

ADDITIONAL SPECIAL CONDITIONS OF CONTRACT i.e. **[Technical conditions]**

- 1 All works under schedule A of this tender documents shall be carried out in accordance with provisions of CPWD Delhi Schedules of Rates (DSR-2023) (DSR- Vol. I, DSR- Vol. II, Analysis of Rates for DSR (AOR-Vol. I, AOR-Vol. II)-2023 & CPWD Specification (Vol. I, Vol. II) including up-to-date correction slips wherever needed. All works under schedule B of these tender documents shall be carried out in accordance with provisions of N.W Railway-Indian Railways Unified Standard Schedule of Rates (NWR-HQ-IRUSSOR-2021) & N.W.Railway-Indian Railways Unified Standard Specification- 2021 (NWR-HQ-IRUSS-2021) with correction slips up to the date of closing of tender.
All works under schedule C,D&E of this tender documents shall be carried out generally in accordance with specification provided in this tender document and as per relevant IS standards.
- 1.1 **Standard Specifications and Code of Practice:**
 - 1.1.1 The standard specifications, architectural and structural drawings of Railway, Indian Railway Standard & Indian Standard Rules & Codes of Practices as revised from time to time available from the Manager, Government of India, Publication Branch Patiala House, New Delhi/Director, ISI/Manak Bhawan, bahadur saha Zafar Nagar, New Delhi respectively must be followed with regard to design, material and workmanship.
 - (i) IS Code of practice for plain and reinforced concrete (IS: 456)
 - (ii) IS Code of Practice for use of structural steel (IS: 800)
 - (iii) IS: 1742 Code of practice for building drainage.
 - (iv) IRS code of practice for Electric Arc welding of mild steel structures.
 - (v) IS specification for fine and coarse aggregate from natural sources for concrete (IS: 515).N.W. Railway Engineering Department's Standard Specifications for Work and Materials with errata and corrections up to date and N.W. Railway Engineering Department's Schedule of Rates with errata and corrections slip up to date.
- 1.2 **Plain/Reinforced Cement Concrete Works:**

The IS code of practice for the structural use of reinforced concrete in building shall from part of these additional specification and this code and the standard practice in reinforced concrete construction that has been evolved by the adoption of this code shall be followed.

Fine and coarse aggregate: Fine and coarse aggregate for all type of concrete works shall conform to N.W. Railway Standard Specifications.

In addition to the routine test/ special test on material will be carried out whenever required by the Engineer. The cost of the special test will be borne by the Railways, if the results are as per standard laid down, failing which the cost of these tests will be borne by the contractor. Necessary facility in the form of moulds, cones, scales, materials, labour for casting, curing, specimens and such other facilities as per prerequisites required to any standard concrete test will be provided by the contractor free of cost.
- 1.3 **Form Works:**
 - 1.3.1 **General:**

Shuttering shall be either of wooden planks of 35mm minimum thickness with steel sheet lining or plywood lining or of steel plates stiffened by steel angles. It should be

ensured that the shuttering should be leak proof and there should not be any leakage of cement slurry during casting of the concrete. The shuttering shall be supported on wooden battens and beams and props of vertical ballies properly braced and cross braced together, so as to make the formwork rigid. In place of ballies props, brick pillars of adequate section built in mud/lean cement sand mortar may be used.

- 1.3.2 The form work shall conform to the shape, lines and dimension as showing in the plain. It shall be sufficiently rigid and strong to maintain correct shape of the members during deposition of concrete and shall be able to resist forces caused by vibration of concrete and incidental loads, associated with men and machineries working over it. The battering shall have smooth and even surface and its joints shall not permit leakage of cement grout.
- 1.3.3 If at any stage of working during or after placing of concrete in the structure, the formwork bulges out beyond the required shape of the structure, the concrete shall be dismantled and removed and work redone with fresh concrete and adequately rigid formwork at contractors cost. Details of shuttering and centering shall be subject to the approval of the Engineer-in charge. The completed formwork shall be inspected and passed by the Engineer before the reinforcement bars are placed in positions.
- 1.3.4 **Camber:**
The shuttering on beams and slabs shall have camber of 4mm per meter (1 in 250) or as directed by Engineer-in charge, so as to offset the subsequent deflection. In case of cantilevers, the camber at free end shall be 1/50th of the projected length or as directed by the engineer-in charge.
- 1.3.5 Provision for holes shall be made in the shuttering for inserting fan hook clamps and provision of conduits etc. for concealed wiring and providing architectural finishing grooves if any at the junction of slabs with beams or walls or columns wherever required for architectural consideration, concealed sanitary and water supply pipes and fittings etc. as are required to be built in connection with the provision of various services in the buildings for service or architectural reasons. It may also be necessary to make holes in the shuttering of RCC columns for projecting bars. The tendered rates shall not be made to the contractor for making these provisions nor shall any deduction be made on account of any saving in RCC due to these. The formwork for the RCC chhajjas will be so made that the drip coarse band can be cast along with the chhajjas. No extra payment shall be made for this drip coarse band.
- 1.4 **Reinforcement:**
 - 1.4.1 Reinforcement may be either with M.S. Round or Tor steel as decided by the Engineer as per approved drawing. No extra payment shall be made in case Tor steel is used in lieu of mild steel
 - 1.4.2 It shall be the responsibility of the contractor to clean the reinforcement bars with dry gunny bags, if they are quoted with rust of impurities and nothing extra shall be paid for the same.
 - 1.4.3 The rate for reinforced cement concrete should be including straightening and uncoiling of rolls of reinforcements. No extra payment for straightening and/or uncoiling of reinforcement shall be payable by the Railway.
- 1.5 **Concreting:**
 - 1.5.1 The concrete shall be mixed properly in approved type mechanical mixer as per N.W Railway's standard specification. The proper consistency shall be determined by the Engineer by slump tests, which shall be carried out. Cost of moulds, labour, tools and plants, materials etc. for slumps tests of concrete shall be borne by the contractor.
 - 1.5.2 The concrete shall be compacted immediately after placing by means of mechanical

vibrator of suitable design for continuous operation.

1.6 Measurement:

1.6.1 All work will be paid for at the tendered rates on the basis of actual measurements at site. No account will be taken for heights and thickness over those shown in the plans, unless they are authorised by Engineer-in charge, in writing.

1.6.2 Measurement shall be made according to N.W. Railway Standard Specification and relevant specification.

1.7 Rates:

1.7.1 For all items of reinforced concrete, the tendered rates shall include supplying and removal of scaffolding, supply of formwork, shuttering and centering etc. of approved design, their erection, dismantling, clearing and oiling, etc, cutting, hooking, bonding, binding, bending, unrolling and straightening of steel section, binding and placing in position of reinforcement etc. complete manufacturing of the reinforcement in required shape as per drawings, screening or washing the aggregate, mechanically mixing and placing the same in position & use of equipments including mechanical mixers, vibrator etc. all watering during the work and curing for the prescribed period after-wards & finishing exposed surface.

1.8 Foundation:

1.8.1 Timely Notice for Inspection of Foundations of Works to be covered Up:

The contractor shall give notice to the engineer when and as soon as the excavation of any portion of the site for obtaining a foundation or bottom, whether above or below water, has reached the depth and width shown in the drawings. The contractor shall also give further notice to the Engineer whenever any bottom foundation is ready for inspection and whenever it is necessary to cover up any work in respect of which Engineer desires previous inspection, so that the Engineer may inspect the same before it is covered up. Bottom of foundation should be maintained by the contractor till execution of the work without any extra cost as directed by the Engineer - in -charge.

1.9 Brick Work:

1.9.1 All brickwork shall be done with well-burnt bricks as per N.W. Railways Standard Specifications in cement mortar in proportion as may be specified in the drawings or as instructed by the Engineer-in- charge.

1.9.2 All pipes clamps or other fittings as may be required shall be fixed in position as the work proceeds. Chases will have to be cut out in the brick walls before housing the fitting and the contractor's rate for brickwork shall be inclusive of the cost of cutting chases.

1.9.3 No claim for any additional labour involved in doing the masonry work around the boards, telephone boxes etc. shall be entertained.

1.10 Rough Cast/Sand Faced Cement Plaster 20mm Thick.

1.10.1 All brick masonry shall be thoroughly wetted and joints raked out to a depth of at least 20 mm well washed with clean fresh water to ensure a clean depth of 13mm free from any mortar, and must be kept watered for a week before the plaster is applied if the masonry is old, otherwise the watering should be done for 2 days.

