pushbuttons. Provide emergency stop pushbuttons on the control console that bring the bridge to a stop by disabling the drives and applying the brakes during any point of span operation. E-stop buttons shall be provided in the control house, switch house, machinery rooms, and pier tops. E-stop pushbutton shall only be used in emergency situations.
- D. The bascule bridge features two (2) existing incoming utility service feeds that supply power to the bridge, one originating from the west approach and one from the east approach. The redundant power supplies shall allow for full control of the bridge in the event one of the service feeds is lost. Power shall transmit between bascule piers by way of submarine cables, as described below. Power shall be isolated between service feeds by automatic transfer switches (ATS). The control system shall indicate service power failure and automatically switch over to the functional service feed. Manual control on each ATS and on the control console shall be provided. The control system shall prevent simultaneous activation of the ATS's.
- E. Submarine cabling shall be used to convey power and communications across the navigable channel. See additional requirements provided elsewhere in the Minimum Technical Requirements.
- F. The bascule bridge prime mover shall be by inverter-duty motor's, controlled by a flux vector Variable Frequency Drive (VFD). The control system shall provide hardwire communications to the VFD(s) for various speed and torque commands. Each drive motor shall be paired with its own VFD.
- G. The bascule bridge shall feature sump pumps located in the counterweight pits that remove excess water and properly dispose outside of the pit in an area acceptable by the SMPK and meeting all Central, State, and Local environmental codes and regulations. Each sump pump shall be automatically controlled, turning on and off based on the water height, detected by float switches. Additional float switches shall be provided for "high water level" indication on the control console.

The following Electrical Design Submittals shall be produced and submitted by the Contractor to the SMPK for review and approval. Electrical Design Calculations/Plans/Special Provisions may be subdivided for different systems and submitted separately to complement the Contractor schedule. Design calculations and special provisions shall be submitted prior to or concurrently with Plans of the same milestone. Additional design submittal requirements are provided elsewhere within these Minimal Technical Requirements.

A. Electrical Design calculations. The Contractor shall submit detailed calculations that demonstrate electrical design compliance to the requirements of all applicable specifications included in these Minimum Technical Requirements. At a minimum, submitted calculations shall include the following sections and details:

- a) Voltage Drop Calculations. Calculate the voltage drop for every device from both the east and west service entrance points. The maximum combined voltage drop for both the feeder and branch circuits shall not exceed 5% and the maximum voltage drop on the feeder or branch circuits shall not exceed 3%. Voltage drop calculations shall account for conductor size, length, voltage, and ampacity of the circuit being calculated.
- b) Conduit Fill Calculations. Calculate the conduit fill of all conduit runs within the project. Conduit fill shall not exceed 40%. Conduit fill calculations shall account for the conduit size and type, conductor size, type, and quantity, and shall reference the conduit layout and schedule referenced elsewhere in the Minimum Technical Requirements.
- c) Main and Branch Circuit Feeder Calculations. Calculate the conductor size of the existing main service feeders located on the west and east piers. This calculation shall verify that the existing feeders are sized in accordance with the NEC for the loads they are servicing. Calculate the proposed overcurrent protection devices (OCPD) and conductor size of all main and branch feeder circuits in accordance with the NEC. Circuit calculations shall account for conductor type and size, terminal temperature of connected devices, ampacity of continuous and/or non-continuous loads, OCPD type and size, current carrying conductors, ambient temperature, ground size, and all other requirements noted in the NEC.
- d) Short Circuit Calculations. Calculate the minimum required interrupting ratings for all protective devices to be installed or supplied as a part of the rehabilitation work. Calculations shall depict calculation method used, available fault currents, and minimum interrupting ratings required for each location.
- e) Sump Pump Calculations. Calculate the minimum size sump required in units of flowrate, lift-height, and horsepower, to dispose of water inside the east and west counterweight pits.

B. Electrical Design Plans. Electrical Plans shall be developed and submitted by the Contractor to complement the special provisions and to provide all construction requirements for the Bridge Electrical Work. At a minimum, the Design Plans shall include the following sections details:

- a) General Plan and Elevation. Provide an overview of the scope of work of the project.
- b) Removal details. Provide plan views of various locations, as required, illustrating what electrical devices are scheduled for removal.
- c) Equipment layouts. Provide plan and elevation views showing proposed electrical equipment locations. Provide dimensions, as required, to verify that the proposed

equipment can be transported to the location without modification and that NEC minimum workspace requirements around the equipment is achieved.

- d) Line Diagrams. Provide line diagrams for all three-phase and single-phase power distribution to main drive motors, panelboards, motor control centers, sump pumps, oil circulation pumps, machinery room fans, maintenance and flood lighting fixtures, navigation lighting fixtures, and all other devices that require power. Three-phase line diagrams shall show proposed breaker and wire size of all circuits, motor starters and overloads, field and panel wiring, disconnect switches, and all devices that intercept the load to source wiring. Identify motor KW/HP ratings, and equipment information, as required.
- e) Panelboard Schedules. Provide panel board schedules for all panels. Schedules shall list circuit numbers, circuit breaker sizes and number of poles, loads on each circuit, and total load on the panel. Panel schedules shall also list voltage, phase, mains type and rating, and short circuit rating.
- f) Motor Control Center Details. Provide motor control center layouts detailing overall enclosure dimensions and individual section dimensions. Provide schedules which list, for each unit to be installed in the motor control center, the unit type (i.e. feeder circuit breaker, full voltage non-reversing starter, etc.), circuit breaker size, number of poles, trip type, description, motor KW/HP, and starter size, as applicable. Schedules shall also include motor control center voltage, phase, bus horizontal and vertical amperes, mains type and rating, and short circuit rating.
- g) Main Drive Schematics. Provide a schematic for each variable frequency drive (VFD) illustrating the source of incoming power, as well as control and power connections. Clearly label contacts and terminations to clearly show all connections to the VFD.
- h) Control Logic Diagrams. Provide control logic diagrams consistent with the standards for the control system type chosen during design. Control diagrams should clearly label all contacts and control devices. Control diagrams shall clearly illustrate all safety devices such as limit switches and demonstrate safety interlocking. Control logic diagrams shall be accompanied by control console layouts which show the location of the indicating and operating devices used within the control logic. Control logic drawings shall be produced in horizontal, ladder logic-style.
- i) Limit Switch Tripping Schedules. Provide limit switch tripping diagrams for all limit switches to be installed. Limit switch diagrams shall clearly identify all limit switch contacts and their position at key points during bridge operation. Key points of operation may include, but are not limited to, closing, fully closed, nearly closed, opening, nearly open, and fully open.
- j) Submarine Cable Details. Provide plan and elevation views detailing proposed installation of submarine cables, installation depth, and trenching details. Plan and elevation views shall show location of existing submarine cables in relation to new. Provide submarine cable details which clearly indicate the number of cables and conductors which make up each submarine cable. Provide details indicating the method which will be used to support the submarine cables at connections to terminal cabinets on each end of the cable.
- k) Conduit Layouts and Schedules. Provide conduit layouts and accompanying schedules detailing all major conduits to be installed as a part of the rehabilitation work. Conduit layouts are diagrammatic only but should show equipment in general locations relative to other equipment to the extent possible. Conduit layouts should show conduit runs with labels which refer to the conduit schedules. Conduit schedules shall list conduit label, to and from locations, conduit material, conduit size, and quantity of each size and type conductor or cable to be installed in each conduit.

- l) Mounting Details. Provide mounting details for all electrical equipment to be installed as a part of the rehabilitation work which requires mounting. Mounting details should be provided for equipment such as, but not limited to, light fixtures, traffic signals, receptacles, junction boxes, terminal cabinets, limit switches, droop cables, submarine cables, and conduit supports.
- C. Electrical Special Provisions. Provide special provisions, as required in combination with the plans, to fully detail all electrical equipment to be installed on the project. The special provisions shall detail material requirements including all applicable ratings and certifications. Detail installation techniques and procedures for each type of equipment to be installed.

3.8.4 GENERAL REQUIREMENTS

A. Field Measurements and Verification.

- a) Before commencing any work, ordering any materials, or fabricating any items, verify all relevant dimensions and other relevant characteristics at the job site and ensure their accuracy.
- b) Verify field point-to-point wiring for connections of new installation, modifications of existing systems, and replacement. Verify all field measurements that are critical to the fabrication of new items, and clearly indicate to differentiate from other dimensions on working drawings that are submitted for review and approval.
- c) The SMPK will not, as a part of shop drawings review, bear responsibility for verification of any field measurements made by the Contractor ~~Design-Build Team~~. Review of shop drawings by the SMPK does not in any way relieve the Contractor from responsibility for the accuracy of field measurements. Full responsibility for any errors that may result from inaccuracy of field measurements and verifications will be borne by the Contractor ~~Design-Build Team~~.

B. Brand Name Products and Substitutions

- a) Provide identification by “brand name” to include manufacturer name and model name or number.
- b) Full and final responsibility for selection of products that satisfy all identified requirements will be borne by the Design-Build Team. In case of any discrepancy, or other conflict, between the salient requirements identified in the contract and products identified by brand name, the salient requirements will govern. Any such conflict, or other discrepancy, will not be considered cause for delay or additional payment.

C. Construction Submittal Requirements.

- a) Obtain approval for all submittals prior to the purchase, delivery to the site, or commitment to this project of the respective equipment or materials. Provide neat and easily readable submittals, clearly show dimensions and pertinent ratings, and explicitly identify the intended use of each component on this project.
- b) Submit the required component descriptive data and system shop drawings all together under the same cover.
- c) Each set of product submittal information must cover only one distinct product.
- d) Do not use or install equipment or perform any work on this project without approved equipment, materials, and associated shop drawings by SMPK.

- e) Where a catalog cut sheet is submitted with a table, listing or group of similar items with different catalog numbers and/or options, clearly mark the specific item(s) proposed.
- f) Provide the following submittals in portable data format (PDF) for the required work and products as described herein:
 - i.) Product information including, brochures, catalog cuts, manufacturer's specification sheets, manufacturer's recommended installation, maintenance, and troubleshooting, and other product literature for all equipment, components, and hardware proposed for installation as required by these Special Provisions. Specifically, submit product information for the following components:
 - 1. Bridge electrical system equipment including, but not limited to, power distribution equipment, general purpose conductors, conduits and raceways, droop, and submarine cables, pull and junction boxes, and accessories.
 - 2. Bridge control system equipment including, but not limited to, control and interposing relays and related items to the control system, ladder logic system drawings, Variable Frequency Drive, bridge limit switches, enclosures, communication and special cables, and accessories.
 - ii.) Shop drawings including, but not limited to, the following:
 - 1. Installation and layout drawings showing the proposed locations and dimensions of equipment and clearances to floors, walls, ceilings, structural members, mechanical components, and other nearby objects and equipment. Clearly illustrate the physical relationship between new and existing components, critical dimensions, and modifications to be made to existing conditions and features. Clearly show the proposed method of attachment, mounting details, specific hardware, and holes to be drilled or cut in masonry. Detail custom or commercial mounting hardware and/or mounting brackets. Describe all installation procedures including alignment, testing, calibration, waterproofing, and as recommended by the manufacturer of the equipment being installed. Drawings need not necessarily be to scale but show items in their proper relative positions and provide dimensions. Field verify all pertinent information regarding existing features and dimensions prior to preparation of the drawings. Indicate dimensions obtained by field measurement as such on the drawings.
 - 2. Equipment enclosure, panel, and terminal cabinet layout drawings. On terminal cabinet layout drawings, clearly indicate all wires, including spares, to be terminated and coordinate wire numbering with wiring diagrams and other shop drawings.
 - 3. Conduit and raceway layout diagrams showing each raceway utilized, with all wire numbers installed therein. Tabulate all raceways, boxes, cabinets, and equipment enclosures, device served and function of each conductor and spare conductors with assigned wire numbers and present in tabular or spreadsheet format. Clearly indicate all wire numbers passing through or terminating in each raceway, box, cabinet, and equipment enclosure. Use different symbols to clearly distinguish between underground, concrete encased, in-wall, and exposed conduits, as well as cable trays, wire trough, flexible conduits, flexible cables,

- wireways, junction boxes, terminal cabinets, equipment, and enclosures. Fully coordinate drawings with all wiring diagrams, tabulations, and other shop drawings.
4. Full schematic wiring diagrams depicting all required power and control wiring, including, if applicable, connections to existing wiring and equipment.
 5. On schematic wiring diagrams, show all circuit phase, neutral, and grounding conductors. Identify all conductors on the diagrams by wire numbers that match the same respective conductors or connections shown on other diagrams and shop drawings. Clearly indicate the size and type of all conductors on wiring diagrams. Wiring diagrams are not intended to be to scale, but must show all equipment, terminal cabinets, junction/pull boxes, and splices.
 6. Complete bill of materials for all components including spare parts. Present bill of materials in tabular format. Clearly identify all components by designation and/or description, along with manufacturer's name and complete model or catalog number.
 7. Mounting and support details for all electrical equipment. Specifically, provide shop drawing(s) for typical conduit support(s), junction and pull box(es) support(s), mounting of all wall mounted style electrical enclosure(s), and light fixture and miscellaneous fixture mounting.
 8. Submarine and droop cable support system attachment details including cable supports and field assembly and cable attachment methods. Provide proposed submarine cable embedment details, including depth below water level and floor bottom, backfill material, and installation methods.
- iii.) Certified prints with certified ratings and dimensions.
 - iv.) Certified drawings for products when requested by the SMPK, or as otherwise required by the contract. Certified drawings must clearly depict all critical dimensions, as well as all electrical and mechanical ratings. Manufacturer's standard catalog drawings are not acceptable in place of certified drawings.
 - v.) Submit certified drawings for the main drive motors by the manufacturer of that equipment. Where motors are provided with special modifications, reflect these modifications on the certified drawings.
 - vi.) Assembly drawings for fabricated items and assemblies.
 - vii.) Factory-certified dimensional drawings for machinery components with rating and performance curves.
 - viii.) Material test certificates for raw materials when requested by the SMPK , or as otherwise required by the contract.
 - ix.) Testing procedures as described in the Construction – Electrical Testing and Measurements section of this Special Provision.
 - x.) Power system study report including arc flash analysis. Report must include calculations and relevant code references to determine the degree of arc flash hazard labels for all electrical enclosures and terminal cabinets per the arc flash safety requirements of NFPA 70 and NFPA 70E.
 - xi.) Submit location drawings of existing submarines cables, illustrating depth and routing from the existing motor control center (MCC) in the control house to the existing MCC in the switch house. Drawing shall consist of plan and elevation views of each cable that crosses the navigable, as well as proposed methods of removal or limits of abandonment of existing

- submarine cables. Provide details for new submarine cable trench and installation locations.
- xii.) As-built drawings. Prepare and submit approved as-built drawings as described:
1. Utilize a set of approved shop drawings (incorporate all review comments if Approved as Noted) and mark, in red, all circuit changes made in the field.
 2. Maintain these construction shop drawings as working drawings for the duration of construction. Required working drawings include all shop drawings as required by part B of Submittal Requirements. Make working drawings available to the **SMPK**, on request, for review of construction issues.
 3. Maintain a full set of working drawings on the job site at all times.
 4. Upon completion and final acceptance, prepare and submit for review and approval the final set of as-built drawings showing all modifications, field changes, revisions, and notes. Draft as-built drawings from the marked up working drawings in CADD format. Do not use existing drawings with mark ups in the as-built drawing set.
- xiii.) Operation and Maintenance Manuals. Upon completion and final acceptance, develop and furnish bridge operation and maintenance manuals. Both hardcopy and electronic portable document format (PDF) format versions must be provided. Hardcopy binder(s) must be hardback vinyl three ring looseleaf type for binding of 8½ by 11-inch sheets. The manual(s) must contain suitably arranged in multiple volumes and chapters including, at a minimum, the following:
1. Table of Contents.
 2. Introduction, including a general description of the bridge and its facilities.
 3. A detailed description of the bridge sequence of operation and bypass switch functions. Include step-by-step raising and lowering procedures to operate the bascule leaves using the main drive system. Include a detailed alarm listing and corresponding operator level troubleshooting steps.
 4. Maintenance troubleshooting procedures to be used by maintenance personnel for relay-based logic and variable frequency drive fault and errors. Include a list of all drive fault and error codes with a detailed description and corrective action.
 5. Complete drive parameter listings for the installed Variable Frequency Drive (VFD) and basic troubleshooting instructions including common drive HMI error messages.
 6. Complete, as-built, ladder logic drawings listing including descriptive address comments and symbols, line comments, and cross reference listing.
 7. Catalog cut sheets and user manuals (including manufacturer recommended maintenance) for each type of new equipment including control system and power distribution equipment, raceways, cables, conductors, boxes and cabinets, bridge control components, lighting fixtures, navigation lighting, variable frequency drive hardware, and accessories.
 8. Half-size (11x17) prints of as-built contract and shop drawings.

9. Complete spare parts list.
10. Contractor experience and qualification logs required as described elsewhere herein.

D. Execution

- a) Employ electricians and helpers who are trained and experienced in the installation and maintenance of industrial electrical power and control systems to perform electrical work, and specialty technicians, mechanical and structural workers who are trained and experienced in the type of work they are performing. Ensure all electrical work is supervised by supervisory personnel.
- b) Complete all work in a professional and safe manner in accordance with NECA 1. Verify all relevant dimensions prior to performing any work and comply with NEC required clearances (i.e. "Working Space", "Dedicated Equipment Space", etc.).
- c) Physically install all products in a secure manner as indicated and as required to provide a reliable installation. Inspect and test all installed products for correct installation, performance, and workmanship. Torque all terminals and other current carrying connections per the manufacturer's recommendations using calibrated tools. Provide nameplates and necessary warning labels for all equipment, cabinets, and boxes.
- d) Employ professional divers to assist in all construction activities of the submarine cable work, including the verification of existing submarine cables and utility locations, removal of existing submarine cables, verification of existing and new conditions, installation of new submarine cables, underwater inspection of new installation, and other miscellaneous underwater work. Ensure the soundings of the existing riverbed, as-built cable locations and depths, as well as the backfilled riverbed are prepared by a Licensed Surveyor provided by the Contractor as specified under this item. Utilize the services of a representative from the submarine cable manufacturer to oversee the shipping, handling, storage, installation, and testing of the submarine cables. The submarine cable manufacturer representative must be on-site to assist with the installation of the submarine cables.

E. Electric Motor Service Vendor (EMSV)

- a) Engage a properly qualified EMSV to procure, provide, shop-assemble, and site-test the main drive motor. To be considered properly qualified, the EMSV must be primarily and regularly engaged in the procurement, service, installation, and maintenance of inverter duty gearmotors, and have been in the business of inverter duty gearmotors for at least 5 continuous years as of the bid date.
- b) The EMSV must perform all this work and assist the Contractor in the installation of the main drive motors.
- c) Provide start-up services. The EMSV must provide a factory-trained field service Engineer/Technician to check out all equipment and system installation on-site, including wiring interconnections to the main drive motors.

F. Control Systems Vendor (CSV)

- a) Engage a systems integrator as the CSV primarily and regularly engaged in the integration, installation, and maintenance of industrial control systems. It is preferred that the CSV have demonstrable experience in the integration, installation, and startup of movable bridge control systems, but is not required. The CSV must have the following applicable experience:

- i.) Providing relay-based, hardwired control systems.
 - ii.) Programming vector-controlled alternating current (AC) drive systems utilizing motors up to 75 horsepower.
- b) Concurrent with submission of the bid, identify the intended Control System Vendor, and submit a previous experience log to verify that the CSV meets the requirements listed herein. Include previous project references, including names of bridge owners and contact persons with phone numbers in the log. Control System Vendors unable to demonstrate compliance with the above requirements will not be accepted, which may be deemed cause for disqualification and rejection of the bid.
- c) Engage a CSV to integrate all components necessary for a fully functioning, safe, and reliable bridge control system operating in accordance with the contract. The CSV must provide all equipment, accessories, and other materials required to produce the desired performance and functionality of the bridge control system, even if they are not specifically identified or implied in the contract. Engage a CSV to perform the following work:
 - i.) Acquire and shop-assemble the bridge control system components.
 - ii.) Furnish equipment as part of the integrated control system including, but not limited to bridge control system, Variable Frequency Drives, all bridge limit switches, and all miscellaneous bridge control components.
 - iii.) Develop the hardwired relay-based control logic.
 - iv.) Configure drive parameter settings, including matching the appropriate motor parameters to the main drive motor and tuning the variable frequency drive to the main drive motor to optimize the running and performance characteristics of the main drive motor.
 - v.) Perform all interfacing and connections of the bridge control system.
 - vi.) Assist the Contractor in testing and in the development and execution of the as built drawings and personnel training.
 - vii.) Perform the shop test as described elsewhere herein.
 - viii.) Provide start-up services by a factory-trained field service engineer/technician to check out all equipment and system installation on-site, including wiring interconnections to various control devices and other equipment described herein. Provide start-up services prior to the initial operation of the bridge. The field service engineer/technician will remain or return on-site during system start-up and must return for at least one additional site visit immediately prior to final acceptance of the control system to make final adjustments to the control system as directed by SMPK/TPI.

G. Delivery, Storage, and Handling.

- a) Properly store and protect all materials and products until installation, including during shipment and storage. Securely mount and store all large, bulky, and/or heavy items on skids or pallets of ample size and strength. Box all small parts in sturdy wood or heavy corrugated paperboard boxes. Provide weatherproof covers to protect materials from weather, when stored outdoors.
- b) Submarine Cables

- i.) Protect submarine cables from water damage especially rain, condensation and water dripping or splashing at all times during shipment and storage. Deliver each cable wound onto a suitable non-returnable reel capable of supporting the weight of the cable during transportation and normal handling. Protect each end of each cable with suitable seals to prevent moisture ingress during shipment and storage.
- ii.) Deliver the cables to the location or to a storage area chosen by the Contractor, on non-returnable reels with drum diameter exceeding the manufacturer's recommended minimum bending radius of the cable. Provide any special requirements required for material handling.
- iii.) Properly package and protect all materials and products until delivery to the location. Provide a weatherproof enclosure suitable for space heating to protect materials from weather.
- iv.) Prepare the various elements for shipment prior to shipping from the manufacturer's and/or fabricator's plant or plants. Securely mount all large, bulky and/or heavy items on skids or pallets of ample size and strength to facilitate loading and unloading. Box all small parts in sturdy wood or heavy corrugated paperboard boxes. Securely attach a packing list enclosed in a moisture proof envelope indicating the contents of each such box. Mount and box the skid/pallet in a manner which will prevent damage to the equipment during loading, shipment, unloading, storage and any associated and/or subsequent handling. Provide weatherproof covers during shipment to protect any and all items shipped in open railway cars, trucks, or barges. Furnish for unloading and handling at the destination any eyebolts, special slings, strongbacks, skidding attachments or other devices used in loading the equipment at the manufacturer's and/or fabricator's plant or plants.
- v.) Equip all shipping units with lifting eye bolts or lifting holes properly sized for safe working loads and located to provide a balanced lift.

H. Protection and Maintenance of Facilities and Work.

- a) Protect and preserve at all times all materials and work. Repair any damage to materials or work during construction to the satisfaction of SMPK. All costs associated with this work are to be borne by the Contractor. Maintain all work, and the project site in general, in top condition. Keep the project site free of excess material, debris, and rubbish caused by the Contractor's operations at all times.
- b) For any damage to any existing facility, repairs must begin immediately and must continue (24 hours a day, 7 days a week) until they are complete to the satisfaction of SMPK. All costs and penalties that may be assessed against the SMPK associated with this work are to be borne by the Contractor.

3.8.5 MATERIALS

The following list of materials does not necessarily include all materials and equipment required to perform the electrical rehabilitation work. The Contractor is responsible for developing and submitting specifications for all materials proposed for installation, as noted elsewhere within the Minimal Technical Requirements.

The Materials provided below are in US-standard / Imperial units for Wire, Conduit, Cable, etc. The Contractor may substitute metric equivalent materials that match the performance specifications of the US-standard / Imperial materials.

A. Wire and Cable

- a) Conductor for General Purpose Use. Provide type XHHW-2, 600 volt (V) rated, un-coated soft copper conductors meeting the requirements of ASTM B 3 and NEMA WC 70. Provide conductors, stranded in accordance with ASTM B 8. Insulate the conductor with cross-linked polyethylene insulation compound. Provide conductors rated 90 degrees Celsius (C) in wet and dry locations, heat, and weather resistant, and suitable for use in raceways.
- b) Conductors for Installation within Control Cabinets. Provide ASTM B8, Class B stranded copper type THWN-2 or MTW rated 600 volts, 90 degrees Celsius. Provide minimum size 16 American wire gauge for control conductors. Size power conductors as required for the application.
- c) Weatherproof Cable. Use type SEOOW or STOOW cable, rated for 600 volts, 105 degrees Celsius, outdoor use with oil, water, and sunlight resistant jacket.
- d) Cable Connector. Use UL listed, stainless steel cable connector(s) with stainless steel mesh strain relief grip of size and type for compatibility with cable. Provide cable connector(s) with embedded O-ring or neoprene gasket for liquid-tight seal.
- e) Ethernet Cable. Provide UL listed Ethernet cable rated TIA/EIA Category 6, NEC type CM, CMR, CMB or equivalent, and suitable for installation in raceways, with high density polyethylene insulation, and sunlight and oil resistant PVC outer jacket, rated 300 volts. Provide Ethernet cable with an overall foil shield, compatible with RJ45 connectors. Employ personnel with necessary training and use manufacturer recommended tools to terminate the cable and perform testing.
- f) Fiber Optic Cable. Use loose tube, dry (gel-free), non-conductive, multimode fiber optic cable, suitable for aerial and conduit applications. Provide fiber optic cable to meet the following additional requirements:
 - i.) Number of fiber stands as indicated on the Plans.
 - ii.) Polyethylene jacket with ultraviolet radiation, fungus, and abrasion protection.
 - iii.) OM3/OM4 – 50/125 μm laser optimized, 850/1300 nm operating wavelength.
 - iv.) 3.0/1.0 dB/km maximum attenuation.
 - v.) 1 Gigabit serial Ethernet length of 1000/550 meters or better.
 - vi.) Operating temperature range of -40 to 70 degrees Celsius.
 - vii.) Minimum bending radius of 20 times its outside diameter during installation and 10 times its outer diameter during operation without changing the characteristics of the fiber optic cables.
 - viii.) Color coding per TIA/EIA 598 B and design and test criteria per ANSI/ICEA/IEC/TIA.
 - ix.) Manufacturer of fiber optic cable and related components must utilize the most advanced commercial materials and manufacturing process and must be ISO 9001 certified.
- g) Fiber optic hardware. Use fiber optic hardware as required to properly splice, terminate, and/or pigtail fiber optic cable in all terminal cabinets and enclosures as described below:
 - i.) Provide hardware in submarine cable terminal cables as required to splice fiber optic cable(s) with fiber optic cable(s) within submarine cable(s).
 - ii.) Provide hardware as required in all other bridge enclosures to allow for easy access to connect bridge equipment to the fiber optic hardware via fiber optic patch cords.

- iii.) Fiber optic hardware will include housings, modules, panels, cassettes, pigtails, and/or splice trays. Use hardware and connectors appropriate for each specific application meeting the requirements of ANSI/TIA/EIA-568. Coordinate characteristics of hardware with fiber optic cable and connectors. Use heatshrink fusion splices.
- h) Fiber Optic Patch Cords. Provide bend-insensitive loose tube fiber optic patch cords meeting the requirements of ITU and TIA. Provide connectors for fiber optic patch cords as required for compatibility with fiber optic hardware and equipment.
- i) Encoder Cable. Provide shielded cable that is compatible with the factory mounted incremental encoder provided with the main drive motor. Cable shall meet the main drive motor manufacturer requirements and specifications.
- j) Droop Cables. Provide droop cables to transmit power and control from the pier tops to the machinery rooms. Droop cables shall be secured to the droop cable terminal cabinets utilizing stainless steel mesh cable grips, sized as required, in a manner that properly attaches cable to cabinets while minimizing stress to cable conductors and prevents damage to insulation. Provide and install redundant control and power cables on each pier for use as spares. Control and power transmission shall be through separate cables, meeting or exceeding the following requirements:
 - i.) UL listed, SOOW flexible cord with minimum 20% spare conductors. Conductors shall be high strand copper conductors, 600V ethylene propylene diene monomer insulation and chlorinated polyethylene jacket, rated 90 degrees C. Cable shall be weather, water, sunlight, oil, and flame resistant.

B. Submarine Cables.

- a) Provide the bridge submarine cables suitable for installation underwater, directly buried underground and in raceway, and in accordance with applicable standards and the following requirements:
 - i.) Meeting requirement of ANSI/NEMA WC-70, Power Cables Rated 2,000 Volts (V) or Less for the Distribution of Electrical Energy, and ANSI/NEMA WC-57, Standard for Control, Thermocouple Extension, and Instrumentation Cables.
 - ii.) Provide four multi-conductor new submarine cables, specifically designed for underwater installation. Ensure each cable is continuous, and free of defects, splices, or repairs, from end to end.
 - iii.) Conductor make-up and size shall be as required to feed the devices served. At a minimum, the following cables shall be provided:
 - 1. Cables 1 and 2 shall be purposed to carry control conductors from one pier to the other. The control conductors shall transmit low-voltage power, 220VAC, for bridge position feedback, limit switch tripping, motor starter control, and all required controllability from the control console. Each cable shall contain minimum of 30% spare conductors of each type specified. The cables shall also contain minimum of two (2) ethernet and two (2) fiber optic cables in each control submarine cable.
 - 2. Cable 3 shall be purposed to transmit power from one service feed to the other, allowing the bridge to be operated from only one live service feed. Cable 3 shall contain duplicate phase and neutral conductors for redundancy.

3. Cable 4 shall be a duplicate of cable 3 for redundancy.

- iv.) Ensure each component conductor is annealed, uncoated, stranded copper conductor, meeting ASTM B 3, and stranding per ASTM B 8, type RHW-2 rated 2,000V alternating current (AC) and insulated with cross-linked polyethylene (XLPE) meeting ICEA S-95-658 (NEMA WC-70). Label the component conductors individually with imprinted legends consisting of numbers and words (e.g. 1- One, 2-Two, 3-Three, etc.). Use labels with color contrasting print which will remain legible after normal handling during installation. The XLPE insulation must meet the accelerated water absorption requirements per Electrical method EM-60 of ANSI/ICEA T-27-581/NEMA WC 53.
 - v.) Provide a colored separator between the conductor and the insulation to provide strip ability of the conductor insulation.
 - vi.) Include a single mode optical fiber cable with minimum 12- fiber count. Provide fiber cable with the operating range from -40 degrees Celsius (C) to 70 degrees C and a minimum crush resistance of 125 pounds per inch (lbs/in) - short and 63lbs/in - long. Provide fiber cable in accordance with ITU-T Recommendation G.652.D, IEC 60793-2-50 Type B.1.3 Optical Fiber Specification, Telcordia GR-20- CORE, and ANSI/ICEA S-87-640. Encase the optical fiber cable in gel-filled loose tubes with dielectric strength members and a Kevlar jacket, suitable for marine applications and suitable to be cabled as an integral component of the submarine cable.
 - vii.) Cable all components into a tight concentric configuration. Use non hygroscopic polypropylene fillers in the cable core as necessary to produce a substantially circular cross section. Wrap the cabled core with a moisture resistant, 2 mil corrugated polyester binder tape applied helically with a minimum 25 percent overlap.
 - viii.) Cover the cable binder tape with a weather and ultra-violet-light resistant, high-density polyethylene (HDPE) inner jacket, in accordance with the requirements of ICEA S-95-658 (NEMA WC-70).
- b) Coated Armor Material. Coated Armor material shall meet the following minimum requirements:
- i.) Armor Material. The armor shall consist of galvanized steel wires in accordance with ANSI/NEMA WC 70 / ICEA S-95-658, paragraph 4.3.5.
 - ii.) Coating Material. Each armor wire shall be coated with a layer of high-density polyethylene (HDPE) in accordance with ANSI/NEMA WC 70 / ICEA S-95-658, paragraph 4.1.7, and Table 4-1 for HDPE jackets.
 - iii.) The coating shall be sunlight (ultraviolet) and weather resistant.
 - iv.) Coated Armor Wire Size. The size of the armor wires shall be in accordance with ANSI/NEMA WC 70 / ICEA S-95-658, Table 4-18, with HDPE coating as follows:

Calculated Diameter of Jacketed Core	Nominal Size of Armor Wire		Nominal Thickness of PE Coating
Inches	BWG	Mils	Mils
0 – 0.750	12	109	20
0.751 – 1.000	10	134	25
1.001 – 1.700	8	165	30

1.701 – Larger	6	203	30
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- v.) The coated armor wires shall be applied at a lay angle of 17 to 25 degrees and provide a coverage of 92 to 98 percent. The armor wires shall be applied in a left lay helix. The armored layer shall then be covered with a 0.002 inch corrugated polyester tape, 25 percent minimum overlap followed by a 0.002 inch adhesive polyester tape, 25 percent minimum overlap. These tapes allow the outer high-density polyethylene jacket to be easily removed during termination.
- c) Provide an outer (overall) jacket made from weather and ultra-violet-light resistant, HDPE, in accordance with the requirements of ICEA S-95-658 (NEMA WC-70). Provide the following minimum thickness to each inner jacket and outer jacket:

Calculated Diameter of Cable under Jacket	Average of Inner or Outer Jacket Thickness
0 to 0.425 inches	45 mils
0.426 to 0.700 inches	60 mils
0.701 to 1.500 inches	80 mils
1.501 to 2.500 inches	110 mils
2.501 and larger	140 mils

- d) Permanently print the outer jacket with a sequential footage marking every three feet. Begin with the actual footage of the outside cable end and descend to zero, with the cable end at the reel center being zero.
- e) Backfill and Backfill material. Refer to Construction Methods for details on submarine cable trench.
- i.) Bedding Aggregate: ASTM C33, coarse aggregate table 2, size #67
- ii.) Backfill Aggregate: ASTM C33, coarse aggregate table 2, size #1

C. Conduit, Raceways, and Accessories.

- a) Rigid Galvanized Steel Conduit. Provide rigid galvanized steel (RGS) conduit meeting the following requirements:
- i.) Nationally Recognized Testing Laboratory (NRTL) listed, threaded rigid metal conduit and fittings, and manufactured from high-strength steel, in accordance with ANSI C80.1, UL 6, and UL 514B. Use 3/4 inch diameter, minimum size.
- ii.) Manufactured from steel tubing having a wall thickness equivalent to Schedule 40 pipe with the entire length of the conduit hot-dip galvanized inside and out, threads hot-dip galvanized after cutting.
- iii.) Comply with the requirements of NEMA RN2.
- iv.) Unless otherwise shown on contract plans, use hot-dip galvanized steel channel, U-bolts, and conduit clamps for conduit mounting.
- v.) Provide components (couplings, elbows, fittings, etc.) of same material and manufacturer as the rigid galvanized steel conduit.
- vi.) Ensure all conduit installers are certified by the conduit manufacturer.

- b) Polyvinyl-Chloride (PVC) Coated Rigid Galvanized Steel Conduit. Provide PVC coated rigid steel conduit meeting the following requirements:
- i.) Nationally Recognized Testing Laboratory (NRTL) listed, threaded rigid metal conduit and fittings, and manufactured from high-strength steel, in accordance with ANSI C80.1, UL 6, and UL 514B. Use 3/4 inch diameter, minimum size.
 - ii.) Manufactured from steel tubing having a wall thickness equivalent to Schedule 40 pipe with the entire length of the conduit hot-dip galvanized inside and out.
 - iii.) Coat the exterior surface of the hot-dip galvanized conduit with a factory applied PVC coating, at least 40 mil thick. Provide an exterior coating that is permanently fused to the hot-dip galvanized surface of the conduit. Ensure the adhesion of the PVC coating to the conduit is greater than the strength of the coating itself. Provide NRTL listed overall conduit with the PVC coating as the primary corrosion protection and the underlying galvanized coating as supplemental protection.
 - iv.) Comply with the requirements of NEMA RN1.
 - v.) Coat the interior surface of the hot-dip galvanized conduit with a factory applied urethane coating at least 2 mils in thickness. The interior coating must afford sufficient flexibility to permit field bending of the conduit without causing cracking or flaking of the interior coating. After the PVC coating of the conduit, clean conduit threads and hot-dip galvanize. Apply a urethane topcoat to the conduit threads after hot-dip galvanizing. Cap all threaded ends of conduit.
 - vi.) Coat couplings, elbows, fittings, and conduit bodies used with the PVC coated steel conduit with the same coating as the conduit. Unless otherwise shown on contract plans, coat U-bolts and conduit clamps used for conduit mounting with the same coating as the conduit.
 - vii.) Provide components (couplings, elbows, fittings, clamps, etc.) manufactured by the same manufacturer as the PVC coated steel conduit.
 - viii.) Ensure all conduit installers are certified by the conduit manufacturer.
- c) Conduit Bodies. Provide conduit bodies meeting the following requirements:
- i.) NRTL listed, hot-dip galvanized cast iron alloy with threaded hubs and integral bushings, and with galvanized steel or iron alloy covers for use with RGS conduit. Use screw-in type covers. Do not use clip-in or other wedge type covers. Use stainless steel cover screws.
 - ii.) Provide PVC coated conduit bodies and associated covers and screws for use with PVC coated rigid steel conduit. Provide PVC coating of the same manufacturer as the PVC coated steel conduit.
- d) Liquid-Tight Flexible Metallic Conduit (LFMC). Provide NRTL listed LFMC, formed from a spiral wound strip of heavy gauge, corrosion-resistant, hot-dipped galvanized steel. Provide LFMC with rugged, flexible PVC, oil, mild acid and ultraviolet (UV) sunlight resistant outer jacket extruded over the steel core. Provide UL listed LFMC fittings of same make and material as the PVC coated rigid steel conduit with sealing gasket or sleeve. Provide heavy-duty stainless steel mesh support grips to support LFMC at all cabinet connection locations.

D. Pull Boxes, Junction Boxes, Terminal Cabinets/Boxes, Enclosures, and Accessories.

- a) General.

- i.) Size boxes and terminal cabinets as required by the NEC, and as appropriate to enclose all conductors and components and for the equipment served.
 - ii.) Use hinged doors pull/junction boxes. Provide bonding jumpers between the door and the box or cabinet body on boxes and cabinets with hinged doors. Provide drains in the bottom of all enclosures.
 - iii.) Provide aluminum or steel mounting panels with corrosion resistant finishes, heavy duty terminal blocks for wire terminations, and uninsulated ground bars. Use copper ground bars for use with copper conductors.
 - iv.) In wet locations, use surface-mounted boxes meeting the requirements of NEMA 250, UL 50, and NEMA 4X Type 316 stainless steel with stainless steel hinges and hardware.
 - v.) In damp locations, use surface-mounted boxes meeting the requirements of NEMA 250, UL 50, and NEMA 12 Type 304 stainless steel with stainless steel hinges and hardware.
 - vi.) Boxes shall not be surface mounted directly to floor or concrete. Provide elevated mounting structure utilizing mounting hardware and materials specified elsewhere in the Minimal Technical Requirements.
- b) Terminal Cabinets and Terminal Boxes.
- i.) Provide freestanding or wall mount style NEMA 4X, constructed of 12 gauge type 316 stainless steel (NEMA 12 stainless steel for indoor locations only) terminal cabinets with an inner back plate for installing terminal blocks, fiber optic connector housings and panels, and other related components. Provide provisions for installing padlock with stainless steel hardware. Terminate all conductors, including spares, inside terminal cabinets. Provide all necessary mounting rails, end blocks, barriers, and accessories. Provide adequate space on each side of each terminal block to meet NEC wiring bending requirements. Provide a permanent barrier or listed divider where power cables are terminated within the same cabinet as fiber optic cable. Enclosure sizes shall be verified by the Contractor based on installation location, devices and terminations installed, and according to NEC requirements.
- c) Terminal Blocks.
- ii.) Use heavy duty, UL listed or recognized terminal blocks and power distribution blocks which are rated 600 volts (minimum 1000 volts for motor terminals), 90 degrees C, suitable for use with copper conductors, NEMA style, barrier type, tin plated copper, or aluminum, and Valox or phenolic insulated, with set-screw type terminals. Mount terminal blocks with stainless steel bolts or machine screws.
 - iii.) Within control enclosures, use finger safe, screw type connection with stainless steel corrosion resistant screws terminal blocks rated for minimum 300 volts, 15 amperes or terminal blocks as described above.
 - iv.) Provide printed or engraved labels for all terminals. Use color coded grounding type terminal blocks for ground conductors.
- d) Variable Frequency Drive (VFD) Cabinet.