1.10.2 Samples of rough cast/sand faced shall be got approved from Engineer-in charge before commencement of work and work shall be done strictly according to N.W. Railways Standard Specifications.

1.11 Water Supply and Sanitary Installation:

a) For execution of sanitary installations and water supply works, the contractor shall arrange a licensed plumber and employ especially skilled artisans for these works. The work shall be executed as per N.W. Railways Standard Specifications.

- b) The work of providing GI and/or HCI pipes, as required, shall proceed along with the construction of building to avoid demolition or breaking up of masonry at a later stage.
- c) Samples of sanitary installations and fittings such as W.C. Pans, wash basins, sinks etc. shall be submitted to the Engineer in charge for approval before supplying and fixing & shall be provided strictly in accordance with the approved samples.
- d) G.I. pipes and fittings shall conform to BIS specifications and samples be got approved from the Engineer-in charge before using the materials in the work.
- e) RCC pipes for sewer should conform to NP-2/NP-3 class of pipe specification as per BIS. These should be tested and certified by approved testing agencies/laboratories and the contractor, if asked for approval of materials by the Engineer, should produce certificate to the effect. Nothing extra will be paid for testing and certification by testing agency laboratory.

1.12 Flooring:

- 1.12.1 Flooring shall be laid using approved quality sand and coarse aggregates and as per N.W. Railway's Standard Specifications. Floor shall be laid in panels and if dividing glass/metal strips shall be provided at the discretion of Engineer-in charge, no extra payment will be made for the same.

1.13 Roofing:

- 1.13.1 The roof shall be laid either with RCC or as per approved plan.
- 1.13.2 Openings for fan clamps and other fittings, connection with services shall be provided in shuttering as directed for which nothing shall be paid.

1.14 Testing of Building Materials:

- 1.14.1 Regular testing of building materials such as bricks, sand, aggregates, tiles, steel, cement, water proofing compounds, doors and windows etc. should be done.
- 1.14.2 Day to day quality control, sample testing facilities etc. must be available at work sites.
- 1.14.3 Test cubes for concrete should be made and tested as per IS specifications.
- 1.14.4 Concrete mix as specified in the tender documents should be followed at work site. In case of design mix, IS specifications for designing, producing, using, testing and accepting/rejecting must be followed.
- 1.14.5 Cement should be used by weight only in case of design mix concrete.
- 1.14.6 In case of cement, steel, HTS wires, besides obtaining test certificates from the contractors, regular independent tests to check the quality as per IS specifications should be done.

2.0. Structural Steel Work:

2.1. General Description:

- 2.1.1 This section covers the requirements for providing fabrication, erection and placing of structural steel work for building construction including temporary supports and all other work as required for structural steel construction.

2.1.2 Applicable Codes and Standards:

The codes and standards generally applicable to the work of this section are listed hereinafter:

IS: 210	GRAY IRON CASTINGS.
IS: 226	STRUCTURAL STEEL (STANDARD QUALITY)
IS: 451	TECHNICAL SUPPLY CONDITIONS FOR WOOD SCREWS
IS: 800	CODE OF PRACTICE FOR USE OF STRUCTURAL STEEL IN GENERAL BUILDING CONSTRUCTION.
IS: 806	CODE OF PRACTICE FOR USE OF STEEL TUBES IN GENERAL BUILDING CONSTRUCTION.
IS: 813	SCHEME OF SYMBOLS FOR WELDING.
IS: 814	COVERED ELECTRODES FOR METAL ARC WELDING OF PART I & II) STRUCTURAL STEEL.
IS: 816	CODE OF PRACTICE FOR USE OF METAL ARC WELDING FOR GENERAL CONSTRUCTION IN MILD STEEL.
IS: 822	CODE OF PRACTICE FOR INSPECTION OF
WELDS. IS: 961	STRUCTURAL STEEL (HIGH TENSILE)
IS: 1024	CODE OF PRACTICE FOR USE OF WELDING IN BRIDGES AND STRUCTURES SUBJECT TO DYNAMIC LOADING.
IS: 1030	CARBON STEEL CASTING FOR GENERAL ENGINEERING PURPOSES. IS: 1120
	COACH SCREWS.
IS: 1161	STEEL TUBES FOR STRUCTURAL PURPOSES.
IS: 1182	RECOMMENDED PRACTICE FOR RADIOGRAPHIC EXAMINATION OF FUSION WELDED BUTT JOINTS IN STEEL PLATES.
IS: 1363	BLACK HEXAGON BOLTS, NUTS AND LOCK NUTS AND BLACK HEXAGON SCREWS.
IS: 1365	SLOTTED COUNTERSUNK SCREWS.
IS: 1367	TECHNICAL SUPPLY CONDITIONS FOR THREADED FASTENERS. IS: 1915
	CODE OF PRACTICE FOR STEEL BRIDGES.
IS: 2016	PLAIN WASHERS.
IS: 2062	STRUCTURAL STEEL (FUSION WELDING QUALITY)
IS: 3757	SPECIFICATION FOR HIGH TENSILE FRICTION GRIP BOLTS IS: 5624
	SPECIFICATION FOR FOUNDATION BOLTS
IS: 3063	SINGLE COIL RECTANGULAR SECTION SPRINT WASHERS FOR BOLTS, NUTS AND SCREWS.
IS: 3443	CRANE RAIL SECTIONS
IS: 3600	CODE OF PRACTICE FOR TESTING OF FUSION WELDED (PART I) JOINTS AND WELD METAL IN STEEL.
IS: 4923	HOLLOW STEEL SECTIONS FOR STRUCTURAL USE.
IS: 6227	CODE OF PRACTICE FOR USE OF METAL ARC WELDING IN TUBULAR STRUCTURE.
IS: 801	CODE OF PRACTICE FOR USE OF COLD FORMED LIGHT GAUGE STEEL STRUCTURAL MEMBERS IN GENERAL BUILDING CONSTRUCTION.
IS: 811	SPECIFICATIONS FOR COLD FORMED LIGHT GAUGE STRUCTURAL STEEL SECTIONS.

2.2 Submittals:

2.2.1 Material Report:

- (I) Prior to state of delivery of structural steel required, the Contractor shall submit the following to the Engineer for review:
 - a) Certified copies of mill test reports including chemical analysis and physical properties as required by the applicable Indian standards for each consignment of steel.
 - b) Where such mill certificates are not available or if the Engineer feels to substantiate conformance of the mill test reports, the contractor shall employ an approved testing laboratory to perform the required tests and chemical analysis at his own cost.
- (II) Shop Drawings- Before commencement of any structural steel fabrication work, the contractor shall submit the following to the Engineer for his approval:
 - a) Fabrication drawings including details of connections.
 - b) Assembly, erection and installation drawings and manuals indicating the sequence of work, welding and bolting procedure to be used. Cambers for trusses and large span girders shall be shown.
 - c) For composite construction the details and calculations of false work and forms supporting the concrete work in steel structure shall be submitted.

2.3. Materials:

2.3.1 Structural Steel:

Structural steel used in the works other than steel in Reinforced concrete, rails and fastenings shall be either of the following type:

- i) Mild steel conforming to IS: 226 - "Structural Steel (standard quality)" or IS: 2062 - "Structural Steel (fusion welding quality)" whichever is approved.
- ii) Whenever high tensile steel is specified it shall be conforming to IS 2062 - "Structural Steel (high tensile)"
- iii) All steel tubes shall be hot finished seamless steel tubes (hfs) of the specified strength and as approved by the Engineer and shall conform to IS: 1161. Tubes made by other processes and which have been subjected to cold work-ing, shall be regarded as hot finished if they have been subsequently heat treated and are supplied in the normalized condition.
- iv) Hollow steel sections for structural use (RHS/SHS) as per IS: 4923-1997 in grade 'B' steel.

2.3.2 Threaded Fasteners:

- a) All bolts and nuts shall comply with IS: 1367.
- b) Black bolts, nuts and screws shall be in accordance with IS: 1363.
- c) Wherever counter sunk screws are specified, they shall be precision grade, slotted, countersunk head. Machine screws shall be conforming to type 'r' of IS: 1365.
- d) Wherever high tensile special quality bolts and nuts are specified, they shall comply with provision of IS: 800.

- e) Coach screws shall be in accordance with IS: 1120 and wood Screws shall conform to IS: 451.
- f) All plain washers shall conform to requirements of IS: 2016. Wherever spring washers for bolts, nuts and screws are specified, they shall be in accordance with the provisions of IS: 3063.

2.3.3 Cast Iron:

Cast iron shall be conforming to IS: 210. All cast iron goods shall be of best quality and make as approved by the Engineer.

2.3.4 Cast Steel:

Cast steel shall be conforming to IS: 1030. Unless specified otherwise, the steel shall be grade 2 and shall cater for all tests specified in the said standard.

2.3.5 Rails:

Rails shall comply with the requirements of IRST-12-64 or IS: 3443 if so instructed by the Engineer. They shall be obtained from an approved manufacturer.

2.3.6 Electrodes:

Electrodes used for metal arc welding of mild steel shall be medium coated type electrodes conforming to IS: 814 (parts I & II) and shall be of the best quality approved by the Engineer.

2.4. Handling and Storage:

- i) Structural steel shall be stored out of mud and dirt and proper drainage of the storage area shall be provided. Protect from damage or soiling by adjacent construction operations.
- ii) Fabricated steel shall not be handled until the paint has thoroughly dried. Care shall be taken to avoid paint abrasions and other damage. Steel work shall be transported in the largest practical lengths and in such a way as not to over-stress the fabricated sections. All pieces bent or otherwise damaged shall be rejected and shall be replaced by the contractor at his own cost.
- iii) Storage of fabricated steel at the job site shall be the responsibility of the contractor. Store material at the job site in a manner which does not overload the existing or newly constructed structures. Protect material against excessive deflection, corrosion or deterioration. As far as practicable, stacking of fabricated steel shall be done in sequence of erection. But heavy members shall not be stacked on top of the light ones.

2.5. Fabrication:

2.5.1. Shop Drawings:

- i) The contractor shall prepare required detailed shop drawings giving complete information necessary for the fabrication of the structures. All information should be clearly given and the drawings shall be in conformity with the best modern practice. A marking diagram allotting distinct identification marks to each separate piece of steel work shall be prepared in sufficient detail to ensure convenient assembly and erection. Symbols used for welding in the drawings shall be in accordance with IS: 813.

- ii) The contractor shall prepare comprehensive bill of material sheets for each shop drawing giving therein all the items shown on the drawings together with their weights, mark numbers, cutting lengths etc. Three copies of all working drawings and bill of material sheets shall be submitted to the Engineer for approval. Fabrication shall not commence until the approval of the relevant drawings has been obtained from the Engineer. While the shop drawings prepared by the contractor and approved by the Engineer are deemed to represent the correct interpretation of the work to be done, the contractor is not relieved of the responsibility for accuracy of detailed dimensions shown therein.
- iii) Erection methodology for steel structures shall be submitted by the contractor and approval of the same shall be obtained before start of erection works.

2.5.2 Templates:

- i) All fabrication shall be in accordance with IS:800 and IS:1915. Extensive use of templates shall be made. The Templates shall be steel bushed where considered necessary by the Engineer.
- ii) In case, actual members are used as templates for similar pieces, it will be at the discretion of the Engineer to decide whether such pieces are fit to be incorporated in the finished structure. The contractor shall arrange for corresponding parts of each unit manufactured from the same drawings to be interchangeable as far as economic manufacturing conditions permit, and shall advise the Engineer of the precise arrangements made in this respect.

2.5.3 Straightening:

All materials shall be straight unless required to be of curvilinear form and shall be free from twists. If necessary, the materials shall be straightened and/or flattened by pressure. Heating of rolled sections and plates for purpose of straightening will not be permitted. Limited straightening may however be effected by local application of heat with a gas torch.

2.5.4 Cutting:

- i) Gas cutting shall normally be permitted for mild steel only. Gas cutting of high tensile steel may be permitted provided special care is taken to leave sufficient metal to be re- moved by machining so that all metal that has been hardened by flame is removed. Gas cutting shall preferably be done by machine. Hand flame cutting may only be permitted subject to the approval of the Engineer. Gas cut edges shall be free of gauge. Any gauges that remain after cutting shall be removed by grinding.
- ii) Rolled sections shall be sawed or flame cut to length. Small plate pieces like gussets may be sheared or cropped to size. Sawing, shearing and dropping shall be clean and free from any distortion. If necessary the edges shall be ground afterwards.
- iii) For tubular construction cutting of the pipe and preparation of joint surface shall be done in a neat manner for a good fit up. The ends of the tubes may be flattened or otherwise formed for connections provided that the methods adopted for such

flattening do not injure the material. The change of section shall be gradual.

2.5.5 Holing:

- i) Holes shall preferably be done by drilling. Punching shall not be resorted to unless previously approved by the Engineer. In any case, punching of holes in materials having a thickness in excess of the connector diameter or in the materials thicker than 16 mm shall not be permitted. Where punching is permitted the holes shall be punched 3 mm less in diameter than the required size and reamed after assembly to the full size.
- ii) Holes shall be drilled or punched at right angles to surface of the member, not more than

1.5 mm/ 2.0 mm (as the case may be depending upon whether the connector diameter is less than or more than 25 mm) larger than the connector diameter. Holes shall not be formed or enlarged by burning or gas Cutting. Holes shall be clean-cut within torn or ragged edges. Outside burrs resulting from drilling operations shall be removed.

- iii) Holes through more than one thickness of material of members such as compound stanchions and girder flanges shall be drilled after the members are assembled and tightly clamped or bolted together. They shall then be separated and burrs removed if so directed by the Engineer.
- iv) Steel members' adjustment shall be provided with slotted holes as shown on the drawings. Suitable templates shall be used for proper location of the holes.

2.5.6 Fabrication Tolerances: As per relevant IS code/IRS B1-2001

2.6. Assembly:

2.6.1. All connections shall be either bolted or welded as shown on the drawings. The contractor shall not redesign or alter any connection without prior approval of the Engineer. The component parts shall be assembled in such a manner that they are neither twisted nor otherwise damaged and shall be prepared such that the specified cambers, if any, are provided. Drifting done during assembly shall not distort the metal or enlarge the holes. Poor matching of holes shall be cause of ejection. However, if permitted by the Engineer. Holes that must be enlarged due to mismatching shall be reamed.

2.6.2. Bolting:

- i) All steel work which is bolted together shall be in close contact over the whole surface. Where two bolted surfaces are to be in permanent contact after assembly, each shall be thoroughly scraped free of loose scales, dirt & burrs and a heavy coat of red oxide, zinc chrome or other approved paint applied after cleaning and drying.

All bolts shall be provided with washers under the nuts and the washers shall be tapered on the inside of the flanges of R.S. Joists and channels. Bolts and studs shall project not less than one full thread through the nut after tightening. Unless otherwise specified, the ends of the bolts shall be burred after erection to prevent the removal of nuts.

- ii) High strength bolts shall be used in bearing or friction as shown on the drawings. High strength bolted joints shall be made without the use of erection bolts. Bolts shall be of a length that will extend not less than 6 mm beyond the nuts. Bolts shall

be entered into the holes without damaging the thread-members. They shall be brought tightly together with sufficient high-strength fitting up bolts which shall be re-tightened as all the bolts are finally tightened. Bolt heads shall be protected from damage during placing. Bolts that have been completely tightened shall be marked for identification. Bolted parts shall fit solidly together and shall not be separated by interposed compressible materials. The contact surfaces in high strength bolted connections shall be free of oil, paint, lacquer, loose scale or other coatings. The facing surfaces shall be machined flat. Final tightening of high strength bolts shall be by turn-of-nut method. Re-tightening shall not be permitted. Whenever the contractor intends to use other means of tightening he shall obtain prior approval of the Engineer.

- iii) Anchor bolts shall be set by use of templates secured firmly in place to permit true positioning of the bearing plates and assemblies. When in drawings anchor bolts are shown to be installed in sleeves, the sleeves shall be completely filled with grout.

2.6.3. **Welding:**

Welding shall be done in accordance with IS: 816.

- i) Welding procedure shall be based on the specific analysis of any given heat of steel (based on the certified mill test reports) and shall be subject to the review of the Engineer. These procedures shall call for one or all of the following:
 - A. Proper bead shape.
 - B. Minimized penetration to prevent dilution of the weld metal with the alloy elements.
 - C. Preheating, controlled inter-pass temperature and controlled heat input.
- ii) Welding shall be performed only by qualified and tested welders specifically trained and experienced for the type of job required to execute the welding work to the complete satisfaction of the Engineer.
- iii) Use of standard weld symbols as adopted by IS: 813 are mandatory. Prequalified joints, that are detailed, prepared & welded in accordance with the requirement of IS: 816 shall invariably be used.
- iv) Structural welding shall not commence until joint elements are bolted or tacked in intimate contact and adjusted to dimensions shown with allowance for any weld shrinkage that is expected. Welding sequence shall be planned and controlled to minimize undue stress increase or undue distortions in restrained members. Heavy sections and those having a high degree of restraint shall be welded with low Hydrogen type electrodes.
- v) If copper wire spacers are used between two surfaces to be welded to reduce transverse stresses in the weld, care shall be taken that it does not mix with the weld metal.
- vi) Concave bead shape shall be avoided. Ratio of weld width to Weld depth shall preferably vary from a minimum of 1 to a maximum of 1.4.
- vii) Field welding shall not be permitted unless shown on the drawings.