- i.) VFD cabinet must house the VFD and all related components as shown on the Plans and described herein. VFD cabinets must meet the following requirements:

1. VFD cabinet must be heavy duty, free standing NEMA 4X industrial control enclosure constructed with a minimum of 12 gauge type 316 stainless steel. VFD cabinets must have a cooling fan/filter kit and an anti-condensation heater. A thermostat controller must be used to control the fan and heater operation. Both devices must be interlocked so that they cannot operate at the same time and cannot operate during bridge operation. Custom enclosure sizes and other creative solutions may be required to install new cabinets while providing working clearances as required by the NEC.
2. Provide flange mounted disconnect switch for incoming power. Mechanically interlock the disconnect operator with the cabinet door and lock in the off position.
3. Provide a cabinet 220-volt AC utility receptacle and door activated internal LED cabinet light.
4. Install plastic wire duct to contain and organize internal control wiring.
5. Indicator lights must be as described elsewhere herein.

E. Mounting Brackets and Supports.

a) Fabricated Mounting Brackets and Supports.

- ii.) Use stainless steel type 316 for all stainless-steel plates, shapes (angles, channels, etc.), fabricated brackets, and similar items.
- iii.) For fabricated items which are constructed by welding, use steel per ASTM A 36, allow items to be thermally stress-relieved after welding and before any additional machining or finishing. Ensure welding complies with AWS standards appropriate for the material(s) and final product in question. Hot-dip galvanize after fabrication.
- iv.) Use type 316 stainless steel bolts, threaded rods, machine screws, nuts, washers, and similar hardware. Unless indicated otherwise in the contract, use type 316 stainless steel concrete anchors with adhesive (epoxy) type anchor. Use hot-dip galvanized hardware with hot-dip galvanized steel brackets and supports.

b) Strut Channel. Use strut channel meeting the following minimum requirements:

- i.) Strut channel and fittings manufactured in accordance with the requirements of the MFMA.
- ii.) Type 316 stainless steel.

F. Power Distribution Equipment.

a) Electric Service.

- i.) The existing electrical services located on the east and west approaches shall be properly tested and size verified for the devices served. Refer to Electrical Testing and Measurements section provided within this Minimum Technical Requirements document for details.

- ii.) The Contractor shall coordinate with the local utility company and the SMPK for all local requirements for proper disconnect, upgrades, and modifications to the existing electrical service feeds located on the east and west approaches. The Contractor shall provide all required materials to supply adequate power distribution to the east and west motor control centers, in accordance with the NEC.

b) Service Main Disconnect.

- i.) Provide a NEMA 12 listed, 304 stainless steel constructed, surface mount, circuit breaker enclosure at an accessible area, intercepting the existing electric service feeds located on the east and west approaches. Enclosure shall be rated for service entrance installation and provided with an exterior operating handle that can be padlocked in the OFF position and is interlocked to prevent the door from opening when the breaker is ON. Provide exterior visual indication for breaker trip. Disconnect shall be installed adjacent to the metering equipment, conforming to the requirements of the local Utility Company and the SMPK. Circuit breaker shall be thermal-magnetic type and meet the requirements listed within this Specification and current ratings in accordance with the NEC.

c) Automatic Transfer Switch (ATS).

- i.) Provide a UL listed ATS, suitable for the 415 volt, three-phase, four-wire, solidly grounded neutral, electrical power source. ATS rating shall be as required for the devices served and housed in a NEMA 12, 304 stainless steel enclosure. Enclosure shall feature double doors, comprised of a dead front door and an internal front door. All controls shall be mounted to internal door. External door shall be pad lockable. The transfer switch shall be 4-pole type with silver alloy contacts. The mechanism shall be electrically operated and mechanically held in position. Normal and auxiliary contacts shall be positively interlocked electrically and mechanically to prevent simultaneous closing. The ATS shall have a microprocessor-based controller with a display for monitoring power conditions and adjusting transfer switch parameters. The ATS shall include indicator LED lamps for source availability, source connected, and exercise/test mode. The ATS shall have a maintenance bypass/isolation switch that permits manual selection and connection of either source of power or power directly to load. While isolated, interlocks prevent transfer-switch operation, except for testing or maintenance. ATS shall transfer line power from either approach to the bridge.

d) Motor Control Center (MCC).

- i.) Provide a UL listed MCC, suitable for the 415 volt, three-phase, four-wire, solidly grounded neutral, electric power source. MCC construction shall be dead front, NEMA 12 with all components, devices, and hardware corrosion resistant to the extent possible. Doors and panels shall be constructed with 12 gauge, or heavier steel. Field power wiring shall connect directly to the device terminals; field control wiring shall connect to master terminal blocks located in each section. Control voltages shall be 220 volts AC, 50 hertz.
- ii.) General Construction: MCC section dimensions shall be as required to serve the equipment and meet the following requirements:

1. The Contractor and Control System Vendor shall coordinate shipping splits and lifting provisions with the manufacturer so that the MCC can be safely transported to and installed in the machinery house without damage.
2. Each unit shall be provided with an individual door giving access to only that unit. Doors shall have concealed hinges. Removable blank doors shall cover all unused openings.
3. Circuit breaker for each combination motor starter units shall have flange mount external operating handles, lockable in the OFF position.
4. Each device shall be in a single MCC bucket. Two (2) devices shall not share one bucket.
5. Operating mechanisms shall be mechanically interlocked with the unit door.
6. Vertical as well as horizontal wires shall be included in each section. The horizontal wireways shall be continuous across the MCC. Separately removable hinged doors shall be provided for each vertical wireway. Wireways shall be fully isolated from all buses. Provide covers over all sharp edges in the MCC wireways and units to prevent damage to conductor insulation.
7. The door to the unit housing the bus monitor and power monitor shall also contain a power monitor display module as specified elsewhere in this Special Provision.
8. The incoming line section shall have an engraved nameplate with the MCC serial number, system electrical data, bus ampacity, and the bus short circuit rating.
9. Engraved plastic nameplates with 1/4 inch white text on black background bearing the name of the equipment served shall be attached to each unit with stainless steel machine screws. Each contactor, relay, circuit breaker, etc. shall also be labeled with its own engraved nameplate located adjacent to the respective device.

iii.) MCC Bus

1. Bus shall be tin plated copper, with symmetrical ampere rating as required. MCC shall include a vertical and horizontal ground buss bars. The main horizontal bus and vertical bus have an ampere rating required to service the devices. Combination motor starter and branch circuit breaker units shall connect to the vertical bus via a single stab block on the back of the unit. Stabs shall be tin plated hardened copper and spring assisted.

iv.) Combination Motor Starter Units.

1. Motor starter units shall be of the NEMA size, reversing or non-reversing type overload with manual reset, as listed in this Special Provision.
2. Starter units shall be provided with thermal magnetic molded case circuit breakers, or instantaneous trip breakers (motor circuit protectors), sized in accordance with the NEC. Circuit breakers in combination starter units shall conform to the requirements for circuit breakers listed in this Special Provision.
3. Pilot light(s) shall be provided on the door of each starter unit, one for non-reversing and two for reversing starters, indicating the device

function. One pilot light shall be provided on each start unit servicing a motor and illuminate when the overload relay is tripped.

e) Circuit Breakers.

- i.) Use UL listed, molded case circuit breakers, with ratings and sizes as required for the equipment served in accordance with the NEC. Circuit breakers shall utilize toggle-type trip-free operating mechanisms, with quick-make, quickbreak action, and positive handle indication. Circuit breaker operating handles shall assume a center position when tripped. Two-pole and three-pole breakers shall be common-trip.
- ii.) Each thermal-magnetic type circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole. Circuit breakers shall be suitable for mounting and operating in any position. Connections to the bus for circuit breakers installed in panelboards on the bridge shall be bolt-on. Lugs shall be mechanical screw type, UL listed for copper conductors, and rated at 90 degrees C.
- iii.) Individually mounted enclosed circuit breakers shall be NEMA 4X, type 316 stainless steel. Enclosures shall have hinged doors with provisions for attaching a padlock, external operating handles which are lockable in the OFF position, and mechanical door interlocks.

f) Full Voltage Contactors and Motor Starters.

- i.) Use UL listed, electrically held, multiple pole contactor, NEMA type, with ratings and sizes as required for the equipment served. Starters smaller than NEMA size 1 shall not be used. Contactors for reversing starters shall be electrically and mechanically interlocked.
- ii.) Electrically isolated auxiliary contacts shall be provided as required for control circuits, plus one normally-open and one normally-closed spare per contactor. Starters shall include overload relays with ambient compensated, Class 20, electronic user adjustable settings. Relays and overloads shall be manual reset type, with electrical isolated auxiliary contacts as required. Overload relays shall be sized per the equipment served. Contactor coils shall be 220 volt AC, 50 hertz.

g) Surge Protection Devices.

- i.) Surge protective device (SPD) shall be heavy duty, UL 1449 listed and UL96A master label compliant. SPD shall provide line-to-line, line-to-neutral, line-toground, and neutral-to-ground protection. SPD's shall include LED indicators for "Loss of Protection" and "Fully Operational", an audible fault alarm with test/silence switch, and one set of normally open and normally closed dry contacts. SPD shall be UL labeled with 200kA short circuit rating, UL labeled as type 1 or 2, intended for use with need for external or supplemental overcurrent controls. Voltage protection ratings shall be as required per the NEC.
- ii.) Main Circuit Breaker: SPD (Type 1) for main service entrance area shall be installed integral to the main circuit breaker disconnect or provided in an external, NEMA 4X 316 stainless steel enclosure. Service entrance SPD surge current capability shall be at least 240,000 amperes per phase, or as required by NEC and NFPA requirements.

- iii.) MCC: SPD (Type 2) for MCC shall be integral to the MCC and mounted inside a designated unit. SPD surge current capability shall be at least 150,000 amperes per phase, or as required per NEC and NFPA requirements.
 - iv.) Panelboards: SPD's (Type 2) for panelboards shall be integral to the panelboard served directly bus connected between the mains and the branch circuit breakers. SPD surge current capability shall be at least 100,000 amperes per phase, or as required per NEC and NFPA requirements.
- h) Power Monitor.
- i.) Provide a UL listed, AC power monitor with built-in display, capable of measuring 3-phase voltage, current, and power, compatible for the 415 volts AC, 3-phase system of the bridge. Programming software shall be included. The device shall be mounted in a MCC unit with its display panel on the unit door. Potential transformers and current transformers shall be provided for connections of the device to the bridge AC power system. The power monitor shall contain internal relay contactors, double-pole, double throw (DPDT) style, rated at 10 amperes at 220 volts AC, 50 hertz, for use as indications on the control console in the event of a phase failure, phase reversal, undervoltage, overvoltage, and phase loss.
- i) Panelboards.
- i.) Provide UL listed, NEMA 12 surface-mounted for indoor use, and NEMA 4X rated for outdoor use, circuit breaker panelboards, with size and ratings as indicated on the Plans. Panelboards shall be equipped with thermal-magnetic molded case circuit breakers, size and ratings for the equipment served. Access covers for panel shall be a pad lockable hinged door.
 - ii.) Bus bar connections to the branch circuit breakers shall be the "distributed phase" or "phase sequence" type. Three-phase, four-wire bussing shall be such that only three adjacent single-pole breakers are individually connected to each of the three different phases in such a manner that two- or three-pole breakers can be installed at any location. All current carrying parts of the bus assembly shall be tin-plated copper. Bus ratings shall be as required for the equipment served.
 - iii.) Each panelboard, as a complete unit, shall have a short circuit rating as required for the equipment served. Panelboards shall be marked with their maximum short circuit current rating at the supply voltage. Terminals for conductors to the panelboard mains and branch circuit wiring shall be UL listed and rated for 90 degrees C. A circuit directory frame and a card with a clear plastic covering shall be provided on the inside of the door. The directory card shall provide a space at least ¼ inch high by three inches long, or equivalent, for each circuit. The directory shall be typewritten to identify the load fed by each circuit.
 - iv.) All panelboards shall be protected with a UL listed SPD, installed directly inside, or mounted immediately adjacent to the panelboard. The SPD shall be rated for the specific voltages of the corresponding panelboard and meet all the requirements listed within this Specification.
- j) Disconnect Switches.

- i.) Provide UL listed, unfused, 3-pole, safety disconnect switches, sizes and ratings per the equipment served. Switches shall utilize quick-make, quick-break contacts, with terminals sized per the incoming and outgoing conductor(s) and rated at 90 degrees C. Disconnect switch enclosures shall be NEMA 12 for damp locations and NEMA 4X, type 316 stainless steel for exposed, wet locations. Enclosures shall have external operating handles, lockable in the OFF position, and mechanical door interlocks. Install disconnect switch at locations as shown on the Plans and as required to meet NEC 420 requirements.

G. Lighting and Receptacles.

a) Maintenance Receptacle.

- i.) Provide UL listed industrial specification-grade extra heavy-duty self-test GFCI (ground fault circuit interrupter) receptacles rated for 220 VAC, 50 HZ, 5 Amps for Type D and 15 Amps for Type M configuration. Provide tamper and weather resistant receptacles complete with all required accessories including while-in-use weatherproof cover and mounting hardware. Provide receptacles designed for wet/outdoor locations to meet the requirements of NEC section 406.8 for use in extremely corrosive, wet, dusty, hot and/or cold condition, with minimum operating temperature range of -35°C to +66°C.

b) Maintenance Lighting Fixtures.

- i.) Provide an UL 1598 listed heavy duty LED lighting fixture. Provide fixtures complete with all required accessories including mounting hardware to supplement building structure for support of fixtures. Comply with the following additional features:

1. Copper free, die-cast aluminum housing
2. Marine and wet locations, NEMA type 4X, ingress protection (IP66)
3. Minimum 1,500 lumen output
4. 5 year limited warranty
5. Vibration resistant
6. 4000 Kelvin color temperature
7. Wide beam angle
8. Minimum 150,000 hours rated life
9. Minimum operating temperature range of -40°C to 55°C
10. Provide lens guard for additional protection

c) Flood Lighting Fixtures.

- i.) Provide UL Listed heavy duty LED flood lighting fixture. Provide fixtures complete with all required accessories including mounting hardware to supplement building structure for support of fixtures. Comply with the following additional features:

1. Copper free, die-cast Aluminum housing
2. Marine and wet locations, NEMA 4x, Ingress protection (IP66)
3. Minimum 15,000 lumen output
4. 5 year limited warranty

5. 6X6 NEMA distribution
6. 4000 Kelvin color temperature
7. Minimum operating temperature range of -40°C to 55°C
8. Provide lens guard for additional protection
9. 220VAC, 50 Hz.

d) Light Switches.

- i.) Use extra heavy duty, corrosion resistant light switches, 220 volts AC, with ampere rating as required. Use NEMA 4X, stainless steel watertight box and cover.

e) Pier Navigation Lights.

- i.) Provide heavy duty, marine type design pier navigation lights with rain-tight, fully gasketed, cast aluminum housing.
- ii.) Provide pier navigation lights with vandal resistant features including stainless steel tamper resistant external fasteners and lens guard formed of expanded stainless steel to provide protection from projectiles such as rocks or other thrown objects.
- iii.) Include a tempered fresnel glass lens red in color with nominal lens section of 180 degrees and inside and outside lens diameters of 7" and 8", respectively.
- iv.) Include a 220 volt LED with 100,000 hour LED lamp rating and dual lamp arrangement with an automatic transfer relay to switch power to the backup lamp upon failure of the primary lamp.

f) Lift Span Navigation Lights.

- i.) Provide heavy duty, marine type design pier navigation lights with rain-tight, fully gasketed, cast aluminum housing with one red light (bottom) and one green light (top) in a vertical arrangement. Navigation lights shall be mounted on each corner of the moveable span, near the nose.
- ii.) Provide span navigation lights with vandal resistant features including stainless steel tamper resistant external fasteners and lens guard formed of expanded stainless steel to provide protection from projectiles such as rocks or other thrown objects. Provide cast junction box with gasketed access cover of same material as light assembly.
- iii.) Suspend the light heads from a 1-1/2" galvanized steel schedule 40 pipe. Provide a swivel design for all wiring to be completely contained within the light assembly. Provide gaskets and o-rings for a weather-tight assembly. Provide a swivel of heavy-duty construction, cast of the same material as the fixture head with a stainless steel spindle.
- iv.) Provide an automatic latch to hold the light securely in the normal operating and service positions. Ensure the service chain will automatically release the latch with a firm pull, allowing the light to pivot, and as the latch is raised, the latch will automatically engage to hold the light in the service position.
- v.) Include a tempered Fresnel glass lens with nominal lens section of 180 degrees green over 180 degrees red and inside and outside lens diameters of 7" and 8", respectively.

- vi.) Include a 220 volt LED with 100,000 hour LED lamp rating and dual lamp arrangement with an automatic transfer relay to switch power to the backup lamp upon failure of the primary lamp for each light

H. Control System Components

a) Control Console.

- i.) Construct a custom freestanding control console to house and display all indicator lights, selector and key switches, pushbuttons, angle display, and all components required for operation. Console shall be constructed of 316 12-gauge stainless steel with a brushed non-reflective finish and hinged top and front access doors. All console doors shall incorporate recessed hinges and three-point type latches with external handles. The top shall be held down with quarter turn latches. Supply removable inner panels and accessories for equipment mounting. The bottom shall be of open type construction. The opening shall be framed with standard size strut, arranged to facilitate the clamping of cables or conduit. Provide a pushbutton to test all the lights at once. Provide engraved nameplates for all devices on the control console.

b) Indicator lights.

- i.) Use UL listed industrial type with colors as indicated on the Plans. Indicator lights shall be size 30.5 millimeter, NEMA 13 rated. Lenses shall be interchangeable plastic Fresnel. Terminals shall be corrosion resistant screw type. Lamps shall be replaceable type, full voltage LED, 220VAC.

c) Pushbuttons.

- i.) Use UL Listed industrial type, size 30.5 millimeter, with operation as required. Pushbuttons shall be rated NEMA 13 with corrosion resistant contacts. Contact blocks shall be screw down stackable type. Contacts shall be rated 10 amperes at 220 volts AC. Terminals shall be corrosion resistant screw type.

d) Key switches.

- i.) Use UL listed industrial type, size 30.5 millimeter, with operation as required. Key switches shall be rated NEMA 13 with corrosion resistant contacts. Contact blocks shall be screw down stackable type. Contacts shall be rated 10 amperes at 220 volts AC. Terminals shall be corrosion resistant screw type. Provide min. 10 spare keys for key switches.

e) Selector Switches.

- i.) Use UL listed Industrial type, size 30.5 millimeter, with operation as required. Control switches shall be rated NEMA 13 with corrosion resistant contacts. Contact blocks shall be screw down stackable type. Contacts shall be rated 10 amperes at 220 volts AC. Terminals shall be corrosion resistant screw type.

f) Bridge Angle Display.

- i.) Provide a custom, analog bridge angle display. Display shall clearly show both the east and west leaf angle throughout the operation in 1-degree increments. Analog display shall communicate with the resolvers located in the east and west machinery rooms (see rotary cam limit switch section). Provide all required modules/converters to calibrate signals developed by the resolver to bridge angle display. Bridge angle display shall be housed in a NEMA 13 enclosure, material to match the control console.

g) Miscellaneous Indicators.

- i.) Provide ammeter, voltmeter, and selectors as shown on the plans and required to display drive amperes and utility service amperes and voltage. Ensure compatibility of miscellaneous indicators with other devices and control system components as required. Provide all required modules, converters, and cables for the miscellaneous indicators.

h) Limit Switches

i.) Lever Arm Limit Switch.

1. Provide UL listed, heavy-duty NEMA style lever arm limit switches constructed of zinc die cast or stainless steel with NEMA 4X or 6P corrosion resistant and IP67 ingress protection ratings. Provide double-pole doublethrow (DPDT) contacts with minimum rating of 10 amperes, 220 volts AC. Provide switch with operating temperature of -40 to 105 degrees Celsius. Provide corrosion resistant lever arm and use factory installed cord set with matching quick disconnect connector.

ii.) Rotary Cam Limit Switch – Machinery Room.

1. Provide UL recognized, NEMA style rotary cam limit switch with number of cams/switches as shown on the Plans and as required to provide all indications. Provide shaft configuration and gear reducer as required by application. Provide cam limit switch with 0 to 500 revolutions per minute (RPM) rated switching speed, bidirectional and snap action DPDT contacts, rated for 10 Amp / 220 volts AC. Provide the cam limit switch with an operating temperature rating of -40 to 85 degrees Celsius and minimum cam adjusting temperature of -20 degrees Celsius. Provide NEMA 4X, stainless steel enclosure for rotary cam limit switch.
2. Provide resolver integral to the rotary cam limit switch assembly and enclosure. Provide industrial grade resolver with single turn and absolute position. Resolver shall be used for bridge angle display on the control console. Provide special cables and accessories as required.
3. Provide an inline timing hub integral to the rotary cam limit switch assembly and enclosure. Timing hub shall allow for positional adjustment of 1/6 of 1 degree minimum without disassembly of rotary cam. Provide easy to read reference scale for adjustment.

4. Provide a reducing gear box that results in 300 degrees rotation of the rotary cam limit switch and resolver when the bridge operates to full open.

iii.) Rotary Cam Limit Switch Mounting – Machinery Room.

1. Rotary Cam Limit switch shall be driven by the open gearing shaft that supports gear G3 and pinion P2, as shown on the Plans and be mounted as follows:
 - a. Fabricate and install a custom support structure to secure the rotary cam limit switch enclosure and reducing gearbox to the machinery room floor. Height and location of structure shall be as required to align the reducing gearbox input shaft with the open gearing shaft.
 - b. Fabricate a custom stub shaft to couple the existing open gearing shaft to the reducing gearbox.
 - c. Bore a hole in the center of the existing open gearing shaft at least 30 mm diameter to mount the new stub shaft. The bored hole shall be within 0.12 mm, T.I.R., of the rotational center of the existing shaft. The bored hole shall provide an H7/h6 fit with the stub shaft. Drill and tap min. 4 holes into existing gear shaft for attachment of stub shaft.
 - d. Couple stub shaft to input shaft on reducing gearbox and output shaft on reducing gearbox to inline timing hub via flexible couplings, sized as required.
 - e. Couple timing hub output shaft to resolver input shaft via flexible couplings, size as required.

iv.) Rotary Cam Limit Switch – Tail Lock.

1. The rotary cam limit switches on all four span locks shall be replaced in-kind. Contact ratings and quantity shall be as required to integrate with the new control system.

i) Control Relay

- i.) Provide UL listed general purpose plug-in type tube or blade style relays with DPDT contacts rated 10 amperes at 300 volts AC, 50 hertz. Provide 220 volts AC, 50 hertz relay coils or as required by application. Provide DIN rail or panel mounting relay with retainer clips and LED indicator light, or a mechanical flag indicator for indicating when the relay is energized.

j) Industrial Control Relays

- i.) Provide industrial control relays, contacts rated 600 volts AC, 10 amperes minimum, NEMA Class A600.

k) Time Delay Relays

- i.) Provide UL Listed electronic delay relays. Delay shall be adjusted adjustment knobs, accurately time-calibrated with high resolution markings. Each timing relay shall be selected with a timing range such that the anticipated setting will be within 4%-60% of the full range. Relay identification information, screw terminals, and terminal markings shall be

located on the front of the relay. Coils shall be 220 volts AC and contacts shall be rated 5 amperes at 220 volts AC, or as otherwise required.

I. Sump Pump System

a) Submersible Pump

- i.) Provide and install one (1) submersible pump in each counterweight pit. Pump performance criteria shall be as required to keep water out of counterweight pit area. At a minimum, the pump shall meet the following design requirements:
 - 1. 3-phase, 220 or 415 volts at 50 Hz.
 - 2. Discharge connection size 2 inch
 - 3. Stainless steel pump body, motor casing, and impeller
 - 4. Provide discharge piping with pump

b) Slide Rail System

- i-) Provide and install one (1) slide rail system in each counterweight pit. The slide rail system shall allow the submersible pump to be easily lifted out of the sump pit, with the provided chain, for pump inspection and maintenance. System shall allow for simple removal of pump without the need to disconnect any plumbing. Provide two (2) stainless steel rails, compatible with the slide rail base and guide rail bracket. Attach the top of S.S. rails to the concrete wall, and the slide rail base to the sump pit floor, using appropriate concrete anchor systems. Submit wall anchorage details and floor anchorage details to SMPK for approval. Slide rail steel must be a corrosion resistant material equal to or greater than 304 or protected with a corrosion resistant coating approved by SMPK.

c) Piping and Fittings

- i.) Discharge piping shall meet the requirements of Section 1102.2, 1102.3 or 1102.4 of IPC. Size piping and supports for a flow rate of 100 gpm (US). Pipe and fittings shall be the same size as, or larger than, pump discharge tapping.
- ii.) Use ASTM A53 Grade A, Type S, Ø2" schedule 40 galvanized steel pipe, hydrostatic tested.
- iii.) Furnish fittings required to connect the submersible pump to the slide rail system, one (1) gate valve, one (1) check valve, and one (1) pipe coupling . All components must be compatible with and comparable to the galvanized steel pipe in size, strength, and corrosion resistance.
- iv.) Piping and fittings rated to hold a vacuum of -25 psig for one hour.
- v.) Fittings must have threaded NPT female ends, be suitable for water, meet class 150, and comply with the following specifications: ANSI /ASME B1.20.1, ANSI/ASME B16.3, ASTM A197.
- vi.) Gate valves must have threaded NPT female ends, be suitable for water, be actuated manually by gradually cutting off the flow of water. The gate and body material must be corrosion resistant.
- vii.) Check valves must have threaded NPT female ends, be suitable for water, feature a corrosion resistant body or coating, contain a ball that stops backflow, and an access port for cleaning or backflushing.

- viii.) Pipe couplings must be suitable for water, slip over adjoining pipes, and connect with 316 stainless steel clamps. Pipe couplings shall meet the following specifications: ASTM C1173, ASTM D5926, CSA Certified, ICC-ES Standards.
- ix.) Provide all bolts, nuts, washers, anchors, epoxy, grout, clamps, shackles, pipe nipples, pipe elbows, eyebolts, pins, links, and all miscellaneous hardware that may be required.

d) Pipe Supports and Anchors

- i.) Support piping to allow maximum flow rate as required. Allow for thermal expansion over a range of 60 degrees Celsius. Space supports every 4 feet unless shown otherwise on Plans.
- ii.) Provide manufactured 304 stainless steel slotted strut channels made from ASTM approved materials or approved equal corrosion resistant coated supports. Support in all directions the weight of the pipe and three times its water volume weight. Clamp piping to strut channels with 316 stainless steel routing clamps.
- iii.) Pipe support concrete anchors are a minimum of 1/2" diameter. Use 3-1/2" minimum embedment mechanical expansion wedge anchors. Anchor studs shall be stainless steel meeting ASTM F593 (AISI 304), Group 1, Condition CW, and stainless-steel nuts meeting ASTM F594 (AISI 304), Group 1, Condition CW. Washers to meet ASME B18.22.1 Type A Plain and stainless steel material.

e) Float Switches

- i.) Provide heavy duty float switches, suitable for sump pump control. Switches shall be single pole, double throw with contacts rated at 220 volts AC, 10 A minimum.

J. Warning Horn

- a) Provide a heavy duty, UL listed electronic warning horn and install on the control house roof. Warning horn shall be electrically activated, rated at 220VAC 50Hz. Warning horn shall be rated for outdoor installation and IP67 ingress protection. Warning horn audible tone and output decibels shall match the existing warning horn.

K. Traffic Signals

- a) Provide LED traffic signals, consisting of vertically oriented 8" diameter red lens (top) and green lens (bottom). Traffic signal enclosure shall be IP65 ingress protection, aluminum, or polycarbonate construction. LED fixtures shall be 220VAC rated.

L. Wind Speed Indicator

- a) Provide a wind speed indicator, consisting of an exterior and interior unit. Exterior unit shall be a fixed sensor, rated for outdoor installation and IP67 ingress protection, capable of measuring wind direction and speed up to 200 kilometers per hour. Interior unit shall be a wall-mount display for wind speed

and direction. Provide all required mounting adapters and cables for the interior and exterior unit.

M. Main Drive Motor.

- a) Provide a main drive inverter duty rated motor with the features and ratings as shown on the Mechanical drawings, Main Motor Specifications, and as follows:
 - i.) 400 volts AC, 3 phase, 50 Hertz.
 - ii.) Minimum duty cycle rating of 5 minutes at 3 to 5 Hertz, 15 minutes at 6 to 15 Hertz, and 60 minutes at 16 to 50 Hertz, with a service factor of 1.15 at constant speed.
 - iii.) Optimized for operation with a variable frequency flux vector drive.
 - iv.) Meet or exceed the requirements of NEMA MG 1, Part 31.
 - v.) Include factory mounted incremental encoder with at least 1024 pulses per revolution and output interface for compatibility with the existing drive(s).
 - vi.) Include 220-volt internal space heater for moisture control.

N. Variable Frequency Drive.

- a) Variable frequency drive (VFD) shall be IP66, NEMA/UL type 4X, flux vector AC drive featuring true field-oriented flux vector control. VFDs shall be suitable for operation on 415 volts AC, 50 hertz, three-phase systems. VFDs shall be rated for 45 kW, heavy duty, and be capable of providing true closed loop (encoder feedback) flux vector speed and torque control. VFDs must also meet the following requirements:
 - i.) Microprocessor based control.
 - ii.) Operator interface, with backlit LCD display and keypad, usable for drive status monitoring and entry of all drive parameters. The operator interface must include all necessary cables and hardware required to mount it on the VFD cabinet door. All parameters must be viewable and adjustable through the drive operator interface and with the drive manufacturer's software package. Parameters must be stored in nonvolatile memory. Mount VFD operator interface on cabinet door to use and view without opening the VFD cabinet.
 - iii.) Include built-in communications capability, including Ethernet with common industrial protocol. The Ethernet communications connection must be used for VFD configuration.
 - iv.) Three preset speeds selectable via external discrete control inputs, independently adjustable acceleration and deceleration times, and adjustable torque limit selectable via external discrete control input to allow for a reduced bridge seating torque.
 - v.) Internal, adjustable electronic thermal overload relay for motor overload protection.
 - vi.) Self-tuning feature allowing the VFD to optimize its performance parameters to the main drive motor.
 - vii.) 0 to 40 degrees Celsius operating temperature without derating and 5-95% relative humidity operation range, non-condensing.
 - viii.) Speed regulation with slip compensation in sensorless vector mode of 0.5% of base speed across 40:1 speed range, 40:1 operating range.
 - ix.) Adjustable carrier frequency with a minimum of four settings.

- x.) Safe torque off function, to safety category 3, Safety Integrity Level (SIL) CL3 or higher.
- xi.) 150% rated motor full load torque for 60 seconds, 180% for three seconds.
- xii.) Provide the drive manufacturer's software package and necessary programming cables for the configuration, backup, and restoration of drive parameters.
- xiii.) Provide a VFD output filter that meets the following requirements:
 1. Drive output filters must be UL listed, 3% impedance reactors with inductance-capacitance (LC) filter (dv/dt filter) suitable for operation on 415 volts AC, 50 hertz, three phase systems.
 2. The dv/dt filters must be harmonically compensated and rated to handle full rated fundamental current plus an additional 50% of fundamental current due to harmonics.
 3. Reactors must include IGBT protection and have a dielectric system which satisfies the requirements of UL 508. Filters must be sized and supplied by the drive manufacturer.
- xiv.) VFD shall feature speed regulation between drives, capable of load sharing when both drives are enabled on each leaf.

O. Drive Braking Resistors.

- a) Provide braking modules and appropriately sized braking resistors sized to provide a braking torque of at least 150 percent rated motor full load torque for a duty cycle consisting of 30 seconds on at 150 percent, then four and one-half minutes off, or as required by the VFD manufacturer.
- b) Braking modules must be the same manufacturer as the VFD and designed for use with the VFD, including all inputs and outputs required for proper interfacing with the VFD. Converter protective features must include module overload.
- c) Braking resistors must be edge-wound stainless steel, mounted in ventilated enclosures. Openings must be screened or otherwise protected to prevent entry of small rodents. Use stainless steel or similarly corrosion resistant hardware. Wire braking resistors to terminal blocks with high temperature silicone or Teflon wire rated for 150 degrees Celsius or higher. Interconnect braking module fault contact and resistor built-in over temperature sensor to the VFD to initiate an alarm and drive stop in the event of a resistor over-temperature condition.
- d) A drive braking resistor(s) shall be provided with each VFD.

P. Machinery Room Fans

- a) Provide machinery room fan assemblies, including motor, fan blade, louvers, thermostat, and all material required to replace the unit in-kind.

Q. Labels and Identification.

- a) Provide one piece engraved plastic type legend plates for indicator lights, selector switches, pushbuttons, and exterior cabinet and enclosure labels with white text on a black background. Include text as shown. Fasten exterior cabinet labels with stainless steel machine screws. Labels mounted inside cabinets and enclosures are permitted to use adhesive backed labels.

R. Spare Parts.

- a) Provide the following minimum spare parts:
 - i.) One (1) main drive motor.
 - ii.) One (1) variable frequency drive (pre-programmed).
 - iii.) Two (2) of each type of surge protective device used.
 - iv.) Two (2) of each type of limit switch used.
 - v.) Ten (10) maintenance lighting fixtures.
 - vi.) Two (2) flood lighting fixtures.
 - vii.) Four (4) of each type of relay and other control devices used.
 - viii.) Two (2) of each type of fuse used.
 - ix.) Two (2) of each type of panelboard breaker used.
 - x.) Two (2) of each pushbutton, key/selecter switch, and indicator light used.
 - xi.) One (1) sump pump and two (2) float switches
 - xii.) One (1) of each type of droop cable
 - xiii.) One (1) oil circulation pump

3.8.6 CONSTRUCTION

A. General Requirements

- a) Provide all miscellaneous products, tools, equipment, and labor necessary to properly complete all work in accordance with the requirements and intent of the plans and special provisions.
- b) Install all machinery components by certified millwrights experienced in precision machinery alignment.
- c) Install all products in accordance with their manufacturers' recommendations and the requirements of the NEC, BIS, and the contract. Physically install all products at the indicated and approved locations, and in a secure manner as indicated or as required to provide a reliable installation. Inspect and test all installed products for correct installation, performance, and workmanship.
- d) Coordinate with the SMPK, Central, State, and Local authorities, and acquire permits and/or permission for the Work performed in and/or over the navigable waterways. Obtain explicit permission and/or permit from the SMPK for any bridge closure or delay of the marine traffic. Maintain the bridge navigation lighting system in continuous operation, 24 hours a day for the duration of the project. All penalties assessed against the SMPK due to the non-operation of the navigation lighting system will be borne by the Contractor. Notify the SMPK of any change to the Contractors work schedule.
- e) Spillage of oil and hazardous material is prohibited. Properly maintain construction equipment, and carefully and properly handle fuel and hazardous material so as not to cause any spillage in the waterway. Notify the SMPK immediately of any spillage of oil/hazardous material in the waterway. Instruct personnel not to dispose of oil/hazardous material into the waterway directly or indirectly and have plans to remove any spillage of such materials, should it occur. The removal method must be as authorized by the Central, State, and Local laws and regulations.

B. Removals

- a) As stipulated in Clause no. 8 under Special Conditions of Contract in Annexure-D.

- b) When instructed to replace, remove the existing components, and furnish and install new components as specified on the Plans and elsewhere herein.

C. Installation

- a) Prior to commencing installation verify that all surfaces upon or in which equipment and devices are to be mounted, are properly prepared.
- b) Before mounting of enclosures, ensure that all required wire pulling has been completed and all wires are properly tagged. Take corrective action, if necessary.
- c) Verify that mounting provisions are suitable for the intended mounting. Make corrective adjustments, if necessary.
- d) Where new mounting brackets and supports are to be mounted on existing structural members, prepare mounting surfaces by cleaning and painting surfaces of the existing steel before mounting new brackets and supports. Clean and paint in accordance with Steel Cleaning and Painting requirements provided elsewhere in the Minimal Technical Requirements. Field drilling of structural members is prohibited; mount to members via clamp-on methods only.

D. Wiring.

- a) Use conductors with green colored insulation only for grounding conductors. The reidentification of conductors with green colored insulation, such as with colored tape, is prohibited.
- b) Supply a dedicated neutral conductor for all branch and feeder circuits requiring a neutral. Ensure a dedicated neutral conductor is not shared by phase conductors of other circuits.
- c) Provide equipment grounding conductors in all conduit and cable runs. Unless otherwise noted, size equipment grounding conductors equal to the largest circuit conductor in the conduit or cable. Coordinate all wire and cable requirements with manufacturers of the equipment served.
- d) Handle and install wires and cables with care to avoid damage to conductors, insulation, jackets, armor, etc. Replace at no additional cost any wire or cable which is found to be damaged.
- e) Permanently label all conductors, cables, and terminal blocks at every terminal or connection, splice, and tap. Assign each conductor or cable with one identifying number (including spares) throughout the entire electrical and control system. Coordinate identification numbers for consistency and accuracy with conductor numbers on the Contractor's approved wiring diagrams and shop drawings, field wiring diagrams, and any other diagrams containing the same respective conductor or cable.
- f) Label all conductors with machine printed self-sealing, adhesive-type labels. Use water and smudge resistant text. Coordinate label text with shop drawings and wiring diagrams. Hand written labels are prohibited.

E. Conduit and Cable.

- a) Unless specifically indicated otherwise, install connections of conduit and cable entrances only in the bottom of cabinets and enclosures which are located outdoors and in damp locations.
- b) To the extent practical, maintain at least a 4-inch separation between power wiring and communication and/or instrumentation cables.

- c) Use weatherproof cable(s) only where the final connection to equipment requires the use of a cable and final connection via conduit or flexible conduit is not feasible. Use cable connectors where weatherproof cable(s) transition from conduit and where weatherproof cable(s) enter box(es) or enclosure(s).
- d) Provide insulated throat bonding bushings or bonding nuts where conduits or metal armored cables enter metal boxes or enclosures. Properly bond/ground conduit to the bonding/grounding hub. Connect bonding bushings and bonding nuts to the equipment grounding conductor included in the conduit or cable.
- e) Install metal conduit and tubing in accordance with the Steel Tube Institute of North America's Guidelines for Installing Steel Conduit/Tubing.
- f) Make bends in rigid conduit with tools which are specifically designed for bending the type and size of conduit in question. When bending conduit maintain proper internal diameter and wall thickness.
- g) Do not make more than three quarter bends, equivalent to 270 degrees, in one conduit run between pull points such as conduit bodies, junction/pull boxes, terminal cabinets, and enclosures.
- h) Make field cuts square to conduit and ream conduit ends to remove burrs. Field cut threads must have same length, dimensions, and taper as factory-cut threads. Clean field cut threads with an appropriate degreasing solvent after cutting and coat with a touch-up compound as recommended by the conduit manufacturer and a urethane topcoat. Similarly treat any area on the interior of the conduit which has been disturbed by reaming.
- i) Install PVC coated rigid metal conduit using tools and methods which will not cause damage to the PVC coating, and in accordance with installation instructions provided by the conduit manufacturer. Coat any area on the exterior of the conduit which has been damaged during installation with an exterior patching compound as recommended by the conduit manufacturer.
- j) Repair, by replacing the entire section of conduit, any defect (nick, scar, cut, tear, abrasion, etc.) to the PVC coating of PVC coated rigid metal conduit that is 3 inches or more in length. Repair any defect to the PVC coating which is less than 3 inches long with an appropriate repair compound as recommended by the conduit manufacturer. However, SMPK may, at its discretion, alternatively require that defects 3 inches long or less be repaired by replacing the entire section of conduit. Any costs associated with required replacement of conduits due to damaged coating, including if such replacement requires the removal and re-installation of conductors will be borne by the Contractor. Submit proposed conduit repair details for approval.
- k) Unless explicitly indicated otherwise, install conduits as follows:
 - i.) All outdoor (wet) locations, including inside the machinery rooms, bascule pier tops, and counterweight pits: use PVC coated rigid metal conduit and liquidtight flexible metal conduit (LFMC).
 - ii.) Inside the control house and switch house: use galvanized steel conduit and LFMC.
 - iii.) Use liquid-tight flexible metal conduits in accordance with the following conditions:
 - 1. In lengths not to exceed 18 inches for final connection to motors and similar equipment subject to vibration.
 - 2. Where flexibility is required, lengths must not exceed 18 inches, unless explicitly indicated otherwise or with the special permission of SMPK. Do not use liquid-tight flexible metal conduit in lieu of bends in rigid conduit, except as may be allowed by SMPK by special permission.

F. Wire and Cable Pulling.

- a) Thoroughly swab raceway system before installing conductors. Use pulling lubricant to facilitate installation of wire and/or cable in conduits. Ensure lubricant is NRTL listed, environmentally friendly, Teflon based lubricant which is safe for use with all cable types and does not harden in conduit.
- b) Replace conductors and cables, which are damaged during shipping, handling, storage or during the installation, or due to high pulling tension during the installation as revealed during any inspection or tests, as required, or as directed by SMPK. Such replacement will not be considered cause for delay or additional payment.