- viii) Subsequent to fabrication, the overlapping or contacting surfaces or other closed sections (such as tubular, box section) which are inaccessible to painting shall be seal welded when the end of the tube is not automatically sealed by virtue of its connection by welding to another member. All the free ends of rectangular/square steel hollow sections shall be sealed properly by welding to prevent internal corrosion. Before sealing, the inside of the tube shall be made dry and free from loose scale.
- ix) Order of assembly of the tubular sections shall consist of welding the tensile member to the main member first. Compression member shall be cut back to overlap the tensile member and then welded to both of these members.
- x) **Sequence:**

Edges are to be tack welded to maintain uniform gap during welding to minimize residual stress

- Transverse weld before longitudinal one.
- Fillet weld following butt weld
- Starting from inside to outwards.

2.6.4. **Testing of Welds:**

- i) All welded connections shall be inspected as per IS: 822. Visual inspection method is the simplest and requires a competent person to observe the welder when he is performing the work.
- ii) All welds shall be tested by "dye penetration test" as per current practices.
- iii) At least 5% of the welds shall be tested by "radiographic examination" as per IS: 1182 at the locations specified by the Engineer. The radiographic test is best suited for the butt welds where the picture will show only the weld material. It is not adaptable to fillet welds because the parent material will also project on the picture. Percentage of welds to be tested may be increased or decreased by the Engineer depending on the quality of welds and results obtained for previous weld tests. All expenses on such testing shall be borne by the contractor.
- iv) At least 10% of fillet welds shall be tested by 'Ultrasonic test method'
- v) Agency for testing of weld shall be approved by the Engineer prior to testing.
- vi) Defective welds shall be repaired or replaced as decided by the Engineer. The repaired or replaced welds shall be tested using the same methods as above. Additionally, when defective welds are found, the cause of the defective welding shall be determined and the contractor shall institute immediate corrective action.

2.7 **Shop Erection:**

- i) Steel work shall be temporarily shop erected completely or partially as directed by the Engineer so that the accuracy of fit may be checked before dispatch. Due notice shall be given to the Engineer So that the accuracy of fit may be checked for dispatch. Due notice shall be given to the Engineer. When the work is ready for inspection, the assembly shall not be dismantled until it has been inspected and approval obtained.

- ii) The parts shall be assembled with a sufficient number of parallel drifts to bring and keep the components in place. In the case of parts drilled or punched through steel jigs with bushes resulting in similar parts being inter-changeable for portion of the steel work, trial assembly shall be carried out to the extent required by IS: 1915.
- iii) All erection marks shall be die-stamped and also distinctly stenciled in paint. The marking shall be as per the marking diagram approved by the Engineer.

2.8 Erection:

- i) As far as possible, the contractor shall deliver the fabricated steel work to the site in the same sequence as he wishes to follow for the erection. Dispatch should be scheduled to avoid cluttering up of the site. The bolts required for erection shall be bagged according to size prior to dispatch.
- ii) All structural work shall be erected in accordance with IS:800, IS:806 and IS:1915 and as per the approved erection drawings. The contractor shall be responsible for setting out the works. The suitability and capacity of all plant and equipment used for erection shall be to the satisfaction of the Engineer. These shall be regularly serviced and maintained. Occupational safety practices shall be strictly adhered to and shall be to the satisfaction of the Engineer.
- iii) Individual pieces shall be plumbed, leveled and aligned. Drift pins may be used only to bring together the several parts. They shall not be used in such manner as to distort or damage the metal. Temporary bracing, guy-line and staging shall be provided to ensure proper alignment and to adequately protect all persons, property and to withstand all loadings to which the structure may be subjected during erection.

Attachment of such temporary steel work to the permanent steel work shall only be done with the approval of the Engineer. Temporary steel work shall remain in position until the structure is stable and self supporting and permanently bolted or welded to the satisfaction of the Engineer. After removal of temporary steel work, the permanent structure shall be made good to the complete satisfaction of the Engineer.

No permanent bolting or welding shall be done until proper alignment has been obtained. Erection of the parts with any moderate amount of reaming, chipping or cutting shall be immediately reported to the Engineer. The steel work shall be rejected unless corrective action is approved by the Engineer.

- iv) No erection shall be permitted more than 2 storeys above a complete bolted and/or welded floor or above a decked surface.
- v) Placement of joists shall not start until the supporting work is secured. Temporary bridging, connections and anchors shall be provided to assure lateral stability during erection. Bridging to steel joists shall be installed immediately after joist erection, before any construction loads are applied. Horizontal or vertical bridging shall be provided in accordance with the type of span of the joists. Ends of the bridging lines shall be anchored at top and bottom chords where terminating to walls or beams.

2.8.1 Erection Tolerances: As per relevant IS code/IRS B1-2001

2.9 Field Modifications:

Corrections to accommodate minor misfits in steel structure by moderate use of drift pins and reaming will be permitted. Errors that cannot be corrected by these measures, but require modifications must be reported immediately to the Engineer along with contractor's proposed solution.

2.10 Grouting Under Base Plates:

Grouting under base plates shall be done after erection of the structural steel, unless otherwise approved by the Engineer. All bearing plates, bearing assemblies shall be set level and to the elevations shown on the drawings. These shall be shimmed with approved means and grouted to assure full bearings on the supporting substrata regardless of the tolerances otherwise permitted.

- i) The grout to be used in superstructure stanchion bases/ structural steel roof holding down bolts pockets and below base plates for trusses shall be Non-Shrink Grout Conbextra-GP2 of M/s Fosroc or equivalent. The surfaces which are to receive the grout shall be thoroughly cleaned immediately prior to the grouting operation. The grout shall be carefully worked under the base plates. Air pockets in the grout packing shall be avoided.
- ii) After the grout has had its initial set, the grout shall be cut back flush with the base plate and the surplus grout shall be removed. Before leaving the site the contractor shall re-tighten the nuts of all anchor bolts.

2.11 Inserts and Embedments:

Various steel inserts and embedments are required under the contract to be fabricated, positioned and secured firmly into place inside the formwork prior to concrete being poured. There are also requirements of jointing, threading, bolting and welding inserts and embedments of different concrete and structural steel elements in order to establish structural continuity and connection. Great care shall be exercised by the contractor in executing all aspects of the work related to inserts and embedments, including tolerances, so that the final assembly of the concrete elements can meet satisfactorily the continuity and contiguity requirements intended in the structure.

2.12 Painting Specification for Steel Structures:-

Description	
FABRICATION SHOP	EXTERNAL SURFACES
Surface Treatment	Sand blasting/Grit Blasting
1 st under-Coat	Inorganic zinc silicate primer (self curing solvent type) DFT-75 micron shall be Berger Zinc Anode 11 or approved equivalent. The primer should be applied by spray only.
2 nd Under-Coat	Epoxy zinc phosphate primer polyamide cured DFT-35 micron shall be Berger Equilux 610 primer or approved equivalent The primer should be applied by spray only.
3 rd Under-Coat	Epoxy zinc phosphate primer polyamide cured DFT-35 micron shall be Berger Equilux 610 primer or approved equivalent. The primer should be applied by spray only.
4 th Under-Coat	Epoxy high build micaceous iron oxide coating polyamide cured DFT- 90 micron shall be Berger Epilux 4 High Build MIO. The primer should be applied by spray only.
ERECTION SITE	
Intermediate coat	Acrylic polyurethane finish aliphatic isocyanate cured DFT-30 micron shall be Berger thane or approved equivalent applied by spray or brush in approved colour.
Finish Coat	Acrylic polyurethane finish aliphatic isocyanate cured DFT-30 micron shall be Berger thane or approved equivalent applied by spray or brush in approved colour.
In case of purlins, in place of above two finishing coats apply two coats of Aluminum paint conforming to IS: 2339.	

Signature of Tenderer(s)

Date:_____

SPECIFICATIONS FOR PRE-ENGINEERED BUILDINGS (PEB)

1.0 PRE-ENGINEERED BUILDINGS (PEB)

1.1 GENERAL

The Pre-Engineered Buildings or building components wherever specified shall be designed, supplied and erected by the contractor through a specialist agency called PEB manufacturer. The agency responsible for design, fabrication and erection shall not be allowed to sub-let any of the activities/operations to another sub-agency in anyway unless a prior written approval of the Chief Engineer is taken. Scope of work under PEB manufacturer includes preparation of General Arrangement Drawings, supply and execution of all related works under their supervision i.e. roofing/wall cladding work, designing and fixing of other components viz. Turbovent, Ridge Ventilator, Solar Pipe light, rain water gutter, Down take pipe, Louvers, Grouting of anchor bolts by epoxy etc.

Tenderer shall submit all structural design / drawings, fabrication drawings, connection design

/drawings etc. complete duly proof checked by IIT for approval by Railways prior to commencement of fabrication works.

Likely PEB manufacturers are as under:-

1. KIRBY Building Systems and Structures India Private Limited, Hyderabad
2. Zamil Steel Buildings India, Pune
3. PENNAR Industries Limited, Hyderabad
4. Paramount Building Solutions Private Limited, Hyderabad
5. Kartikeya Industries Private Limited, Hyderabad
6. M/S Passive Infra Projects (P) Limited, Delhi.
7. M/S Pinax Steel Industries Pvt. Ltd., Bihta, Patna

However, prior approval of PEB manufacturer is to be taken from the OFFICE OF CPM GATI SHAKTI BIKANER for any of the above PEB manufacturer. Railway officials may visit the plant/facilities of the PEB manufacturer proposed by the tenderer to ensure adequacy of their infrastructure and quality control facilities.

PEB manufacturer other than those listed above as likely PEB manufacturers may also be considered by Railway but prior approval of PEB manufacturer is to be taken from the OFFICE OF CPM GATI SHAKTI BIKANER. Railway officials may visit such PEB manufacturing plant, if proposed by tenderer, to examine their infrastructure and capabilities.

All codes and standards for material, design, fabrication and erection shall generally be as indicated for structural steel work unless the following specifications call for a deviation otherwise. PEB manufacturer shall use Submerged Arc Welding for built-up sections, meeting the applicable requirements of the American Welding Society (AWS D1.1M : 2010).

Finalized drawings / document shall be submitted in 06 sets hard copies (1 set on good quality polyester film paper and 05 sets on good quality paper) and one set soft copy (in pen drive) stamped and signed both by the Designer of PEB Manufacturer, the IIT as proof checking authority and Tenderer.

1.2 DESIGN SPECIFICATIONS FOR PEB BUILDINGS

The PEB manufacturer shall be responsible for carrying out all the design of PEB's as per following relevant IS codes only.

- a) IS:800 Code of Practice for General Construction in Steel (including Chapter-12 of the Code)
- b) IS:801 Code of Practice for use of Cold Formed Light Gauge Steel Structure
- c) IS:875 Code of Practice for design loads for building and structures
- d) IS:1893-2002 (Part-1) Code for Earthquake Resistance Design of structures

Only in absence of design criteria not available in mentioned IS codes, reference can be made to other international codes/manuals as applicable to PEB's and same shall be subject to approval of Railways in case of deviation from IS codes.

The deflection limits of members shall generally be as per Clause 5.6.1 – Table 6 (IS :800- 2007) provided the roofing and cladding sheets are capable of absorbing this deflection without any deformation/cracks. Responsibility of same shall be given in writing by the PEB's supplier.

As the design of PEB's are mainly governed by Wind load, no increase in permissible stresses is allowed for wind load combinations in working Stress Design as per Clause 11.1.4 of IS:800-2007.

The wind load for design of various PEB's should be taken as given in relevant table of IS:875-1987.

The local external wind pressure coefficient should be taken strictly for the local zones as shown in relevant tables of IS 875-1987. The internal and local external coefficients shall be combined for design of roof sheeting, glass panels, individual cladding units and purlins falling in high local pressure zones shown in relevant tables of IS:875-1987. It's the responsibility of PEB supplier to account for design loads of the cranes, gantries etc. in design of PEB's. The connection detail and related accessories/fixtures to fix all above miscellaneous units to PEB frames is also responsibility of PEB supplier. Sufficient strengthening measures shall be taken in the portals due to these loads.

The fabrication drawings along with necessary design calculation for connections etc. should also be submitted by PEB supplier before start of fabrication Consultant/Railway's approval.

The cold formed sections shall be designed strictly based on IS: 801-1975. The cold formed sections should be designed as stiffened /unstiffened section based on lip dimension satisfying the section requirements of stiffened/unstiffened section.

Following items shall be reviewed /clarified and clearance obtained by the PEB supplier before start of design of PEB buildings:-

- 1. Plan dimensions of the buildings.
- 2. Height of cladding for buildings.
- 3. Door opening sizes
- 4. Crane load requirement
- 5. Specification for painting accounting for exposure condition.
- 6. Steel grade for portals and cold formed sections.
- 7. Minimum thickness requirements for cold formed sections and structural steel members.

8. Use of stiffener plates for built-up portals.
9. Use of HSFG bolts for base connections.
10. Liberty of using portal spacing to achieve economy providing they satisfy the architectural/operational requirement and door/window opening sizes.
11. Expansion joint requirements for PEB's.
12. Pitch for rafter members.
13. No. of continuous span for design of purlin and roof sheeting.
14. Temperature effect for temperature variation.
15. Type of suspended utilities as per specific requirement of different structures for load consideration.
16. Future expansion of structures.
17. Provision of lighting arrester.

NOTE : Nothing extra shall be payable for any change in loads & design criteria.

1.3 RESPONSIBILITIES

Nothing extra is payable for anchor bolts and is deemed to be included in the PEB's rate. All the steel work above this level shall be entirely carried out by the PEB manufacturer. All other civil work e.g. flooring, brickwork, grouting, etc. shall also be carried out and paid for as per the relevant item of BOQ.

Upon receiving comments on the designs and drawings, PEB manufacturer shall carry out all modifications within the stipulated time schedule and get the same approved before carrying out any activity relating to the same.

Well qualified, approved personnel of the PEB manufacturer shall be available at the site during all operations relating to the PEBs. Qualified personnel of the PEB manufacturer shall carry out the necessary assembly and erection at the site.

All components of PEBs shall be fabricated, manufactured, sand blasted where required and primed at the PEB manufacturer's works. No site fabrication shall be allowed.

1.4 TIME SCHEDULE OF DESIGNS AND APPROVALS

Immediately upon being awarded the work, complete design calculations including all references, loadings, justification, etc., drawing and details shall be submitted by the Contractor/PEB manufacturer for approval .

The Consultant and/or client will comment upon the same in a suitable time. The Contractor/PEB manufacturer will carry out all modifications and also attend to the design consultant to sort out their queries necessary for the smooth and timely approval of the designs and drawings. Upon receiving the comments, the contractor/PEB manufacturer will submit their modified designs and drawings within one week for approval.

Immediately after approval, the activities relating to the construction of the PEBs shall be taken up. The cost of designs, drawings including approvals shall be deemed to be included in the rates for PEBs.

A local design office of the PEB supplier is desirable for faster clarifications on the design issues.

1.5 MATERIAL

- (i) Unless specifically called for , all structural components other than purlins and side cladding runners shall be made from Hot Rolled Sections and Plates with Quality

- “B” steel of designation E 250 (Fe 410 W ‘B’), conforming to IS 2062 : 2006.
- (ii) Minimum metal thickness for Hot Rolled Steel shall not be less than 6 mm.
- (iii) Purlins and side cladding runners only shall be made from Cold formed sections conforming to grade ASTM-A 572 M Grade 50.
- (iv) Minimum metal thickness for Cold formed section shall not be less than 2.5 mm, unless specifically permitted by consultant/railways.
- (v) Whenever High strength steel is specified, it shall be conforming to IS 2062 : 2006 and with prior approval of railways.
- (vi) High Strength Bolts for Primary connections shall be conforming to IS 1367, Grade 8.8.
- (vii) Machine Bolts for Secondary connections shall be conforming to IS 1367, Grade 4.6.
- (viii) Structural Steel shall be procured from approved manufacturer viz. SAIL, TISCO, IISCO, RINL, ESSAR.