G. Submarine Cables

- a) Use proper equipment and perform field measurement of the existing cables to ensure that the new submarine cables will have adequate lengths for installation between termination points as indicated. New submarine cable routing shall be similar, but clear of the existing submarine cables. Do not obstruct the navigable channel during this work. Refer to Submarine Cable Shop Testing procedures described elsewhere in the Minimum Technical Requirements.
- b) Employ professional divers and/or perform underwater surveys to trace the routing path of the existing cables buried under the mud line of the navigable channel.
- c) Provide the submarine cables with adequate length between termination cable points as per field measurements. Ensure the new cable lengths include at least 10 feet of submarine cables extending beyond each termination point.
- d) Notify and coordinate all work with the SMPK and all Central, State, Local, and dredging agencies having jurisdiction over the waterway and with any utilities using the waterway.
- e) Before the installation of the submarine cables, perform soundings to determine the elevations of the navigable channel bottom. Survey the channel bottom for any existing underwater installation that may obstruct or interfere with the lay-down, excavation, or other installation process of the submarine cables.
- f) Submarine cable routing from switch house and control house to the waterway trench shall be in a manner that eliminates interference from foot or marine traffic. Installing the submarine cables directly on the bascule pier tops is not acceptable.
- g) Excavate a trench in the bottom of the navigable channel to bury the submarine cables at a depth that is accepted by the SMPK and all dredging agencies. At a minimum, the cables shall be installed 15 feet below the existing river bottom. Excavate using a method that is permitted by the SMPK. Construct the cable trench in such a way to avoid cave-ins during placement of the cables and backfill. Lay each cable side by side without any loop, twist, or bend exceeding the limitations of the manufacturer recommended bend radius. Do not place cables to cross another. Reroute the cable path as necessary to avoid any unforeseen obstruction or remove the obstruction of any abandoned material which will interfere with the installation of the cables to the required depth.
- h) Bedding and cable placement:
 - i.) The cables shall be placed in the trench and covered with a bedding aggregate to depth of at least (12) inches.

- ii.) The remainder of the trench shall be filled with backfill aggregate to the elevation of the channel bottom.
 - iii.) Refer to Material Requirements for aggregate requirements.
- i) Provide supports for each submarine cable riser, constructed from 316 stainless steel.
 - j) When the ambient temperature of the submarine cable storage at the work site is below 0 degrees Celsius, heat the submarine cables within an enclosure to an ambient temperature of at least 2 degrees Celsius for 2 hours before reeling off the cables for installation.
 - k) Prior to installation, test conductors for continuity, measure insulation resistance of conductors and verify that the test results are within acceptable test values from the manufacturer. Document and submit all test results to SMPK.
 - l) Survey the location of each submarine cable as it is being installed. Identify the cable path with points at 10 foot maximum spacing and ± 1 foot accuracy. Verify the burial depth of each cable.
 - m) Upon completion of the installation, inspect the channel bottom to ensure that all construction waste materials have been removed from the channel. During construction, notify the SMPK and governing agencies for any material, machinery, or equipment that is lost, dumped, sunk, or thrown overboard and may obstruct, or interfere with the navigation traffic, and remove such material immediately. Mark the location of such material until the obstruction is removed.
 - n) Perform continuity test and insulation resistance measurement of conductors of the submarine cables after the cables are installed in place and ready for connections to ensure that there is no damage to the conductors during installation. Ensure the measured values are not less than 90 percent of the values documented before the installation.
 - o) Properly dispose of all unused excavated materials away from the construction site in accordance with the contract, requirements of the permit, all applicable Central, State, Local laws, and regulations.

H. Low Voltage Splices, Terminals, and Terminal Blocks.

- a) Splice and tap conductors only in equipment enclosures, cabinets, or junction boxes, and on terminal blocks or with insulated compression crimping-type connectors or as described herein. Do not terminate more than two conductors per terminal block. Make splices and taps at equipment or in locations which do not permit the use of terminal blocks with crimp or mechanical type connectors with SMPK's permission.
- b) Make connections to motor terminal leads only with means which will allow for disconnection without cutting motor leads, such as two crimp type lugs bolted together or mechanical type connectors. The use of wire nut connectors is prohibited.
- c) After the installation, insulate all splices made with crimp or mechanical type connectors with rubber and vinyl tape, or an insulating cover specifically designed for use with the connector. SMPK may require the use of special splices or splice kits to address specific application considerations.
- d) For splices without integral insulating sleeves, tightly apply a minimum of one half-lapped layer of rubber tape, tacky side up, over entire splice and extending onto the conductor insulation at least one tape width on both sides of splice. Apply a minimum of two half-lapped layers of vinyl tape completely over rubber tape and extending onto conductor insulation past ends of rubber tape.

- e) For splices which are provided with integral insulating sleeves, apply a minimum of two half-lapped layers of vinyl tape completely over splice and extending onto conductor insulation, past ends of splice.
- f) Use 3M 33+, Super 88 vinyl electrical tape, Scotch electrical vinyl tape, or an approved equal. Ensure rubber insulating tape is 3M 130C linerless rubber splicing tape, or Scotch rubber linerless tape, or approved equal.

I. Grounding and Bonding.

- a) Provide grounding and bonding in compliance with the requirements of NEC Article 250 for grounding and bonding.
- b) Do not use raceways and metallic cable armor/sheaths as the sole grounding or bonding conductor for any circuit.
- c) Solidly connect all electrical equipment to the equipment grounding conductor serving that equipment.
- d) Bond the ground buses of all equipment to the nearest substantial structural steel member. Size bonding jumpers equal to the equipment grounding conductors serving the equipment. Install the bonding jumper in accordance with the requirements for grounding electrode conductors given in the NEC. Ensure bare ground wire is used when installing a bonding wire in junction boxes, terminal cabinets, and enclosures.
- e) Where bolted connections are used for connection of equipment grounding conductors to equipment, clean the area around the connection down to bare metal prior to making the connection. Touch-up the area with paint after the connection is made in accordance with the equipment manufacturer recommendations.

J. Conduit and Cable Supports.

- a) Support rigid conduits near each elbow and within 18 inches of each box, enclosure, conduit body, or similar termination, and at regular intervals not to exceed 6 feet.
- b) Support flexible conduits near each elbow and within 12 inches of each box, enclosure, conduit body, or similar termination, and at regular intervals not to exceed 3 feet, except where flexibility is required.

K. Conduit Penetrations.

- a) Provide conduit penetrations through walls, floors, and ceilings as necessary for the installation of conduits. Following the installation, restore floors, walls and ceilings with materials equal to the original construction and finish to match surrounding surfaces. Materials used will be subject to the final approval of SMPK for appropriateness.

L. Equipment Cabinets and Enclosures.

- a) Equipment cabinets and enclosures shall be sized in accordance with the NEC and as required to house all internal components.

M. Mounting Brackets.

- a) Fabricate mounting brackets as required by the contract, or for the specific equipment and devices, or as proposed by the Contractor to accommodate the

specific mounting locations and equipment. Submit to SMPK , for approval, shop drawings and details of mounting brackets proposed for installation with indicated dimensions, materials, type, and materials of anchorage.

N. Touch-up Painting.

- a) Touch-up paint all scratches and damage to factory-applied finishes on electrical equipment and enclosures, raceways, and boxes, as required to repair the damage to the factory finish. Use touch-up painting at least one coat of primer, and two coats of finish paint. Use primer and paint as supplied or recommended by the manufacturer of the item being painted.

O. Variable Frequency Drive.

- a) The CSV must perform the manufacturer recommended sequence for tuning the variable frequency drive to its the main drive motor. Adjust any other main drive settings necessary to ensure fully functional and reliable bridge operations.
- b) See the Special Provision for Mechanical Rehabilitation for additional construction requirements and hardware required for the installation of the main drive motor.

P. Electrical Testing and Measurements

a) Submittals.

- i.) Submit proposed testing procedures, including test instruments, up-to-date instrument calibration proof, and other equipment to be used for approval at least 15 working days prior to testing.
- ii.) Accurately record the results of all tests in a neat and orderly manner along with time and date of test(s), environmental conditions (temperature, humidity, general weather conditions, etc.), testing equipment used, conditions of test(s), and the name(s) of person(s) performing the test(s).
- iii.) Submit all test results with all text in typewritten format no later than 10 working days from date of test(s). The results of these tests must be deemed acceptable by SMPK prior to acceptance of the work in question.
- iv.) Submit the following:

1. Insulation resistance testing of the new main drive motors at the time of installation and at final acceptance.
2. Insulation resistance testing of all newly installed power and control conductors (including submarine cable and droop cable conductors), except for instrumentation conductors.
3. Results of operational testing after installation. Operational testing must include three-phase motor current measurements for at least one complete bridge operation (raise and lower).
4. Insulation resistance testing of the existing utility service feeds on the east and west approach. De-energize source of power for both utility feeds and perform testing on each phase conductor.
5. Submarine cable testing described elsewhere within the Minimum Technical Requirements.

b) General Requirements.

- i.) Perform all testing, inspections, and any resulting corrective work to ensure that, after the installation of the electrical materials and equipment for the required work, the entire bridge power and control systems properly function as intended and as recorded by the Contractor prior to the removals and as modified and required by the contract.
 - ii.) In addition to the specific tests described herein, perform all additional testing, and make any necessary repairs or adjustments to provide a complete, functional, and reliable installation. All testing, inspections, and demonstrations, and any resulting remedial work, will be deemed solely the responsibility of the Contractor and will not be considered cause for delay or additional payment.
 - iii.) Use test procedures and equipment in accordance with manufacturer's recommendations, NETA Acceptance Testing Standards, any other applicable industry standards, and appropriate for the specific test being performed.
 - iv.) Use true root mean square (RMS) type voltmeters and ammeters. Maintain in proper calibrated condition and use all tools and instruments specifically designed for measuring the quantity in question.
- c) Shop Testing.
 - i.) Perform a shop test for the control system prior to shipment from the CSV's shop. Ensure the shop test is witnessed by SMPK or its designated representative. Include a complete run through of the operating sequence and confirm all safety interlocking.
 - ii.) Prepare a detailed testing procedure for shop testing of the installed work. Submit the shop test procedure at least 3 weeks in advance for approval before beginning shop testing. Coordinate with the SMPK and schedule the test at a time agreeable to all parties involved. Determine the schedule at least 2 full weeks in advance of the proposed start date for the testing. If an approved shop testing procedure is not documented prior to the scheduled time of the test, the SMPK retains the right to reschedule the test. In the event a reschedule is required, the Contractor will bear any costs associated with delay and rescheduling of travel arrangements.
 - iii.) Note that not all components will be present at the shop test; use simulation of these components to perform the most complete shop test as practical. Utilize temporary indicator lights and control switches as required.
 - iv.) Wire and assemble all relays, timers, and other related control system components to the extent practical in the proper cabinet(s) and make ready for shipping pending any corrections or adjustments necessitated by testing results, before performing such tests.
 - v.) Correct any errors found in the system and rerun the respective portion of the test.
- d) Submarine Cable Shop Testing:
 - i.) Individual Conductors - Spark. Perform AC root mean square (rms) voltage spark test on individual insulated conductors in accordance with ANSI/NEMA WC 70/ICEA S-95-658, Table 3-4 and ANSI/ICEA T-27-581/NEMA WC 53, paragraph 2.2.4.
 - ii.) Individual Conductors - Wet. The individual insulated conductors must withstand an AC (rms) voltage, while in water, in accordance with:

1. ANSI/NEMA WC 57/ICEA S-73-532, table 3-3, paragraphs 3.4 and 6.17.1 (20-16 American wire gauge (AWG))
2. ANSI/NEMA WC 70/ICEA S-95-658, table 3-4, par. 3.6.2 and 6.10.1.1 (14 AWG and larger)
3. ANSI/ICEA T-27-581/NEMA WC 53, paragraph 2.2.2.

iii.) Finished Cable:

1. Voltage Test. Test the finished cable between each conductor and all other conductors to withstand an AC (rms) voltage in accordance with:
 - a. ANSI/NEMA WC 57/ICEA S-73-532, table 3-3, paragraphs 3.4 and 6.17.1 (20-16 AWG)
 - b. ANSI/NEMA WC 70/ICEA S-95-658, table 3-4, paragraphs 3.6.2 and 6.10.1.1 (14 AWG and larger)
 - c. ANSI/ICEA T-27-581/NEMA WC 53, paragraph 2.2.2
2. Insulation Resistance. Measure the insulation resistance after the completion of the cable AC voltage tests, in accordance with:
 - a. ANSI/NEMA WC 57, paragraphs 3.5 and 6.18 (20-16 AWG)
 - b. ANSI/NEMA WC 70, paragraphs 3.6.3 and 6.10.2 (14 AWG and larger)
 - c. ANSI/NEMA WC 53, paragraph 2.3

iv.) Testing Methods: Use the insulation resistance constant (IRK) of 10,000 for XLPE insulation in accordance with ANSI/NEMA WC 70/ICEA S-95-658, paragraph 3.6.3, and Table 3-8 for insulation Class X-1. Ensure the measured values are equal to or greater than the calculated values for insulation resistance (IR), as follows:

$$IR = (IRK) \log_{10}(D/d)$$

Where:

IR = Insulation resistance in megohms- I000 feet

IRK = Constant for the Insulation

D = Diameter over the Insulation

d = Diameter under the insulation

- v.) Conductor Resistance. Measure the direct current (DC) resistance of each conductor in the completed cable to comply with:
1. ANSI/NEMA WC 57, paragraph 2.3.4 (20-16 AWG)
 2. ANSI/NEMA WC 70/ICEA S-95-658, paragraph 2.3 (14 AWG and larger)
 3. ANSI/ICEA T-27-581/NEMA WC 53, paragraph 2.1

e) Testing and Inspection after Installation.

- i.) After all wires have been installed and prior to connections of any circuit, test to verify that all installed conductors are free of shorts, opens, or unintentional grounds, and properly terminated.

- ii.) Measure and record the insulation resistance of the new main drive motors. Make measurements at the motor, or at the local disconnect switch. Measure and record the insulation resistance of all newly installed power and control conductors, except for instrumentation conductors. The minimum acceptable resistance is 100 megohms (at 500V DC).
 - iii.) Measure the contact resistance of all new circuit breakers and contactors. Deviation of 50 percent or more between contacts of any device, or between contacts of similar devices, is considered a failure.
 - iv.) Perform tests after energizing any circuit and prior to connections to equipment or motors to verify the following conditions:
 - 1. Correct no-load voltage for the equipment to be powered.
 - 2. Correct phase sequence.
 - 3. Correct polarities.
 - v.) After all connections have been made to all equipment and devices, visually inspect all electrical connections, and verify that all lugs, connectors, and terminals are tightened and torqued to the levels recommended by the manufacturer.
- f) Testing of Motors and Machinery.
- i.) Prior to first operation of any motor or motor driven machinery, confirm proper motor rotation with all driven machinery disconnected or otherwise suitably arranged to prevent damage in the event of incorrect rotation. After confirming proper rotation, record the correct circuit phase to motor terminal connections on the as-built plans and working drawings.
 - ii.) Visually inspect all motors and motor driven machinery, including, but not limited to, checking for excess mechanical or electrical noise, for excessive heating, for vibration, verifying proper tightening of all mounting bolts and coupling connections, and observation of any other physical indications of improper installation and operation.
 - iii.) Following final acceptance, measure and record the motors terminal voltage and three-phase currents for the main drive motors through one complete bridge operation (raise and lower). Take measurements at the outputs of the VFD's and continuously record with suitable computer-based recording equipment at a data sampling rate of at least 20 samples per second.
- g) Operational Tests and Demonstrations.
- i.) Prior to attempting to test-run the bridge, test and verify that all control wiring has been installed correctly. Verify the correct operation of all limit switches and sensors.
 - ii.) When the installation of all systems is complete and ready for testing, test-run the lift span. Demonstrate a trouble-free bridge operation, meeting all specified requirements with all interlocks properly functioning through the control system.
 - iii.) Perform additional miscellaneous operational tests as required or as requested by SMPK's representative to demonstrate and establish that the work as installed meets all specified requirements and is operating in a reliable manner.
- h) Final Field Acceptance Testing.

- i.) Perform a final field acceptance test for the bridge operation, control system, and other components as described herein after all required components are installed and initial operational tests and demonstrations are complete. Ensure the final field acceptance test is witnessed by SMPK or SMPK's representative. The final field acceptance test must include, at a minimum, the following demonstrations:
 1. Include a complete run through of the operating sequence for the main drive mode. A minimum of 14 consecutive, successful, error free, and full bridge operations are required, including 6 consecutive bridge operations with all four main drive motors active at full speed mode, 4 consecutive bridge operations with all four main drive motors active at reduced speed mode, 2 bridge operations with 1 main drive motor active on each leaf at reduced and 2 bridge operations with the opposite main drive motor active on each leaf. At least one bridge operation from each utility service feed must be performed. Perform at least 2 bridge operations in manual mode and the remaining in automatic mode. Perform all bridge operations within one single day. In the case of any error or required adjustment, ensure the count of successful operations is started over.
 2. Perform one complete check of proper bridge safety interlocking.
 3. Demonstrate that all bridge lighting, navigation lighting, automatic transfer switch and other miscellaneous systems are operating satisfactorily.
 4. Perform additional tests and demonstrations to demonstrate to SMPK's representative that the installed systems satisfy the requirements and intents of the plans and special provisions.
 - ii.) Prepare a detailed testing procedure for final field acceptance testing of the installed work. Submit the final field acceptance test procedure at least 3 weeks in advance for approval to SMPK before beginning final field acceptance testing. Coordinate with the SMPK and schedule the test at a time agreeable to all parties involved. Determine the schedule at least 2 full weeks in advance of the proposed start date for the testing. If an approved final field acceptance testing procedure is not documented prior to the scheduled time of the test, the SMPK retains the right to reschedule the test. In the event a reschedule is required, the Contractor will bear any costs associated with delay and rescheduling of travel arrangements.
 - iii.) Correct any deficiencies revealed during testing and repeat the test until such time SMPK is satisfied with all test results and the overall performance of the bridge control system.
 - iv.) For final acceptance by the SMPK, the minimum 14 consecutive bridge operations must be successful and error-free, and operation and maintenance training must be completed. The time required for opening and closing of the bridge separately would have to be within $\pm 10\%$ tolerance limit of the existing time for each operation. Contractor will record the existing time in presence of SMPK's representative before commencement of any work and record it for final reference during Final Acceptance test.
- i) Operation and Maintenance Training.

i.) After all systems are installed and tested, the bridge and its control and drive systems are proven to operate reliably, and the 14 bridge operations, as described above are successful, provide operation and maintenance training for maintenance personnel. Provide training for a minimum of two full 8-hour working day, with a minimum of 1 week notice to the SMPK. Training must include, at a minimum, the following:

1. Using and navigating the HMI interface(s) on the VFD and interpreting common VFD errors and faults and respective corrective actions.
2. Overview of control system and control console equipment, including basic troubleshooting and recommended maintenance.
3. Overview of bridge operating sequence and interlocking.
4. Basic newly installed device troubleshooting instructions.
5. Include additional training at the request of the SMPK.

Q. Corrective Actions.

- (a) For any test failure, or for any test result which fails to meet the specified requirements or the stated acceptable values or conditions, , the Contractor must investigate the cause of the failure, take appropriate corrective actions, and repeat the test(s). Repeat this procedure until such time as all test results are deemed acceptable by SMPK.

R. Contractor Supervised Lift Span Operation.

- (a) Provide a minimum of one person to supervise the operation of the bridge for a period of 3 months after final acceptance by the SMPK (after final field acceptance testing and operation and maintenance training is complete) and provide one person on call for the period. Ensure these people are able to operate the bridge, to supervise its operation, and to make any adjustments or corrections that may be required in the electrical and control equipment of the bridge. During this period , exhaustive operator's training shall be provided by the Contractor to SMPK employees in the operation of the bridge. Any adjustments or corrections required during the period must be at no additional cost.

3.9. MECHANICAL SYSTEM

3.9.1 DESCRIPTION

The work shall include furnishing, manufacturing, fabricating and/or refurbishing, erecting, installing, testing, and placing into satisfactory service, the mechanical components for operation of the bascule leaves, including the motor and machinery brakes, open gearing, shaft couplings, enclosed gear reducers, tail lock drive systems, passive center locks, and machinery supports. Included as part of the bridge mechanical operating system are the shims and any associated brackets and bearings.

All parts furnished by the Contractor shall be new.

The Contractor shall provide all apparatus, tools, devices, materials, and labor to manufacture, paint, ship, install, erect, align, adjust, lubricate, and test the operating machinery for the bascule bridge in an approved manner as provided herein. Any apparatus, tools, devices, materials and labor, not specifically stated or included, which may be necessary for the work, shall be furnished by the Contractor.

The installation and adjustment of all machinery and machinery pedestals and bolsters shall be by millwrights experienced in this class of work.

3.9.2 APPLICABLE STANDARDS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. The latest revisions at the time of bid only shall be used for all references.

3.9.3 GENERAL REQUIREMENTS

Where not otherwise specified herein, workmanship, materials, fabrication, and erection of the bridge components shall be in accordance with the requirements of The American Association of State Highway and Transportation Officials (AASHTO), LRFD Movable Highway Bridge Design Specifications, 2nd Edition, including all interim revisions issued at the time of bid.

A. Submittals

a) Field Measurements and Verification

- i.) Before commencing any work, ordering any materials, or fabricating any items, verify all relevant dimensions and other relevant characteristics at the job site and ensure their accuracy.
- ii.) The SMPK will not, as a part of shop drawings review, bear responsibility for verification of any field measurements made by the Design- Build Team. Review of shop drawings by the SMPK does not in any way relieve the Contractor from responsibility for the accuracy of field measurements. Full responsibility for any errors that may result from inaccuracy of field measurements and verifications will be borne by the Design- Build Team.
- iii.) Verify all field measurements that are critical to the fabrication of new items, and clearly indicate to differentiate from other dimensions on working drawings that are submitted for review and approval. Gear geometry, shaft diameters, keyway widths, etc. shall be verified in the field prior to creation of shop drawings.

B. Delivery, Storage, and Handling

- a) All components and materials shall be stored by the Contractor until needed by others responsible for on-site erection, installation and alignment of machinery components.
- b) All components and materials shall be delivered to the site in accordance with the approved schedule of work. Any special provisions used for material handling shall be provided by the Contractor. No equipment shall be shipped to the field without being successfully tested and calibrated.
- c) Components and materials shall be properly packaged and protected (from weather, dirt, and all other injurious conditions during manufacture, shipment, and while awaiting erection) from initial shipment until the time of installation.
 - i.) All machinery shall be cleaned of dirt, chips, grit and all other injurious material prior to shipping.

- ii.) Prior to shipment from the manufacturer's and/or fabricator's plant or plants, the Contractor shall prepare the various elements for shipment. All large, bulky and/or heavy items (Assembled units) shall be securely mounted on skids or pallets of ample size and strength to facilitate loading and unloading. Skids or pallets should be crafted for protection during shipment and storage. All small parts shall be boxed in sturdy wood or heavy corrugated paperboard boxes. A packing list enclosed in a moisture proof envelope and indicating the contents of each such box shall be securely attached to the outside of the container. The skid/pallet mounting and boxing shall be done in a manner which will prevent damage to the equipment during loading, shipment, unloading, storage and any associated and/or subsequent handling. Weatherproof covers shall be provided during shipment to protect any and all items shipped in open railway cars, trucks, or barges. Any eyebolts, special slings, strongbacks, skidding attachments or other devices used in loading the equipment at the manufacturer's and/or fabricator's plant or plants shall be furnished for unloading and handling at the destination.
 - iii.) Finished and unpainted metal surfaces that would be damaged by corrosion, shall be coated with a .030" minimum film thickness, as soon as practicable after finishing, of No-Ox-Id, A-Special, Cosmoline Rust-Veto 342, or approved equal (HH), as manufactured by San-Chem Company, Chicago, Illinois, or approved equal. This coating shall be removed from all surfaces prior to lubrication for operation and from all surfaces prior to painting after erection. Removal shall be done by using solvents recommended by the manufacturer. If the anti-rust coating on any part becomes compromised prior to part installation, the coating shall be restored immediately.
 - iv.) Shaft journals that are shipped disassembled from their bearings shall be protected during shipment and before erection by a packing of oil-soaked rags secured in place by burlap and covered with heavy metal thimbles or heavy timber lagging securely attached; an alternate method may be submitted for approval. Every precaution shall be taken to ensure that the bearing surfaces will not be damaged and that all parts shall arrive at their destination in satisfactory condition.
 - v.) All shipping units shall have lifting eye bolts or lifting holes properly sized for safe working loads and located to provide a balanced lift.
- d) Material storage on site shall afford easy access for inspection and identification, protection from the ground and prevent distortion or damage.

3.9.4 MATERIALS

A. MATERIALS

All materials shall be as called out on the Contract Drawings and as indicated herein.

The current issue of all material specifications and standards shall be those in effect on the date of the bid for this project.

All mechanical components and materials shall be new, except as noted, clean, and free of defects, and conform to standard ASTM and other specifications included previously and indicated on the drawings and herein, or as may be otherwise applicable. Brinell hardness tests shall be made, and included on inspection reports,

for castings and forgings for which hardness values are required on the drawings, in the materials specifications or specified herein.

Steel for weldments and miscellaneous components shall be ASTM A709, Grade 50, unless otherwise specified on the contract documents, fine grain practice is mandatory, and always weldable grades as designated by applicable ASTM standards. Welding materials and methods shall conform to the AASHTO/AWS Code D1.5M/D1.5, current edition.

No item shall be fabricated, machined, welded, cast, or forged without sufficient advance notification to SMPK to permit scheduling of required inspection. The Contractor shall furnish all facilities and provide for the free access at the plant or shop for the inspection of material and workmanship. Inspection and testing shall conform to the following requirements:

- a) Inspection at the plant or shop will not relieve the Contractor from responsibility for furnishing satisfactory materials and workmanship. Acceptance of a material or item shall not prevent subsequent rejection if material is found defective. The Contractor shall remedy defects due to workmanship, erection, materials or design for a period of one year after final tests and acceptance have been made, at his own expense. The Contractor shall furnish a satisfactory guarantee to ensure correction of defects. When written notification of a defect or malfunction is given and no satisfactory corrective action is provided after 14 days, such defects may be corrected by others at expense to the Contractor.
- b) The Contractor shall furnish SMPK with the number of copies of purchase orders as may be required.
- c) Unless otherwise provided, the Contractor shall furnish without charge, test specimens required herein, and all labor, testing machines, tools and equipment necessary to prepare the specimens and to make the physical tests and analyses. Two copies of test reports and chemical analyses shall be furnished to SMPK

Proposed substitutions to the specific manufacturers and/or models shown on the contract drawings must satisfy all listed requirements, be appropriate for the intended application, and be approved by SMPK as substantially equivalent to the specified item(s). The Contractor shall be responsible for all design modifications, engineering analysis, and documentation as may be necessitated by his proposed substitution.

B. Manufacturer's Recommendations

When installation procedures for an item or component are required to be in accordance with the recommendation of the manufacturer, printed copies of the recommendations shall be furnished to SMPK prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

C. Standard Products

Materials and equipment shall essentially be standard, current production, cataloged products of established manufacturers regularly engaged in production of such materials or equipment, and have at least two years of satisfactory commercial or industrial use prior to bid opening and the latest design that complies with the requirements on these contract documents. Where two or more units of the same

class of equipment are required, these units shall be products of a single manufacturer; however, the component parts of the system need not be the products of the same manufacturer. Each major assembled component shall have a conspicuous, durable, permanently affixed nameplate that includes at least the following information: the manufacturer's name, address, the component model number, serial number, rated capacity and pertinent factory setting(s). The nameplate of the distributing agent will not be acceptable. Copies of nameplates and/or equipment tags shall be furnished as part of the shop drawing.

Materials of equal or greater strength and corrosion resistance than shown on the contract drawings may be proposed and are subject to approval by SMPK . Similarly commercial components proposed to be supplied by alternative manufacturers shall be submitted to SMPK for approval. The Contractor will be responsible for proving equality with the originally specified component.

D. Electrodes for Welding

Electrodes for welding shall comply with AASHTO/AWS Code D1.5M/D1.5, current edition and be compatible in strength and composition with the materials joined.

E. High Strength (H.S.) Bolts, Nuts and Washers

High Strength (H.S.) Bolts shall conform to ASTM F3125, Grade A325M, Type 1. The recommended nut and washer, listed in the aforementioned specification, shall be used in conjunction with all high strength bolts, unless noted otherwise. All bolts shall conform to the dimensions specified in F3125. All bolts and hardware shall be galvanized in accordance with ASTM B695 class 50.

F. High Strength Turned/Fitted Bolts

Turned bolts 36 mm and smaller shall conform to ASTM F3125, Grade A325M, Type 1, unless otherwise specified on the contract drawings. Turned bolts larger than 36 mm shall conform to ASTM A449, Type 1 unless otherwise specified on the contract drawings. For this paragraph, specification conformance refers to material, chemistry, and mechanical properties. Threads shall be Metric Coarse Thread Series as specified in ASME B1.13M and shall have Grade 6g tolerances, unless otherwise specified.

G. Socket Head Cap Screws

Alloy steel socket head cap screws shall comply with ASTM A574. Stainless steel socket head cap screws shall be Type 316, with a minimum tensile strength of 520 MPa, and shall meet or exceed ASTM F837, Alloy Group 2, Condition CW, unless otherwise specified. Dimensions shall conform to ASME B18.3.

H. Hex Cap Screws

Hex cap screws up to and including 36 mm diameter shall conform to ASTM F3125, Grade A325M, Type 1. Hex cap screws greater than 36 mm diameter shall conform to ASTM A449, Type 1. Heavy hex nuts and hardened washers shall be used with hex cap screws and shall conform to A563M, Grade 10S, and F436M, Type 1, respectively. Stainless steel hex cap screws shall be Type 316 with a minimum

tensile strength of 520 MPa and shall meet or exceed ASTM F593, Alloy Group 2, Condition CW. Locking shall preferably be by use of double nuts. Hole clearances shall be governed by ASME B18.2.8. Screw length shall be sufficient to allow a minimum of two threads to extend beyond the nut.

I. Flat Countersunk Head Cap Screws

Flat countersunk head cap screws shall conform to ASTM F835. Stainless steel flat countersunk head cap screws shall be Type 316, with a minimum tensile strength of 520 MPa, and shall meet or exceed ASTM F879, Alloy Group 2, Condition CW, unless otherwise specified. Dimensions shall conform to ASME B18.3.5M.

J. Stainless Steel

Stainless steel for fasteners shall comply with the preceding paragraphs, unless otherwise specified. Stainless steel fasteners shall be used in conjunction with stainless steel washers (Type 316) and hex nuts of Type 316 stainless steel with a minimum proof strength of 520 MPa and shall meet or exceed ASTM F594, Alloy Group 2, Condition CW. Stainless steel pins shall be ASTM A276, Type 316, Condition S, cold finished. Stainless steel bolts shall generally be tightened to produce a tension of 70% of the proof load. Include friction coefficient data for any thread lubricant with installation procedures to confirm torque magnitudes.

K. Pinion P2

The new pinions shall be forged steel. The Contractor shall select a material suitable for the new pinions in this application. At a minimum, the material chosen shall meet the requirements of ASTM A291M, Grade 4, Class E.

L. Shims

Where shown on the drawings, all machinery shims required for leveling and alignment of equipment, including tapered shims as necessary for trunnion bearing alignment, shall be stainless steel, ASTM A240, Type 316.

M. Keys

Unless otherwise specified herein or on the contract drawings, keys for all components shall be made from cold-finished carbon steel squares or flats that meet the requirements of ASTM A668M, Class K, with a minimum tensile strength of 725 MPa, and minimum yield strength of 550 MPa, or approved equal.

N. Steel Castings

Steel castings shall conform to ASTM A148M, Grade 530-345, unless otherwise specified in the plans.

O. Bushings and Liners

Unless otherwise specified on the plans, material for bushings shall conform to ASTM B22M, Alloy C91100, and brass liners shall conform to SAE AMS-DTL-22499B, Comp 2.

P. Shafts

Unless otherwise specified, shafting shall be forged steel conforming to ASTM A291M alloy steel with a minimum tensile strength of 655 MPa and a minimum yield strength of 485 MPa. Substitution of cold-finished steel shafting (ASTM A108) for forged steel shall be acceptable if of equal or greater strength and ductility.

3.9.5 CONSTRUCTION

The machinery shall be finished, assembled, and adjusted in an approved manner using best machine-shop practice. The limits of accuracy, which are to be observed in machining the work, and the allowances for all metal fits, shall be placed on the Contractor's working drawings. Fits and finishes of machinery parts shall be as called for on the contract drawings or as specified in the AASHTO Movable Highway Bridge Design Specifications.

Where surface finishes are indicated on the contract drawings or specified herein, the symbols used shall conform to ASME B46.1, "Surface Texture". Values of roughness height are specified in micrometers as an arithmetical average deviation from the mean line. Roughness specified is the maximum value, and any smoother finish will be satisfactory. Compliance with specified surface roughness will be determined by trained sense of feel and by visual inspection of the work compared to standard "roughness comparison specimens" in accordance with the provisions of AMSE B46.1. Values of roughness width and waviness are not specified, but shall be consistent with the general type of finish specified by the roughness height. Flaws such as scratches, ridges, holes, peaks, cracks, or checks which will make the part unsuitable will be cause for rejection.

Unspecified surface finishes shall conform to AASHTO, Clause 6.7.8. Mating surfaces shall be machined to provide even, true bearing. Surfaces with rotating or sliding contact shall be highly polished and finished true to the given dimensions. Surfaces to be machine-finished shall be indicated on shop drawings by symbols, which conform to ASME B46.1.

So far as practicable, all work shall be laid out to secure proper matching of adjoining unfinished surfaces. Large discrepancies between adjoining unfinished surfaces shall be remedied to realize proper alignment. Unfinished surfaces shall be true to the lines and dimensions shown on the shop drawings and shall be chipped or ground free of all projections and rough spots. Depressions or holes not affecting the strength or function of the parts may be filled in a manner approved by SMPK .

A. Mechanical Component Requirements

a) Fits and Finishes

- i.) Fits and surface finishes, when not included on these Contract Documents, shall be in accordance with AASHTO specifications for movable highway

bridges or vendors' recommended specifications, whichever is more rigorous, and as modified below.

Surface finishes are given as the roughness height in micro-meters.

Part	Fit	Finish, μm
Machinery base on steel	-	6.3
Machinery base on masonry	-	12.5
Shaft journals	H8/f7	0.2
Journal bushings	H8/f7	0.4
Split bushing in base	H7/h6	3.2
Solid bushing in base (to 6 mm wall)	H7/p6	1.6
Solid bushing in base (over 6 mm wall)	H7/s6	1.6
Hubs on shafts (to 50 mm bore)	H7/s6	0.8
Hubs on shafts (over 50 mm bore)	H7/s6	1.6
Turned/fitted bolts in finished holes	H7/h6	1.6
Hubs on main trunnions	H7/s6 to H7/u6	1.6
Sliding bearings	H8/f7	0.8
Center Disks	-	0.8
Keys and keyways (top and bottom)	H7/h6	1.6
Keys and keyways (sides)	H7/s6	1.6
Machinery parts in fixed contact	-	3.2
Teeth of open spur gears,		
Under 8 mm circular pitch	-	0.8
8 to 16 mm circular pitch	-	1.6
over 16 mm inch circular pitch	-	3.2

The above fits for cylindrical parts shall also apply to the major dimensions of non-cylindrical parts.

b) Shafting and Pins

- i.) Rounds and shafts shall be true, straight, and free from flaws, piping, laps, seams, or cracks. All shafts shall have finished ends with a 60-degree lathe center with a clearance hole at the exact center of the shaft. Stepped shafts shall have fillets finished smoothly to adjacent surfaces without tool marks or scratches. Surface finish for fillets shall have a maximum roughness of 1.6 micrometers according to ASME B46.1 unless a finer finish is required.
- ii.) All forged shafts shall be reduced to size from a single bloom or ingot until perfect homogeneity is secured. The blooms or ingots, from which shafts or pins are to be made, shall have a cross-sectional area at least three times that required after finishing. No forging shall be done at less than red heat. Forged rounds for shafts and pins shall be true, straight, and free from any defect.
- iii.) All shafts and pins shall be accurately finished, round, smooth, and straight; and when turned to different diameters, they shall have rounded fillets at the shoulders. Each shaft or pin having a uniform diameter of 200 mm or more and each shaft or pin having several diameters, of which the smallest is 200 mm or more, shall be bored lengthwise through the center to a diameter approximately one fifth the smallest diameter. The wall of the center bore shall be examined for cracks and fissures. Shafts and pins exhibiting defects

will not be accepted. Shafts that are bored with an inspection hole shall have the ends prepared for the attachment of a centering device equivalent to the lathe center. All such devices shall be furnished as part of the work.

- iv.) Turned, ground and polished shafting straightness tolerance shall be 0.15 millimeters per meter for shafts up to and including 38 mm in diameter and 0.25 millimeters per meter for shafts over 38 mm in diameter. All shafts shall be free from camber and shall run without vibration, noise, or chatter at all speeds up to and including at all operating speeds.
- v.) All journal bearing areas on shafts and pins shall be accurately turned, ground, and polished with no trace of tool marks or scratches on the journal surface or adjoining shoulder fillets. The journal bearing area shall have an 0.2 micrometer finish or better. Journal diameters shall be finished to the limits of an H8/f7 running fit, unless otherwise noted. Bearing seats on shafts with rolling element bearings shall have a surface finish of 1.6 micrometers, unless otherwise specified by the bearing manufacturer. Fit of rolling element bearing I.D. and shaft shall be as specified by the bearing manufacturer.

c) Keys, Keyways, and Set Screws

- i.) Keys and keyways shall conform to the dimensions and tolerances for square and flat keys of the ASME Standard B17.1, "Keys and Keyseats," unless otherwise specified. Keys shall be machined for an H7/s6 side fit and an H7/h6 fit on top and bottom with keyways in shafts and hubs and a 1.6 micrometer finish or better. Keyway corners and key chamfers shall be cut with the fillet radius and chamfer as suggested by ASME B18.25.1M. All keys shall be effectively held in place, preferably by setting them into closed-end keyways milled into the shaft. The ends of all such keys shall be rounded to a half circle equal to the width of the key. Keyways shall not extend into any bearing. Keys shall preferably not extend past the end of the hub of the keyed element. If two keys are used, they shall be located 120 degrees apart. Custom keys shall be provided as necessary for manufactured components to meet the required key fits and finishes.
- ii.) Set screws shall not be substituted for keys for transmitting torsion; they may be used only for holding keys or light parts in place. They shall be safety-type headless set screws with cup points set in counterbored seats. Unless otherwise noted, they shall be secured in place by use of self-locking threads.

d) Hubs and Bores

The hubs of all gears and couplings shall be finished on both faces and polished where the hub face performs the function of a collar to prevent shaft movement. The hubs shall be bored concentric with the rims of gears or with the outside of couplings. Unless otherwise noted or recommended by the manufacturer, all other hubs shall have a 0.8 micrometer finish or better for 50 mm or smaller bore, or a 1.6 micrometer finish or better for a bore larger than 50 mm. All hubs shall have an H7/s6 medium force fit on the shafts unless otherwise specified.

e) Shims

Where shown on the contract drawings, all machinery shims required for leveling and alignment of equipment shall be stainless steel, neatly trimmed to the dimensions of the assembled parts, and drilled for all bolts that pass through the

shims. Slotted shims shall not be used, unless noted otherwise on the contract drawings. In general, total shim thickness available shall be no less than equal to twice the nominal thickness shown on the contract drawings, and sufficient varying thicknesses shall be furnished to secure 0.25 mm variations of the shim allowance including one shim equal to the full allowance. The Contractor shall provide shims with less than 0.25 mm variations if required to meet proper machinery installation alignment tolerances. Shims shall be placed to provide full contact between machinery and machinery supports. Shims shall be shown in detail on the shop drawings. Shim packs shall be individually packed to prevent damage from handling during shipment to the project site. Packaging shall be clearly marked with the plan sheet number and item number of the part for which the shim pack was fabricated.

Tapered shims shall be provided as necessary to achieve proper trunnion bearing alignment. Full contact shall be provided across the tapered shim mounting surface with the bearings and the bearing supports. Starting thickness of the tapered shim plates shall be 25 mm, prior to final machining, and shall have a minimum thickness of 6 mm. Tapered shims shall have a multidirectional lay top and bottom and shall have all surfaces machine-finished to 3.2 micrometers. Tapered shim bolt holes shall be drilled and reamed in the field, after final alignment, to the same fit as the connected components.

f) Turned/Fitted Bolts

The dimensions of turned bolts shall conform to ASME B18.2.6M for heavy hex structural bolts, except as noted in these contract documents. The fillet under the bolt head shall be 0.8 mm and the transition from the shank to the threads shall be a 30° to 45° chamfer. The bodies of turned bolts shall be finished to 1.6 micrometers or better, as defined by AASHTO. Threads for the turned bolts and nuts shall conform to the Metric Coarse Thread Series as specified in ASME B1.13M and shall have Grade 6g tolerances, unless otherwise specified. Turned bolts are designated by their nominal thread size. The turned bolt body shall be 1.6 mm larger in diameter than the nominal size specified and shall have an H7/h6 fit with reamed holes. Bolt head and nut bearing surfaces shall be flat and square with the axis of the bolt holes and shall be spot faced if necessary. The threads of turned bolts shall not be in the shear plane of the connection. Unless otherwise noted, bolt holes in machinery parts required for connecting to supporting steelwork shall be sub-drilled (in the shop) smaller than the turned bolt diameter and shall be reamed together with supporting steel either during assembly or at erection, after the parts are correctly assembled and aligned. Positive type locking shall be provided. Double heavy hex nuts are preferred. Where double heavy hex nuts are not used, heavy hex and jam nuts shall be used. Alternate locking methods shall be submitted to SMPK for approval. Turned bolts shall be installed with a hardened plain washer meeting ASTM F436M at the head and nut ends.

g) Castings

All castings shall be cleaned free of all loose sand and scale. All fins, seams, gates, risers and other irregularities shall be removed. All unfinished edges of castings shall be neatly cast with rounded corners and all inside angles shall have ample fillets. Dimensions of castings shown on the approved shop drawings will be the finished dimensions. Deviations from the dimensions and the thicknesses

of the castings, as shown on the drawings, will not be permitted to exceed such amounts as will, in the opinion of SMPK , impair the strength of the casting as computed from the dimensions shown. Warped or otherwise distorted castings, or castings that are oversize to such an extent as to interfere with the proper fit with other parts of the machinery, will be rejected. All castings shall be manufactured in accordance with ASTM A781 and shall be tested for internal defects using the applicable examination method prescribed under Supplementary Requirements of ASTM A781.

h) Welding

Welding required for machinery shall comply with the AASHTO/AWS Code D1.5M/D1.5 , current edition. Welded steel machinery parts shall be given a stress relief heat treatment prior to machining. The Contractor shall submit a schedule of the proposed stress relief heat treatment to SMPK for approval. The schedule shall include a description of the part and an explanation of the proposed heat treatment, including the rate of heating, the soaking temperature, the time at the soaking temperature, the rate of cooling, and the temperature at which the part is to be withdrawn from the chamber. Soaking times of less than one hour will not be approved. Completely test all welds used to fabricate machinery by ultrasonic inspection using the methods given by ASTM E164, according to AWS D1.5 for compression tension members, unless noted otherwise.

All structural welds shall be complete joint penetration (CJP) welds unless otherwise noted or shown on the Contract Plans. No feather edges allowed on weldments. All free edges of stiffeners, webs, and gussets must be welded.

All welding shall be by certified welders.

Welding for stainless steel shall conform to AWS D1.6.

Welding for aluminum shall conform to AWS D1.2.

Submit all weld procedures and welding qualifications prior to the start of work.

Minimum size fillet welds: Unless otherwise specified, the minimum weld size allowed is shown below:

Material Thickness	Minimum Size Fillet**
to 13 mm inclusive	5 mm*
over 13 mm to 19 mm	6.5 mm*
over 19 mm to 38 mm	8 mm*
over 38 mm to 57 mm	9.5 mm
over 57 mm to 152 mm	13 mm
over 152 mm	16 mm

* single pass weld must be used. The minimum weld shall be a 6.5 mm fillet weld.

** weld size is determined by the thicker of the two parts joined unless a larger size is required by calculated stress. The weld size need not exceed the thickness of the thinner part joined.

i) Machinery Guards and Covers

The machinery room shall be equipped with machinery guards to cover all open gearing in the machinery house including. Guards shall be constructed of Type 316 stainless steel sheet metal, stiffened and supported along all edges and intermediately as necessary to be rigid. Guards shall be capable of supporting a load of 100 kg. Easy access at maintenance points shall be provided by hinged or otherwise two-piece access. The guards shall be removable if additional access is required. Supports and fasteners shall be Type 316 stainless steel. Clearance for maintenance access to the operating machinery in the machinery room is provided below the line shafts on either side of the primary bedplate. The machinery guard supports shall be located to minimize interference with these access areas. The Contractor shall submit machinery guard details for approval.

Motor and machinery brake covers shall be supplied by the brake manufacturer as described herein.

B. Erection

- a) Erection work shall not commence until the required items have been completed and approved for installation, and until preparations by others where required have been satisfactorily completed.
- b) The Contractor shall provide personnel and supervising engineers familiar and experienced in the installation of movable bridge machinery. The Contractor shall provide all the precision equipment that may be required for the proper and accurate installation of the machinery.
- c) Prior to erection, all finished surfaces, which were coated by a rust-inhibiting coating, shall have the coating removed with gasoline, benzene, or other approved solvent. While machinery parts are being erected, and work is interrupted, they shall be covered by a sound tarpaulin or other durable waterproof covering. Prevent soil and waterway contamination by appropriate containment. Collect and dispose of waste solvents, coating, and expendables per central, state, and local regulations.
- d) The machinery: motors, reducers, brakes, bolsters, shafts, couplings, ancillary electrical equipment connected to the operating machinery, bearing bolsters, tail locks, and the like shall be erected and adjusted by competent mechanics and millwrights skilled in the type of work involved. Representatives of the machinery manufacturers shall be present during final assembly. They shall be provided with all necessary precision measuring and leveling instruments as may be required. The machinery shall be erected with exactness so the various parts are truly aligned in their proper positions and, when entirely assembled, will operate smoothly without binding or undue looseness of the components.
- e) Bolt holes in structural steel for connecting machinery with turned bolts shall, in general, be drilled from the solid after final alignment of the machinery. Sufficient erection holes, sub-drilled 3 to 6 mm undersize for temporary bolts, may be used for erection and alignment of the machinery. When the machinery is aligned in its final position, full-size holes for the permanent turned bolts shall be drilled and reamed; full-size bolts installed; and the temporary bolts removed.
- f) Torques for other grades of bolts shall be proportioned to their strength and shall be indicated on the erection drawings.
- g) Torque machinery mounting bolts to 70% of their proof load value published in the applicable ASTM Standards. Include friction coefficient data for any thread lubricant with installation procedures to confirm torque magnitudes.

- h) Throughout the installation, bolts and nuts shall be adjusted or tightened only with wrenches that fit; tightening with chisels and hammers will not be permitted.
- i) Installation and alignment of all mechanically-connected machinery and electrical equipment shall be conducted under supervision of the machinery manufacturer's field engineer.
- j) The machinery and all machine-like elements or parts shall be assembled, erected, aligned, and adjusted at the bridge site in accordance with the contract drawings, specifications, and acceptable construction practices and to the satisfaction of SMPK.

C. Field Inspection and Testing

All field testing and alignment verification shall be performed in the presence of SMPK for at least two weeks prior notification to be given to SMPK.

a) Main Operating Machinery

- i.) The motors shall be aligned to the reducer input shafts within the installation requirements of the coupling manufacturer. Adjustments to the motor alignment shall be made with stainless steel shims. The motor turned bolts shall not be installed until motor alignment is demonstrated and accepted.
- ii.) The motor brakes shall be aligned to the brake drums within the installation requirements of the brake manufacturer. Adjustments to the motor brakes shall be made with stainless steel shims. Brake functionality shall be tested to demonstrate that the shoes have clearance with the brakewheel when the brake is energized, and that the shoes contact the brakewheel when the brake is de-energized. All limit switches shall be actuated and/or de-actuated properly when the brake operates.
- iii.) Alignment of the new pinions with their mating gears shall be demonstrated by taking backlash measurements and by using layout dye to observe gear tooth contact. The goal of the gear alignment should develop 70% face contact, centrally disposed, on the gear teeth. SMPK shall establish acceptability criteria based on the existing condition of the G2 gears that are to remain and which will mate with the new P2 pinions.

b) Passive Center Locks

- i.) The center locks shall be adjusted to have the specified total combined top/bottom clearance with the diaphragm on the opposite leaf. The clearance shall be consistent across the width of the locks.

D. Span Drive Motors, Couplings, and Motor Brakes Replacement

- a) The span drive electric motors and motor brakes shall be replaced. Two new electric motors shall be installed per leaf and operate together to move the bascule leaves at full speed.
- b) The new electric span drive motors shall be 45 kW, 1500 rpm motors. The Contractor shall verify the motor power and speed requirements to meet AASHTO prime mover sizing requirements. See electrical requirements herein for motor specifications.
- c) The existing hydraulic units shall be removed. The new motors shall be installed so that they couple to the enclosed gear reducer high speed shafts either directly, or through an adapter to accommodate the brake wheel.

- d) The existing bedplate shall be modified or replaced to suit the new motor and brake geometry. The new bedplate shall be sized according to AASHTO design loads for machinery supports. The motors shall be mounted to the bedplate with turned bolts.
- e) New shims, minimum 6 mm nominal thickness, shall be provided for the new motors and motor brakes to provide alignment adjustment. Allowance for these shims shall be made in the new or modified machinery supports.
- f) The Contractor shall calculate the span drive motor brake torque requirements per AASHTO braking requirements. The brake size shall be chosen so that the torque setting is approximately 60-80% of the max torque capacity of the brake.
- g) Span drive motor brakes shall be electro-hydraulic thruster type, Mill Duty series drum brakes. The brakes shall be thruster-released when energized, and spring-set when deenergized. Each brake shall have a low force hand release lever that will permit release of the brake without energizing the thruster motor. The lever shall be mounted on the side that provides the easiest access for use. Brakes shall be adjustable to independently regulate the time for setting of the brake. One brake shall be provided for each drive motor (2 total). The motor brake wheels shall be mounted and keyed to the enclosed gear reducer high speed shafts, or to special shaft adapters mounted to the reducer high speed shafts, as detailed by the Contractor. Each brake shall be factory set for the calculated braking torque. The brakes shall be furnished with an auto-equalization assembly designed to ensure that the shoes maintain equal alignment, positive and equal braking action and equal lining wear. The brakes shall be supplied with stainless steel pivot pins, bearings at all main pivots, and any other optional features necessary for corrosion protection. The brakes shall be painted with a finish coat of Federal Safety Orange, as specified in ANSI Z535.1, prior to final assembly.
- h) The motor brakes shall operate at 400 volts AC, 3 phase, 50 Hz. Each motor brake shall be equipped with three separate limit switches for interlocking span control supervision and indications. Two brake limit switches shall provide for sequence interlocking on span control operation and for indication of the set and release status of the brakes. The other brake limit switch shall provide for lock-out of the span control circuitry when any brake is hand released and for indication. Brake Limit switches shall be lever-arm actuated type, spring return, NEMA 4X rated, oil-tight, DPDT, with contact ratings as required for control indications, furnished and mounted on each brake frame by the manufacture.
- i) Each motor brake shall operate on a brakewheels that are a standard product of the selected brake manufacturer. The brakewheels shall be bored and keyed for the shaft onto which they are mounted. The hub and key fits shall be as described herein. All exposed surfaces shall be painted as specified in the Steel Cleaning and Painting section herein.
- j) The motor brakes shall be supplied with a set delay valve. Brake set delay shall be initially set at 3 seconds. This delay may be adjusted in the field at the discretion of the SMPK.
- k) Each motor brake shall have the manual low force brake release lever mounted on the side of the brake that provides the most access for operation.
- l) Provide each motor brake with a Type 3R stainless steel brake cover, with slots for drive shafts, and access to brake release lever without removal of cover. The cover shall have a hinged lid for inspection purposes. Motor brake covers provided shall not interfere with the primary parallel shaft speed reducer output shaft couplings existing machinery components including brake limit switches and wiring.
- m) The motors shall couple to the reducer high speed shafts with new gear couplings.

- n) The Contractor shall select new couplings to satisfy the mechanical component sizing requirements in AASHTO. The new couplings shall be double engagement gear couplings, bored and keyed to match their mating shafts. Bore and key fits shall be as stated in the Fits and Finishes requirements herein. The coupling hub bore shall not exceed the manufacturer's max allowable hub bore for hubs with keyways and interference fits.
- o) The couplings shall be made of forged alloy steel, have exposed bolts, curved face teeth, and provide for at least a 3/4-degree misalignment per gear mesh during operation. Installation misalignment should be limited to no more than 1/8 degree per gear mesh.
- p) Gear-type couplings shall be the standard product of an established manufacturer.
- q) Coupling hubs shall be bored by the coupling manufacturer to the required size and tolerances, including keyways, and each hub shipped to the proper location for installation on its shaft by the manufacturer of the connected component or by the Contractor's machine shop.

E. Enclosed Gear Reducer Repairs

- (a) The lubricating oil circulation pumps shall be replaced.
 - i.) The new circulation pumps shall be in-kind to the existing, or pumps of similar construction, capacity, and flow rate.
 - ii.) Any damaged or leaking piping and/or fittings for the oil circulation system shall be replaced in kind.
 - iii.) See electrical specifications for circulation pump operating requirements.
- (b) The enclosed gear reducers shall be flushed and filled with new oil according to the following sequence:
 - i.) Drain existing lubricating oil and fill with flushing fluid.
 - ii.) Circulate the flushing fluid so that all of the existing oil is suspended and removed with the flushing fluid. Use a wand sprayer to rinse the internal walls of the reducer that the lubricating oil does not normally contact.
 - iii.) Drain the flushing fluid and fill with rinsing fluid.
 - iv.) Circulate the rinse fluid so that all of the flushing fluid is suspended and removed with the rinse fluid. Use a wand sprayer to rinse the internal walls of the reducer.
 - v.) Drain the rinsing fluid and fill with new lubricating oil. The oil shall be filled to the level indicator on the reducer housing.
- (c) The flushing fluid, rinsing fluid, new lubricating oil, and full flushing procedure shall be submitted to SMPK for approval.
- (d) All reducer shaft seals shall be replaced in-kind while the coupling hubs are removed and the reducer is empty of oil. New seals shall match existing in type, quantity, form, and function. Any wear on the shaft seal areas shall be polished smooth for the new seals. Any damage to the shaft in the seal area shall be repaired using a thermal spray coating. The Contractor shall select an appropriate material and application process for this application.

F. Open Gear Replacement

- (a) Two of the span drive operating pinions shall be replaced, as designated on the Plans.
- (b) The shafts for the pinions that are to be replaced shall be carefully removed from the bearings, and the pinion shall be removed from the shaft without causing damage to the shaft.
- (c) The new pinions shall be bored and keyed to match the existing shaft. Fits for the bore and keyways shall be as stated in the Fits and Finishes requirements herein.
- (d) The new pinions shall match the existing gear geometry, pressure angle, and tooth form.
- (e) The teeth of all gears shall be cut from solid rims or blanks. The sides and peripheries of all gears shall be finished, and the pitch circle for all open gearing shall be scribed on both sides not less than 0.5 mm deep, with a V-pointed tool. The working surfaces of all gear teeth shall be true to the proper outline, accurately spaced on the true pitch circle, exceptionally smooth, and free from plane or milling-cutter ridges. Cutter burrs shall be removed from all edges of the teeth, and the top edges of all teeth shall be rounded to 0.8 mm radius.
- (f) Except as otherwise provided herein or on the plans, all gears shall be cut and mounted to meet requirements for accuracy of the ANSI/AGMA Standard 2000-A88 (or most recent edition), Gear Classification and Inspection Handbook. The AGMA quality number shall be stated on the applicable shop drawings. Open gearing shall conform to minimum AGMA Quality No. 8. Gearing in enclosed gear reducers shall conform to AGMA Quality No. 10 or higher.
- (g) Pinion and rack gears shall have 20-degree involute, full depth, cut teeth in accordance with the proportions of AGMA standards for coarse pitch spur gears, unless otherwise specified herein or shown on the drawings.
- (h) The new pinions shall be installed and aligned by a gear expert and to the approval of the SMPK. The gearing expert shall meet the requirements of accuracy in mounting from ANSI/AGMA 2000-A88 based on gear size and quality. Extreme caution shall be exercised so that over-engagement does not occur at any time. Tooth contact area shall be a minimum of 70% of face width and centrally disposed.
- (i) The installation and alignment procedure for the new pinions shall be submitted to SMPK for approval.
- (j) Following installation of the new pinions, any damaged or missing gear covers shall be replaced. New covers shall meet the requirements stated in the Machinery Guards and Covers clause herein.

G. Coupling Replacement

- (a) All couplings for the cross shafts between the enclosed gear reducer and the open gearing shall be replaced, as indicated on the Plans.
- (b) The Contractor shall select new couplings to satisfy the mechanical component sizing requirements in AASHTO. The new couplings shall be single engagement gear couplings, with centering disks, bored and keyed to match their mating shafts. Bore and key fits shall be as stated in the Fits and Finishes requirements herein. The coupling hub bore shall not exceed the manufacturer's max allowable hub bore for hubs with keyways and interference fits.
- (c) The couplings shall be made of forged alloy steel, have exposed bolts, curved face teeth, and provide for at least a 3/4-degree misalignment per gear mesh during operation. Installation misalignment should be limited to no more than 1/8 degree per gear mesh.
- (d) Gear-type couplings shall be the standard product of an established manufacturer.

- (e) Coupling hubs shall be bored by the coupling manufacturer to the required size and tolerances, including keyways, and each hub shipped to the proper location for installation on its shaft by the manufacturer of the connected component or by the Contractor's machine shop.
- (f) The new couplings shall be installed such that the flexible hub is mounted to the cross shaft, and the rigid hub is mounted to the reducer shaft and open gearing shaft.

H. New Machinery Brakes

- (a) Two new machinery brakes shall be installed per leaf on the cross shafts between the enclosed gear reducer and the open gearing assemblies, as indicated on the plans.
- (b) The machinery brakes shall meet the same requirements set forth above for the motor brakes. The machinery brakes shall be of the same manufacturer as the motor brakes.
- (c) The Contractor shall select brake models that provide sufficient braking torque to meet AASHTO brake sizing requirements.
- (d) The Contractor shall design new steel supports for the machinery brakes, sufficiently rigid to resist deflection under braking load. The new supports shall be mounted to the existing steel structure of the machinery room floor. This connection shall be designed as a fixed, structural connection.
- (e) The interface between the machinery brakes and the new steel supports shall incorporate 6 mm nominal thickness shims to provide alignment adjustment.
- (f) The existing cross shaft shall be modified for installation of the new brakewheel. The shaft shall be machined to provide an H7/s6 fit with the brakewheel, and shall incorporate a keyway sized for the full braking torque.
- (g) The brakewheel shall be solid and installed from the end of the cross shaft. Split brakewheels will not be accepted.

I. Tail Locks Refurbishing

- (a) The tail locks shall be cleaned of all accumulated debris and excess lubrication on the external components.
- (b) The tail lock enclosed gear reducers shall be drained, flushed, and filled with new lubricating oil. A similar procedure used for flushing the span drive enclosed gear reducer shall be used for the tail lock reducers.
- (c) Drive chains for the tail lock rotary cam limit switches shall be replaced in-kind with new chains. The new drive chains shall be the same size and pitch as existing to mate with the existing sprockets. A riveted master link shall be included with each chain to prevent inadvertent disconnection of the master link. Add fresh lubrication to all maintenance points after cleaning.
- (d) Test operate tail locks through at least 10 cycles.

J. Passive Center Locks Component Replacement

- (a) The existing passive center locks and surrounding structure shall be cleaned completely of accumulated debris and old lubricant.
- (b) The Contractor shall replace the passive span lock wearing plates, shims, and fasteners.

- i.) The new wearing plate dimensions shall match the existing, and shall have an elongated chamfer at the leading edge to allow smooth engagement with the tongue casting.
- ii.) The steel for the new plates shall, at a minimum, meet the requirements specified for the structural steel. The Contractor shall give consideration to using abrasion resistant steel when selecting the wearing plate material.
- iii.) The new wearing plates shall accommodate countersunk fasteners to allow the bolts to pass through the wearing plates, shims, and supporting steel and be secured with double nuts or prevailing-torque nuts. Countersunk heads shall be recessed below the top of the steel plate. New shim packs with at least 6 mm nominal thickness, adjustable to 0.5 mm increments, shall be installed to allow adjustment of the clearance between the jaw and the tongue casting.

K. Live Load Bearing and Center Lock Adjustments

- (a) The live load bearings and passive center locks shall be adjusted in sequence to provide proper alignment of the roadway and bascule leaves.
- (b) Following fabrication and installation of new live load shoe and center lock components, adjustments shall be performed as follows:
 - i.) The center lock jaws shall be adjusted to have a total combined top/bottom clearance of 0.6 mm to 0.8 mm with the mating tongue castings. The shim adjustment shall also ensure the elevation of the roadway surfaces of the two leaves are within 5 mm of each other when the locks are engaged.
 - ii.) The live load bearing adjustment shall be performed in a span heavy balance condition.
 - iii.) With the span in the seated position, and with the brakes released so that there is no residual torque in the drive machinery, the live load bearings shall be adjusted so that all four bearings contact their strike plates evenly. Contact shall be defined as refusal when inserting a 0.08 mm feeler gauge. All four live load bearings must have contact at the same time with the bascule leaves seated.
 - iv.) Live load bearing contact shall be even across the surface. The contractor shall utilize tapered or stepped shims as necessary to provide even bearing. The largest allowable shim step shall be 0.25 mm.
 - v.) Any adjustments to the tail locks necessitated by the live load bearing adjustments, shall be made after the center lock and live load bearing adjustments have been completed.

L. Span Balance Adjustment

- (a) The balance condition of both leaves is currently in an extreme counterweight-heavy condition (bridge tends to raise when seated), and the quantity of balance blocks in the counterweight pockets is unknown. The Contractor shall develop balance adjustment plans to create a final span balance condition described herein.
- (b) The Contractor shall perform strain gauge balance testing, as described below, to determine the existing balance state of the bridge.
- (c) The Contractor shall permanently add weight to the toe end of the bascule leaves to achieve the required balance condition. Consideration of the balance angle shall be taken when determining the location of the added span weight.

- (d) Sufficient weight shall be added to the toe so that the minimum quantity of balance blocks remains in the counterweight pockets once the bascule leaves are in their final balance condition. The minimum number of balance blocks shall be as required by AASHTO.
- (e) The Contractor shall perform a final strain gauge test following the balancing work to demonstrate the final balance condition.
- (f) Required Balance Condition

- i.) The balance of the bascule leaves shall meet the following requirements (all reactions listed are dead load only, no live loading):
 - 1. During Construction, Bridge Operation Not Permitted. Bridge is in the Closed Position, with Tail Locks Engaged. Ensure the bascule spans are span heavy, with a minimum positive toe reaction of 7,000 N with the bridge in the closed position. The center of gravity must be between -70 degrees and +70 degrees with the leaf in the closed position.
 - 2. During Construction, Bridge Operation Permitted. Ensure the bascule leaves are span heavy in the closed position, with a positive toe reaction between 7,000 N and 26,000 N. The center of gravity must be between -40 degrees and +40 degrees with the leaf in the closed position. Ensure the maximum imbalance torque of the span does not exceed 650,000 Nm at any position.
 - 3. Final Balance Condition of Bridge Following Construction. Ensure the bascule spans are span heavy in the closed position, with a positive toe reaction between 11,000 N and 13,000 N. The center of gravity must be between -20 degrees and +20 degrees with the leaf in the closed position. Ensure the maximum imbalance torque of the span does not exceed 340,000 Nm at any position.

(g) Strain Gauge Balancing

- i.) The Contractor is responsible for determining the balance conditions of the bascule leaves by utilizing the strain gauge procedure described below. Strain gauge balancing of the bascule leaves shall be performed by the Contractor after preliminary balance adjustments to the span and/or counterweight have been made, and after all construction is completed. Exercise the bascule span through a minimum of 3 full operating cycles prior to strain gauge balance testing.
- ii.) Two bi-axial strain gauge rosettes shall be mounted on machinery shafts at each corner of the bridge, configured in such a way as to cancel the effects of bending, so that only torsional strain in each shaft is being measured. Strain in each shaft shall be continuously measured by a data acquisition system. The lift height of the bridge shall be simultaneously recorded by the same data acquisition system as the shaft strain.
- iii.) Prior to performing strain gauge measurements, the Contractor shall submit full documentation of the proposed procedure, including instrumentation equipment, strain gauge mounting and wiring arrangements, method for zeroing static torque, and specific formulas and equations to be utilized for data analysis. The method of measuring and determining lift height shall be completely detailed in this documentation. This documentation shall be submitted to SMPK for review and approval.
- iv.) Prior to recording strain, the strain readings shall be zeroed and all static torsional loading shall be relieved from the machinery. The Contractor shall

submit the proposed procedure to relieve the static torque to zero strain gages.

- v.) Strain gage measurements shall be taken only on a dry, calm day, with wind loads less than 15 kph, when there is no extraneous equipment, debris, rainwater, ice, snow, or other material on the bridge that would affect the balance of the span.
- vi.) The lift span shall be tested through at least three (3) complete operational cycles powered by a main motor and a permanent record of each test shall be maintained.
- vii.) The Contractor shall submit a report of the results of the balance determination. From the strain data, shaft torque and bridge imbalance, per leaf, shall be computed and plotted against angle of opening from fully seated to fully raised, and from fully raised to fully seated. A plot of raw data strain against span angle shall also be included. Also included in the results presentation shall be a discussion on the peak operating torques as a percentage of the full load motor torque (when they occur and their magnitude) and system friction.
- viii.) If the final balancing results indicate that an acceptable final balance condition has not been obtained after adjustments have been made, the Contractor shall make additional adjustments and repeat the balance testing as required until the desired balance conditions have been achieved.
- ix.) Additional balance weights shall be furnished by the Contractor as specified herein. Any new blocks shall match size, shape, material, and weight of the existing balance blocks.
- x.) The testing and all balance calculations and reporting shall be performed, signed, and sealed by an engineer qualified to perform bascule span balancing. The Contractor shall provide evidence of successful strain gage balancing experience on a minimum of three (3) bascule bridges within the previous five years. A complete test procedure, along with the resume of the Professional Engineer conducting the tests, shall be submitted for review and approval by SMPK prior to the initial balancing test.

4. DESIGN REQUIREMENTS

4.1. REFERENCE STANDARDS

Portions, or all, of certain recognized industry or association standards or specifications, referred to herein as being a requirement, shall be considered as binding as though reproduced in full herein unless supplemented and/or modified by more stringent requirements. Unless otherwise stated, the referenced standard or specification is that version which is current as of the date of the Technical Proposal. The following abbreviations shall be used to designate standard specifications for material and workmanship:

- | | |
|--|------|
| (a) American Association of State Highway and Transportation Officials | |
| AASHTO | |
| (b) American Concrete Institute | ACI |
| (c) American Gear Manufacturers Association | AGMA |
| (d) American Iron and Steel Institute | AISI |
| (e) American National Standards Institute | ANSI |
| (f) American Society of Mechanical Engineers | ASME |
| (g) ASTM International | ASTM |

(h) American Wire Gauge	AWG
(i) American Welding Society	AWS
(j) Electrical Apparatus Service Association	EASA
(k) Electronic Industries Alliance	EIA
(l) Bureau of Indian Standards (Electrical)	BIS
(m) Federal Communications Commission	FCC
(n) Insulated Cable Engineer's Association	ICEA
(o) International Electrotechnical Commission	IEC
(p) Institute of Electrical and Electronics Engineers	IEEE
(q) Illuminating Engineering Society	IES
(r) International Plumbing Code	IPC
(s) International Telecommunication Union	ITU
(t) Joint Industrial Council	JIC
(u) Manual on Uniform Traffic Control Devices	MUTCD
(v) National Electrical Code of NFPA	NEC
(w) National Electrical Manufacturers Association	NEMA
(x) National Electrical Testing Association, Inc.	NETA
(y) National Electrical Contractors Association – Standard for good workmanship in Electrical Construction	NECA
(z) National Electrical Safety Code	NESC
(aa) National Fire Protection Association	NFPA
(bb) Electrical Safety in the Workplace	NFPA 70E
(cc) National Lubricating Grease Institute	NLGI
(dd) Occupational Safety and Health Administration	OSHA
(ee) SAE International	SAE
(ff) Society for Protective Coatings	SSPC
(gg) Telecommunication Industry Association	TIA
(hh) Underwriters' Laboratories, Inc.	UL

4.2. DESIGN CRITERIA

- A. Design loads shall be in accordance with AASHTO LRFD Bridge Design Specifications and AASHTO LRFD Movable Highway Bridge Design Specifications, current editions, unless noted otherwise.
- B. Design shall be in accordance with the Load and Resistance Factor Design methodology.
- C. The design service life of all repairs shall be 75 years.
- D. The Contractor shall provide maintenance of traffic as required. Maintenance of traffic shall be in accordance with all Central, State, and Local laws, rules and regulations.

5. SUBMITTAL REQUIREMENTS

5.1. GENERAL

All design and constructions submittals shall be made in accordance with the Project Special Provisions, Design-Build Submittal Guidelines and these Minimum Technical Requirements. All design and construction submittals shall be identified on the Critical Path Method (CPM) schedule.

All submittals shall be provided in English.

5.2. DESIGN SUBMITTALS

Design submittals for all components of the rehabilitation, including all items covered under these Minimum Technical Requirements, shall be submitted as described herein:

- A. Preliminary Design Calculations, Plans and Special Provisions (60% level of design)
- B. Final Design Calculations, Plans and Special Provisions (90% level of design)
- C. Release for Construction (RFC) Design Calculations, Plans and Special Provisions (100% level of design)

All comments pertaining to the Design Calculations, Plans and Special Provisions (Preliminary and Final) shall be resolved to the SMPK's satisfaction prior to the RFC submission.

Additional detailed design submittal requirements as included throughout other sections of these Minimum Technical Requirements.

For each submittal milestone, electronic documents in PDF format shall be submitted.

Design calculations shall demonstrate design compliance of all elements to the requirements of all applicable specifications including these Minimum Technical Requirements. Design Calculations shall be submitted prior to or concurrently with Plans of the same level. Preliminary Design Calculations shall be commensurate with the level of design development presented in the Preliminary Plans and Preliminary Special Provisions. Final Design Calculations shall be prepared, signed and sealed by an Engineer qualified to perform this work.

Preliminary, Final and RFC Plans shall conform to these Minimum Technical Requirements. RFC Plans shall be signed and sealed by an Engineer qualified to perform this work.

Preliminary, Final and RFC Special Provisions shall conform to these Minimum Technical Requirements. RFC Special Provisions shall be signed and sealed by an Engineer qualified to perform this work.

Each milestone submission from the Contractor will be reviewed within 3 weeks of receipt to ensure compliance. If any part of the Design-Build Team's design is not allowed, it will be rejected and they will be required to revise and resubmit.

These submissions or the resulting review comments do not relieve the Contractor from the responsibility to deliver an RFC package that is free of errors and omissions.

5.3. CONSTRUCTION SUBMITTALS

Construction submittals shall conform to the requirements of this section. Additional detailed construction submittal requirements are included throughout other sections of these Minimum Technical Requirements.

Prior to submitting to the SMPK, each submittal from the Contractor shall be reviewed and approved for compliance with the Contract requirements by the Engineer of Record as evidence by signature and date of review and stamp or annotation to this effect on each page or sheet of the submittal. The SMPK will review the submittals for compliance with these Minimum Technical Requirements but will not relieve the Engineer of Record of their liability of the design.

All submittals shall be provided in English.

A. Manufacturer's Certificates

- (a) When required, the Contractor shall submit manufacturer's certificates for review. Certificates may be recent or previous test results on material or product, but shall be acceptable to SMPK.
- (b) The Contractor shall indicate that material or product conforms to or exceeds specified requirements and submit supporting reference data, affidavits, and certifications as appropriate.

B. Manufacturer's Instructions

- (a) When specified in the Contract Documents, the Contractor shall submit manufacturer instructions for review and approval.
- (b) The Contractor shall identify conflicts between manufacturer instructions and the Contract Documents and submit resolution for review and approval.

C. Shop Drawings / Working Drawings

- (a) Shop drawings for components or elements of a system or assembly shall be grouped as a single submittal.
- (b) The Contractor shall provide in the title block of all shop drawings the Project Number, the Bridge Name, and Bridge Number.
- (c) The Contractor shall submit electronic drawings in PDF format and full-size drawings for those items requiring construction from such drawings. The Contractor shall provide descriptive leaflets for standard catalog items that are mass-produced. Minimum acceptable drawing size is 11 by 17 inches.
- (d) Before preparation of shop drawings for new components that must mate with the existing structure, the Contractor shall obtain all necessary field dimensions to provide proper fit of the new components.
- (e) The Contractor shall clearly identify all dimensions shown on the shop drawings which were obtained by field measurements.
- (f) The Contractor shall include manufacturer test data, certified by the manufacturer, and identify the application for which they are proposed.
- (g) The Contractor shall mark standard drawings showing more than one model or size, to indicate the model or size proposed.
- (h) The Contractor shall submit shop drawings of cabinets containing electrical equipment and include outside dimensions, areas for conduit penetrations, one-line and three-line diagrams, wiring diagrams, schematic and interconnection diagrams, terminal block arrangements and numbers (if such terminal blocks are intended for connection in the field) and operating instructions.
- (i) The Contractor shall provide layout drawings and geographic diagrams for the complete electrical systems.
- (j) The Contractor shall submit shop drawings when installation and mounting details of switches, fixtures, and devices are different from or not specifically detailed on the RFC Plans.
- (k) The Contractor shall submit field/factory test procedures and reports for electrical and mechanical equipment for SMPK's review and approval.

D. Samples

- (a) The Contractor shall submit for inspection, where specified in the RFC Special Provisions and in these Minimum Technical Requirements, or if requested by SMPK , at no cost to the SMPK, samples and support data of the proposed items and substitutions.
- (b) The SMPK will not be liable for any materials purchased or work done or any delay incurred prior to their review.
- (c) Failure of the Contractor to note unsatisfactory materials as received is not a relief from responsibility.

E. Product Data

- (a) Product data shall be clearly marked to identify applicable products, models, options, and other data. Supplement manufacturers' standard data with information unique to this project. Product data shall be referenced to the applicable Special Provision(s) clearly identified.

F. As-Built Plans

- (a) A complete set of As-Built Plans shall be submitted representing the As-Built project and identifying all modifications from the RFC Plans. As-Built Plans shall be produced and submitted in the same format as RFC Plans, documenting all modifications as revisions annotated on applicable Plan sheets. All As-Built Plan sheets shall contain a stamp indicating "As-Built" regardless if revisions were made to the Plan sheet.

6. QUALITY CONTROL, ASSURANCE PLAN AND INSPECTION

6.1. GENERAL

The whole contracted work will be inspected by SMPK/ 3rd party (Appointed by SMPK) at the works of successful Bidder during manufacturing and / or on final product as well as at site to ensure conformity of the same with the acceptable criteria of technical specifications, approved drawings, manufacturing drawings and applicable national / international standards.

The Contractor shall provide a project specific Design Quality Control Plan and Construction Quality Control Plan, for review and approval by the SMPK/ 3rd Party/SMPK's consultant at least one month prior to start of particular segment of work.

The Contractor must not perform any design until the Design Quality Control Plan is approved and no construction until the Construction Quality Control Plan is approved. SMPK/ 3rd Party/SMPK's consultant reserve the right to verify the quality programme of Bidder & its vendors/sub- vendors to assure the effectiveness of the programme to meet the intended and specified quality of the product.

Quality Control Plan must be submitted in six (6) sets for approval shall be duly stamped and signed by the successful Bidder.

The Contractor shall indicate procurement source, and furnish copies of P.O., Sub-P.O., Tender Specification, approved GA drawings/ data sheets & detailed manufacturing

drawings, as backup reference materials during submission of Quality Control Plan for scrutiny & final approval of the same by SMPK/ 3rd Party/SMPK's consultant.

Inspection and test requirements shall be decided with due consideration of relevant standards mentioned elsewhere in this Minimum Technical Requirement and factors like safety, duty cycle, operating conditions, equipment life, environmental conditions, place of installation and statutory regulations, as applicable, for a particular equipment. Any, additional type or special tests or routine tests if found necessary to establish the intended quality after detailed engineering then the same shall have to be incorporated in the Quality Control Plan without any commercial implication

Detailed Quality Control Plan shall be prepared by the Contractor in consultation with their Sub-contractors / Manufacturers to avoid any complicity later .

A. Design Quality Control

- (a) Provide quality control documentation procedures such as QC review sets and QC comments to demonstrate that cross checking of all engineering discipline's design drawings and specifications has taken place. The QC review documentation shall exhibit a checking process of the design documents for completeness, accuracy, and constructability.
- (b) Include a list of design consultants and the scope of the work which each firm will accomplish.

B. Construction Quality Control

- (a) The Contractor shall maintain and be responsible for the Quality Control of the installation of all repair work as required by this contract. The Contractor's Quality Control Manager shall perform QC inspections for all structural, electrical, and mechanical components including witnessing required testing, monitoring installation and alignment work, and ensure that all work is performed in accordance with the Contract documents, Specifications, manufacturer's installation procedures and all applicable Codes and Standards.
- (b) The Contractor's Quality Control Manager shall maintain documentation of all required testing and shall submit that documentation to SMPK in a timely manner.
- (c) The Contractor's Quality Control program shall be responsible for notifying SMPK immediately for clarification whenever any portion of the work is not clearly or accurately defined.
- (d) The contractor shall remedy defects due to workmanship, erection, materials, or design for a period of five year after final tests and acceptance have been made, at his own expense. The Contractor shall furnish a satisfactory guarantee to ensure correction of defects. If necessary, such defects may be corrected by others at expense of the Contractor if written notification is given and no satisfactory corrective action is provided after 14 days.
- (e) Perform the work to not pose any danger to persons and/or property, and, in the judgment of the Contractor, to not expose persons and/or property to any danger as a result of normal service, including normal wear and tear. Perform all work aesthetically, including neatness and cleanliness in accordance with NECA 1.

- (f) Coordinate all features, ratings, etc. of products as required to provide complete, operational, reliable, and safe system(s) and sub-system(s) in accordance with the requirements and intents of the contract.
- (g) Perform all coordination necessary to perform all work, including, but not limited to, coordination with and/or between suppliers, vendors, sub-contractors, trades, utility companies, and the SMPK. Ensure proper interfacing between new and existing electrical systems and sub-systems, and the bridge operating machinery, the bridge structure, and miscellaneous equipment.
- (h) Verify all data, dimensions, and details at the site before proceeding with any work, purchasing any items, or fabrication of any custom components. All costs and/or damages that may result from the ordering or fabrication of any items or materials prior to such verifications will be borne by the Contractor.
- (i) Fully determine the nature and location of the work, the character, quality, and quantity of the materials that are required, the nature of equipment and facilities needed preliminary to and during the performance of the work, the general and local conditions, and of all other matters which can in any way affect the work for this project. Failure to comply with these requirements does not relieve the Contractor from responsibility for completion of all specified work and is not considered cause for delay or additional payment.
- (j) All products and work, including fabrication, erection, and/or installation procedures, will be subject to inspection and testing by SMPK/TPI at all times. If any products and/or installations are found to be defective, coordinate repair or replacement at no additional cost. Under no circumstances will any inspection and/or test by SMPK/TPI, or any approval granted as a result thereof, relieve the Contractor from responsibility for full compliance with the requirements of the contract.

C. Quality Assurance

- (a) The SMPK/TPI shall, at his discretion and as he deems necessary, inspect, and verify the procedures and operations being performed during the repair work.
 - i.) Inspection. Materials and fabrication procedures are subject to inspection and testing in the mill, shop, and field by SMPK/TPI. Such inspections and tests will not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
 - ii.) Design of Items and Connections. All details shown on the contract drawings are typical and apply to similar conditions unless otherwise indicated. All dimensions and details are for Bid-Purposes only and shall be verified at the site and using erection design layouts before proceeding with any work.
 - iii.) The TPI engaged by SMPK shall be responsible for reviewing all QC records and test reports submitted by the Contractor's Quality Control Manager.
 - iv.) Certified Test Reports. As used herein, certified test reports refer to reports of tests conducted on previously manufactured materials or equipment identical to that proposed for use.
 - v.) Mill/Factory Tests. As used herein, mill or factory tests refer to tests required to be performed on the actual materials or equipment proposed for use. Results of the tests shall be submitted in accordance with the provisions of this Contract for laboratory test results.
- (b) The SMPK/TPI shall have the authority to reject materials and workmanship that do not conform to the requirements of the contract. Inspection of material and workmanship may be conducted before, during, and after fabrication, as

deemed necessary by SMPK/TPI. Materials and workmanship which are “in the process” of being fabricated and are found to contain defects, or to have been subjected to damaging fabrication procedures, shall be rejected while still in process. SMPK/TPI will have the right to perform non-destructive tests of material and workmanship. At the discretion of SMPK, QA functions may be exercised on site and at the mill and shop. The Contractor shall furnish means and assistance for testing materials and workmanship without cost to SMPK.

- (c) SMPK/TPI’s Quality Assurance (QA) program, including a review of tests reports, and mill, shop, or field inspections, will not relieve the Contractor of the responsibility for providing materials and fabrication procedures in compliance with specified requirements.
- (d) SMPK/TPI will have free and safe access at all times to any portion of shops and field where work is being done under these specifications.