1.6 DESCRIPTION OF PEB BUILDINGS/WORKSHOPS

- i) The buildings/workshops under PEB shall be combination of masonry wall, RCC wall and metal cladding for side/end walls. The metal sheets for wall cladding as well as that for the roof cladding shall be as relevant architectural specifications and items of schedule. While the structure such as purlins shall be provided to suit the specified wall and roof cladding sheet. The item of cladding sheet, masonry/RCC wall, plaster and finishing shall be paid for separately in relevant items.
- ii) The structure shall be designed to withstand the loads and forces of EOT cranes as per specifications and details.
- iii) All the PEBs structure shall be supplied suitably primed and painted as per specification of the paints and recommendations.
- iv) All column spacing shall be maintained same as shown on the drawing unless agreed to otherwise by the engineer.
- vi) Method of assembly shall be as per the recommendations/specifications of the PEB manufacturer subject to approval by the engineer.

1.7 DESCRIPTION OF PEB BUILDINGS/WORKSHOPS

- i) The buildings/workshops under PEB shall be combination of masonry wall, RCC wall and metal cladding for side/end walls. The metal sheets for wall cladding as well as that for the roof cladding shall be as relevant architectural specifications and items of schedule. While the structure such as purlins shall be provided to suit the specified wall and roof cladding sheet. The item of cladding sheet, masonry/RCC wall, plaster and finishing shall be paid for separately in relevant items.
- ii) The structure shall be designed to withstand the loads and forces of EOT cranes as per specifications and details.
- iii) All the PEBs structure shall be supplied suitably primed and painted as per specification of the paints and recommendations.
- iv) All column spacing shall be maintained same as shown on the drawing unless agreed to otherwise by the engineer.
- v) Method of assembly shall be as per the recommendations/specifications of the PEB manufacturer subject to approval by the engineer.

Note:

- i) **Structures of all above PEB sheds to be designed keeping in view to install Solar Plate in future.**

1.8 QUALITY ASSURANCE PLAN FOR PRE-ENGINEERING BUILDING

S.N.	Comp onent/ operati on	Characteristic Check	Type of Check	Ref. Document	Fabricators Quality Control	Inspection Detail		Format of Record	Acceptanc e Norm
						Inspection	Extent of		
	Raw Material								
1.	TATA, RINL, SAIL,J SW,JI NDAL	a) Identification and co-relation with mill test certificate from supplier	As per mill TC or any test as required by Railways	Challan, Mill test certificate	Verification of reference document	Railways	100%	Fabrication record	IS: 2062
1.1	Steel Plates , Struct ural Sectio n	b) Physical Conditions- Painting, rusting, straightness, rolling defects etc.			Complete visual inspection	Railways	100%	Inspection report of inspection officials and fabricators record	IS: 1852
		c) Mechanical test- UTS, Yield stress, elongation, % reduction area Impact and bend test	Lab test at fabricator workshop & manufacturer Test certificate	Challan Manufacturer's test certificate		Railways	Random per Lot*	Inspection report of inspection officials and fabricators record	IS: 2062, IS: 1599, IS: 1608, IS: 1757,
		d) Chemical test- Max C, Mn, Si, S,P, Cr, Cu, Ce Equivalent	Independent Lab test & manufacture r Test certificate	Challan Manufacturer's test certificate		Railways	Random per Lot*	Inspection report of inspection officials and fabricators record	IS: 2062, IS: 228
		e) Ultrasonic Test-for plates	Lab test at fabricator workshop & manufacturer Test certificate	Challan Manufacturer's test certificate		Railways	100% for plates thickness above 12mm & 25% for equal for less than 12mm	Inspection report of inspection officials and fabricators record	IS: 2062

		f) Dimensional	Measurement	Challan		Railways	100%		IS: 1852
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Lot*- Sampling and testing and acceptance consideration will be made on a lot basis. A lot shall be defined as those material presented for inspection at a specific time and date. A lot shall be further defined as a smallest weight of plates as determined below.

1. A lot shall not exceed material cast with one heat.
2. A lot shall not exceed material of 50t of a particular plate thickness.
3. Structural Plates of different thickness are regarded as separate lot.

S.N.	Component/op eration	Characteristic Check	Type of Check	Ref. Docume nt	Fabricator s Quality Control	Inspection Detail		Format Record	of Acceptanc e Norm
						Inspectio n	Extent of		
1.2	Bolts, nuts & Washers	a) Dimension as per specification	Visual/Measur e ment, Any test as required	Challan Manufacture r's test certificate	Verification of reference document & Measuremen t	Railways	As per requiremen t		IS: 1363, IS :1367
		b) Mechanical test- Tensile strength, Hardness, Impact Test, Decarburization, Retempering& Surface Integrity Test	Lab test at independent laboratory & manufacturer test certificate	Challan Manufacture r's test certificate		Railways	Rando m per Lot*	Inspection report of inspection officials and fabricators record	IS: 1367
		c) Chemical test- C Min & Max, P,S	Independent Lab test & manufacturer test certificate	Challan Manufacture r's test certificate		Railways	Rando m per Lot*	Inspection report of inspection officials and fabricators record	IS: 1367

Lot*-Sampling and testing and acceptance consideration will be made on a lot basis. A lot shall be defined as those material presented for inspection at a specific time and date. A lot shall be further defined as a smallest weight of plates as determined below.

1. A lot shall not exceed material cast with one heat.
2. A lot shall not exceed material of 100 nos. of bolt of particular diameter & length.
3. Bolts of different diameter & length are regarded as separate lot.

1.3	Paint	a) Verification of manufacturer test certificate, inspection certificate challan	Visual	Challan Manufacturer's test certificate	Verification of reference document	Railways	Each Batch	Manufacturer's test certificate Challan	IS: 101 IS: 102
		b) Supply viscosity, specific gravity, Mixing ratio, Surface Dry and Hard Dry DFT/coat, volume solid%	Independent Lab test		Verification of reference document	Railways	Sampling shall be done as defined in IS: 101 (Part-1/sec-1)	Inspection report of inspection officials	IS: 101 IS: 102
		c) Metalising	Independent Lab test		Verification of reference document	Railways	Sampling shall be done as defined in IS: 101 (Part-1/sec-1)	Inspection report of inspection officials	IS: 2590, BS: 1475 Material, I-B (99.5%)
1.4	Welding electrodes/wires , flux etc.	As per specifications	Any test as required	Challan, Manufacturer's test	Verification of reference document	Railways/ Authorised Inspecting Agency	As per requirement	Fabrication record	Welding consumbale should be Railway approved
2	Manufacturing Process								
2.1	Layout of Components & Joints								

a	Nominal	Dimensions	Measurement with tested steel tape and gauges	Approved Drawings	Measurement of dimensions	Railways/ Authorized inspecting Agency	100%	Inspection Report of inspection officials	Relevant IRS/ IS code and approved drawings
b	Camber	Dimensions	Measurement with tested steel	Approved	Measurement	Railways/ Authorized	100%	Inspection Report of inspection	Relevant IRS/ IS

			tape and gauges	Drawings	of dimensions	inspectin g Agency		officials	code and approve d drawings
c	Master (Replica of Jig)	Dimensions, intersection lines, pitch, guage, dia of holes and no. of holes	Measurement with tested steel tape and gauges	Approved Drawings	Measurement of dimensions	Railways/ Authorized inspectin g Agency	100%	Inspection Report of inspection officials	Relevant IRS/ IS code and approve d drawings
d	Jig, Template and Fixtures	Dimensions, intersection lines, pitch, gauge, diameter of holes and number of holes	Measurement with tested steel tape and gauges	Approved Drawings	Measurement of dimensions	Railways/ Authorized inspectin g Agency	100%	Record of jigs& fixtures as per Performa issued by RDSO	IRS: B1- 2001

2.2	Cutting straightening edge preparation and milling	Dimension, freedom from defects	visual measurement	Inspection report of inspecting officials fabricator's records	Visual inspection and measurement of dimensions	Railways/ Authorized inspecting Agency	Random	Inspection Report of inspecting officials and fabricator's records	IRS: B1-2001
2.3	Welding								
a	Submission of WPSS	Review of WPSS	Visual	IRS: B1-2001	Verification of reference documents	Railways/ Authorized inspecting Agency	100%	Fabricator's records	IRS: B1-2001
b	WPQR	Witness of established WPS	Welding and DT/NDT tests at approved lab	Approved WPSS	Verification of reference documents and test report	Railways/ Authorized inspecting Agency	100%	WPQR record sheet to be recorded	IS: 7310 part I
c	Inspection of Welding i.e. after welding	a) Visual, Fillet size, leg length, throat thickness	Visual DP Test Gauge Micro Etching	Approved Drawings and WPSS	Visual inspection and verification of dimensions by gauge	Railways/ Authorized inspecting Agency	100%	Fabricator's records	Relevant IRS/ IS code and approved drawings
		b) NDT of all butt welds	Radiography	IIW Blue Standard	Verification of Film Review	Railways/ Authorized inspecting Agency	100%	Exposed films to be kept in records & submitted to purchaser	IIW Blue Standard

		c) NDT of fillet welds	USFD Test	IS:9565	USFD Test Record sheets	Railways/ Authorized inspecting Agency	10%	UT Test Report	IS: 9565
2.4	Drilling Work for Bolting								
a	Drilling Through Approved Jigs	Dimensions	Measurement	Approved Drawings	Random checking of dimension by measurement	Railways/ Authorized inspecting Agency	Random	Fabricator's records	Relevant IRS/ IS code and approved drawings
b	Application of paint on hidden surface	Visual	Visual	IRS Code and contract agreement	100% of visual check on paint application	Railways/ Authorized inspecting Agency	Random	Fabricator's records	Relevant IRS/ IS code and approved drawings
2.5	Drilling Work for Bolting								
a	Sand blasting, Dry Film thickness		Measurement		Random checking of dimension by measurement	Railways/ Authorized inspecting Agency	Random	Fabricator's records	Relevant IRS/ IS code
b	Adhesion test					Railways/ Authorized inspecting Agency	Random	Fabricator's records	Relevant IRS/ IS code

2.0 PAINTING SPECIFICATION FOR STEEL STRUCTURES:-

	GENERAL SURFACE	
FABRICATION SHOP	EXTERNAL SURFACES	INTERNAL SURFACES
Surface Treatment	Abrasive blast cleaning to minimum SA-2.5 SIS-055900 near – white blast cleaning	Abrasive blast cleaning to minimum SA-2.5 SIS-055900 near – white blast cleaning.
Ist Under-Coat	Inorganic zinc silicate primer (self curing solvent type) DFT – 75µm shall be Berger Zinc Anode 11 or approved equivalent. The primer should be applied by spray only.	Epoxy zinc phosphate primer polyamide cured DFT-35µm
2 nd Under-Coat	Epoxy zinc phosphate primer polyamide cured DFT-35µm shall be Berger Epilux 610 Primer or approved equivalent. The primer should be applied by spray or brush only.	Epoxy zinc phosphate primer polyamide cured DFT-35µm shall be Berger Epilux 610 Primer or approved equivalent. The primer should be applied by spray or brush only.
3 rd Under-coat	Epoxy Zinc Phosphate primer polyamide cured DFT-35µm shall be Berger Epilux 610 Primer or approved equivalent. The primer should be applied by spray or brush only.	Polyamide cured coaltar epoxy coating DFT 100µm
4 th Under – Coat	Epoxy high build micaceous iron oxide coating polyamide cured DFT-90µm shall be Berger Epilux 4 High Build MIO. The primer should be applied by spray or brush only.	Polyamide cured coaltar epoxy coating DFT – 100µm
ERECTION SITE		
Intermediate coat	Acrylic polyurethane finish aliphatic isocyanate cured DFT-30µm shall be Berger thane or approved equivalent applied by spray or brush in approved colour.	NA
Finish Coat	Acrylic polyurethane finish aliphatic isocyanate cured DFT-30µm shall be Berger thane or approved equivalent applied by spray or brush in approved colour.	NA

INTERNAL SURFACE = Internal surface are those which will become inaccessible after

fabrication. For example the 2/ISMC box section, RHS and SHS sections etc.

EXTERNAL SURFACE = All other surfaces whether they are inside the roof sheeting,

inside the workshop or any other locations which are prone to humidity and moisture from the atmosphere.

The following precautions should be taken:

- a. After abrasive blast cleaning, the first undercoat (primer coat) should be applied well before surface deterioration.
- b. At least EPOXY MIO coating application should be completed before giving any long over coating interval for external surface.
- c. At least up to one coat of coal tar epoxy shall be completed before giving any long over coating interval for internal surface.
- d. Over coating intervals, application parameters shall conform to manufacturer's instruction manual.
- e. Do not apply during rains or when temperature is below 10 deg. C or rises above 50deg C or when relative humidity rises above 90%.

3.0 GUARANTEES FOR BUILDING MAINTENANCE:-

The contractor shall guarantee and indemnify for Pre-Engineered buildings and roofing for their successful performance for the period of 20 years against any damage to property and injury to persons on account of any defective work. The format of indemnity bond is attached at Annexure-PEB and the format of guarantee bond would be given by the Engineer.

Witness:

1. _____

2. _____

Signature of Tenderer(s)

Date _____

INDEMNITY BOND

Indemnity for Guarantee of PEB Structure as per Special Conditions of Contract of PEB Agreement No.: _____ dated: _____ for the work

“ *Name of Work* :-----”

This deed of indemnity made on the _____ day of _____ by _____ having its registered office _____ (here in after referred to as ‘Contractor’ which expression shall unless excluded by or repugnant to the context be deemed to include his heirs, executors, administrators, legal representatives, successors and permitted assigns).

1.0 WHEREAS the contractor has agreed with the “President of India acting through CPM/GSU/BKN/NWR, Indian Railway,” (hereinafter referred to as ‘Railway’) vide agreement no _____ to execute the work which includes the Pre-Engineered Buildings (PEB) under this agreement.

2.0 AND WHEREAS, under Para for ‘SPECIFICATIONS FOR PRE-ENGINEERING BUILDINGS (PEB) contractor has agreed to guarantee for structural stability and undertake to maintain and rectify the various components of the PRE-Engineering buildings (PEB) for their successful performance for the period of 20 (Twenty) years.

3.0 AND WHEREAS, under Para of ‘SPECIFICATIONS FOR PRE-ENGINEERING BUILDINGS (PEB) contractor has also agreed to indemnify the ‘Railway’ for the period mentioned in 2.0 above, against any damage to property and injury to persons on account of any defective work.

3.1 AND WHEREAS, under Para of ‘SPECIFICATIONS FOR PRE-ENGINEERING BUILDINGS

(PEB), contractor has also agreed to indemnify the ‘Railway’ for the deflection limit of member shall generally be as open clause 3.13 of IS: 800-1984, provided the roofing and cladding sheets are capable of absorbing this deflection without any deformation/cracks. Responsibility of same is being given in writing by PEB's supplier.

AND WHEREAS, the various works described in 2.0 above have been executed by contractor under various items of this agreement as detailed under along with stipulated guarantee—

4.0 In consideration of Para of Specifications for Pre-Engineered Buildings (PEB) of tender documents as mentioned here in Para 2.0 above, the contractor hereby agrees and undertakes that —

He shall indemnify the Railways from any damage to the property and injury to persons on account of any defective work in Buildings mentioned in para 2.0 above provided that such damage and defect is not directly caused by errors in the contract documents, act of providence or insurrection or civil riot, and the contractor shall be liable for and shall indemnify and make good to the ‘Railway’ or other persons legally entitled thereto whenever required by the ‘Railway’ so to do. He shall indemnify all costs, losses or damages caused to the property of the Railways or the lives of persons, on account of defective work in the Buildings mentioned in Para 2.0 above.

Railways shall take such steps as may be considered necessary to mitigate the effect of such costs, losses or damages as the case may be.

- (i) He shall indemnify and save harmless the 'Railway' from and against all actions, suit proceedings, losses, costs, damages, charges, claims and demands of every nature and description brought or recovered against the 'Railway' by reason of any act or omission of the contractor, his agents or employees on account of defective work in the Buildings mentioned in Para 2.0. above
- (ii) Period specified in para 2.0 above will commence from the date of completion of entire civil works, (Actual date of completion) as mentioned by the Railway in the completion certificate.
- (iii) He will indemnify for all the liabilities under this indemnity bond within 30 days from the written information given by 'Railway' to this effect.
- (iv) It is also agreed that stipulated time for repair / replacement of the damages / defects or paying for any liabilities under this indemnity bond will commence as soon as written communication through fax, email or SMS is made to him.
- (v) The address, Email, Fax and SMS(Phone number for it) are given below
 - a) Postal Address
 - b) Email
 - c) Fax
 - d) Phone Number

5.0 Notwithstanding anything provided hereinabove the Contractor shall be liable and/or responsible to indemnify 'Railway' only in case defect and/or any loss has occurred directly due to structural instability of PEB structure. The name and mobile number of contact person is given below:

- a) Name
- b) Designation
- c) Phone Number

This will be responsibility of indemnifier to intimate any changes in above at least one month in advance and clear acknowledgement and confirmation will be taken by Railways to avoid any miscommunication.