7. DEMOLITION

7.1. DESCRIPTION

As stipulated in Clause no. 8 under Special Conditions of Contract in Annexure-D.

7.2. APPLICABLE STANDARDS

Comply with the standards and specifications as applicable provided elsewhere in these Minimum Technical Requirements.

7.3. GENERAL REQUIREMENTS

- A. The existing paint on the bridge structural steel may contain lead paint. A vacuum blasting system shall be used to remove localized areas of paint, as required, to use cutting torches or other methods of cutting the existing bridge components to facilitate removal. Dispose of the collected paint waste in accordance with all Central, State and Local laws, rules, and regulations.
- B. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the work within limitations of governing regulations as follows:
 - (a) Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping.
 - (b) Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - (c) Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 - (d) Maintain fire watch during and for at least 1 hour after flame-cutting operations.
 - (e) Maintain adequate ventilation when using cutting torches.
 - (f) Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

- (g) Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - (h) Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting framing.
 - (i) Dispose of demolished items and materials promptly.
- C. Protect persons, motor vehicles, surrounding structures, plants, and surrounding buildings from harm resulting from repair work.
- (a) Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
 - (b) Use only proven protection methods appropriate to each area and surface being protected.
 - (c) Provide temporary barricades, barriers and directional signage to exclude public from areas where repair work is being performed.
 - (d) Contain dust and debris generated by repair work and prevent it from reaching the public or adjacent surfaces.
 - (e) Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.
 - (f) Neutralize and collect alkaline and acid wastes for disposal off the SMPK's property.
- D. Preparation for concrete removal: Examine construction to be repaired to determine best methods to perform work safely and effectively. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed in the course of repair.
- (a) Verify that affected utilities have been disconnected and capped.
 - (b) Inventory and record the condition of items to be removed for reinstallation or salvage.
 - (c) Provide and maintain shoring, bracing, and temporary structural supports as required to preserve stability and prevent unexpected or uncontrolled movement, settlement, or collapse of construction being demolished and construction and finishes to remain. Strengthen or add new supports when required during progress of removal work.
- E. Dispose of debris and runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations and damage to landscaping.

8. OPERATION AND MAINTENANCE OF BRIDGE DURING CONSTRUCTION

The Contractor is responsible for operating the bridge any time that a bridge operation is required from the time the construction starts until all required testing and training is complete, the construction of the bridge is complete, and final acceptance of the project has been issued, including any necessary bridge operation during the bridge outage period for construction. During this time, the Contractor is responsible for maintenance of the lift span. Maintain and provide any required adjustments and corrections to all work during

construction and until all required training and the period of Contractor supervised operation is complete.

Provide at least one operator available to operate the bridge at all times during this construction phase. Maintenance of the lift span includes performing all required machinery lubrication and any adjustments or corrections required to maintain the bridge operational.

Provide at least one “on-call” individual available at all times while Contractor personnel are not working on-site. This individual must be available and able to resolve any issues that are a result of work performed by the Contractor on-site.

Deenergize electrical devices and lock-out the equipment (Lockout/Tagout) when Contractor personnel are working on-site. The bridge operating machinery must be locked out at all times by the Contractor’s Employee responsible for coordination of bridge operations unless bridge operations are required.

The Contractor will be fully responsible for all fines, fees, and damages resulting from non-compliance with the requirements of this section, caused by the Contractor work, non-compliance with applicable Central, State, and Local laws and regulations. The Contractor must immediately reimburse the SMPK for any fines, fees, and damages assessed against the SMPK due to the Contractor's activities.

9. SEQUENCE OF OPERATION

9.1. DESCRIPTION

The sequence of operation provided below is intended to describe the operation of the hardwired, relay-based control system, which shall be fully developed and provided on the Contract Plans by the Design-Build Team. The information provided does not encompass all features or safety interlocks required for full bridge operation. The Contractor is responsible for including all bypasses, safety interlocks, alarm notifications, equipment indications, and features required for full bridge operation in a safe and efficient manner.

9.2. OPERATING SEQUENCE

1. Normal Bridge Operation:

- 1.1. For normal operation, both main drive motors are utilized on each leaf to operate the span. A selector switch on the control console allows for selection of single or dual motor operation, which applies to the east and west leaf. When single mode operation is selected, the operator can select which main drive motor to run with selector selections for each leaf. When single motor operation is selected, the control system will apply the motor brake to the motor that is not desired to drive and provide motor brake set, released, and hand released indication on the control console. But machinery brakes for each leaf operate the same as during dual drive operation.
- 1.2. For normal operation, the main drive motors are utilized in full speed mode. A selector switch on the control console allows for selection of full or reduced speed. The selector switch shall control the speed of all drive motors. The span can be operated in full or reduced speed in single or both motor operation. The speed control of one leaf shall match the speed control of the other leaf.

2. Bridge operation – Automatic mode

- 2.1. Bridge operation in automatic mode shall be considered the “normal” operating mode, featuring automatic operations from the lower to raised position and vice versa. See sequence number 1 for normal bridge operation scenarios.
- 2.2. With the bridge operation mode selector switch and all motor and machinery brake selector switches in the auto position, the bridge shall operate as follows:

2.2.1 Raise Bridge:

- 2.2.1.1. Bridge operator verifies that the local e-stop button is not pressed. Control power will not turn on with e-stop energized. Pressing the e-stop or turning off control power will de-energize all motorized devices associated with bridge operation and apply the motor and machinery brakes, as described in step 7 below.
- 2.2.1.2. Bridge operator turns on control power from the control power key switch and verifies with indicator light.
- 2.2.1.3. Bridge operator verifies that no faults are present with fault indicator lights off. If faults are present, bridge operation will not proceed. refer to section 8 below for list of faults.
- 2.2.1.4. Bridge operator manually changes the east and west approach traffic signals from green to red via the traffic signals selector switch. Both traffic signals are controlled by one switch and verified by indicator light.
- 2.2.1.5. Once traffic has stopped clear of the bridge, the operator momentarily presses the horn pushbutton to sound the horn indicating that an operation is imminent.
- 2.2.1.6. After the warning horn sounds, the operator performs a visual inspection of the roadway, verifying that no obstructions are present.
- 2.2.1.7. The operator pulls the east and west tail locks with the corresponding selector switch. Each lock automatically stops when it trips the pulled limit switch. Tail lock position shall also be controlled by the rotary cam limit switch located on each tail lock platform.
- 2.2.1.8. For each leaf, when both tail locks have been verified to be pulled via indicator lights, the leaf permissive light turns on, and the control system enables the leaf’s two main drives.
- 2.2.1.9. When all four tail locks are pulled and both leaf permissive lights are on, the bridge run permissive illuminates. The operator momentarily turns the span auto control switch to the raise position to latch the raise command, indicated by the east and west drive raise lights on the console.
- 2.2.1.10. All drives receive the raise span command and the oil circulation pumps turn on.
- 2.2.1.11. When the drives have been confirmed to be enabled and running, the motor and machinery brakes for the corresponding leaves are released. Indicator lights on the control console show the set, released, or hand released status of the brakes. The main drive motors will not proceed

to raise until all brakes have been released and all tail locks are pulled.

- 2.2.1.12. The drives for both leaves accelerate the motors and run at a creep speed until the leaves are above the locked passive span locked position, approx. 1.2 degrees. The rotary cam limit switch and lever arm limit switches on each leaf shall confirm that both leaves are moving in unison to prevent collision between passive center lock jaw and tongue casting.
- 2.2.1.13. The drives for both leaves accelerate to full speed when above the locking position.
- 2.2.1.14. At nearly open, approx. 60 degrees, the drives for both leaves decelerate to creep speed and indication is provided on the control console for each leaf.
- 2.2.1.15. The rotary cam limit switch contact(s) shall enable the deceleration fault detection circuit and create a fault if the span speed is above predetermined threshold, indicating that the span is not decelerating. If a deceleration fault is detected, the drives on both leaves shall be disabled and the motor and machinery brakes shall set. Deceleration fault shall be indicated on the control console.
- 2.2.1.16. At fully open position, approx. 66 degrees, the drive raise command deactivates for both leaves. The motor and machinery brakes are set, the oil circulation pump turns off, and the raising operation is complete. Each leaf fully open indicator light illuminates and the span navigation lights switch from red to green.
- 2.2.1.17. The rotary cam limit switch on each leaf shall detect span overtravel and create a fault if the span reaches approx. 68 degrees, indicating that the span fully open limit switch is not functioning. Overtravel shall be indicated on the control console.
- 2.2.1.18. The bridge is fully open for marine traffic.

2.2.2 Lower Bridge:

- 2.2.2.1. The operator visually checks the waterway that all marine traffic is clear from the bridge.
- 2.2.2.2. Operator uses the navigation horn push-button to alert marine traffic that the bridge will be closing.
- 2.2.2.3. The operator momentarily turns the span auto control switch to the lower position to latch the lower command, indicated by the east and west drive lower indicator lights on the console.
- 2.2.2.4. All drives receive the lower span command, and the oil circulation pumps turn on.
- 2.2.2.5. When the drives have been confirmed to be enabled and running, the motor and machinery brakes for the corresponding leaf are released. Indicator lights on the control console show the set, released, or hand released status of the brakes. The main drive motors will not proceed to lower until all brakes have been released and all tail locks are pulled.

- 2.2.2.6. The drives for both leaves accelerate the motors and run at full speed. Once the leaves have lowered past the fully open position, the span navigation lights switch from green to red.
- 2.2.2.7. At 10 degrees closed, both leaves decelerate to creep speed, detected by the lever arm limit switches located on the elevated counterweight platforms. Indication for both leaves reaching the nearly closed position is provided on the control console.
- 2.2.2.8. The rotary cam limit switch contact(s) shall enable the deceleration fault detection circuit and create a fault if the span speed is above predetermined threshold, indicating that the span is not decelerating. If a deceleration fault is detected, the drives on both leaves shall be disabled and the motor and machinery brakes shall set. Deceleration fault shall be indicated on the control console.
- 2.2.2.9. Both leaves proceed to lower at creep speed, passed 10 degrees. The west leaf lowers to 3.2 degrees, detected by the lever arm limit switches located on the west elevated counterweight platform. The west leaf drives disable, and the motor and machinery brakes are applied. Indication is provided on the control console for west leaf at 3.2 degrees closed.
- 2.2.2.10. The east leaf continues to lower to 1.2 degrees, detected by the lever arm limit switches located on the east elevated counterweight platform. The east leaf drives disable, and the brakes are applied. Indication is provided on the control console for east leaf at 1.2 degrees closed.
- 2.2.2.11. When the east leaf has stopped at 1.2 degrees closed, the west leaf drives enable and the brakes release. The west leaf lowers to 1.2 degrees and trips the lever arm limit switch located on the east leaf, near the south center lock. The drives disable and the brakes are applied. Indication is provided on the control console for west leaf at 1.2 degrees closed.
- 2.2.2.12. When the west leaf comes to a complete stop at 1.2 degrees, both the east and west leaf drives enable, brakes release, and lower in unison, to properly lock the passive center locks.
- 2.2.2.13. Once both leaves reach 0 degrees, detected by the lever arm limit switches located on the elevated counterweight platforms, the drives are allowed to stall for a preset amount of time. During the stall time, the motor and machinery brakes will be set, drives will disable, and the oil circulation pumps turn off. Indication is provided on the control console for each leaf at 0 degrees (fully closed).
- 2.2.2.14. Once the bridge is fully seated and the brakes are set, the operator drives the east and west tail locks with the corresponding selector switch. Each lock automatically stops when it trips the driven lever arm limit switch or the driven rotary cam limit switch contact.
- 2.2.2.15. After the tail locks have driven and indication is provided on the control console, the bridge operation is complete and the operator changes the traffic signals from red to green,

indicating that vehicular and pedestrian traffic is allowed to traverse the bridge.

3. Bridge Operation – Manual Mode.

- 3.1. Bridge operation in manual mode is utilized to manually control the tail locks, motor and machinery brakes, and drive commands. The control system shall provide all interlocks to prevent out of sequence of operation unless the bypass functions listed below are utilized.
- 3.2. The control system shall limit the drive speed during manual mode to reduced speed.
- 3.3. The leaf manual operation - raise and lower selector switches can be released at any point during an operation to perform a normal stop of the bridge. If the leaves are within the passive center lock locking threshold (less than 3 degrees) both leaves will automatically stop if one of the leaf manual operation - lower selector switches is released.
- 3.4. The brakes can be manually set or released while the span is immobile for testing purposes. The control system shall not allow the operator to set the brakes during a manual or automatic operation (span in motion). The control system shall not send the drive raise or lower commands unless the brakes are released, or the bypass functions are utilized. The motor and machinery brake selector switches shall remain in the auto position for the bridge to operate in manual mode.
- 3.5. Each leaf can be raised individually when they are passed the passive span lock locking threshold.
- 3.6. With the bridge operation selector switch in manual mode, the bridge shall operate as follows:

5.1.1 Raise Bridge:

- 3.6.1.1. Bridge operation shall proceed as described in steps 2.2.1.1-2.2.1.8.
- 3.6.1.2. When all four tail locks are pulled, the leaf permissive indicator lights illuminate. The operator turns the east and west manual control switches to the raise position. The operator must manually hold both selector switches in the raise position to begin the raising sequence.
- 3.6.1.3. With both switches held in the raise position, the drives receive the raise command, and the oil circulation pump turns on. bridge operation shall proceed as described in steps 2.2.1.11 – 2.2.1.15.
- 3.6.1.4. At the fully open position, approx. 66 degrees, the drives are deactivated, motor and machinery brakes are set, and the oil circulation pumps turn off. The operator releases the raise command selector switches and the raising operation is complete.

5.1.2 Lowering:

- 3.6.2.1. Bridge operations shall proceed as described in steps 2.2.2.1-2.2.2.2.
- 3.6.2.2. The operator initiates lowering by turning the east/west span manual control switches to the lower position. The operator

- must manually hold both selector switches in the lower position to begin the lowering sequence.
- 3.6.2.3. With both switches held in the lower position, the drives receive the lower command, and the oil circulation pump turns on.
 - 3.6.2.4. Bridge operations shall proceed as described in steps 2.2.2.5-2.2.2.13.
 - 3.6.2.5. Once the indicator light for leaves fully seated illuminates, the operator releases the lower command selector switches, and the lowering sequence is complete.
 - 3.6.2.6. Bridge operations proceed as described in steps 2.2.2.14-2.2.2.15.

4. Manual Drive Bridge Operation:

- 4.1. This mode of operation is intended for use in the event utility power is lost on both the east and west approaches and/or the main drive motors are non-functional. The bridge is raised and lowered manually by the hand-operated crank located near the northeast and northwest rack frame.
- 4.2. For manual drive bridge operation, the manual drive enclosed reducer is utilized to divert power from the main drive motors to the manual hand crank. The manual drive enclosed reducer, located in the machinery rooms, shall be actuated via hand lever. when actuated, local lever arm limit switches shall provide indication to the control system that the manual drive clutch is engaged via indicator light and prevent bridge operation in the event utility power is restored.
- 4.3. The hand-operated machinery brakes located in the machinery rooms shall be utilized to manually stop the span. Lever arm limit switches shall be installed on the hand machinery brake for indication to the control system that the brakes are set or released and displayed via indicator lights on the control console. The motor and machinery brakes must be hand released to operate the bridge manually.
- 4.4. Hand Machinery brake and manual drive clutch limit switches shall be integrated into the control system to prevent normal bridge operation to occur when the clutches are engaged, or the hand machinery brakes are set.
- 4.5. If the hand machinery brakes or gearboxes are actuated during an operation, the bridge will perform a normal stop, described in step 6 below.

5. Bypass Functions.

- 5.1. The following key switches shall be provided to bypass limit switches and functions for testing and/or equipment failure. Bypass functions shall interrupt the design operating sequence and be used with caution.
 - 5.1.1 Tail lock bypasses: bypass tail lock driven and pulled limit switches, as well as tail lock rotary cam limit switches.
 - 5.1.2 Brake bypasses: bypass motor and machinery brake set, release, and hand release limit switches. Bypass hand machinery brake set and release limit switches.
 - 5.1.3 Span fully open bypass: bypasses span fully open limit switches. Allows span opening if fully open limit switches fail.

- 5.1.4 Span fully closed bypass: bypasses span closed open limit switches. Allows tail locks to be driven and traffic signals switched to green if a fully closed limit switch fails.

6. Normal Stop Pushbuttons

- 6.1. The leaf normal stop pushbutton can be used at any time during a bridge operation to interrupt raising or lowering and perform a controlled stop of the span. The normal stop will decelerate and stop all drives. After the drives have stopped, all motor and machinery brakes will set. The operator shall use the auto-raise control switch to restart the drives and proceed with the operation. The drives shall accelerate to full or creep speed, dependent on bridge position.

7. Emergency Stop Pushbuttons

- 7.1. The leaf emergency stop pushbuttons can be used at any time during a bridge operation for emergency situations only. The emergency stop command will de-energize all drives and simultaneously set all motor and machinery brakes. To prevent shock loading of the machinery, a mechanical delay on the brakes shall be added to set the machinery brakes after the motor brakes are set. To reset the bridge, the operator must pull the e-stop button and restart the bridge as noted in step 6.1. An emergency stop is not advised for testing or under normal conditions.

8. Faults.

- 8.1. Major and minor faults listed below shall be latched and can only be removed by resolving the fault and pressing the fault reset pushbutton on the control console. All major and minor faults shall generate an audible alarm, noted in step 9.

8.2. Minor Faults

- 8.2.1 The bridge shall proceed with the normal stop operating sequence listed on step 6.1 if the following minor faults occur:

- 8.2.2.1. Tail lock time-out: trips when the tail locks fall out of the determined time to drive or pull the tail lock.
- 8.2.2.2. Bus monitor detects phase failure, phase reversal, undervoltage, overvoltage, and phase loss from the west and east approach utility service and creates a minor fault.

8.3. Major Faults

- 8.3.1 The bridge shall proceed with the emergency stop operating sequence listed on step 7.1 if the following major faults occur:

- 8.3.1.1. Leaf overtravel: trips when the rotary cam limit switch detects the leaf has overtraveled.
- 8.3.1.2. Leaf deceleration fault: trips when the leaves do not decelerate within the preset time/distance.
- 8.3.1.3. Drive fault: trips when the drive encounters an internal fault, such as drive overspeed via the motor mounted encoder.

9. Misc. Alarms:

9.1. An audible alarm shall be generated, and the general alarm indicator light shall illuminate for all minor and major faults listed above and the indications provided below. The audible alarm can be acknowledged and silenced with the alarm acknowledge pushbutton on the control console. The fault reset pushbutton can be used to remove the latched fault indicator light(s) (assuming the fault has been resolved).

9.1.1 Motor brake hand release

9.1.2 Machinery brake hand release

9.1.3 Hand Machinery brake set

9.1.4 High water level in counterweight pit area

9.1.5 Loss of utility power: trips when either the west or east approach utility power is lost and the Automatic Transfer Switch (ATS) switches to the active power source.

10. Interlocking

10.1. The bridge control system shall include the following interlocking to prevent out of sequence operation, assuming that bypass functions are not used:

10.1.1 Traffic signals must be red to pull tail locks.

10.1.2 Traffic signals must be red and tail locks must be pulled to enable drives and operate the span.

10.1.3 When operating on both drive motors per leaf, all motor and machinery brakes must be released to operate the span.

10.1.4 When operating on one drive motor, the deactivated drive motor brake must be set and the other released to operate the span.

10.1.5 The hand machinery brake must be released, and the manual drive clutch must be disengaged to operate the span.

10.1.6 Both leaves must be fully seated to drive tail locks.

10.1.7 Both leaves must be fully seated, and all tail locks driven to turn traffic signals green.

10.1.8 Both leaves must be fully open to turn span navigation lights from red to green.

Special Conditions of Contract**1. Security Deposit:**

Within 30 days of the receipt of the Letter of Intent from SMPK, the contractor shall furnish to SMPK, Security Deposit towards guaranteeing the performance of the contractor in execution of work as indicated in this Tender Document including guaranteeing the performance of the Bascule Bridge during Warranty Period (in terms of Clause 3 under Annexure-D) , either in the form of Demand Draft or Banker's Cheque or in the form of an irrevocable and unconditional Bank Guarantee from a Nationalized Bank of India having office in Kolkata, for an amount equivalent to 3 % of the contract price, as per the format given in the General Conditions of Contract of SMPK as enclosed with this Tender Document. Work order will be issued immediately after receipt of Security Deposit and verification of the same as per the extant rule.

In the event of issuance of the Bank Guarantee by any branch outside Kolkata, any Kolkata Branch of such Bank shall confirm the same and stand by for all the commitments under the Bank Guarantee. In all cases, any dispute regarding such Bank Guarantee will be adjudicated under the jurisdiction of The Calcutta High Court.

This Bank Guarantee should be kept valid till expiry of the warranty period with a claim period of 6(six) months thereafter. In case the contractor fails to furnish the required Bank Guarantee within the stipulated time, the contract shall be liable to be terminated and the earnest money shall be liable to forfeiture.

2. Terms of Payment:**2.1. General:**

- (i) Payment will be made to the Contractor in Indian Rupees. No foreign exchange is payable against the contract.
- (ii) All payment including refund of Earnest Money/ Security Deposit will be made through Electronic Clearing System (ECS). To facilitate payment through ECS, the tenderers will have to furnish the following information. The account shall have to be with a bank within the ECS zone prescribed by the RBI.
 - a) Name of the bank with Code No. :
 - b) Name of the Centre :
 - c) Name of the Branch with Code No. :
 - d) Bank Account No. :
 - e) Type of Account : Saving/Current/Cash Credit
(Strike out whichever is not applicable)
 - f) MICR Number :
- (iii) The contractor is required to pay income tax on all payments made to him under this contract. Accordingly, the income tax will be recovered from the contractor at source at the appropriate rate, as per relevant provision of Income Tax Act, 1961 or any amendment thereof.

2.2. Payment Stages:

Sl.No.	% of the Contract Price except GST	Milestone achieved
1.	2%	On approval of Release for Construction (RFC) Design Calculations, Plans and Special provisions w.r.t mechanical, electrical and structural system with broad Technical parameters and drawing of the scheme.
2.	8.5%	Supply & delivery of all mechanical items*
3.	25%	Supply & delivery of electrical items*
4.	5%	Supply & delivery of structural items*
7.	1.5%	Completion of Structural Rehabilitation BoQ item no. 1-13)
	4%	Completion of Mechanical Rehabilitation (BoQ item no. 14 -15)
	26%	Completion of Electrical Rehabilitation (BoQ item no. 16)
9.	8%	Commissioning of the Bascule bridge with all electrical, mechanical and structural rehabilitation work completed as per Scope of work.
10.	10%	After final taking over of the Bascule Bridge with all accessories on completion of successful commissioning and acceptance by SMPK as per Clause no. 7 of Special conditions of contract.
11.	2%	On successful completion of 1 st year of warranty
12.	2%	On successful completion of 2 nd year of warranty
13.	2%	On successful completion of 3 rd year of warranty
14.	2%	On successful completion of 4 th year of warranty
15.	2%	On successful completion of 5 th year of warranty

Note: GST as applicable will be paid against each invoice subject to Clause No. 11, 12 of Annexure-B.

* Maximum 75% of the value of material will be released on each occasion subject to fulfilling Clause no. 6.6 of G.C.C.

3. Onsite Warranty Period:

The contractor must give warranty the complete mechanical and electrical installation and performance (including all associated items, devices, equipment, and systems) to be free of defects in material and workmanship for a minimum period of five (5) years from the date of Final Acceptance and subsequent handing over of the new system to SMPK after 3 months trial operations. Any defect within this period of 5 years shall be repaired or replaced by the Contractor, including labor, parts, and transportation at no additional cost to the SMP, Kolkata.

During the warranty period, the Contractor shall also deploy one technical team consisting of one mechanical fitter one electrical fitter and one supervisor, at site during the operation period of the bridge, conversant with the entire operating system, to attend instantly to any malfunction/breakdown of the system during operation of the bridge. The bridge is expected

to be operated only once in a day during this time spanning maximum 3 hours. The above malfunction/breakdown should be attended by the onsite team and restored within a period of maximum ½ hour time. In case of default by the Contractor in deployment of the full team, proportionate deduction will be made from the payable amount of yearly 2% as stipulated in Payment Terms, and further penalty of same amount will also be deducted. *In the event of failure of the Contractor in attending breakdown and consequent out of commissioning of the bridge beyond ½ hour time, the warranty period of 5 years would be extended for the equivalent period for which the bridge remained out of commissioned due to the Contractor's said inability to attend the breakdown and rectify the same.* For the purpose of extension of Warranty period, the aggregate breakdowns in a year will be calculated and any fraction of a day will be rounded off to one day. The Contractor shall provide letters to the suppliers with copies to the SMP, Kolkata, identifying the scheduled date of Final Acceptance and subsequent handing over of the same to SMPK of the bridge and, therefore, the date the guarantee period shall begin. If the date of Final Acceptance and subsequent handing over to SMPK as mentioned hereinbefore is extended or if beyond the normal guarantee, it shall be the Contractor's responsibility to extend the commencement of the warranties from the suppliers at no cost to SMPK. The Contractor shall assign to SMPK, all manufacturer's warranties or guarantees on all such equipment, material or products furnished for, or installed as, part of the work.

Standards of performance and conditions representing failure of all items, groups of items, and systems to be used shall be clearly and explicitly indicated. The Contractor shall be responsible for ensuring that means and methods of handling, storage, installation, and protection do not violate the terms of, nullify, or otherwise compromise in any way, the manufacturer's warranty of any item, group of items or system. For each item, group of items, or system, the Contractor shall assume responsibility for fulfilling the manufacturer's obligations for the manufacturer-specified period if any action of the Contractor during construction and within the specified warranty period following Final Acceptance relieves the manufacturer of obligations to repair or replace under the terms and conditions of the manufacturer's warranty for that item, group of items, or system.

4. **Inspection:**

The total supply & installation of complete system is to be inspected by 3rd party Inspecting Agency to be engaged by SMPK. However, Contractor has to arrange the facilities for inspection. Detailed about inspection of works is given under Clause no. 6 under Scope of Work (Annexure-C).

5. **Completion period:**

The work is to be completed in all respect within 11 months from the date of placement of Work Order. Design, Engineering, Approvals and completion of rehabilitation of Bascule Bridge including test operations and training is to be completed within 10 months of placement of Work Order. Submission of final drawings, cleaning of site of all installation and test equipment and handing over is to be completed within 30 days thereafter.

The Completion period of 11 months is inclusive of the time taken for approval of the design drawings by SMPK/Consultant and time required for 3rd party inspection (To be Appointed by SMPK).

SMPK/Consultant will give their comments/approval of the design calculation /drawing within 21 days from the date of submission of the drawing and document by the successful

bidder. The procedure for third Party Inspection is given under Clause no. 6 under Scope of Work (Annexure- C)

It is desirable that during the entire period of repair, disruption to vehicular traffic as well as shipping is kept at the minimum. However, it is envisaged that there would be a marine outage of approximately three months and stoppage of vehicular traffic for one week. In addition, the contractor shall keep ready necessary arrangement for operation of the Bascule Bridge manually for facilitating shipping in the event of SMPK requiring operation of the Bridge for shipping during this period. The Contractor shall arrange and schedule his work accordingly and submit his plan as enumerated in Clause no. 26 hereinafter. Any disruption in Marine Traffic as well as Road Traffic has to be intimated to SMPK well in advance , at least one week prior to such planned disruption.

Any disruption/stoppage of work due to operational urgency/delay in giving site clearance etc. attributable to SMPK's account, shall not be counted while calculating the completion period. However, such disruption/stoppage of work/ has to be recorded in the Log book/Hindrance Register to be maintained by the Contractor which is to be countersigned by the authorised representative of the Chief Mechanical Engineer.

6. Liquidated Damage:

Applicable as per Clause no. 8 of the General Conditions of Contract of SMP, Kolkata.

7. Final Acceptance:

Upon completion of the entire project as determined by SMPK/ Third Party Inspecting Agency appointed by SMPK, SMPK/TPI as the case may be, will inspect the project for final acceptance. If all construction provided for and contemplated by the contract is found to be satisfactorily completed, the project will be accepted.

When the inspection discloses any work, in whole or in part, as being unsatisfactory or incomplete, the same will be intimated to the Contractor of such unsatisfactory or incomplete work, and the Contractor shall immediately correct, repair, or complete such work. The project will not be accepted and the Contractor shall be responsible for the maintenance of the project and maintenance of traffic until all the recommendations made at the time of the inspection have been satisfactorily completed.

SMPK/ Third Party Inspecting Agency appointed by SMPK will notify the Contractor in writing that the project has been accepted as soon as practicable after the completion of the project. When an observation period is required that extends beyond the final acceptance date, the satisfactory completion of the observation period shall be covered by the contract bonds.

The successful bidder would be required to operate and maintain the new system for a period of 3 months from the date of commissioning and during which period the staff and supervisor of SMPK to be trained for taking up the operations and maintenance over and above the training schedule as mentioned in Clause no. 3.7.6(P)(i) under Scope of Work (Annexure-C).

During this period for attending Breakdown maintenance, the contractor shall deploy maintenance staff round the clock at his own cost.

The system will be finally taken over by SMPK after smooth trouble free operation for a period of 3 months. However, the guarantee period will start only thereafter.

8. All scraps, debris and other materials, if any, arising out of the works would be required to be delivered to Trustees' sales yard or at a place as per SMPK's instruction within a distance of 5 KM at free of cost by the contractor. SMPK will provide security escort during transportation of scrap materials.
9. Facilities to be provided by SMPK for compliance of the contractual obligation by the Contractor:
 - 9.1. SMPK would provide required space, as available, free of cost to the contractor against application to SMPK.
 - 9.2. Construction power will be provided to the extent possible as per requirement on chargeable basis from the nearest available source. Rate will be charged as per maximum slab of M/S CESC Ltd. for L.T. power supply prevailing at the time of execution. However, the contractor shall indicate in advance the required load and average consumption pattern. The contractor will have to arrange required cable from the nearest source point at their own expense. The electrical work is to be carried out as per relevant rules under supervision of SCC Holder Supervisor. Additional local illumination, over & above the existing illumination is to be arranged by the Contractor, if required, at their own cost and arrangement.
 - 9.3. Water and toilet facility as available in the dock area shall be extended to the contractor free of cost.
 - 9.4. Unfiltered water from the dock basin may be taken by the contractor at free of cost. The contractor has to make bore hole for getting water for all civil construction works at their own cost.
 - 9.5. The contractor shall have to obtain required RFID Card/Tag by making necessary payment to SMP, Kolkata. However, permits for personnel and vehicles (passenger and goods) for entry inside dock premises, would be given by SMP, Kolkata free of cost against application for required number of heads and vehicles for required number of days during pendency of the contract. Free permit for goods vehicles would be given only for carrying materials required for the locomotives concerned

10. Damage & loss to private property & injury to workmen:

The contractor shall at his own expenses reinstate and make good to the satisfaction of SMPK and pay compensation for any injury, loss or damage accrued to any person, property or rights whatever including property and rights of SMPK (or Agents/servants or employees of SMPK), the injury, loss or damage arising out of or in any way in connection with the execution or purported execution of the contract and further the contractor shall indemnify SMPK against all claims enforceable against SMPK (or any Agent, servant or employees of SMPK) or which would be so enforceable against SMPK where SMPK is a private person, in respect of any such injury (including injury resulting to death), loss or damage to any person whomsoever or property including all claims which may arise.

11. **Additional Work:** It would be the responsibility of the contractor to undertake all additional works as may be required to be carried out for successful commissioning of the bridge. During execution of the contractual work, if such additional work arises, the same should be undertaken by the contractor upon receipt of approval from SMPK, in respect of cost and time required for such additional work. Granting of additional time, if required, for additional work, would be approved by the Engineer of the Contract.

However, a Committee comprising Officers of SMPK shall evaluate and certify the reasonableness of the cost for such 'Additional Work'. The contractor shall have to put up their justification before the Committee in respect of cost and the time required for additional work.

12. Termination of Contract and Risk purchase clause:

Will be applicable as per Clause no. 8 of SMPK's General Conditions of Contract.

13. Contract agreement is to be made by successful tenderer as per SMPK's General Conditions of Contract within 15 days from the date of receipt of order.

14. Custodian Certificate:

After delivery at site the supplied materials are to be verified by SMPK officials and the Custodian Certificate is to be issued by the contractor in this regard, for consumption of such materials in the instant work.

15. Special /additional security may be arranged by the contractor at the site at no extra cost to SMPK over and above the general security provided within the dock by the CISF (Central Industrial Security Force).

16. Settlement of disputes:

- 16.1. Amicable settlement : If any dispute or difference or claims of any kind arises between the Contractor and SMP, Kolkata in connection with interpretation or application of any terms and conditions or any matter or thing in any way connected with or in connection with or arising out of the contract, or the rights, duties or liabilities of the parties under the contract, then the parties shall meet together promptly at the requests of any party in an effort to resolve such dispute, difference or claim by discussions between them.

- 16.2. Arbitration: In addition to what has been stated in this tender document on this issue, the following may be noted by the tenderer:

- a) Arbitrators: Failing amicable settlement, the dispute or differences or claims as the case may be, shall be finally settled by binding arbitration under the Arbitration and Conciliation Act, 1996 including all amendments thereof. The arbitration shall be by a panel of three Arbitrators, one to be appointed by each party and the third to be appointed by the two arbitrators appointed by the parties. A party requiring arbitration shall appoint an Arbitrator in writing, inform the other party about such appointment and call upon the other party to appoint its Arbitrator and inform the party initiating such arbitration within 60 days. If the other party fails to appoint its Arbitrator, the party (initiating such arbitration) appointing Arbitrator shall take step in accordance with Arbitration and Conciliation Act, 1996, including any amendment thereof.
- b) Place of Arbitration: The place/jurisdiction of arbitration shall be in Kolkata, West Bengal, India.

17. Priority of Contract Documents:

The several documents forming the Contract are to be taken as mutually explanatory to one another, but in case of ambiguity or discrepancies, the same shall be explained and adjudicated by the Engineer of the Contract (EoC), who shall thereupon issue to the Contractor instructions thereon which will be final and binding on the Contractor. Unless otherwise provided in the Contract, if the stipulations in the various documents forming a part of the Contract are found to be in variation in any respect then, unless a different intention appears, the provision(s) of one will override others (but only to the extent these are at variance) in order of precedence as given in the list below i.e. a particular item in the list will take precedence over all those placed lower down the list:

The following documents of the Contract Agreement in the following sequence:

- a) Letter of Intent (LoI)/Work Order
- b) Special Conditions of Contract
- c) Scope of work and Terms of Payment
- d) Bill of Quantities
- e) Instructions to the Tenderer
- f) General Conditions of Contract
- g) Any other document(s) forming part of the Contract

18. Integrity Pact:

The Tenderers will have to submit on the plain paper, the duly filled-in, signed and stamped (on each page) Integrity Pact enclosed as Annexure – P along with their techno-commercial bid (Cover-II) of their offer, failing which their offer will not be considered any further. Name of the Independent External Monitors (IEMs) for this tender will be intimated to the tenderers duly.

19. Compliance to the Labour Laws and Contract Labour Regulation and Abolition Act, 1970:

The contractor shall be required to comply with the Minimum wages Acts 1948, Employees Liability Act, 1938, Industrial Disputes Act, 1938, Industrial Dispute Act, 1940 and The Contract Labour (Regulation and Abolition) Act, 1970, or statutory amendments and the modifications thereof, any other laws relating thereto and the rules made there under from time to time. It will be the duty of the contractor to abide by the provisions of the Act. Ordinances, Rules, Regulations, Byelaws and Procedures as are lawfully necessary in the execution of the works. The contractor will be fully responsible for any delay/damage etc. and keep the Engineer indemnified against all penalties and liabilities of any kind for noncompliance or infringement of such Acts, Ordinances, Rules, Regulations By-laws and Procedures.

The contractor shall indemnify the SMPK against payment to be made under or for the observance of the laws aforesaid without prejudice to his right to claim indemnity from his subcontractor.

The aforesaid regulations shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a Breach of Contract. It will be obligatory

on the part of Contractor to obtain necessary Labour License from the competent Authority for deploying requisite Nos. of labours in the work and submit to the Engineer-In-Charge prior to commencement of the work.

20. Protection of existing services:

The contractor must pay full attention to the fact that the existing service facilities for users are not distributed at any time due to storing of materials and rubbish and take every precaution to keep the entrance passage clear if the same are being used by the labourers.

The contractor shall be held liable for all damage and interference to the existing service, caused by him in execution of works. Should any damage be done to the existing services, in general, the contractor shall make good the same and any further work considered necessary by the Engineer's representative without any delay otherwise the cost of such repairing shall be recovered for his running bill for which Engineer's decision shall be final and binding.

21. Port Area Obligations:

The Dock area is a custom bounded area and as such the contractor shall comply with all regulations of the Port and Custom authorities and those that may be imposed from time to time in respect of the transit of all of contractors plants, vehicles, materials, and staff in the area. Whenever regulations so require, permits shall have to be obtained for such transit of contractor's plants, vehicles, staff and workmen. The contractor shall instruct his staff and workmen to comply with all requirements in this "Restricted Area". The contractor shall suitably fence the area that may be allotted to him inside the "Bonded Area" of the port for stores and other requirements to the full satisfaction of the Port and Security Agencies.

The contractor shall, abide by all the regulations and rules of SMPK and those that may be issued from time to time without any extra cost to the SMPK.

22. **Temporary Works:** The successful tenderer shall allow for providing labour and materials for the construction and removal of all temporary works, e.g. site office, site store, scaffolding, fencing lighting; watching, tube well and pipe lines etc. required for constructional purpose as well as for drinking water purpose of contractor's men, water supply, vats, platform, etc. as may be necessary for the successful execution, completion and maintenance of works without any extra cost to the Trustees and the rates should be quoted accordingly. No rent shall, however, be charged to the contractor for construction/erection of such temporary sheds and structures.
23. Any insurance coverage shall have to be arranged by the contractor at his own cost & liability.
24. **Personal Protective Equipment:** Personnel deployed by you should have Personal Protective Equipment as would be necessary for the given working condition.
25. **Electricity, Water and Gas:** The Contractor shall be responsible for the provision of all power, water and other services he may require for his execution of the Works.
- i.) The detailed project network schedule both in hard and editable soft copy (in MS Project) covering further details of project and construction, erection activities, area-wise, within 15 days from zero date for approval and finalisation by the Purchaser / Consultant.
 - ii.) The format of progress report shall be discussed and finalized within 15 days from zero date.
 - iii.) The progress reports in approved format shall be submitted every month.
 - iv.) Updated detailed project network schedule (in hard and soft copies) shall be submitted every month along with progress report.

26. Progress Monitoring

- i.) An effective system of progress monitoring has been evolved to ensure timely completion of all project activities. In general, progress of the following major activities is to be reported.
 - a) Issue of ordering / technical specifications and placement of orders on sub-vendors for bought out items.
 - b) Detailed design and engineering including submission of drawings and their approval and subsequent revisions and resubmissions.
 - c) Manufacturing activities at the works of the Bidders / sub-vendors.
 - d) The progress report on inspection status
 - e) Dispatch of material / equipment at site.
 - f) Site activities including receipt of material / equipment at site, erection, testing and commissioning.

A monthly progress report showing current status of various activities including status of ordered / yet to be ordered items shall be submitted to the purchaser / or his consultants by the Contractor.

The monthly progress report shall indicate progress of activities against targeted dates and targeted quantities. Reasons for shortfalls, if any, shall be clearly brought out and proposed remedial measures to arrest the delays shall be indicated by the contractor in the progress report, wherever applicable.

The contractor shall submit a schedule for site execution, along with quantitative program in terms of month-wise physical targets for various disciplines of work, 15 days before start of site activities.

After the site activities are started, the contractor shall furnish information on site activities, viz: daily, weekly and monthly progress reports for construction / erection, receipt of equipment, monthly construction / erection plan etc. The contractor shall also indicate resource deployment at site, highlights of critical areas and constraints in the site progress reports.

Other information related to site activities as may be required by the Purchaser / Consultants shall also be submitted by the Contractor.

In the interest of timely completion of the project, the area of monitoring may be altered in consultation with the Purchaser/ Consultant, if required.

- ii.) The Purchaser/Consultant shall also have the right to:
 - a) Invite the Bidder for monthly /weekly/daily meetings to review the progress of the project.
 - b) Depute Purchaser's authorised representatives for ascertaining / expediting progress at contractor's works.
 - c) Suggest remedial actions to bridge-up time gap between planned progress & observed progress.


27. Safety Regulations

- i.) The Bidder shall comply with the relevant Safety Rules and Regulations but not limited to the following:
- West Bengal State Factory Rules/ Acts.
 - Indian Electricity Acts /Central Electricity Authority(Measures relating to safety and electric supply), Regulation,2010.
 - Electricity Regulatory Commission Acts
 - Gas Cylinder Rules/ Acts
 - Carbide of calcium Rules/ Acts.
 - Fire protection manual issued by Tariff advisory committee (India)
 - Pollution Control Regulations/ Acts
 - Directorate General Factory Advice and Service and Labour Institute as per Dock workers (Safety, Health & Welfare) regulation 1990
- ii.) Strict attention shall be paid to all statutory regulations and safety rules for prevention of accidents.
- iii.) The safety posters/regulations for prevention of accidents shall be displayed by the Bidder at appropriate places. Notices and warning signs shall be displayed for all sources of dangers.
- iv.) When the work is carried out at night or in the obscure day light, adequate arrangements for flood lighting in the working area shall be made by the Bidder at his own cost and got approved by the Purchaser.
- v.) All handling / transport and rigging equipment including lifting tools and tackles shall be checked at regular intervals and kept in good and safe working condition.
- vi.) A register is to be maintained regarding the results of periodical tests/checks and other particulars in respect of each and every such equipment.
- vii.) The Successful Bidder must take sufficient care in moving his construction plant and equipment from one place to another, so that those do not cause any damage to the property of SMPK or obstruct operation/ activities of other Bidders.
- viii.) The Bidder shall depute a full time safety engineer who will exclusively look after all the jobs pertaining to safety at site and keep close liaison with SMPK/Consultant. He will be responsible for maintaining safe working conditions at site, promoting safety consciousness among the workmen and reporting to concerned authorities in case of accident/dangerous occurrences.

28. Safety in Designing of Equipment

- i.) All machinery and equipment must be equipped with safety devices. The safety provisions shall conform to the recognised standards, safety codes and statutes.
- ii.) All safety measures as required to be adopted as per the statutory regulations and the safety rules of the plant shall be strictly followed by the Bidder during the execution of the Contract.

18. All other terms and condition not mentioned separately would be governed by SMP's General Conditions of Contract Forms and Agreement as enclosed with this Tender Document.

 <p>श्यामा प्रसाद मुखर्जी पोर्ट, कोलकाता SYAMA PRASAD MOOKERJEE PORT, KOLKATA Formerly Kolkata Port Trust</p>	Syama Prasad Mookerjee Port, Kolkata				
PROJ. DRG. NO.					
Logo of Consultant	CONSULTANT <div style="text-align: center;">XXXXXXXXXX</div>				
SUPPLIER'S FORMAT					
SUBMITTED FOR	APPROVAL	INFORMATION	REFERENCE	RECORD	CONSTRUCTION

Bill of Quantities (BoQ)
(All amount in INR)
(To be quoted Online)

Item No.	Description	Unit	Evaluation Quantity	Price inclusive of all except GST(in INR)
1.	Rack Frame Repairs	LS	1	INR.....LS
2.	Rack Frame Platform Repairs	EA	4	INR.....EA
3.	Live Load Shoe Replacement	EA	4	INR.....EA
4.	Machinery House Support Repairs	LS	1	INR.....LS
5.	Cross Girder 1 & 1' Repairs	LS	1	INR.....LS
6.	Stringer Repairs	LS	1	INR.....LS
7.	Crack Repair at West Leaf Girder	LS	1	INR.....LS
8.	Heel Joint Bolt Replacement	EA	20	INR.....EA
9.	Cleaning and Painting	SM	325	INR.....PER SM.
10.	Grouting	LS	1	INR.....LS
11.	Footpath slab	LS	1	INR.....LS
12.	Handrails, Staircase and Roadway Joint	LS	1	INR.....LS
13.	General Cleaning of Bascule Piers	LS	1	INR.....LS
14.	Mechanical Rehabilitation	LS	1	INR.....LS
15.	Span Balance Adjustment	KG.	14000	INR.....PER KG.
16.	Electrical Rehabilitation	LS	1	INR.....LS
17.	Manual operation of Bascule Bridge on demand	EA	30 (approx.)	INR.....LS
18.	GRAND TOTAL price including all charges excluding GST	XX	XX	INR.....

Grand total price including all charges excluding GST (in Rupees) (In words):

Rupees _____

NOTE:

1. Evaluation will be done on the basis of Grand total price including all charges excluding GST.
2. GST will be paid extra at actual as applicable.
3. Quoted price shall be lump-sum.
4. Price should be quoted in Indian Rupee Currency.

Signature with date of the Tenderer :

Name and Designation with Seal of the Tenderer.....

Address :

LEGEND: EA = Each, KG= Kilogram, LS= Lump Sum, SM= Square Meter

Profile of the Tenderer
(for Single Entity Tenderer as well as for Joint Venture)

(On official Letterhead)

Profile of the tenderer	
Name of the tenderer	
Country of incorporation	
Address of the corporate headquarters and its branch office(s), if any in India	
Date of incorporation and commencement of business	
Brief description of the Company including details of its main lines of business and proposed role and responsibilities in connection with implementation of the tender	

Details of individual (s) of the tenderer who will serve as the point of contact for communication with Syama Prasad Mookerjee Port, Kolkata	
Name	
Designation	
Company	
Address	
Telephone no (Land line and mobile)	
E-Mail Address	
Fax Number	

Details of Authorized Signatory of the tenderer	
Name	
Designation	
Company	
Address	
Telephone no (Land line and mobile)	
E-Mail Address	
Fax Number	

Signature of Power of Attorney Holder(s):

Name:.....

Designation:

Date:

Seal:.....

Covering Letter for submission of Tender (for Single Entity Tenderer as well as for Joint Venture)

(On official Letterhead of the bidder)

Ref. No:.....

Date:

The Chief Mechanical Engineer,
Syama Prasad Mookerjee Port, Kolkata
Mechanical and Electrical Engineering Department,
8, Garden Reach Road,
Kolkata – 700043

Dear Sir,

We,(Name of the Tenderer) having carefully examined, read, understood its contents, hereby submit our tender for(name of the work) and confirm that we unconditionally accept all the terms and conditions of the tender including the Addendum (if issued). We declare that all information and proofs provided in the tender including the Addendum are true and all documents accompanying the tender are true copies of their respective originals.

2. We undertake to execute and perform the work completely in accordance with all the terms and conditions of the tender and the Addendum (if issued).

3. We declare that in our offer, there is no deviation from the terms and conditions of the instant Tender Document and the Addendum (if issued).

4. We declare that any partner/director of our company is not associated with any other firm bidding for this tender.

5. We declare that we have not altered/modified/deleted/added any terms and conditions of the tender document and the Addendum (if issued).

6. We declare that we shall make available to Syama Prasad Mookerjee Port, Kolkata additional information which may be necessary in supplementing or authenticating our tender.

7. We declare that we have not been banned/debarred/delisted by Central Govt./any State Govt. or any entity controlled by them or any other legal authority from participating in any Tender/Contract/Agreement of whatever kind. We further declare that neither we have been expelled from any project or contract nor have had any contract terminated for breach in the last 3 years ending on the date of opening of the techno commercial part of the tender.

8. We,(Name of Tenderer) hereby undertake that we shall abide by the decisions of Kolkata Port Trust in the matter of examination, evaluation and selection of successful tenderer and shall refrain from challenging or questioning any decision taken by Syama Prasad Mookerjee Port, Kolkata in this regard. We further acknowledge the right of Syama Prasad Mookerjee Port, Kolkata to reject our tender without assigning any reason or otherwise and hereby waive our right to challenge the same on any account whatsoever.

9. We declare that we shall refrain from any corrupt, fraudulent or coercive practices to influence the evaluation process of the tender.

10. We understand that Syama Prasad Mookerjee Port, Kolkata reserves the right to accept or reject any tender and to annul the tendering process and reject all tenders at any time without any liability or any obligation for such acceptance, rejection or annulment without assigning any reason thereof.

Thanking you,

Yours faithfully,

Signature of Power of Attorney Holder(s).....
Name:

Format for submitting details of Similar Work in case of Single Entity Tenderer

	Name of similar project(s)/work(s) executed successfully with Work Order/Agreement references;	Period(s) of the project(s)	Value(s) of the project(s)
Single entity			

(Please add more rows depending upon the number of similar project(s)/work(s) executed successfully)

The single entity tenderer should furnish its details in the appropriate column.

The description of each of the project(s) shall have to be provided while giving the following details:

- (i). Location of the project(s).....
- (ii). Contact details of the concerned personnel(s) of the project(s) of clients.

Name of the contact person(s)	
Designation(s)	
Address(es)	
Telephone No(s) / Mobile No(s)	
Fax No(s)	
Email(s)	

Signature of Power of Attorney Holder(s).....

Name:

Designation:

Date:

Seal:.....

CERTIFIED BY

Name of Chartered / Certified Accountant Firm

UDIN and other details

Name of the Signatory.....

Signature

Designation

Date

Seal.....

FORMAT OF AFFIDAVIT
On the Rupees Ten Non - Judicial Stamp Paper

BEFOR THE 1ST CLASS JUDICIAL MAGISTRATE AT-----

AFFIDAVIT

I ----- son of ----- aged about -----
-----Years , by faith ----- , by occupation -----, residing at-----

do hereby solemnly affirm and declare as follows:-

1. That I am the proprietor/Partner of ----- having office at -----
and carrying on business on the said name and style.

(In case the above Deponent is an enlisted Contractor at Syama Prasad Mookerjee Port, Kolkata, the same should be mentioned in affidavit.)

2. THAT my aforesaid Firm is exempted from E.S.I. Act and the said Firm has no valid E.S.I Registration.
3. THAT the present affidavit is to be files before the Syama Prasad Mookerjee Port, Kolkata as per the clause no ----- of Tender no-----issued by Kolkata Port Trust in respect of the work (the name of the work is to be mentioned)
That the statements made above are all true to be the best of my knowledge and belief.

That in the event the declaration is found to be wrong and false, I will be held responsible for all the consequences in respect of compliance of The Employees State Insurance Act, 1948

DEPONENT

Identified by me

(FORMAT OF INDEMNITY BOND)
On the Rupees Fifty Non – Judicial Stamp Paper

INDEMNITY BOND

By THIS BOND I, Shri/Smt-----, son of
Shri/Smt-----
Residing at ----- by occupation -----the Partner/Proprietor/Director
-----having office at ----- am a tenderer under Mechanical
Engineering Department, Syama Prasad Mookerjee Port, Kolkata (A statutory body under
MPT Act, 1963)

- 2 WHEREAS , the said Syama Prasad Mookerjee Port, Kolkata asked the every tenderer, who is not covered under E.S.I Act or exempted to furnish an Indemnity Bond in favour of Mechanical Engineering Department, Syama Prasad Mookerjee Port, Kolkata against all damages and accident to the Labourer Tenderer/contractor.
- 3 NOW THIS BOND OF INDEMNITY WITHNESSTH THAT the Tenderer/contractor named herein above shall indemnify the Syama Prasad Mookerjee Port, Kolkata AGAINST ALL DAMAGES AND ACCIDENT OCCURRING TO THE Labourers of the Tenderer/contractor as demanded by the Syama Prasad Mookerjee Port, Kolkata and which shall be legal and /or claimed by the Syama Prasad Mookerjee Port, Kolkata during the execution of the work stated in the NIT No----- of -----
- 4 AND the contractor hereunder agree to indemnity and at all times keep indemnified the Syama Prasad Mookerjee Port, Kolkata and its administrator and representative.
5. And also all such possible claim or demand for damages and accidents. In the event the declaration is found to be wrong and false, the tenderer will be held responsible for all the consequences in respect of compliance of The Employees State Insurance Act, 1948.

In WITNESS WHEREOF I-----, the Partner/Proprietor/Director-----
Hereto set and seal this the----- Day of-----
In the year----- at-----

Sureties

Signature of the Indemnifier

1 Signature
 Name:-
 Address

2 Signature
 Name:-
 Address

3 **Witness**
 Signature
 Name:-
 Address

**Undertaking to be submitted in lieu of uploading/submitting signed copy of full tender document
(On official Letterhead)**

Ref. No.....

Date

The Chief Mechanical Engineer,
Syama Prasad Mookerjee Port, Kolkata,
Mechanical and Electrical Engineering Department,
8, Garden Reach Road,
Kolkata – 700 043

Dear Sir,

We,(Name of Tenderer) have fully read and understood the entire Tender Document, GCC, and Addenda, if any, downloaded from under the instant e-tender and no other source, and will comply to the said Tender document, GCC and Addenda.

We are submitting this undertaking in lieu of submission of signed copy of the full Tender document.

Yours faithfully,

Signature of Power of Attorney Holder(s)
Name:

SPECIMEN EMD (Bank Guarantee Format)

(The Bank shall fill in this bank Guarantee Form in accordance with the instructions indicated. To be executed on Rs 100 /- non-judicial stamp paper)

(Bank's Name, and Address of Issuing Branch or Office)

Beneficiary: _____ (Name and Address of Employer / Board)

Date : _____

Tender Guarantee No: _____

We have informed that (name of the Tenderer) (hereinafter called "the Tendered ") has submitted to you its Tender dated (hereinafter called "the Tender") for the execution of {name of contract} under Invitation for Tenders No. (number). Furthermore, we understand that, according to your conditions Tenders must be supported by an Earnest Money Deposit (EMD).

At the request of the Tenderer, we (name of Bank) hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of (amount in figures) (amount in words) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Tenderer is in breach of its obligation(s) under the Tender conditions, because the Tenderer:

- (a) Has withdrawn its Tender during the period of Tender validity specified by the Tenderer in the Form of Tender : or
- (b) Having been notified of the acceptance of its Tender by the Employer /Board during the period of Tender Validity, (i) fails or refuses to execute the form of Agreement, if required or (ii) fails or refuses to furnish the performance guarantee, in accordance with the instructions to Tenderers.

This guarantee will expire unless otherwise extended or informed by the Employer/Board :

- (a) If the Tenderer is the successful Tenderer, upon our receipt of copies of the contract signed by the Tenderer and the performance guarantee issued to you upon the instruction of the Tenderer: or
- (b) If the Tenderer is not the successful Tenderer, upon the earlier of
 - (i) Our receipt of a copy of your notification to the Tenderer of the name of the successful Tenderer : or
 - (ii) Twenty – eight days after the expiration of the Tenderer's Tender validity or any extended period thereof:

Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

[Signature (s)]

[Authorisation letter from the issuing bank that the signatory of this BG is authorized to do so-should also be enclosed]

Format of Power of Attorney in case of Single Entity Tenderer

(To be executed before Notary Public on a Non-Judicial Stamp Paper of at least Rs 10)

Dated: __

POWER OF ATTORNEY

To whomsoever it may concern

Mr..... (Name of the Person(s), residing at.....
(Address of the person(s), acting as.....(Designation of the person and
name of the firm) and whose signature(s) is / are attested below, is/are hereby authorized on behalf
of (Name of the Tenderer) to sign the e-tender
No.....for (Subject of the tender:
.....) and submit the same and is
hereby further authorized to provide relevant information/document and respond to the enquiries
etc. as may be required by Kolkata Port Trust (Kolkata Port Trust) in respect of the tender.

And I/ we hereby agree that all acts, deeds and things lawfully done by our said attorney shall be
construed as acts, deeds and things done by us and I/ we undertake to ratify and confirm all and
whatsoever that my / our said attorney shall lawfully do or cause to be done for me / us by virtue of
the power hereby given.

(Attested signature of Mr.....)

For(Name of the Tenderer with Seal)

JOINT VENTURE TERMS AND FORMATS

1. In case the tender is submitted in joint venture, the Bidder shall submit the following confirmation along with their offer submitted for this tender.
 - (i) All joint venture agreements shall ensure that all parties of the joint venture are individually and jointly responsible for the tender conditions and such agreements are legally valid.
 - (ii) Joint venture should be in the nature of legally acceptable agreements and such agreements should be notarized as per format Annexure-N6.
 - (iii) Such joint venture agreement should contain explicitly the scope and responsibilities of all the partners in the joint venture in terms of financial and technical commitments/contribution. The members of JV should be equally, severally and jointly responsible.
 - (iv) One of the members of the joint venture (JV) shall be authorized as being in-charge (lead member), and this authorization shall be evidenced by a power of attorney duly signed by the authorized signatories of the joint venture (JV) Members as per the format enclosed in the tender document as Annexure-N2.
 - (v) The Lead Partner shall be authorized to incur liabilities and receive instructions for & on behalf of any & all the partners. The entire execution of the contract, including payment, shall be carried out exclusively through the Lead Partner. During the entire period of the contract, the Lead Partner cannot be changed. In the event of the Lead Partner becoming defunct, selection of the new Lead Partner would be made, as may be mutually agreed between the remaining partner(s) and KoPT, without any additional financial involvement. As the approval towards such new Lead Partner is the sole discretion of KoPT, it must be approved by them, in writing. The said new Lead Partner shall also be jointly, as well as severally, liable with the remaining partner(s) for the satisfactory performance of the contract as per the scope of these bidding documents.
 - (vi) The validity of the joint venture agreement entered upon on the award of Letter of Acceptance (LOA) by the port should continue for the entire period of contract as specified in the tender. All such agreements shall be irrevocable for the above periods.
 - (vii) Where the bidder is a joint venture (JV), the average annual financial turnover of the individual members forming the joint venture (JV) shall be submitted.
 - (viii) The purchaser of the tender document must be a member of the joint venture (JV) submitting the tender.
 - (ix) It is clarified that an unsuccessful bidder or JV shall not be permitted to join a successful JV whose bid is accepted at a later date.
 - (x) In case of a joint venture (JV), the combined Technical and Financial Capability of those members forming the Joint Venture as explained in this tender document, should satisfy the conditions of eligibility as defined in the pre-qualification criteria of the tender document.
 - (xi) A Power of Attorney is to be executed before Notary Public on a Non-Judicial Stamp Paper of at least Rs.10/- by all members of the joint venture for signing of tender as per format Annexure-N1.
 - (xii) Further, a Power of Attorney is to be executed before Notary Public on a Non- Judicial Stamp Paper of at least Rs 10 by the lead member of the joint venture for signing of tender as per format Annexure-N2.
 - (xiii) Details of similar works executed successfully by the tenderer and details of financial capability of the tenderer is to be submitted as per format Annexure-N3 and Annexure-N4.
 - (xiv) All the members of the Joint Venture participating in the tender must not have been debarred by the Central / State Government or any Entity controlled by them or any other legal authority for participating in any tender / contract / agreement of whatever kind. An

undertaking in this regard shall be given by the Tenderer in the Covering Letter as per Annexure-N5.

SMP, Kolkata

Format for Power Of Attorney for signing of tender in case of Joint Venture

(To be executed before Notary Public on a Non-Judicial Stamp Paper of at least Rs.10/-)

Date :.....

POWER OF ATTORNEY

To whomsoever it may concern

Mr.....(Name of the Person(s)), residing at(Address of the person(s)), acting as (Designation of the person and name of the firm), and whose signature is attested below, is hereby authorized on behalf of (Name of the Tenderer [in case of a Joint Venture, name of the lead member]) to sign the tender (Tender No.and (Tender subject-)) and submit the same and is hereby further authorized to provide relevant information/ document and respond to the enquiry's etc. as may be required by Kolkata Port Trust (KoPT) in respect of the tender.

And I/ we hereby agree that all acts, deeds and things lawfully done by our said attorney shall be construed as acts, deeds and things done by us and I/ we undertake to ratify and confirm all and whatsoever that my / our said attorney shall lawfully do or cause to be done for me / us by virtue of the power hereby given.

(Attested signature of Mr.)

For (Name of the Tenderer / Joint Venture Members with Seal)

Note –

(In case of Joint Venture, representative of all members must sign)

Format For Power Of Attorney For Lead Member Of Joint Venture

(To be executed before Notary Public on a Non-Judicial Stamp Paper of at least Rs 10)

POWER OF ATTORNEY

Whereas Kolkata Port Trust (“the Authority”) has invited tenders from interested parties for “.....” (Tender No.).

Whereas,,, And (collectively the “Joint Venture”) being members of the Joint Venture are interested in bidding for the Tender in accordance with the terms and conditions of the Tender Document and other connected documents in respect of the said tender, and

Whereas, it is necessary under the Tender Document for the members of the Consortium to designate one of them as the Lead Member with all necessary power and authority to do for and on behalf of the Consortium, all acts, deeds and things as may be necessary in connection with the Consortium’s bid for the Tender and its execution.

NOW THEREFORE KNOW ALL MEN BY THESE PRESENTS

We, M/s. having our registered office at, M/s..... having our registered office at, M/s. Having our registered office at, and M/s. having our registered office at, [the respective names and addresses of the registered office] (hereinafter collectively referred to as the “Principals”) do hereby designate, nominate, constitute, appoint and authorize M/s. having its registered office at, being one of the members of the Joint Venture, as the Lead Member and true and lawful attorney of the Joint Venture (hereinafter referred to as the “Attorney”). We hereby irrevocably authorize the Attorney to conduct all business for and on behalf of the Joint Venture and any one of us during the bidding process and, in the event the Joint Venture is awarded the Contract, during the execution of the contract, and in this regard, to do on our behalf and on behalf of the Joint Venture, all or any of such acts, deeds or things as are necessary or required or incidental to the pre-qualification of the Joint Venture and submission of its bid(s) for the tender, including but not limited to signing and submission of all applications, bids and other documents and writings, participate in Pre Bid and other conferences/meetings, respond to queries, submit information/ documents, sign and execute contracts and undertakings consequent to acceptance of bid(s) of the Joint Venture and generally to represent the Joint Venture in all its dealings with the Authority, and/or any other Government Agency or any person, in all matters in connection with or relating to or arising out of the Joint Venture’s bid(s) for the tender and/or upon award thereof till the Agreement is entered into with the Authority.

AND hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things lawfully done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us / Joint Venture.

IN WITNESS HEREOF WE HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS
..... DAY OF2019

For

.....
.....

(Name & Title)

For

.....

(Name & Title)

For

.....

(Name & Title)

Witnesses:

1.

2.

.....

(To be executed by all the members of the Joint Venture)

Format for submitting similar works in case of Joint Venture

	Name of similar project(s)/work(s) executed successfully	Period(s) of the project(s)	Value(s) of the project(s)
Joint Venture Member-1			
Joint Venture Member-2			
Joint Venture Member-3			

(Instructions: Each member of Joint Venture should furnish its details in the appropriate column. Description of each of the projects/works shall have to be provided while giving the following details).

- (i) Work Order/Agreement references of the project(s)/work(s) executed successfully,
- (ii) Location of the said projects/works,
- (iii) Name of contact Person(s) of clients with designations,
- (iv) Address of contact Person(s) of clients,
- (v) Telephone/Mobile No. of contact Person(s) of clients,
- (vi) Fax Number of contact Person(s) of clients,
- (vii) Email id of contact Person(s) of clients.

Signature of Power of Attorney Holder(s).....

Name:

Designation:

Date:

Seal:

CERTIFIED BY

Name of Chartered / Certified Accountant Firm

UDIN and other details

Name of the Signatory.....

Signature

Designation

Date

Seal.....

Details of financial capability of the Tenderer

Applicant type	Annual financial turnover (Rs. In Crores)
Joint Venture Member – 1	
Joint Venture Member – 2	
Joint Venture Member – 3	

(Instructions: Please add more rows depending upon Joint Venture Members. The Joint Venture Tenderer including each members should submit its details in the appropriate column).

Signature of Power of Attorney Holder(s).....

Name:

Designation:

Date :

Seal :

CERTIFIED BY

Name of Chartered Accountant Firm

UDIN and other details

Name of the Signatory

Signature

Designation

Date :

Covering Letter in case of Joint Venture

To,
The Chief Mechanical Engineer
Syama Prasad Mookerjee Port, Kolkata
Mechanical and Electrical Engineering Department
8, Garden Reach Road
Kolkata-700043

Date:.....

Dear Sir,

I/we,..... (Name of tenderer) having examined the Tender Document and understood its contents, hereby submit our tender for at Syama Prasad Mookerjee Port, Kolkata.

All information provided in the tender including Addenda and in the Appendices are true and correct and all documents accompanying such tender are true copies of their respective originals.

I/We shall make available to Syama Prasad Mookerjee Port, Kolkata (hereinafter referred to as SMPK) any additional information it may find necessary or require to supplement or authenticate the Tender.

I/we acknowledge the right of SMPK to reject our tender without assigning any reason or otherwise and hereby waive our right to challenge the same on any account whatsoever.

I/we also certify the following:

I/we / any of the Joint Venture member (as the case may be) have not been debarred by the Central/State Govt. or any entity controlled by them or any other legal authority for participating in any tender / contract / agreement of whatever kind.

I/we certify that in the last three years, I/We/any of the Joint Venture members or our / their associates have neither failed to perform on any contract, as evidenced by imposition of a penalty by an arbitral or judicial authority or a judicial pronouncement or arbitration award, nor been expelled from any project or contract by any public authority/entity nor have had any contract terminated by any public authority / entity for breach on our part.

I/we declare that:

I/we have examined and have no reservations to the Tender Document, including the Addenda issued by SMPK thereon

I/we hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any corrupt, fraudulent or coercive practices to influence the evaluation process of the tender.

I/we understand that SMPK reserves the right to accept or reject any tender and to annul the tendering process and reject all tenders at any time without any liability or any obligation for such acceptance, rejection or annulment without assigning any reason thereof.

.....(Name of Tenderer) hereby undertakes that I/we will abide by the decision of KoPT in the matter of examination, evaluation and selection of successful tenderer and shall refrain from challenging or questioning any decision taken by SMPK in this regard.

Thanking you,

Yours faithfully,

Signature of Power of Attorney Holder(s).....

Name:

Format in case of Joint Venture Agreement

(To be submitted on stamp paper)

This Joint venture agreement is made atonday of 20.... between M/s.(please indicate the status viz. Proprietor, firm, Company) represented through its proprietor/partner or Director (hereinafter referred to as “first Party”) and M/s.(Please indicate the status viz. Proprietor, Firm, Company) represented through its proprietor/partner or Director (hereinafter referred to as “Second Party”) WHEREAS the First party is engaged in the business of..... AND WHEREAS THE Second Party is engaged in the business of AND WHEREAS both the parties are desirous of entering into a joint venture for carrying on the work of Syama Prasad Mookerjee Port, Kolkata in connection with work of(please mention the work of the tender).

AND WHEREAS the First Party and Second Party have agreed to form joint venture for execution of subject works.

NOW THIS DEED WITNESSED AS UNDER:

- (a). That under this Joint Venture Agreement the work will be done jointly by the first party and second party in the name and style of M/s.....
- (b). It is further agreed by the Joint Venture Partner thatof M/s.has been nominated as Lead Partner for the execution of the works.
- (c). That all the parties shall be liable jointly, equally and severally for the satisfactory execution of the contract in all respect in accordance with terms and conditions of the contract and the lead partner shall be authorized to incur liabilities and receive instruction for and on behalf of any and all the partners and parties of the Joint Venture and the entire execution of the contract including payment shall be done exclusively with the lead partner.
- (d). THE PROPOSED PARTICIPATION SCOPE OF ACTIVITIES TO BE PERFORMED AND RESPONSIBILITIES OF EACH:

The proposed administrative arrangement, participation, scope of activities to be performed and responsibilities for the execution of the work of the each party shall be as under:

First Party:

Second Party:

e. The turnover and experience of each party is as under:

First Party:

Second Party:

(f). Subject to above, the parties shall depute their experienced staff as required for the works and plants, equipment, machinery etc. as requires for execution of works, will be deployed by each Joint Venture partners for execution of the contract.

(g). In the event of default by any partner in the execution of the part of the contract, the Lead Partner will have the authority to assign the work to any other party acceptable to the Syama Prasad Mookerjee Port, Kolkata to ensure the satisfactory execution of that part of the contract.

(h). The Registered Office of the Joint Venture/Lead Partner shall be at

(i). The Joint Venture shall regularly maintain in the ordinary course of business a true and correct account of all its incoming and outgoing and also of its assets and liabilities in proper books or account which shall ordinarily be kept at place of business and after Completion of above mentioned work all account shall be taken.

(j). Opening and operation of Bank Account:

The Joint Venture shall open and maintain bank account(s) atThe Lead Partner as mentioned above shall have the power to receive the payments on behalf of the Joint Venture and to give discharge on behalf of the Joint Venture.

IN WITNESS WHEFEOF the Parties hereto have signed hereunder aton thisday of

Party of First Part

Party of Second Part

Witness:

(1)

(2)

Format for Financial Capability of the Tenderer in case of Single Entity Tenderer

Applicant Type	Average of last 3 years viz. 2020-21, 2021-22 and 2022-23 annual financial turnover (Rupees in Crores)
Single entity Tenderer	Rs.....Crores

Signature of Power of Attorney Holder(s).....

Name:

Designation:

Date :

Seal.....

CERTIFIED BY

Name of Chartered Accountant Firm

UDIN and other details

Name of the Signatory

Signature

Designation

Date.....

(DOCUMENT TO BE UPLOADED)

e-Tender No.

On the Rupees Fifty Non-Judicial Stamp Paper

(Scanned copy to be submitted online and one hard copy to be submitted to SMPK offline)

INTEGRITY PACT

Between

Syama Prasad Mookerjee Port, Kolkata (SMPK) hereinafter referred to as “The Principal/ Employer”

And

.....hereinafter referred to as “The Bidder/Contractor”.

Preamble

The principal intends to award, under laid down organizational procedures, contract/s for.....The Principal values full compliances with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/ transparency in its relations with its Bidder(s) and/ or contractor(s).

In order to achieve these goals, the Principal will appoint an Independent External Monitor (IEM) appointed by the principal, will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

NOW, THEREFORE

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence / prejudiced dealings prior to, during and subsequent to currency of the contract to be entered into with a view to :-

Enabling the PRINCIPAL / EMPLOYER to get the contractual work executed and / or to obtain / dispose the desired said stores / equipment at a competitive price in conformity with the defined specifications / scope of work by avoiding the high cost and the distortionary impact of corruption on such work / procurement /disposal and Enabling BIDDERS /CONTRACTORS to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will abstain from bribing and other corrupt practices and the PRINCIPAL/EMPLOYER will commit to prevent corruption, in any form, by its officials by following transparent procedures.

Section 1- Commitments of the Principal/employer.

(1) The Principal commits itself to take measures necessary to prevent corruption and to observe the following principles:-

- a. No employee of the Principal, personally or through family members, will, in connection with the tender for, or the execution of a contract, demand, take a 53 promise for or accept, for self or third person, any materials or immaterial benefit which the person is not legally entitled to.
 - b. The Principal will, during the tender process, treat all Bidder(s) with equity and reason. The Principal will, in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - c. The Principal will exclude from the process all known prejudiced persons.
- (2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal Code (IPC)/ Prevention of Corruption (PC) Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section 2- Commitments of the Bidder(s)/Contractor(s)

- (1) The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
- a. The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
 - b. The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or nonsubmission of bid or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
 - c. The Bidder(s)/Contractor (s) will not commit any offence under the relevant IPC/PC Act; further the Bidder(s)/Contractor(s) will not use improperly, for purpose of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details including information contained or transmitted electronically.
 - d. The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representative in India, if any. Similarly the Bidder(s)/Contractor(s) of

Indian Nationality shall furnish the name and address of the foreign principals, if any. Further details as mentioned in the “**Guidelines on Indian Agents of Foreign Suppliers**” shall be disclosed by the Bidder(s)/Contractor(s). Further, as mentioned 54 in the Guidelines, all the payments made to the Indian Agent/representative have to be in Indian Rupees only. Copy of the Guidelines on Indian Agents of foreign Suppliers is annexed and marked as **Annexure-Q**.

- e. The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- (2) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 - Disqualification from tender process and exclusion from future contracts

- (1) If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or take action as considered appropriate.

Section 4 - Compensation for Damages

- (1) If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand the recover the damages equivalent to Earnest Money Deposit / Bid Security.
- (2) If the Principal has terminated the contract according to Section 3 or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the contract value or the amount equivalent to Performance Bank Guarantee.

Section 5- Previous transgression

- (1) The Bidder declares that no previous transgressions occurred in the last 3 years from the date of signing the Integrity Pact with any other Company in any country conforming to the anti corruption approach or with any other Public Sector Undertakings /Enterprise in India, Major Ports, / Govt. Departments of India that could justify his exclusion from the tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as considered appropriate.

Section 6- Equal treatment of all Bidders / Contractors/ Subcontractors

- (1) The Bidder(s)/ Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.

- (2) The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and subcontractors.
- (3) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section7 – Other Legal actions violating Bidder(s)/Contractor(s)/ Sub contractor(s)

The actions stipulated in this Integrity pact are without prejudice to any other legal action that may follow in accordance with provisions of the extant law in force relating to any civil or criminal proceedings.

Section 8- Role of Independent External Monitor (IEM)

- (a) The task of the monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.
- (b) The monitors shall not be subject to instructions by the representatives of the parties and shall perform their functions neutrally and independently.
- (c) Both the parties accept that the Monitors have the right to access all the documents relating to the contract.
- (d) As soon as the Monitor notices, or has reason to believe, a violation of this pact, he will so inform the authority designated by the Principal and the Chief Vigilance Officer of Syama Prasad Mookerjee Port, Kolkata.
- (e) The BIDDER / CONTRACTOR(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the PRINCIPAL including that provided by the BIDDER / CONTRACTOR. The demonstration of a valid interest, unrestricted and unconditional access to his contract documentation, if any. The same is applicable to Sub-contractors. The Monitor shall be under contractual obligation to treat the information and documents of the Bidder / Contractor / Subcontractor(s) with confidentiality.
- (f) The Principal / Employer will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor, the option to participate in such meetings.
- (g) The Monitor will submit a written report to the designated Authority of Principal / Employer / Chief Vigilance Officer of Syama Prasad Mookerjee Port, Kolkata within 8 to 10 weeks from the date of reference or intimation to him by the Principal / Employer / Bidder / Contractor and should the occasion arise, submit proposals for correcting problematic situation. BIDDER / CONTRACTOR can approach the Independent External Monitor (s) appointed for the purposes of this Pact.
- (h) As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or to take

corrective action, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

- (i) If the Monitor has reported to the Principal substantiated suspicion of an offence under the relevant IPC/PCA and the Principal / Employer has not, within reasonable time, taken visible action to proceed against such offence or reported to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- (j) The word 'Monitor' would include both singular and plural.

Section 9 – Facilitation of Investigation:

In case of any allegation or violation of any provisions of this Pact or payment of commission, the PRINCIPAL / EMPLOYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER / CONTRACTOR shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

Section 10 – Pact Duration:

The pact begins with when both parties have legally signed it and will extend up to 2 years or the complete execution of the contract including warranty period whichever is later. In case bidder / contractor is unsuccessful this Integrity Pact shall expire after 6 months from the date of signing of the contract. If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged / determined by Chairman of SMPK

Section 11- Other provisions:

- (1) This agreement is subject to Indian law. Place of performance and jurisdiction is the Registered Office of the Principal in Kolkata.
- (2) Changes and supplements as well as termination notices need to be made in writing in English.
- (3) If the Contractor is a partnership or a consortium, this agreement must be signed by all partners of consortium members.
- (4) Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

For & on behalf of the Principal)

(Office Seal)

Place.....

Date.....

Witness 1: (Name & Address) _____

(For & on behalf of Bidder/Contractor)

(Office Seal)

Witness 2: (Name & Address) _____

SMP, Kolkata

GUIDELINES FOR INDIAN AGENTS OF FOREIGN SUPPLIERS

- 1.1 There shall be compulsory registration of Indian agents of foreign suppliers for all Tender. An agent who is not registered with SMPK shall apply for registration in the prescribed Application – Form.
- 1.2 Registered agents will file an authenticated Photostat copy (duly attested by a Notary Public) / Original certificate of the principal confirming the agency agreement and giving the status being enjoyed by the agent and the commission / remuneration / salary / retainer ship being paid by the principal to the agent before the placement of order by SMPK.
- 1.3 Wherever the Indian representatives have communicated on behalf of their principals and foreign parties have stated that they are not paying any commission to the Indian agents and the Indian representative is working on the basis of salary or as retainer, a written declaration to this effect should be submitted by the party (i.e. Principal) before finalizing the order.

**2.0 DISCLOSURE OF PARTICULARS OF AGENTS / REPRESENTATIVES IN INDIA.
IF ANY.**

2.1 Bidders of Foreign nationality shall furnish the following details in their offer:

- 2.1.1 The name and address of the agents / representatives in India, if any and the extent of authorization and authority given to commit the Principals. In case the agent / representative be a foreign Company, it is to be confirmed whether it is real substantial Company and details of the same shall be furnished.
- 2.1.2 The amount of commission / remuneration included in the quoted price(s) for such agents / representatives in India.
- 2.1.3 Confirmation of the Bidder that the commission / remuneration if any, payable to his agents / representatives in India, is to be paid by SMPK in Indian Rupees only.

2.2 Bidders of Indian Nationality shall furnish the following details in their offers:

- 2.2.1 The name and address of the foreign principals indicating their nationality as well as their status, i.e. whether manufacturer or agent of manufacturer holding the Letter of

59 Authority of the Principal specifically authorizing the agent to make an offer in India in response to tender either directly or through the agents / representatives.

- 2.2.2 The amount of commission / remuneration included in the price (s) quoted by the bidder for himself.
- 2.2.3 Confirmation of the foreign principals of the Bidder that the commission / remuneration, if any, reserved for the Bidder in the quoted price (s), is paid by SMPK in India in equivalent Indian Rupees.
- 2.2.4 In either case, the event of contract materializing, the terms of payment will provide for payment of the commission / remuneration, if any payable to the agents / representatives in India in Indian Rupees on expiry of 90 days after the discharge of the obligations under the contract.
- 2.2.5 Failure to furnish correct and detailed information as called for in paragraph – 2.0 above will render the concerned tender liable for rejection or in the event of a contract materializing, the same liable to termination by SMPK. Besides this there would be a penalty of banning business dealings with SMPK or damage or payment of a named sum

LIST OF DRAWINGS

Sl.No.	Description	Drawing No.
1.	General Plan and Elevation	S01
2.	Rack Frame Removals	S02
3.	Rack Frame Repairs	S03
4.	Live Load Shoe Repairs	S04
5.	Machinery House Support Repairs	S05
6.	Cross Girder 1 & 1' Repairs	S06
7.	Stringer Repairs	S07
8.	Mechanical GP & E And Scope of Work	M01
9.	Mechanical General Notes	M02
10.	Span Drive Machinery Existing Layout	M03
11.	Machinery Repair Details-1	M04
12.	Machinery Repair Details-2	M05
13.	Electrical GP & E And Scope of Work	E01
14.	Removal – Bridge Plan	E02
15.	Control And Switch House Layouts	E03
16.	Machinery And Pier Top Layouts	E04
17.	Single Line Diagram	E05
18.	Main Drive System Schematic	E06
19.	Control Console layout	E07
20.	Limit Switch Layouts And Schedule	E08

Checklist for Documents to be Uploaded

[Bidder to submit this document completely filled up for evaluation of its offer]

Name of the Firm:

Sl. No.	Documents to be uploaded as per instructions of NIT	Details of Documents as Uploaded
1	Earnest Money deposit (For Bank Guarantee Format please see Annexure-L)	
2	Tender Fee (details of DD no./Banker's Cheque No. with date or NSIC No. with validity period, if applicable, to be mentioned here)	
3	PAN No.	
4	Trade License Details	
5	Electrical Contractor License Details (No. & Validity period)	
6	ESI Regn. No. (If registered)	
7	Affidavit/Indemnity Bond Uploaded (Yes/No) (If ESI Registration is not applicable for the firm)	
8	PF Regn. No.	
9	GST Regn. certificate No.	
10	Professional Tax No.	
11	Undertaking (Annexure-K), Uploaded (Yes/No)	
12	Covering letter as per Annexure-G ,Uploaded (Yes/No)	
13	Income Tax Return for the last three years as mentioned in 2(h) of Annexure-B, Submitted (Yes/No)	
14	Status of Tenderer (i.e. Pvt. Ltd./Partnership/Proprietorship etc.)	
	"Financial Turnover (Average of Last 3 year turnover shall be 30% of the Tender value)"	
	FY: 2018-19	
	FY: 2019-20	
	FY: 2020-21	
15	Details as required for ECS Payment [Scan copy of unissued cheque is to be uploaded.]	
	Name of Bank with Code	
	Branch Name	
	Type of A/C	
	A/C no.	
	MICR Code	
	IFSC No.	
16	Profile of Tenderer as per Annexure-F, Uploaded (Yes/No)	
17	Integrity Pact as per Annexure-P, Uploaded (Yes/No)	
18	Power of Attorney, in case of Single entity Tenderer , as per Annexure-M, Uploaded (Yes/No)	

19	Financial Capability of the Tenderer, in case of Single entity Tenderer, as per Annexure-O, Uploaded (Yes/No)	
20	Details of similar work in case of Single entity Tenderer as per Annexure-H including self attested Completion Certificate , Uploaded (Yes/No)	
21	In case of Joint Venture, documents as per Annexure- N1 to N6, Uploaded (Yes/No)	

Note: No field is to be left blank.

Signature of Tenderer.....

Name:

Designation:

Date:

Seal of the tenderer.....

SMP, Kolkata

General Conditions of Contract Forms and Agreements

Sanctioned by the Trustees under Resolution No. 92 of the 6th
Meeting held on 27th May, 1993

Including Addendum Sanctioned by the Trustees Meeting
held on July, 2014

KOLKATA PORT TRUST
KOLKATA DOCK SYSTEM
& HALDIA DOCK COMPLEX

GENERAL CONDITIONS OF CONTRACT

	CLAUSE		PAGES
1.	AMENDMENT TO GENERAL CONDITIONS OF CONTRACT	...	GC 1
2.	DEFINITION	...	GC 2 - GC 3
3.	DUTIES & POWERS OF ENGINEER & ENGINEER'S REPRESENTATIVE	...	GC 3 - GC 5
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AMENDMENT
TO

GENERAL CONDITIONS OF CONTRACT

❖ CI-3.4 THE TENDER/OFFER & ITS PRE-REQUISITES

Table under sub-clause (a)

PREVIOUS			AS AMENDED		
Estimated Value of Work	Amount of Earnest Money		Estimated Value of Work	Amount of Earnest Money	
	For Works Contract	For Contract of Supplying Materials or Equipment only		For Works Contract	For Contract of Supplying Materials or Equipment only
Up to Rs. 1,00,000/-	5% of the estimated value of work	1% of the estimated value of work	Up to Rs. 10 Crore	2% of the estimated value of work	1% of the estimated value of work
Over Rs. 1,00,000/-	2% of the estimated value of work subject to a maximum of Rs. 20,000/- and minimum of Rs. 5,000/-.	½% of the estimated value of work subject to a maximum of Rs. 10,000/- and minimum of Rs. 1,000/-.	Over Rs. 10 Crore	2% on first Rs. 10 Crore + 1% on the balance	½% of the estimated value of work subject to a maximum of Rs. 10,000/- and minimum of Rs. 1,000/-.

[AMENDMENT SANCTIONED BY THE BOARD OF TRUSTEES VIDE RESOLUTION NO 210 OF THE TRUSTEES' MEETING HELD ON 26.02.2013]

Table under sub-clause (d)

PREVIOUS			AS AMENDED		
Class of Registration	Amount Of Fixed Security	Financial Limit Of Each Tender	Class of Registration	Amount Of Fixed Security	Financial Limit Of Each Tender
A	Rs 10,000/-	Any tender priced upto Rs 2,00,000/-	A	Rs 50,000/-	Any tender priced up to Rs 10,00,000/-
B	Rs 5,000/-	Any tender priced upto Rs 1,00,000/-	B	Rs 25,000/-	Any tender priced upto Rs 5,00,000/-
C	Rs 2,500/-	Any tender priced upto Rs 50,000/-	C	Rs 15,000/-	Any tender priced upto Rs 3,00,000/-

[AMENDMENT SANCTIONED BY THE BOARD OF TRUSTEES VIDE RESOLUTION NO 82 OF THE TRUSTEES' MEETING HELD ON 12.10.2012]

1. DEFINITIONS

- 1.0 In the contract, as here in after defined, the following words and expressions shall have the meaning herein assigned to them, except where the context otherwise required.
- 1.1 "Employer" or "Board" or "Trustees" means of the Board of Trustees for the Port of Kolkata, a body corporate under Section 3 of the Major Port Trusts Act, 1963, including their successors, representatives and assigns. **Employer**
- 1.2 "Chairman" means the Chairman of the Board and includes the person appointed to act in his place under Sections 14 and 14A of the Major Port Trusts Act, 1963 **Chairman**
- 1.3 "Contractor" means the person or persons, Firm or Company whose tender/offer has been accepted by the Trustees and includes the Contractor's representatives, heirs, successor and assigns, if any, permitted by the Board/Chairman. **Contractor**
- 1.4 "Engineer" means the Board's official who has invited the tender on its behalf and includes the Manager (Infrastructure & Civic Facilities) or other official as may be appointed from time to time by the Employer, with written notification to the Contractor, to act as Engineer for the purpose of the Contract, in place of the "Engineer" so designated. **Engineer**
- 1.5 "Engineer's Representative" means any subordinate or Assistant to the Engineer or any other official appointed from time to time by the Engineer to perform the duties set forth in Clauses 2.4 to 2.6 hereof. **Engineer's Representative**
- 1.6 "Work" means the work to be executed in accordance with the Contract and includes authorised "Extra Works" and 'Excess Works" and "Temporary Works". **Works**
- 1.7 "Temporary Works" means all temporary works of every kind required in or about the execution, completion or maintenance of the works and includes (without thereby limiting the foregoing definitions) all temporary erections, scaffolding, ladders, timbering, soaking vats, site offices, cement and other godowns, platforms and bins for stacking building materials, gantries, temporary tracks and roads, temporary culverts and mixing platforms. **Temporary works**
- 1.8 "Extra Works" means those works required by the Engineer for completion of the Contract which were not specifically and separately included in the schedule of items of the works i.e. (Bill of Quantities) of the tender. "Excess Works" means the required quantities of work in excess of the provision made against any item of the bill of Quantities. **Extra works and Excess works**
- 1.9 "Specifications" means the relevant and appropriate Bureau of Indian Standard's specifications / International Standard's Specifications (latest revisions) for materials and workmanship unless stated otherwise in the Tender. **Specification**

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1.10	“Drawings” means the drawings referred to in the Tender and specification and any modification of such drawings approved in writing by the Engineer and such other drawings as may from time to time be furnished or approved in writing by the Engineer.	Drawings
1.11	“Contract” means and includes the General and Special Conditions of Contract, Specifications, Drawings, priced Bill of Quantities, the Tender / Offer, the letter of acceptance of the Tender/Offer, the Contract Agreement, if separately entered into and the Schedule of Rates and Price, if any, adopted by the Trustees at their discretion.	Contract
1.12	“Constructional Plant” means all appliances or things of whatsoever nature required or about the execution, completion or maintenance of the works or temporary works and includes (without thereby limiting the foregoing definition) all machinery and tools but does not include materials or other things intended to form or forming part of the permanent works.	Constructional Plant
1.13	“Site” means the land, waterways and other places, on, under, in or through which the works are to be executed by the Trustees for the purpose of the Contract.	Site
1.14	“Contract Price” means the sum named in the letter of acceptance of the Tender/Offer of the Contractor, subject to such additions thereto and deductions therefrom as may be made by the Engineer under the provisions here in after contained.	Contract Price
1.15	“Month” means English Calendar Month.	Month
1.16	“Excepted Risks” are riot in so far as it is uninsurable, war, invasion, act of foreign enemies, hostilities) whether war be declared or not), Civil War, rebellion, revolution, insurrection or military or usurped power or use or occupation by the Trustees of any portion of the works in respect of which a certificate of completion has been issued (all of which are herein collectively referred to as the excepted risks).	Excepted Risks
1.17	Word importing the singular only, also includes the plural and vice-versa where the context so requires.	Singular/ Plural
1.18	The heading and marginal notes in these General Conditions of Contract shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.	Headings/ Marginal Notes.
1.19	Unless otherwise stipulated the work “Cost” shall be deemed to include overhead costs of the Contractor, whether on or off the site.	Cost
2.0	DUTIES & POWERS OF ENGINEER & ENGINEER’S REPRESENTATIVE.	
2.1	The Contractor shall execute, compete and maintain the works in terms of the contract to the entire satisfaction of the Engineer and Shall comply with the Engineer’s direction on any matter whatsoever.	Engineer’s Authority

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2.2	The Contractor shall take instructions from the Engineer and subject to limitation of Clause 2.5 hereof, from the Engineer's Representative.	Authority of Engineer's Representative
2.3	<p><i>The Engineer shall have full power and authority :</i></p> <p>(a) to supply to the contractor from time to time during the progress of the works such further drawings and instructions as shall be necessary for the purpose of proper and adequate execution and maintenance of the works and the contractor shall carry out and be bound by the same.</p> <p>(b) to alter or modify the specification of any material and workmanship and to inspect the work at any time.</p> <p>(c) to order for any variation, alteration and modification of the work and for extra works.</p> <p>(d) to issue certificates as per contract.</p> <p>(e) to settle the claims & disputes of the Contractor and Trustees, as the first referee.</p> <p>(f) To grant extension of completion time.</p>	Engineer's Power
2.4	<p><i>The Engineer's Representative shall :</i></p> <p>(i) watch and supervise the works.</p> <p>(ii) test and examine any material to be used or workmanship employed in connection with the work.</p> <p>(iii) have power to disapprove any material and workmanship not in accordance with the contract and the contractor shall comply with his direction in this regard.</p> <p>(iv) take measurements of work done by the contractor for the purpose of payment or otherwise.</p> <p>(v) order demolition of defectively done work for its reconstruction all by the Contractor at his own expense.</p> <p>(vi) have powers to issue alteration order not implying modification of design and extension of completion time of the work and</p> <p>(vii) have such other powers and authorities vested in the Engineer, which have been delegated to him in writing by the Engineer under intimation to the Contractor.</p>	Power of Engineer's Representative.

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2.5	<p><i>Provided always that the Engineer's Representative shall have no power :</i></p> <ul style="list-style-type: none"> (a) to order any work involving delay or any extra payment by the Trustees, (b) to make variation of or in the works; and (c) to relieve the Contractor of any of his duties or obligations under the Contract. 	Limitation of Engineer's Representative's Power
2.6	<p>Provided also as follows :</p> <ul style="list-style-type: none"> (a) Failure of Engineer's Representative to disapprove any work or materials shall not prejudice the power of the Engineer thereafter to disapprove such work or materials and to order the pulling down, removal, breaking-up thereof and re-constructing at the contractor's cost and the contractor shall have no claim to compensation for the loss if any sustained by him. (b) If the contractor shall be dissatisfied by reason of any decision of the Engineer's Representative, he shall be entitled to refer the matter to the Engineer who shall thereupon confirm, reverse or vary such decision. (c) Any written instructions or written approval given by the Engineer's Representative to the contractor, within the terms of delegation of power and authority vested in the Engineer to his Representative in writing, shall bind the contractor and the Trustees as though it had been given by the Engineer, who may from time to time make such delegation. 	Engineer's Overriding Power
3.0	THE TENDER/OFFER AND ITS PRE-REQUISITES	
3.1	The Contractor shall, before making out and submitting his tender/offer, be deemed to have inspected and examined the site, fully considered all factors, risks and contingencies, which will have direct and indirect impact on his expenses and profit from the work and shall be specifically deemed to have taken the following aspects into consideration :	The tender must encompass all relevant aspects/issues.
	(a) The form and nature of the site and its surroundings including their sub-surface, hydrological, tidal and climatic conditions, the means of access to the site and all other local conditions, including the likely charges and costs for temporary way-leave, if any, required for the work.	Site & Local condition.
	(b) The drawings, specifications, the nature and extent of work to be executed and the quality, quantity and availability of the required materials and labour for the work and the need to execute the work to the entire satisfaction of the Engineer, and also by complying with the General and Special Conditions of Contract.	Drawing/ Specification/ Nature & extent of work to be done.

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	(c) The accommodation required for the workmen and site office, mobilisation/demobilisation and storage of all plant, equipment and Construction materials.	Accommodation for Contractor's men/materials.
	(d) The sources and means of procurement of water for drinking, washing and execution of work, and source and availability of electrical power, all at Contractor's cost.	Water for drinking etc. /Electrical power.
	(e) Payment of taxes and duties and compliance of all applicable statutes, ordinances and law together with the rules made thereunder, the rules, regulations and bye-laws of public bodies or any local or other authority by the Contractor, keeping the Trustees indemnified against penalties and liabilities of every kind arising from the Contractor's failure in such compliance.	Payment of Taxes/duties and observance of all statutes.
	(f) Payment of all kinds of stamp-duty for executing the agreement or for any legal instrument including Bank Guarantees and Indemnity Bonds.	Payment of Stamp Duty by the Contractor.
3.2	The Contractor's tender shall be in ink on the Tender Forms supplied by the Trustees, unless stipulated otherwise in the Notice Inviting the Tender and shall be faultless in figures and free from erasing. Corrections, if any, shall only be made by scoring out and initialling of the revised figure.	
3.3	If required by the Engineer or the Trustees, the Contractors in their tender or subsequently, shall disclose the names of their owners/partners/share holders at the required points of time. The failure in this regard shall be treated as a breach and a contract, if entered into, shall be liable to be cancelled.	Disclosure of Owner's name.
3.4	(a) Unless otherwise stipulated in the Notice Inviting Tender / Offer, every tender must be submitted with Earnest Money of the amount calculated as per the following scale.	Earnest Money and Security Deposit.
	Estimated Value of Work	Amount of Earnest Money
		For Works Contract
		For Contract of Supplying Materials or Equipment only
	Up to Rs. 1,00,000=00	5% of the estimated value of work
	Over Rs. 1,00,000=00	2% of the estimated value of work subject to a maximum of Rs. 20,000/- and minimum of Rs. 5,000/-.
		1% of the estimated value of work
		½% of the estimated value of work subject to a maximum of Rs. 10,000/- and minimum of Rs. 1,000/-.

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	(b) Earnest Money shall be deposited with the Trustees' treasurer in cash or by Banker's Cheque of any Kolkata Branch of a Nationalised Bank of India drawn in favour of "Syama Prasad Mookerjee Port, Kolkata" or in the form of any "Account Payee" Draft of any Nationalised Bank of India drawn in favour of "Syama Prasad Mookerjee Port, Kolkata" and payable at Kolkata/Haldia, as the case may be, and the receipt granted therefor be kept attached to the Tender/Offer in the Sealed Cover.	Method of Paying E.M.												
	(c) Earnest Money of unaccepted tender shall be refunded without any interest through A/c. Payee Cheque drawn on a Nationalised Bank of Kolkata / Haldia.	Refund of E.M.												
	(d) The enlisted (registered) Contractors of the Trustees who have deposited fixed Security with the Trustees' FA & CAO / Manager (Finance) according to his Class of Registration, shall be exempt from depositing the Earnest Money, as per the following scale :	Exemption from E.M. to Regd. Firms												
	<table border="1"> <thead> <tr> <th>Class of Registration</th><th>Amount of Fixed Security</th><th>Financial Limit of Each Tender</th></tr> </thead> <tbody> <tr> <td>A</td><td>Rs. 25,000/-</td><td>Any tender priced up to Rs.5,00,000/-</td></tr> <tr> <td>B</td><td>Rs. 10,000/-</td><td>Any tender priced up to Rs.2,00,000/-</td></tr> <tr> <td>C</td><td>Rs. 5,000/-</td><td>Any tender priced up to Rs.1,00,000/-</td></tr> </tbody> </table>	Class of Registration	Amount of Fixed Security	Financial Limit of Each Tender	A	Rs. 25,000/-	Any tender priced up to Rs.5,00,000/-	B	Rs. 10,000/-	Any tender priced up to Rs.2,00,000/-	C	Rs. 5,000/-	Any tender priced up to Rs.1,00,000/-	
Class of Registration	Amount of Fixed Security	Financial Limit of Each Tender												
A	Rs. 25,000/-	Any tender priced up to Rs.5,00,000/-												
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C	Rs. 5,000/-	Any tender priced up to Rs.1,00,000/-												
	<p>(e) (i) Tender submitted without requisite Earnest Money may be liable to rejection.</p> <p>(ii) If before expiry of the validity period of his Tender/Offer, the tenderer amends his quoted rates or tender/offer making them unacceptable to the Trustees and/or withdraws his tender/offer, the Earnest Money deposited shall be liable to forfeiture at the option of the Trustees.</p>	<p>Tender without EM liable to rejection.</p> <p>Forfeiture of E.M. before Acceptance of offer.</p>												
	(f) The Earnest Money of accepted tender/offer shall be retained by the Trustees as part of the Security Deposit, for which a separate Treasury Receipt shall be issued to the Contractor after cancellation of the previous Receipt of Earnest Money.	E.M. to be converted to part S.D.												
	(g) Balance security for works contract shall be recovered by deduction from all progressive Bill (including final Bill, if necessary) @ 10% of the gross value of work in each such bill, so that the total recovery may not exceed the quantum computed as per the under noted percentages of the total value of work actually done up to the stage of completion.	Mode of recovery of balance S.D.												

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	Value of Work	% of Security Deposit for works contract.	% of Security Deposit For contract of supply-ing materials & equipment only.	Scale of S.D. recovery.
	For works up to Rs.10,00,000/-.	10% (Ten percent)	1% (One percent)	
	For works costing more than Rs.10,00,000/- and up to Rs.20,00,000/-	10% on first Rs.10,00,000/- + 7½% on the balance.	1% on first Rs.10,00,000/- + ½% on the balance.	
	For works costing more than Rs.20,00,000/-	10% on first Rs.10,00,000/- + 7 ½% on the next Rs.10,00,000/- + 5% on the balance.	1% on first Rs.10,00,000/- + ½% on the next Rs.10,00,000/- + ¼% on the balance.	
	(h) Balance Security for Contract of supplying materials and equipment computed in terms of the percentages given above, shall have to be deposited with the Trustees' Treasurer in advance and within 30 days from the date of placement of supply order, either in cash or by A/c. Payee Draft of a Nationalised Bank of India drawn in favour of Syama Prasad Mookerjee Port, Kolkata and payable at Kolkata/Haldia, as the case may be.			S.D. for supply contracts to be deposited in advance.
	(i) No interest shall be paid by the Trustees to the Tenderer/Contractor on the amount of Earnest Money/Security Deposit held by the Trustees, at any stage.			No interest payable on E.M. /S.D
3.5	(i) The Security Deposit shall refunded to the Contractor in terms of Clause 9.3 hereinafter and subject to deduction, if any, under the provision of Sub-clause 3.5 (ii) herein below. Id, however, the Contract provides for any maintenance period. 50% of the Security Deposit may be refunded against any of the treasury Receipt for that amount on expiry of half of the maintenance period and the balance deposit on the expiry of the said maintenance period and after the Engineer has certified the final completion of work in Form G.C.2 and the Contractor has submitted his "No Claim" Certificate in Form G.C.3.			Mode of refund of S.D.
	(ii) The Security Deposit/Earnest Money may be liable to forfeiture at the option of the Trustees, if the Contractor fails to carry out the work or to perform/observe any of the conditions of the Contract. The Trustees shall also be at liberty to deduct any of their dues from the Security Deposit, fixed Security, Earnest Money or from any sum due or to become due to the Contractor under any other contract.			Forfeiture of S.D.

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3.6	If stipulated in the contract as a Special Condition, the contractor shall have to submit to the Engineer a performance Bond in the form of an irrevocable guarantee from Kolkata/Haldia Branch, as the case may be, of any Nationalised Bank of India in the proforma annexed hereto and for the sum and period as mentioned in the letter of acceptance of the Tender/Offer, within 15 days from the date of such letter, failing which the Contract shall be liable to be terminated and the earnest money shall be liable to forfeiture; all at the discretion of the Engineer. The cost of obtaining this or any other Bank Guarantee and/or the revalidation thereof, wherever required, has to be borne by the Contractor and it shall be his sole responsibility to arrange for timely revalidation of such Bank Guarantee, failing which and for non-fulfilment of any contractual obligation by the Contractor, the Engineer and/or the Trustees shall be at liberty to raise claim against the Guarantee and/or enforce the same unilaterally.	Bank Guarantee in lieu of Cash S.D. in certain cases
3.7	"Every Tenderer/ Bidder shall submit, in respect of a tender value of more than Rs 5 Crore, along with their tender comprising Special Conditions of Contract, General Conditions of Contract, BOQ, Earnest Money, etc. a document called Integrity Pact Agreement duly signed by their authorized representative. The Proforma of the Integrity Pact Agreement shall as specified in the GCC. In case of tender value more than Rs 5 Crore, the Integrity Pact Agreement is an essential part and parcel of bid document to be submitted by each tenderer, without which the tender shall not be considered."	
4.0	THE CONTRACT & GENERAL OBLIGATIONS OF CONTRACTOR	
4.1	(a) The contract documents shall be drawn-up in English language.	English language to be used
	(b) The contract shall be governed by all relevant Indian Acts. As applicable only within the jurisdiction of the High Court at Kolkata, India, including the following Acts : 1. The Contract Act (India), 1872. 2. The Major Port Trusts Act, 1963. 3. The Workmen's Compensation Act, 1923. 4. The Minimum Wages Act, 1948. 5. The Contract Labour (Regulation & Abolition) Act, 1970. 6. The Dock Workers' Act, 1948. 7. The Arbitration and Conciliation Act (1996) (in the case of a definite Arbitration Agreement only).	Applicability of laws on the contract
4.2	After acceptance of his Tender/Offer and when called on to do so by the engineer or his representative, the contractor shall, at his own expense, enter into and execute a Contract Agreement to be prepared by him in the form annexed hereto. Until such Contract Agreement is executed, the other documents referred to in the definition of the term 'Contract' here-in-before, shall collectively be the Contract.	Contractor to Execute Contract Agreement.
4.3	Several documents forming the contract are to be taken as mutually explanatory of one another. Should there be any discrepancy, ambiguity, omission or error in the various contract documents, the Engineer shall have the power to correct the same and his decision shall be final and binding on the parties to the Contract.	Interpretation of contract documents - Engineers' Power

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4.4	Two copies of the Drawings referred to in the general and special Conditions of Contract and in the Bill of Quantities, shall be furnished by the Engineer to the Contractors free of cost for his use on the work, but these shall remain the property of the Trustees and hence, the Contractor shall return them to the Engineer or his Representative on completion of the work, if not torn or mutilated on being regularly used at site.	All Drawings are Trustees' property.
4.5	The Contractor shall prove and make at his own expense any working or progress drawings required by him or necessary for the proper execution of the works and shall, when required, furnish copies of the same free of cost to the Engineer for his information and/or approval, without meaning thereby the shifting of Contractor's responsibility on the Engineer in any way whatsoever.	Contractor to prepare working / progress drawings
4.6	The Contractor shall not directly or indirectly transfer, assign or sublet the Contract or any part thereof without the written permission of the Engineer. Even if such permission be granted, the Contractor shall remain responsible (a) for the acts, defaults and neglect of any sub-contractor, his agents, servants or workmen as fully as if these were the acts, defaults or neglects of the Contractor himself or his agents, servants or workmen and (b) for his full and entire responsibility of the contract and for active superintendence of the works by him despite being sublet, provided always that the provision of labourers on a "piece rate" basis shall not be deemed to be sub-letting under this clause.	Contractor cannot sub-let the work
4.7	Unless otherwise specified, the Contractor shall be deemed to have included in his Tender/Offer all his cost for supplying and providing all constructional plant, temporary work. Materials both for temporary and permanent works, labour including supervision thereof, transporting to and from the site and in and about the work, including loading, unloading, fencing, watching, lighting, payment of fees, taxes and duties to the appropriate authorities and other things of every kind required for the construction, erection, completion and maintenance of the work.	Contractors' price is inclusive of all costs
4.8	The Contractor shall be solely responsible for the adequacy, stability and safety of all site operations and methods of construction, even if any prior approval thereto has been taken from the Engineer or his Representative. The Contractor shall not be responsible for the correctness of the design or specification of the Temporary and Permanent works formulated by the Engineer; but the Contractor shall be fully responsible for the correct implementation thereof, as also for any design and specification prepared/proposed/used by the Contractor.	Contractor is responsible for all construction process, except for correctness of design and specification formulated by the Engineer.
4.9	Whenever required by the Engineer or his representative, the Contractor shall submit to him the details of his (a) programme for execution of the work, (b) proposed procedure and methods of work, (c) proposed deployment of plant, equipment, labour, materials and temporary works. The submission to and/or any approval by the Engineer or his Representative to any such programme or particulars shall not relieve the Contractor of any of his obligations under the contract.	Contractor to submit his programme of work

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	If for any reason the contractor be unable to adhere to his earlier programme, he shall submit his revised programme for completion of work within the stipulated time whenever asked to do so.	
4.10	Necessary and adequate supervision shall be provided by the Contractor during execution of the works and as long thereafter as the Engineer or his representative shall consider necessary during the maintenance period. The Contractor or his competent and authorised agent or representative shall be constantly at site and instructions given to him by the Engineer or his representative in writing shall be binding upon the Contractor subject to limitation in Clause 2.5 hereof. The Contractor shall inform the Engineer or his representative in writing about such representative/agent of him at site.	Contractor to supervise the works
4.11	The Contractor shall employ in execution of the Contract only qualified careful and experienced persons and the Engineer shall be at liberty to direct the Contractor to stop deployment of any of his staff, workmen or official at site and the Contractor shall within 48 hours comply with such instruction without any demur whenever the Engineer shall feel that the deployment of the person concerned will not be conducive to the proper and timely completion of the work.	Contractor to deploy qualified men and Engineer's power to remove Contractor's men
4.12	The Contractor shall be responsible for the true and proper setting out of the works in relation to reference points/lines/levels given by the Engineer in writing. The checking of any setting-out or of any alignment or level by the Engineer or his Representative shall not in any way relieve the contractor of his responsibility for the correctness thereof and he shall fully provide protect and preserve all stakes, templates, bench marks, sight rails, pegs, level marks, profile marks and other things used in setting out the works.	Contractor is responsible for line, level, setting out etc.
4.13	From the commencement of the works till issue of the completion certificate in Form G.C.1, vide Clause 5.12 hereof, the contractor shall take full responsibility for the care thereof. Save for the excepted risks, any damage, loss or injury to the work or any part thereof shall be made good by the Contractor at his own cost as per instruction and to the satisfaction of the engineer, failing which the Engineer or his Representative may cause the same to be made good by any other agency and the expenses incurred and certified by the Engineer shall deem proper. This Clause will not apply to that part of the work, which might have been taken over by the Trustees on partial completion of the work and in such case the Contractor's obligation will be limited to repairs and replacement for manufacturing or construction defects during the Maintenance period (Guarantee Period) as per the directions of the Engineer as also for defects/damages if any caused to the work by the Contractor during such repairs and replacement in the maintenance period.	Contractor is responsible to protect the work

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4.14	The Contractor shall at his own cost protect support and take all precautions in regard to the personnel or structure or services or properties belonging to the Trustees or not which may be interfered with or affected or disturbed or endangered and shall indemnify and keep indemnified the Trustees against claim for injury, loss or damage caused by the Contractor in connection with the execution and maintenance of the work to the aforesaid properties, structures and services and/or to any person including the Contractor's workmen. Cost of Insurance Cover, if any, taken by the Contractor shall not be reimbursed by the Trustees, unless otherwise stipulated in the Contract.	Contractor is responsible for all damages to other structures / persons caused by him in executing the work.
4.15	The Contractor shall immediately inform the Engineer's Representatives if any fossil, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological importance be discovered at site which shall remain the property of the Trustees and protect them from being damaged by his workmen and arrange for disposal of them at the Trustees' expense as per the instruction of the Engineer's Representative.	Fossils, Treasure travois, etc. are Trustees' property
4.16	<p>The Contractor shall be deemed to have indemnified and shall indemnify the Trustees against all claims, demands, actions and proceedings and all costs arising therefrom on account of :</p> <p>(a) Infringement of any patent right, design, trademark or name or other protected right in connection with the works or temporary work.</p> <p>(b) Payment of all royalties, rent, toll charges, local taxes, other payments or compensation, if any, for getting all materials and equipment required for the work.</p> <p>(c) Unauthorised obstruction or nuisance caused by the contractor in respect of Public or Private or Private road, railway tracks, footpaths, crane tracks, waterways, quays and other properties belonging to the Trustees or any other person.</p> <p>(d) Damage/injury caused to any highway and bridge on account of the movement of Contractor's plants and materials in connection with the work.</p> <p>(e) Pollution of waterway and damage caused to river, lock, sea-wall or other structure related to waterway, in transporting contractor's plants and materials.</p> <p>(f) The Contractor's default in affording all reasonable facilities and accommodation as per the direction of the Engineer or his Representative to the workmen of the Trustees and other agencies employed by or with the permission and/or knowledge of the Trustees on or near the site of work.</p>	Contractor to Indemnify the Trustees against all claims for loss, damage, etc.
4.17	Debris and materials, if obtained by demolishing any property, building or structure in terms of the Contract shall remain the property of the Trustees.	Dismantled materials Trustees'

		property
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4.18	<p>The Contractor's quoted rates shall be deemed to have been inclusive of the following :</p> <ul style="list-style-type: none"> (a) Keeping the site free of unnecessary obstruction and removal from site of constructional plant wreckage, rubbish, surplus earth or temporary works no longer required. (b) Cleaning and removal from site all the surplus materials of every kind to leave the site clean and tidy after completion of the work, without which payment against final bill may be liable to be withheld. (c) Precautionary measures to secure efficient protection of Docks, the River Hooghly and other waterways against pollution of whatever nature during execution and maintenance of the works and to prevent rubbish, refuse and other materials from being thrown into the water by the Contractor's men or those of his agency. (d) Making arrangements for deployment of all labourer and workers, local or otherwise including payment for their wages, transport, accommodation, medical and all other statutory benefits and entry permits, wherever necessary. (e) Making arrangements in or around the site, as per the requirements of local authority or the Engineer or his Representative for preventing (i) spread of any infectious disease like smallpox, cholera, plague or malaria by taking effective actions for destruction of rats, mice, vermin, mosquitoes, etc. and by maintaining healthy and sanitary condition, (ii) illegal storage and distribution of Drugs, Narcotics, Alcoholic liquor, Arms and Ammunitions, (iii) unlawful, riotous or disorderly conduct of the Contractor's or his Sub-Contractor's workmen, (iv) deployment of workmen of age less than 16 years. 	Contractor's quoted rates/price must be all inclusive
4.19	Every direction or notice to be given to the Contractor shall be deemed to have been duly served on or received by the Contractor, if the same is posted or sent by hand to the address given in the tender or to the Contractor's Site Office or to the Registered Office of the Contractor. The time mentioned in these conditions for doing any act after direction or notice shall be reckoned from the time of such posting or despatch.	Notice to Contractor.
4.20	The Contractor and his Sub-contractor or their agents and men and any firm supplying plant, materials and equipment shall not publish or caused to be published any photographs or description of the works without the prior authority of	Contractor not to publish photograph or particulars of work

	the Engineer in writing.	
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4.21	The Contractor shall at the Trustees' cost to be decided by the Engineer render all reasonable facilities and Co-operation as per direction of the Engineer or his representative to any other Contractor engaged by the Trustees and their workmen to the Trustees' own staff and to the men of other Public Body on or near the site of work and in default the Contractor shall be liable to the Trustees for any delay or expense incurred by reason of such default.	Contractor to provide facilities to outsiders
4.22	The work has to be carried out by the Contractor causing the minimum of hindrance for any maritime traffic or surface traffic.	Work to cause minimum possible hindrance to traffic movement
4.23	All constructional plants, temporary works and materials when brought to the site by the Contractor shall be deemed to be the property of the Trustees who will have lien on the same until the satisfactory completion of the work and shall only be removed from the site in part or in full with the written permission of the Engineer or his Representative.	Trustees' lien on Contractor's Plant & Equipment.
5.0	COMMENCEMENT, EXECUTION AND COMPLETION OF WORK.	
5.1	The Contractor shall commence the work within 7 days of the receipt of Engineer's letter informing acceptance of the Contractor's tender/offer by the Trustees or within such preliminary time as mentioned by the Contractor in the Form of Tender or the time accepted by the Trustees. The Contractor shall then proceed with the work with due expedition and without delay, except as may be expressly sanctioned or ordered by the Engineer or his Representatives, time being deemed the essence of the contract on the part of the contractor.	Preliminary time to commence work an maintenance of steady rate of progress
5.2	The Contractor shall provide and maintain a suitable office at or near the site to which the Engineer's Representative may send communications and instructions for use of the Contractor.	Contractor's site office
5.3	Unless specified otherwise in the contract or prior permission of the Engineer has been taken, the contractor shall not execute the work beyond the working hours observed by the Engineer's Representative and on Sundays and Holidays observed in the Trustees' system, except in so far as it becomes essential on account of tidal work or for safety of the work. If the progress of the work lags behind schedule or the work has been endangered by any act or neglect on the part of the contractor, then the Engineer or his Representative shall order and the contractor at his own expense shall work by day and by night and on Sundays and Public Holidays. Any failure of the Engineer or his Representative to pass such an order shall not relieve the contractor from any of his obligations. The Engineer's decision in this regard shall be final binding and conclusive.	Contractor to observe Trustees' working hours

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5.4	Unless stipulated otherwise in the contract all materials required for the work shall be procured and supplied by the contractor with the approval of the Engineer or his Representative and subject to subsequent testing as may be required by the Engineer or his Representative. The Engineer shall exercise his sole discretion to accept any such materials.	Contractor to supply all materials as per requirement of the Engineer or his representative
5.5	Unless stipulated otherwise in the contract all materials, workmanship and method of measurement shall be in accordance with the relevant Codes (Latest Revision) of the Bureau of Indian Standards and the written instructions of the Engineer or his Representative. Where no specific reference is available in the contract, the material and workmanship shall be of the best of their respective kinds to the satisfaction of the Engineer.	Materials & Works
5.6	Samples shall be prepared and submitted for approval of the Engineer or his representative, whenever required to do so, all at the Contractor's cost.	Contractor to submit samples for approval
	Unless stipulated otherwise in the contract, the cost of any test required by the Engineer or his representative in respect of materials and workmanship deployed on the work, shall be borne by the Contractor.	Contractor to arrange all testing at his own cost.
5.8	Regarding the supply of any materials by the Trustees to the contractor in accordance with the contract, the following conditions shall apply :	
	(a) The Contractor shall, at his own expense, arrange for transporting the materials from the Trustees' Stores, watching, storing and keeping them in his safe custody, furnishing of statement of consumption thereof in the manner required by the Engineer or his representative, return of surplus and empty container to the Trustees' Stores as per the direction of the Engineer or his Representative.	The Contractor shall account for and look after the Trustees' materials
	(b) Being the custodian of the Trustees' materials, the contractor shall remain solely responsible for any such materials issued to him and for any loss or damage thereof for any reason other than "Excepted Risks", the Contractor shall compensate the Trustees' in the manner decided by the Engineer and shall at no stage remove or cause to be removed any such material from the site without his permission in writing.	Contractor to compensate for loss and damage to Trustees' materials
	(c) The Trustees' materials will generally be supplied in stages and in accordance with the rate of progress of work but except for grant of suitable extension of completion time of work as decided by the Engineer. The Contractor shall not be entitled to any other compensation, monetary or otherwise, for any delay in the supply of Trustees' materials to him. The Contractor shall, however, communicate his requirement of such materials to the Engineer	Delay in supply of Trustees' materials will only entitle the Contractor for extension of completion

	from time to time.	time of work
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	(d) Unless stipulated otherwise in the contract, the value of the Trustees' materials issued to the contractor shall be recovered from the contractor's bills and/or any of his other dues, progressively according to the consumption thereof on the work and/or in the manner decided by the Engineer or his representative and at the rate/s stipulated in the contract. These rates shall only be considered by the contractor in the preparation of his tender/offer and these will form the basis of escalation/variation, if in future the contractor is required to procure and provide any such material on the written order of the Engineer consequent on the Trustees' failure to effect timely supply thereof.	Recovery from Contractor for Trustees' materials under normal circumstances
	(e) If the Engineer decides that due to the contractor's negligence, any of the Trustees' materials issued to the contractor has been - (i) lost or damaged, (ii) consumed in excess of requirement and (iii) wasted by the contractor in excess of normal wastage, then the value thereof shall be recovered from the contractor's bills or from any of his other dues, after adding 19 ¼% extra over the higher one of the followings - (1) The issue rate of the materials at the Trustees' Stores and (2) The market price of the material on the date of issue as would be determined by the Engineer.	Recovery from Contractor for Trustees' materials under other circumstances.
5.9	The Engineer or his Representative shall have the power to inspect any material and work at any time and to order at any time - (I) for removal from the site of any material which in his opinion is not in accordance with the contract or the instruction of the engineer or his representative, (ii) for the substitution of the proper and suitable materials, or (iii) the removal and proper re-execution of any work which in respect of material and workmanship is not in accordance with the contract or the instructions of the Engineer. The Contractor shall comply with such order at his own expense and within the time specified in the order. If the contractor fails to comply, the Engineer shall be at liberty to dispose any such materials and re-do any work in the manner convenient to the Trustees by engaging any outside agency at the risk and expense of the contractor and after giving him a written prior notice of 7 days.	Contractor to replace materials/work not acceptable to the Engineer or his Representative
5.10	No work shall be covered up and put out of view by the contractor without approval of the Engineer or his Representative and whenever required by him, the contractor shall uncover any part or parts of the work or make openings in or through the same as may be directed by the Engineer or his representative from time to time and shall reinstate or make good those part of works thus affected to the satisfaction of the Engineer, all at the cost of the contractor. The Trustees shall reimburse such cost as determined by the Engineer, if the initial covering up was with prior written order of	Contractor to seek approval of Engineer or his Representative before covering up any portion of work

	the Engineer or his Representative.	
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5.11	<p>On a written order of the Engineer or his Representative, the contractor shall delay or suspend the progress of the work till such time the written order to resume the execution is received by him. During such suspension the contractor shall protect and secure the work to the satisfaction of the Engineer or his Representative. All extra expenses in giving effect to such order shall be considered by the Trustees, unless such suspension is -</p> <p>(a) otherwise provided for in the contract, or</p> <p>(b) necessary by reason of some default on the part of the contractor, or</p> <p>(c) necessary by reason of climatic conditions on the site, or</p> <p>(d) necessary for proper execution of the works or for the safety of the works or any part thereof.</p> <p>The Engineer shall settle and determine such extra payment and/or Extension of completion time to be allowed to the contractor, as shall, in the opinion of the Engineer be fair and reasonable, and the same shall be final and binding on the Contractor.</p>	Contractor to suspend work on Order from Engineer or his Representative
5.11.1	<p>If at any time before or after commencement of the work the Trustees do not require the whole of the work tendered for the Engineer shall notify the same to the contractor in writing and the contractor shall stop further works in compliance of the same. The Contractor shall not be entitled to any claim for compensation for underived profit or for such premature stoppage of work or on account of curtailment of the originally intended work by reason of alteration made by the Engineer in the original specifications, drawings, designs and instructions.</p>	
5.12	<p>When the whole of the work has been completed to the satisfaction of the Engineer and has passed any final test prescribed in the contract, the contractor shall, within 21 days of submission of his application to the Engineer, be entitled to receive from him a certificate for completion of work in Form G.C.1, annexed hereto. If any part of the total work having been completed to the satisfaction of the Engineer, be taken over and/or used by the Trustees, the Contractor shall on application be entitled to partial completion certificate in the Form G.C.1 indicating the portion of the work covered by it, so that the Contractor's liability during maintenance period of the contract, if any, shall commence from the date mentioned in such certificate so far as the completed portion of the work is concerned.</p>	Completion Certificate G.C.1.

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6.0	TERMS OF PAYMENT :	
6.1	<p>No sum shall be considered as earned by or due to the Contractor in respect of the work till final and satisfactory completion thereof and until a certificate of final completion in Form G.C.2 has been given by the Engineer.</p> <p>On account payments, if any, made prior to issue of the certificate in Form G.C.2, shall all be treated as mere advance, which shall stand recoverable in full or in part, if the Engineer so decides in the context of Contractor's unfulfilled contract condition, if any.</p>	All interim payments are advances till issue of Certificate in Form G.C.2
6.2	All payments shall be made to the Contractor only on the basis of measurements of actual work done, as recorded in the Trustees' measurement books and at accepted tendered or at agreed rates, as the case may be, except as otherwise provided in the contract and when the Engineer decides any other rate for change in the scope of work or omission, if any, on the part of the Contractor.	Payment on the basis of measurements at agreed rates.
6.3	For work of sanctioned tender value more than Rs.50,000/- or having an initially stipulated completion period of 4 months or more, on account payments may be made at the discretion of the Engineer or his Representative at intervals deemed suitable and justified by him. Provided always that subject to execution of work of substantial value in the context of the contract price, the interval of such on account payments shall be decided by the Engineer or his Representative, which shall ordinarily not be less than 1 month in between two payments for on account bill and/or advance.	Limitation for on account payment
6.4	Measurement for works done shall be progressively taken by the Engineer's Representative and entered in the Trustees' Measurement Book, at intervals deemed suitable and proper by him and/or the Engineer. The Contractor or his duly accredited Representative or Agent shall remain present at the time of such measurement and assist the engineer's Representative in every manner required by him. After the measurements taken have been entered in the Measurement Book, the Contractor or his Agent shall sign the Measurement Book at the end of such Measurements over the Contractor's Rubber Stamp as a token of acceptance of all such measurements, recorded above and prior to such signature. If the Contractor or his Agent fails to participate even after 3 days written notice from the Engineer's Representative, the measurement shall be taken ex-parte by the Engineer's Representative and those shall be accepted by the Contractor.	Recording of measurements

6.5	Based on the quantum of work and the value thereof computed in the Measurement Book, the Contractor shall type out his bill in the proforma approved by the Engineer and submit the same to the Engineer's Representative in quadruplicate, duly signed by him or his accredited Agent over his Rubber Stamp. The Engineer or his Representative may in his absolute discretion, allow advance payment against such bill to the extent of an amount not exceeding 75% of the "net payable" sum of the said bill, subject to adjustment thereof against the bill at the time of checking and auditing the bill at the Trustees' end. The measurement Book will not be handed over to the Contractor; but he will obtain the abstracts of quantities, amounts and recoveries to type out the bill.	Contractor to prepare and submit his bills
6.6	<p>At the discretion of the Engineer or his Representative and only in respect of accepted offers/where estimated amount put to tender would be Rs.2,00,000/- or more, advance payment may be made to the extent of 75% of the value of any material purchased and brought to the site by the Contractor. Provided always that -</p> <ul style="list-style-type: none"> (i) the materials shall, in the opinion of the Engineer or his Representative be of imperishable nature, (ii) the value of such materials shall be assessed by the engineer or his Representative at their own discretion, (iii) a formal agreement has been drawn up with the contractor, under which the Trustees secure a lien on the contractor's materials, (iv) the materials are safe-guarded by the contractor against losses, shortage and misuse due to the contractor postponing the execution of the work or otherwise, 	Advance payment against Non-perishable materials
	(v) in the event of storage of such materials within the Trustees' protected areas in the Docks, the contractor shall submit an Indemnity Bond in the proforma and manner acceptable to Trustees' whereby the contractor shall indemnify the Trustees against all financial loss/damage, on account of loss/damage to such materials for whatever reasons,	

	(vi) in the event of storage of such materials outside the Trustees' protected areas the Contractor shall submit to the Engineer an irrevocable Bank Guarantee favouring the Trustees and for the same sum as is being advance, in the proforma and manner acceptable to the Trustees. The Guarantee shall be of a Kolkata/Haldia Branch of any Nationalised Bank or a Schedule Commercial Bank, as the case may be, acceptable to the Trustees and shall remain valid till the anticipated period of consumption of such materials in the work. The Bank Guarantee must bear an undertaking by the issuing Bank guaranteeing automatic payment of the guaranteed sum to the Trustees by the Bank on the date of expiry of the validity of the Guarantee, unless with the prior written approval of the Engineer on behalf of the Trustees, the Bank has extended the validity of the Guarantee.	
	(vii) The amount of advance shall be recoverable from the contractor's bills or any other dues, progressively with the consumption of the materials on the basis of quantity consumed. Consequent on full recovery of the advance the Indemnity Bond/Bank Guarantee, vide Sub-clause (v) & (vi) above, shall be returned to the Contractor duly discharged by the Engineer on behalf of the Trustees.	
6.7	No certificate of the Engineer or his representative shall protect the Contractor against or prevent the Trustees from obtaining repayment from the Contractor, in case the Engineer or his representative should overcertify for payment or the Trustees should over-pay the Contractor on any account.	Recovery for wrong and over payment
6.8	No claim for interest shall be admissible or payable to the Contractor at any stage and in respect of any money or balance or Bank Guarantee, which may be due to the Contractor from the Trustees, owing to dispute or otherwise or for any delay on the part of the Trustees in making interim or final payment or otherwise.	Interest not admissible to Contractor
7.0	VARIATION AND ITS VALUATION :	
7.1	The Quantities set out in the Bill of Quantities of the tender shall be treated as estimated quantities of the work and shall never be deemed as actual or correct quantities of the works to be executed by the contractor in fulfilment of his obligation under the contract.	Quantities in Bill of Quantities of Tender
7.2	The Engineer shall have the power to order the Contractor in writing to make any variation of the quantity, quality or form of the works or any part thereof that may, in his opinion, be necessary and the Contractor upon receipt of such an order shall act as follows :	Engineer's power to vary the works

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7.2	<p>(a) Increase or decrease the quantity of any work included in the contract.</p> <p>(b) Omit any work included in the contract.</p> <p>(c) Change the Character or quality or kind of any work included in the contract.</p> <p>(d) Change the levels, lines, position and dimensions of any part of the work, and</p> <p>(e) Execute extra and additional work of any kind necessary for completion of the works</p>	
7.3	No such variation shall in any way vitiate or invalidate the contract or be treated as revocation of the contract, but the value (if any) of all such variations evaluated in accordance with the Engineer's sole decision shall be taken into account and the contract price shall be varied accordingly.	Variation by engineer do not vitiate the contract
7.4	Provided always that written order of the Engineer shall not be required for increase or decrease in the quantity of any work upto 15% where such increase or decrease is not the result of any variation order given under this clause but is the result of the quantities exceeding or being less than those stated in the bill of quantities. Provided also that verbal order of variation from the Engineer shall be complied with by the Contractor and the Engineer's subsequent written confirmation of such verbal order shall be deemed to be an order in writing within the meaning of this clause.	Where written order for variation is not needed
7.5	<p>(a) The Contractor shall not be entitled to any claim of extra or additional work unless they have been carried out under the written orders of the Engineer.</p> <p>(b) The Engineer shall solely determine the amount (if any) to be added to or deducted from the sum named in the tender in respect of any extra work done or work omitted by his order.</p>	Payment for extra or additional, or omitted work or substituted work, Engineer's powers
	(c) All extra, additional or substituted work done or work omitted by order of the Engineer shall be valued on the basis of the rates and prices set out in the contract, if in the opinion of the Engineer, the same shall be applicable. If the contract does not contain any rates or prices directly applicable to the extra, additional or substituted work, then the Engineer may decide the suitable rates on the basis of Schedule of Rates (including surcharge in force at the time of acceptance of tender), if any, adopted by the Trustees with due regard to the accepted contractual percentage, if any thereon. In all other cases the Engineer shall solely determine suitable rates in the manner deemed by him as fair and reasonable, and his decision shall be final, binding and conclusive.	

	(d) If the nature or amount of any omission or addition relative to the nature or amount of the whole of the contract work or to any part thereof shall be such that, in the opinion of the Engineer, the rate of prices contained in the contract for any item of the works or the rate as evaluated under sub-clauses (b) and (c) of this clause, is by reason of such omission or addition rendered unreasonable or in-applicable, the Engineer shall fix such other rate or price as he deems proper and the Engineer's decision shall be final, binding and conclusive.	
8.0	DELAY / EXTENSION OF COMPLETION TIME / LIQUIDATED DAMAGE / TERMINATION OF CONTRACT	
8.1	Should the quantum of extra or additional work of any kind or delayed availability of the Trustees' materials to be supplied as per contract or exceptionally adverse climatic conditions and natural phenomenon or strikes, lock-outs, civil commotion or other special circumstances of any kind beyond the control of the Contractor, cause delay in completing the work, the contractor shall apply to the Engineer in writing for suitable extension of completion time within 7 days from the date of occurrence of the reason and the Engineer shall thereupon consider the stated reasons in the manner deemed necessary and shall either reject the application or determine and allow in writing the extension period as he would deem proper for completion of the work with or without the imposition of "Liquidated Damage" Clause (No.8.3 hereof) on the Contractor and his decision shall be final and binding on the Contractor. If an extension of completion time is granted by the Engineer without imposition of liquidated damage, from the Clause No.8.3 of the Liquidated damage shall apply from its date of expiry, if the work be not completed within the extended time, unless stated otherwise in the decision communicated by the Engineer, as aforesaid.	Extension of completion time
8.2	a) If the Contractor fails to complete the work within the stipulated dates or such extension thereof as communicated by the Engineer in writing, the Contractor shall pay as compensation (Liquidated Damage) to the Trustees and not as a penalty, ½% (half percent) of the total value of work (contract piece) as mentioned in the letter of acceptance of the tender/offer, for every week or part thereof the work remains unfinished. Provided always that the amount of such compensation shall not exceed 10% of the said value of work. The amount of Liquidated damages shall be determined by the Engineer, which shall be final and binding.	'Liquidated Damage' and other compensation due to Trustees

	(b) Without prejudice to any of their legal rights, the Trustees shall have the power to recover the said amount of compensation/damage in Sub-clause (a) of this clause, from any money due or likely to become due to the Contractor. The payment or deduction of such compensation/damage shall not relieve the Contractor from his obligation to complete the work or from any of his other obligations/liabilities under the contract and in case of the Contractor's failure and at the absolute discretion of the Engineer, the work may be ordered to be completed by some other agency at the risk and expense of the Contractor, after a minimum three days notice in writing has been given to the Contractor by the Engineer or his Representative.	
8.3	Without being liable for any compensation to the Contractor, the Trustees may, in their absolute discretion, terminate the contract and enter upon the site and works and expel the Contractor there from after giving him a minimum 3 days' notice in writing, due to occurrence of any of the following reasons and decision of the Trustees in this respect, as communicated by the Engineer shall be final and conclusive : (i) The Contractor has abandoned the contract.	Default of the Contractors remedies & powers/Termination of Contract.
	(ii) In the opinion of the Engineer, either the progress of work is not satisfactory or the work is not likely to be completed within the agreed period on account of Contractor's lapses.	
	(iii) The Contractor has failed to commence the works or has without any lawful excuse under these conditions has kept the work suspended for at least 15 days despite receiving the Engineer" or his Representative" written notice to proceed with the work.	
	(iv) The Contractor has failed to remove materials from site or to dismantle or demolish and replace work for 7 days after receiving from the Engineer or his representative the written notice stating that the said materials or work were condemned and rejected by him under these conditions.	
	(v) The Contractor is not executing the works in accordance with the contract or is persistently or flagrantly neglecting to carry out his obligations under the contract.	
	(vi) Any bribe, commission, gift or advantage is given, promised or offered by or on behalf of the contractor to any officer, servant or representative of the Trustees or to any person on his or their behalf in relation to the obtaining or to the execution of the contract.	
	(vii) The Contractor is adjusted insolvent or enters into composition with his creditors or being a company goes into liquidation either compulsory or voluntary.	

8.3.1	Upon receipt of the letter of termination of work, which may be issued by the Engineer on behalf of the Trustees, the Contractor shall hand over all the Trustees' tools, plant and materials issued to him at the place to be ascertained from the Engineer, within 7 days of receipt of such letter.	
8.3.2	In all such cases of Termination of work, the Trustees shall have the power to complete the work through any other agency at the Contractor's risk and expense and the Contractor shall be debited any sum or sums that may be expended in completing the work beyond the amount that would have been due to the Contractor, had he duly completed the work of the work in accordance with the contract.	
8.3.3	Upon termination of contract, the Contractor shall be entitled to receipt payment of only 90% of the value of work actually done or materials actually supplied by him and subject to recoveries as per contract, provided the work done and materials conform to specifications at the time of taking over by the Trustees. The payment for work shall be based on measurements of actual work done and priced at approved contract rates or other rates, as decided by the Engineer. The payment for materials supplied shall be at the rates as decided by the Engineer, which shall I in no case be more than market rates prevailing at the time of taking over by the Trustees. The Engineer's decision in all such case shall be final, binding and conclusive.	
8.3.4	The Trustees shall have the power to retain all moneys due to the Contractor until the work is completed by other agency and the Contractor's liabilities to the Trustees are known in all respect.	
9.0	MAINTENANCE AND REFUND OF SECURITY DEPOSIT	
9.1	On completion of execution of the work the Contractor shall maintain the same for a period, as may be specified in the form of a Special Condition of the Contract, from the date mentioned in the Initial Completion Certificate in Form G.C.1. Any defect/fault, which may appear in the work during aforesaid maintenance period, arising, in the sole opinion of the Engineer or his representative, from materials or workmanship not in accordance with the contract or the instruction of the Engineer or his representative, shall, upon the written notice of the Engineer or his representative, be amended and made good by the Contractor at his own cost within seven days of the date of such notice, to the satisfaction of the Engineer or his representative, failing which the Engineer or his representative shall have the defects amended and made good through other agency at the Contractor's risk and cost and all expenses, consequent thereon or incidental thereto, shall be recoverable from the Contractor in any manner deemed suitable by the Engineer.	Contractor's obligation for maintenance of work.

9.2	The Contractor shall not be considered completed and the work shall not be treated as finally accepted by the Trustees, until a Final Completion Certificate in Form G.C.2 annexed hereto shall have been signed and issued by the Engineer to the contractor after all obligations under the Contract including that in the maintenance period, if any, have been fulfilled by the Contractor. Previous entry on the works or taking possession, working or using thereof by the Trustees shall not relieve the Contractor of his obligations under the contract for full and final completion of the work.	Certificate of final completion
9.3	On completion of the contract in the manner aforesaid, the Contractor may apply for the refund of his Security Deposit by submitting to the Engineer (I) The Treasury Receipts granted for the amount of Security held by the Trustees, and (ii) his "No further claim" Certificate in Form G.C.3 annexed hereto (in original), where upon the Engineer shall issue Certificate in Form G.C.2 and within two months of the Engineer's recommendation, the Trustees shall refund the balance due against the Security Deposit to the Contractor, after making deduction therefrom in respect of any sum due to the Trustees from the Contractor.	Refund of Security Deposit
10.0	INTERPRETATION OF CONTRACT DOCUMENTS, DISPUTES AND ARBITRATION	
10.1	In all disputes, matters, claims, demands or questions arising out of or connected with the interpretation of the Contract including the meaning of Specifications, drawings, designs and instructions or as to the quality of workmanship or as to the materials used in the work or the execution of the work whether during the progress of the works or after the completion and whether before or after the determination, abandonment or breach of the contract the decision of the Engineer shall be final and binding on all parties to the contract and shall forthwith be given effect to by the Contractor.	Engineer's decision
10.2	If the Contractor be dissatisfied with any such decision of the Engineer, he shall within 15 days after receiving notice of such decision require that the matter shall be referred to Chairman, who shall thereupon consider and give a decision.	Chairman's award.
10.3	If, however, the Contractor be still dissatisfied with the decision of the Chairman, he shall within 15 days after receiving notice of such decision require that within 60 days from his written notice, the Chairman shall refer the matter to an Arbitrator of the panel of Arbitrators to be maintained by the Trustees for the purpose and any such reference shall be deemed to be a submission to arbitration within the meaning of Indian Arbitration Act, 1940 or any statutory modification thereof.	Arbitration.
10.3.1.	If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever, another person from panel shall be appointed as Sole Arbitrator and	

	he shall proceed from the stage at which his predecessor left it.	
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10.3.2	The Arbitrator shall be deemed to have entered on reference on the date he issues notice to both the parties fixing the date of first hearing.	
10.3.3	The time limit within which the Arbitrator shall submit his award shall normally be 4 months as provided in Indian Arbitration Act, 1940 or any amendment thereof. The Arbitrator may, if found necessary, enlarge the time for making and publishing the award, with the consent of the parties..	
10.3.4	The venue of the arbitration shall be either Kolkata or Haldia as may be fixed by the Arbitrator in his sole discretion. Upon every or any such reference the cost of any incidental to the reference and award respectively shall be in the discretion of the Arbitrator who may determine, the amount thereof or by whom and to whom and in what manner the same shall be borne and paid.	
10.3.5	The Award of the Arbitrator shall be final and binding on all parties subject to the provisions of the Indian Arbitration Act 1940 or any amendment thereof. The Arbitrator shall give a separate award in respect of each item of disputes and respective claim referred to him by each party and give reason for the award.	
10.3.6	The Arbitrator shall consider the claims of all the parties to the contract – within only the parameters of scope and conditions of the contract in question.	
10.3.7	Save as otherwise provided in the contract the provisions of the Arbitration Act, 1940 and rules made thereunder, for the time being in force, shall apply to the arbitration proceedings under this Clause.	
10.4	The Contractor shall not suspend or delay the work and proceed with the work with due diligence in accordance with Engineer's decision. The Engineer also shall not withhold any payment, which, according to him, is due or payable to the Contractor, on the ground that certain disputes have cropped up and are likely to be referred to arbitration.	
10.5	Provided always as follows:	
	[a] Nothing of the provisions in paragraphs 10.3 to 10.3.7 hereinabove would apply in the cases of contracts, where tendered amount appearing in the letter of acceptance of the tender / offer is less than Rs.40,00,000/-.	
	[b] The Contractor shall have to raise disputes or differences of any kind whatsoever in relation to the execution of the work to the Engineer within 30 days from the date of occurrence of the cause of dispute and before the preparation of the final bill, giving detailed justifications, in the context of contract conditions.	

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	[c]	Contractor's dispute if any arising only during the maintenance period, if any, stipulated in the contract, must be submitted to the Engineer, with detailed justification in the context of contract conditions, before the issuance of final completion certificate in Form G.C.-2 <i>ibid</i> . No dispute or difference on any matters whatsoever, the Contractor can raise pertaining to the Contract after submission of certificate in form G.C.3 by him.	
	[d]	Contractor's claim / dispute raised beyond the time limits prescribed in sub-clauses 10.5[b] and 10.5 [c] hereinabove, shall not be entertained by the Engineer and / or by any Arbitrator subsequently.	
	[e]	The Chairman / Trustees shall have the right to alter the panel of Arbitrators, vide Clause 10.3 hereinabove, on their sole discretion, by adding the names of new Arbitrators and / or by deleting the names of existing Arbitrators, without making any reference to the Contractor.	

THE BOARD OF TRUSTEES FOR THE PORT OF KOLKATA

FORM OF TENDER

To

.....
.....
.....

I/We _____

having examined the site of work, inspected the Drawings and read the specifications, General & Special Conditions of Contract and Conditions of the Tender, hereby tender and undertake to execute and complete all the works required to be performed in accordance with the Specification, Bill of Quantities, General & Special Conditions of Contract and Drawings prepared by or on behalf of the Trustees and at the rates & prices set out in the annexed Bill of Quantities within _____ months / weeks from the date of order to commence the work and in the event of our tender being accepted in full or in part. I / We also undertake to enter into a Contract Agreement in the form hereto annexed with such alterations or additions thereto which may be necessary to give effect to the acceptance of the Tender and incorporating such Specification, Bill of Quantities, Drawing and Special & General Conditions of Contract and I / We hereby agree that until such Contract Agreement is executed the said Specification, Bill of Quantities, Conditions of Contract and the Tender, together with the acceptance thereof in writing by or on behalf of the Trustees shall be the Contract.

THE TOTAL AMOUNT OF TENDER Rs. **NOT TO BE QUOTED**

(Repeat in words)

.....

I / We require _____ days / months preliminary time to arrange and procure the materials required by the work from the date of acceptance of tender before I We could commence the work.

I / We have deposited with the Trustees' Manager (Finance), HDC, vide Receipt No. _____ of _____ as Earnest Money.

I / We agree that the period for which the tender shall remain open for acceptance shall not be less than four months.

Dated :
with Seal)

(Signature of Bidder

WITNESS :			
Signature :		Name of the Bidder : (In Block letters)	
Name : (In Block letters)		Address :	
Address :			
Occupation :			

Syama Prasad Mookerjee Port, Kolkata

FORM G.C.1

Contractor _____

Address -----

Date of completion :.....

Dear sir(s),

This is to certify that the following work viz :-

Name of work :

.....

.....

Estimate No. E.E.0.....Dt.....

C.E.O.....Dt.....

Work Order No.....

Allocation.....

Contract No.

which was carried out by you is in the opinion of the undersigned complete in every respect on the _____ day of _____ 2000 in accordance with terms of the Contract and you are required to maintain the work as per Clause 62 of the General Conditions of Contract and under provisions of the Contract for a period of _____ weeks / months / years

from the _____ day of _____ 20.....

to _____ day of _____ 20..... .

Yours faithfully,

Signature.....

(ENGINEER/ENGINEER'S REPRESENTATIVE)

Name.....

Designation.....

OFFICE SEAL

Syama Prasad Mookerjee Port, Kolkata

FORM G.C.2.

Certificate of Final Completion.

The Financial Adviser & Chief Accounts Officer
The Manager (Finance), Haldia Dock Complex.

This is to certify that the following work viz:-

Name of work :

Estimate No. E.E.O.....dt.....
C.E.O.....dt.....

Work Order No.....

Contract No.

Resolution & Meeting No.

Allocation :

which was carried out by Shri/Messrs..... is now complete in every respect in accordance with the terms of the Contract and that all obligations under the Contract have been fulfilled by the Contractor.

Signature.....

(ENGINEER/ENGINEER'S REPRESENTATIVE)

NAME.....

DESIGNATION.....

OFFICE SEAL

Syama Prasad Mookerjee Port, Kolkata

FORM G.C.3

(‘NO CLAIM ‘ CERTIFICATE FROM CONTRACTOR)

The Engineer
Syama Prasad Mookerjee Port, Kolkata

Kolkata.

(Atten:.....)

Dear Sir,

I / We do hereby declare that I / we have received full and final payment from the Syama Prasad Mookerjee Port, Kolkata for the execution of the following work viz:-

Name of work : _____

Work Order No :- _____

Contract No. _____

Agreement No.....Dt.....

and I / we have no further claim against the Syama Prasad Mookerjee Port, Kolkata in respect of the above-mentioned job.

Yours faithfully,

(Signature of the Contractor)

Dated _____

Name of Contractor.....

Address:.....

(OFFICIAL SEAL OF THE CONTRACTOR)

Syama Prasad Mookerjee Port, Kolkata
PROFORMA OF FORM OF AGREEMENT

THE BOARD OF TRUSTEES FOR THE PORT OF KOLKATA
FORM OF AGREEMENT

THIS AGREEMENT made thisday of.....200.....between the Board of Trustees for the Port of Kolkata, a body corporate constituted by the Major Port Trusts Act, 1963 (thereinafter called "Trustees" which expression shall unless excluded by or repugnant to the context be deemed to include their successors in office) of the one part and(hereinafter called " the Contractor ", which expression shall unless excluded by or repugnant to the context be deemed to include its heirs, executors, administrators, representatives and assignees or successors in office) of the other part.

WHEREAS the Trustees are desirous that certain works should be executed / constructed , viz.a
nd have accepted a Tender / Offer by the Contractor for the execution and maintenance of such work NOW THIS AGREEMENT WITNESSETH as follows :

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in General Conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.
 - (a) The said Tender / Offer & the acceptance of the Tender / Offer
 - (b) The General Conditions of Contract
 - (c) The Special Conditions of Contract
 - (d) The Conditions of Tender
 - (e) The Technical Specifications
 - (f) The Schedule of Rates
 - (g) The Terms of Payment
 - (h) All correspondence by which, the contract is added, amended, varied or modified in any way by mutual consent.
3. In consideration of the payments to be made by the Trustees to the Contractor as hereinafter mentioned, the Contractor hereby covenant with the Trustees to execute and maintain the work in conformity in all respects with the provisions of the contract.
4. The Trustees hereby covenants to pay to the Contractor, in consideration of such execution and maintenance of the Work, the Contract Prices at the times and in the manner prescribed by the Contract.

IN WITNESS whereof of the parties hereto have caused their respective Common Seals to be hereunto affixed (or have hereunto set their respective hands and seals) the day and year first above written.

The Seal of.....
.....

Was hereunto affixed in the presence of:

Name

Address

.....

Or

SIGNED, SEALED AND DELIVERED

by the said

In the presence of:

Name

Address:

.....
The Common Seal of the Trustees was hereunto affixed in the presence of:

Name.....

Address:

SMP, Kolkata

Draft Proforma of Bank Guarantee (Performance Bond) in lieu of cash Security Deposit, to be issued by the Kolkata/Haldia, as the case may be, of any nationalized Bank of India on Non-Judicial Stamp Paper worth Rs.50/- or as decided by the Engineer / Legal Adviser of the Trustees.

To

The Board of Trustees

for the Port of Kolkata.

BANK GUARANTEE NO.....DATE.....

Name of issuing Bank.....

Name of Branch.....

Address.....

In consideration of the Board of Trustees of the Port Kolkata, a body corporate - duly constituted under the Major port Trust Act, 1963 (Act 38 of 1963), having agreed to exempt Shri / Messrs a proprietary / Partnership / Limited / Registered Company, having its Registered Office at

(hereinafter referred to as "The Contractor") from cash payment of Security Deposit / Payment of Security Deposit through deduction from the Contractors' bills under the terms and conditions of a contract made between the Trustees and the Contractor for (write the name of the work as per Work Order) in terms of the Work order No dated.....(hereinafter referred to as "the said contract"), for the due fulfillment by the contractor of all the terms and conditions contained in the said contract, on submission of a bank Guarantee for Rs (Rupees)

we,.....Branch, Kolkata...../ Haldia, do on the advise of the contractor, hereby undertake to indemnify and keep indemnified the Trustees to the extent of the said sum of Rs (Rupees) We.....Branch,Kolkata

...../Haldia, further agree that if a written demand is made by the Trustees through any of its officials for honoring the Bank Guarantee constituted by these presents, We,..... Branch, Kolkata /Haldia shall have no right to decline to cash the same for any reason whatsoever and shall cash the same and pay the sum so demanded to the Trustees within a week from the date of such demand by an A/c. Payee Banker's Cheque drawn in favour of "Syama Prasad Mookerjee Port, Kolkata", without any demur. Even if there be any dispute between the contractor and the Trustees, this would be no ground for us,..... (Name of Bank), Branch, Kolkata...../Haldia to decline to honour the Bank Guarantee in the manner aforesaid. The very fact that We,Branch,Kolkata /Haldia, decline or fail or neglect to honour the Bank Guaranteed in the manner aforesaid shall constitute sufficient reason for the Trustees to enforce the Bank Guarantee unconditionally without any reference, whatsoever, to the contractor.

2. We,.....Branch,Kolkata..... Haldia, further agree that a mere demand by the Trustees at any time and in the manner aforesaid, is sufficient for us, Branch, Kolkata / Haldia, to pay the amount covered by this Bank Guarantee in full and in the manner aforesaid and within the time aforesaid without reference to the contractor and no protest by the contractor, made either directly or indirectly or through Court , can be valid ground for us,

.....Branch,Kolkata /Haldia, to decline or fail or neglect to make payment to the Trustees in, the manner and within the time aforesaid.

3. We, Branch, Kolkata /Haldia, further agree that the Bank Guaranteed herein contained shall remain in full force and effect, during the period that is taken for the due performance of the said contract by the contractor and that is shall continue to be enforceable till all the dues of the Trustees under and/or by virtue of the terms and conditions of the said contract have been fully paid and its claim satisfied and/or discharged in full and/or till the Trustees certify that the terms and conditions of the said contract have been fully and properly observed/fulfilled by the contractor and accordingly, the Trustees have discharged the Bank Guarantee, subject however, that this guarantee shall remain valid up to and inclusive ofday of19.....and subject all so that the provision that the Trustees shall have no right to demand payment against this guarantee after the expiry of 6(six) calendar months from the expiry of the aforesaid validity period up to Or any extension thereof made by us,Branch, Kolkata/Haldia, in further extending the said validity period of this Bank Guarantee on Non-Judicial Stamp Paper of appropriate value, as required / determined by the Trustees, only on a written request by the Trustees to the contractor for such extension of validity of this Bank Guarantee.

4. We, Branch,Kolkata /Haldia, further agree that, without our consent and without affecting in any manner our obligations hereunder, the Trustees shall have the fullest liberty to vary from time to time any of the terms and conditions of the said contract or to extend the time for full performance of the said contract including fulfilling all obligations under the said contract by the contractor or to postpone for any time or from time to time any of the powers exercisable by the Trustees against the contractor and to forebear or enforce any of terms and conditions relating to the said contract and We, Branch, Kolkata/Haldia, shall not be relieved from our liability by reason of any such variation or extension being granted to the contractor or for any forbearance, act or commission on the part of the Trustees or any indulgence by the Trustees to the contractor or by any such matter or thing of whatsoever nature, which under the law relating to sureties would, but for this provision, have effect of so relieving us,.....Branch, Kolkata...../Haldia.

5. We Branch, Kolkata/Haldia, lastly undertake not to revoke this Bank Guarantee during its currency except with the previous consent of the Trustees in writing.

SIGNATURE.....
NAME.....
DESIGNATION.....

(Duly constituted attorney for and on behalf of)
BANK.....
BRANCH.....
Kolkata...../Haldia.

(OFFICIAL SEAL OF THE BANK)

SMP, Kolkata

No. P-45021/2/2017-PP (BE-II)
Government of India
Ministry of Commerce and Industry
Department for Promotion of Industry and Internal Trade
(Public Procurement Section)

Udyog Bhawan, New Delhi
Dated: 04th June, 2020

To

All Central Ministries/Departments/CPSUs/All concerned

ORDER

Subject: Public Procurement (Preference to Make in India), Order 2017– Revision; regarding.

Department for Promotion of Industry and Internal Trade, in partial modification [Paras 2, 3, 5, 9(a), 9(b) and 10(b) modified and Para 3A added] of Order No.P-45021/2/2017-B.E.-II dated 15.6.2017 as amended by Order No.P-45021/2/2017-B.E.-II dated 28.05.2018 and Order No.P-45021/2/2017-B.E.-II dated 29.05.2019, hereby issues the revised 'Public Procurement (Preference to Make in India), Order 2017' dated 04.06.2020 effective with immediate effect.

Whereas it is the policy of the Government of India to encourage 'Make in India' and promote manufacturing and production of goods and services in India with a view to enhancing income and employment, and

Whereas procurement by the Government is substantial in amount and can contribute towards this policy objective, and

Whereas local content can be increased through partnerships, cooperation with local companies, establishing production units in India or Joint Ventures (JV) with Indian suppliers, increasing the participation of local employees in services and training them,

Now therefore the following Order is issued:

1. This Order is issued pursuant to Rule 153 (iii) of the General Financial Rules 2017.
2. **Definitions:** For the purposes of this Order:

'Local content' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

'Class-I local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%, as defined under this Order.

'Class-II local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%, as defined under this Order.

.....Contd. p/2

'Non - Local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than or equal to 20%, as defined under this Order.

'L1' means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

'Margin of purchase preference' means the maximum extent to which the price quoted by a "Class-I local supplier" may be above the L1 for the purpose of purchase preference.

'Nodal Ministry' means the Ministry or Department identified pursuant to this order in respect of a particular item of goods or services or works.

'Procuring entity' means a Ministry or department or attached or subordinate office of, or autonomous body controlled by, the Government of India and includes Government companies as defined in the Companies Act.

'Works' means all works as per Rule 130 of GFR- 2017, and will also include 'turnkey works'.

3. Eligibility of 'Class-I local supplier' / 'Class-II local supplier' / 'Non-local suppliers' for different types of procurement

(a) In procurement of all goods, services or works in respect of which the Nodal Ministry / Department has communicated that there is sufficient local capacity and local competition, only 'Class-I local supplier', as defined under the Order, shall be eligible to bid irrespective of purchase value.

(b) In procurement of all goods, services or works, not covered by sub-para 3(a) above, and with estimated value of purchases less than Rs. 200 Crore, in accordance with Rule 161(iv) of GFR, 2017, Global tender enquiry shall not be issued except with the approval of competent authority as designated by Department of Expenditure. Only 'Class-I local supplier' and 'Class-II local supplier', as defined under the Order, shall be eligible to bid in procurements undertaken by procuring entities, except when Global tender enquiry has been issued. In global tender enquiries, 'Non-local suppliers' shall also be eligible to bid along with 'Class-I local suppliers' and 'Class-II local suppliers'.

(c) For the purpose of this Order, works includes Engineering, Procurement and Construction (EPC) contracts and services include System Integrator (SI) contracts.

3A. Purchase Preference

(a) Subject to the provisions of this Order and to any specific instructions issued by the Nodal Ministry or in pursuance of this Order, purchase preference shall be given to 'Class-I local supplier' in procurements undertaken by procuring entities in the manner specified here under.

.....Contd. p/3

(b) In the procurements of goods or works, which are covered by para 3(b) above and which are divisible in nature, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

- i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract for full quantity will be awarded to L1.
- ii. If L1 bid is not a 'Class-I local supplier', 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price for the remaining 50% quantity subject to the Class-I local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such 'Class-I local supplier' subject to matching the L1 price. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price or accepts less than the offered quantity, the next higher 'Class-I local supplier' within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on Class-I local suppliers, then such balance quantity may also be ordered on the L1 bidder.

(c) In the procurements of goods or works, which are covered by para 3(b) above and which are not divisible in nature, and in procurement of services where the bid is evaluated on price alone, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

- i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract will be awarded to L1.
- ii. If L1 is not 'Class-I local supplier', the lowest bidder among the 'Class-I local supplier', will be invited to match the L1 price subject to Class-I local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such 'Class-I local supplier' subject to matching the L1 price.
- iii. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price, the 'Class-I local supplier' with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the 'Class-I local supplier' within the margin of purchase preference matches the L1 price, the contract may be awarded to the L1 bidder.

(d) "Class-II local supplier" will not get purchase preference in any procurement, undertaken by procuring entities.

4. **Exemption of small purchases:** Notwithstanding anything contained in paragraph 3, procurements where the estimated value to be procured is less than Rs. 5 lakhs shall be exempt from this Order. However, it shall be ensured by procuring entities that procurement is not split for the purpose of avoiding the provisions of this Order.
5. **Minimum local content:** The local content requirement to categorize a supplier as 'Class-I local supplier'/ 'Class-II local supplier'/ 'Non-local supplier' shall be as defined in the Para "2" of the Order. No change is permissible on this account. However, if any nodal Ministry/ Department finds that for any particular item, pertaining to their nodal ministry/department, the definition of Local Content, as defined in the Order, is not workable/ has limitations, it may notify alternate suitable mechanism for calculation of local content for that particular item.
6. **Margin of Purchase Preference:** The margin of purchase preference shall be 20%.
7. **Requirement for specification in advance:** The minimum local content, the margin of purchase preference and the procedure for preference to Make in India shall be specified in the notice inviting tenders or other form of procurement solicitation and shall not be varied during a particular procurement transaction.
8. **Government E-marketplace:** In respect of procurement through the Government E-marketplace (GeM) shall, as far as possible, specifically mark the items which meet the minimum local content while registering the item for display, and shall, wherever feasible, make provision for automated comparison with purchase preference and without purchase preference and for obtaining consent of the local supplier in those cases where purchase preference is to be exercised.
9. **Verification of local content:**
 - a. The 'Class-I local supplier'/ 'Class-II local supplier' at the time of tender, bidding or solicitation shall be required to indicate percentage of local content and provide self-certification that the item offered meets the local content requirement for 'Class-I local supplier'/ 'Class-II local supplier', as the case may be. They shall also give details of the location(s) at which the local value addition is made.
 - b. In cases of procurement for a value in excess of Rs. 10 crores, the 'Class-I local supplier'/ 'Class-II local supplier' shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.
 - c. Decisions on complaints relating to implementation of this Order shall be taken by the competent authority which is empowered to look into procurement-related complaints relating to the procuring entity.

- d. Nodal Ministries may constitute committees with internal and external experts for independent verification of self-declarations and auditor's/ accountant's certificates on random basis and in the case of complaints.
- e. Nodal Ministries and procuring entities may prescribe fees for such complaints.
- f. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.
- g. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, in the manner prescribed under paragraph 9h below.
- h. The Department of Expenditure shall issue suitable instructions for the effective and smooth operation of this process, so that:
 - i. The fact and duration of debarment for violation of this Order by any procuring entity are promptly brought to the notice of the Member-Convenor of the Standing Committee and the Department of Expenditure through the concerned Ministry /Department or in some other manner;
 - ii. on a periodical basis such cases are consolidated and a centralized list or decentralized lists of such suppliers with the period of debarment is maintained and displayed on website(s);
 - iii. in respect of procuring entities other than the one which has carried out the debarment, the debarment takes effect prospectively from the date of uploading on the website(s) in the such a manner that ongoing procurements are not disrupted.

10. Specifications in Tenders and other procurement solicitations:

- a. Every procuring entity shall ensure that the eligibility conditions in respect of previous experience fixed in any tender or solicitation do not require proof of supply in other countries or proof of exports.
- b. Procuring entities shall endeavour to see that eligibility conditions, including on matters like turnover, production capability and financial strength do not result in unreasonable exclusion of 'Class-I local supplier'/ 'Class-II local supplier' who would otherwise be eligible, beyond what is essential for ensuring quality or creditworthiness of the supplier.
- c. Procuring entities shall, within 2 months of the issue of this Order review all existing eligibility norms and conditions with reference to sub-paragraphs 'a' and 'b' above.

- d. If a Nodal Ministry is satisfied that Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, it may, if it deems appropriate, restrict or exclude bidders from that country from eligibility for procurement of that item and/ or other items relating to that Nodal Ministry. A copy of every instruction or decision taken in this regard shall be sent to the Chairman of the Standing Committee.
- e. For the purpose of sub-paragraph 10 d above, a supplier or bidder shall be considered to be from a country if (i) the entity is incorporated in that country, or (ii) a majority of its shareholding or effective control of the entity is exercised from that country; or (iii) more than 50% of the value of the item being supplied has been added in that country. Indian suppliers shall mean those entities which meet any of these tests with respect to India."

10A. Action for non-compliance of the Provisions of the Order: In case restrictive or discriminatory conditions against domestic suppliers are included in bid documents, an inquiry shall be conducted by the Administrative Department undertaking the procurement (including procurement by any entity under its administrative control) to fix responsibility for the same. Thereafter, appropriate action, administrative or otherwise, shall be taken against erring officials of procurement entities under relevant provisions. Intimation on all such actions shall be sent to the Standing Committee.

11. Assessment of supply base by Nodal Ministries: The Nodal Ministry shall keep in view the domestic manufacturing / supply base and assess the available capacity and the extent of local competition while identifying items and prescribing minimum local content or the manner of its calculation, with a view to avoiding cost increase from the operation of this Order.

12. Increase in minimum local content: The Nodal Ministry may annually review the local content requirements with a view to increasing them, subject to availability of sufficient local competition with adequate quality.

13. Manufacture under license/ technology collaboration agreements with phased indigenization: While notifying the minimum local content, Nodal Ministries may make special provisions for exempting suppliers from meeting the stipulated local content if the product is being manufactured in India under a license from a foreign manufacturer who holds intellectual property rights and where there is a technology collaboration agreement / transfer of technology agreement for indigenous manufacture of a product developed abroad with clear phasing of increase in local content.

14. Powers to grant exemption and to reduce minimum local content: The administrative Department undertaking the procurement (including procurement by any entity under its administrative control), with the approval of their Minister-in-charge, may by written order, for reasons to be recorded in writing,

- a. reduce the minimum local content below the prescribed level; or
- b. reduce the margin of purchase preference below 20%; or

- c. exempt any particular item or supplying entities from the operation of this Order or any part of the Order.

A copy of every such order shall be provided to the Standing Committee and concerned Nodal Ministry / Department. The Nodal Ministry / Department concerned will continue to have the power to vary its notification on Minimum Local Content.

15. **Directions to Government companies:** In respect of Government companies and other procuring entities not governed by the General Financial Rules, the administrative Ministry or Department shall issue policy directions requiring compliance with this Order.

16. **Standing Committee:** A standing committee is hereby constituted with the following membership:

Secretary, Department for Promotion of Industry and Internal Trade—Chairman
Secretary, Commerce—Member
Secretary, Ministry of Electronics and Information Technology—Member
Joint Secretary (Public Procurement), Department of Expenditure—Member
Joint Secretary (DPIIT)—Member-Convenor

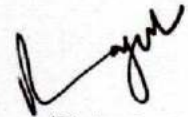
The Secretary of the Department concerned with a particular item shall be a member in respect of issues relating to such item. The Chairman of the Committee may co-opt technical experts as relevant to any issue or class of issues under its consideration.

17. **Functions of the Standing Committee:** The Standing Committee shall meet as often as necessary, but not less than once in six months. The Committee

- a. shall oversee the implementation of this order and issues arising therefrom, and make recommendations to Nodal Ministries and procuring entities.
- b. shall annually assess and periodically monitor compliance with this Order
- c. shall identify Nodal Ministries and the allocation of items among them for issue of notifications on minimum local content
- d. may require furnishing of details or returns regarding compliance with this Order and related matters
- e. may, during the annual review or otherwise, assess issues, if any, where it is felt that the manner of implementation of the order results in any restrictive practices, cartelization or increase in public expenditure and suggest remedial measures
- f. may examine cases covered by paragraph 13 above relating to manufacture under license/ technology transfer agreements with a view to satisfying itself that adequate mechanisms exist for enforcement of such agreements and for attaining the underlying objective of progressive indigenization
- g. may consider any other issue relating to this Order which may arise.

18. **Removal of difficulties:** Ministries /Departments and the Boards of Directors of Government companies may issue such clarifications and instructions as may be necessary for the removal of any difficulties arising in the implementation of this Order.

19. **Ministries having existing policies:** Where any Ministry or Department has its own policy for preference to local content approved by the Cabinet after 1st January 2015, such policies will prevail over the provisions of this Order. All other existing orders on preference to local content shall be reviewed by the Nodal Ministries and revised as needed to conform to this Order, within two months of the issue of this Order.
20. **Transitional provision:** This Order shall not apply to any tender or procurement for which notice inviting tender or other form of procurement solicitation has been issued before the issue of this Order.



(Rajesh Gupta)

Director

Tel: 23063211

rajesh.gupta66@gov.in