6.0 IN WITNESS WHEREOF I,.....
Chairman/Managing Director/Director of M/s duly
authorized vide Power of Attorney dated hereunto have signed this
deed under common seal of the company on the day and year first hereinabove written.

Encl:-i) Power of Attorney

ii) Guarantee by PEB's supplier Signature & Address of Witnesses:

Signature of Tenderer

Additional Special Conditions of Contract for drawing and design

GENERAL NOTES:-

(1) CODES & SPECIFICATIONS:

- I. All the designs are to be done using computer program as far as possible. The design is to be done as per the relevant IRS codes with up to date correction slips. The design is to be done satisfying all the latest codal provisions & procedures. The latest guidelines or the provisions in manuals & schedules will also have to be taken into consideration in design. In case of non availability of any codes on the subject design matter, standard practices. Standard books can be followed.
- II. In case of any disputes, Railways decision will be final.
- III. A preliminary scheme of design will be finalized between Railways & designer. There is Scope of inclusion of any suggestion/modification etc. later on also.

(2) OBLIGATIONS OF CONSULTANT (Architect/Designer)

- I. All minor modification which does not change the nature of in design/drawings to suit the site conditions shall be carried out by the Consultant (Architect/Designer).
- II. In case of non standard computer programs being used by the designer, the programs shall be supplied to Railways.
- III. Consultant(Architect/Designer) shall supply two sets of drawings each at conceptual stage (submission of drawing) and construction stage. The tracing in original and triplicate shall be handed over to Railway after drawings fit for construction have been released after proof checking and approval of Railway.
- IV. Proof checking is to be done from IIT.
- V. The Railway reserves the right to get the proof checker changed in consultation with the agency.
- VI. All Structural Drawings along with design calculation (properly typed) shall be submitted duly signed and stamped by designer and duly Proof checked from IIT in hard as well as soft copy.
- VII. No separate payment shall be made by Railway for design and drawing except exclusively items provided in tender schedules for Design and Drawing.

(3) OBLIGATIONS OF THE RAILWAY:

- I. Co-ordination with the State Govt. & other authorities like PWD/Irrigation dept/Local bodies etc. for obtaining necessary details required for design work.
- II. All related records and reports shall be made available by RAILWAY.

(4) The Consultant (Architect/Designer) along with his team must visit to the proposed site to get a feel of the layout, the land, surroundings, roads, electrical cables, drainage & water lines, existing vegetation, etc which are likely to affect the site and design.

- (5) Consultant may required to visit site 02 to 03 times during execution of work to clarify any points, issue necessary instructions to field Engineers regarding designs/drawings & specifications. Nominated Engineer of Railways may also visit consultant's office for further clarification on any point, after above 03 visits of consultant to site, on which consultant shall issue necessary clarification/guidelines to the nominated railway Engineer. No payment shall be made to consultant visit to site including transportation, fooding lodging, consultant's advice/clarification at site of work/consultant's office etc. complete. Cost is inclusive in the rate of Schedule item of works.
- (6) Any change in the work's tendered cost due to any reason what so ever shall not be considered for the purpose of payment.
- (7) Preparation of drawing is to be done satisfying all Codal Provisions, Plan, Geo-technical and Hydraulic data etc.
- (8) Proof checking of detailed design/drawings of structures is to be done by IIT.
- (9) Contractor shall submit 06Copies(Xerox) of approved drawings, after approval from Railway on good quality paper and Scanned soft copy in **PDF format and in AutoCAD format**.
- (10) After completion of structure/buildings/shop etc., "**As-constructed**" drawing in good quality tracing paper/Polyester film shall be submitted in 03 copies after checking by Site Engineer of Railway.
- (11) The work will be considered complete only after physical completion of the work and handing over to user. During this period, all required clarification and minor modifications is inclusive in cost.
- (12) TDS at the rate applicable would be recovered and Form 16 would be given to the contractor.
- (13) No claims shall be admissible if Railways modifies any data supplied to the consultant before approval of drawing by the Railways.
- (14) No claim shall be admissible for any variations in BUILDING's/SHED's cost at the time of construction.

Witness

- 1.
- 2.

Signature of Tenderer.

Dated:

Additional Special Condition Specifications for Non schedule items-(Schedule-E)

NS-1 this item includes the cost of

1. Designing, providing and fixing of rain water gutters and down take pipe of 0.50 TGT pre-painted Galvalume/Zinacalume steel in approved color all along all edges of the building based on the available surface area and rainfall data.
2. Provision of ventilation system including designing, supply and fixing at required location for 600mm throat edge ventilators along ridge for full length of the shed with required numbers of 600mm dia Turbo vents shall be provided on both side slopes to achieve minimum 5 (five) air changes per hour as per the design approved by railway.
3. Planning and providing architectural and engineering drawings with all details f Workshop including façade, plan, elevation, section, details of gantry girders & crane rail to suit installation of EOT crane, details of roofing, wall cladding, rolling shutters, flooring, cable duct, water supply, drainage, doors, windows, grills, louvers etc as per requirement of Individual shed in consultation with Engineer charge. In and
4. Designing and providing detailed drawing of Foundations, columns, tie beams& beam/plinth beam duly proof checked by IIT approved by Railway Designing and providing detailed drawing of flooring, cable ducts, drains, water supply, cubicles, embedded tracks, gas pipe line, roofing, solar light pipe & poly carbonate sheets, wall cladding, industrial flooring, etc as per requirement of individual shed in consultation with Engineer charge. in- (The payment for actual executed quantities of foundation & all other Items upto top of RCC Pedestals ding Holding Down MS Bolts will be made separately in relevant items)
5. Designing and providing complete structural, fabrication and erection details drawing of all Pre Engineered-Structures duly proof checked by IIT approved by Railway.
6. Designing, fabricating, providing, Holding Down MS Bolts including all assemblies and accessories that are embedded in concrete work under scope of this work. Bolts shall be of sufficient length to ensure that a minimum 40mm length of threaded portion is embedded in concrete. Threaded portion to be left projecting outside the concrete surface shall be as per requirement of supplier's design and approved drawings. Cost of fabricated, assembled and supplied Bolts shall include all necessary expenses incurred, including cost of all washers, nuts, locknuts and pins that may be required for securing the structural member with the embedded bolts. Work of actual fastening of the structural components with the embedded bolts shall have to be carried out by of the the suppliers/contractors PEB/Steel structure under this item only. PEB contractors/suppliers' quoted rate for the items shall include cost of executing the work for bolts of all diameter and length.
7. CPWD DSR-2023 specification Chapter-10 shall be applicable for mode measurement of weight payment. of for
8. Weight of Rain water gutters, down take pipes, Ridge ventilators, Turbo vents and associated fixtures/ fastenings required for fitting as well as Nuts/Bolts for connection of PEB components not considered weight measurement payment Rate of this item is Inclusive of cost of all these works also. will be of in for
9. Payment schedule of all sub items under this item against submission of Indemnity Bond as per prescribed preform shall be as under-
 - On supply of PEB fabricated component at work site. 55%
 - On erection of PEB Portals as per approved drawings. 10%
 - Final erection and completion of other allied works covered under

- Description of item. 30%
- After satisfactory commissioning of Shed as per Engineer-in-charge. 5%

NS-2 to NS-6 shall be required to execute as per Additional Special Conditions of Contract for drawing and design General and technical conditions-as given in schedule and as per instructions of engineer in-charge. Items are all inclusive and no additional charges are to be paid.

NS/07 Providing fixing wind operated multivalent roof.

1. The features of the product should be as follows:

- a. free spinning roof ventilator, which works on free wind energy & provides fresh air in your roof space, working & living areas 24 hrs a day & 365 days year at zero operating cost.
- b. It does not require any electrical energy unlike a regular exhaust fan. Therefore the ventilation system pays for itself in a very short period of time.
- c. These Wind Operated Turbo Ventilators are a combination of both' Natural Forced Air Ventilation System.
- d. It functions as a Natural Ventilator when there is a difference in thermal or wind pressure between the inside & outside of the building, which forces the air to move through the opening of the ventilator.
- e. It also acts as a Forced Ventilation System when the ventilator rotates due to the wind-velocity acting on it creating a negative pressure within the building. Cooler air from outside will rush into the negative pressure space within the building in order to maintain an equilibrium condition.
- f. This continuous positive extraction eliminates heat, dust, fume etc. & creates a downdraught into the building providing a healthier & cooler working environment thereby increasing productivity.
- g. It should be very sturdy fit & forget devices requiring no maintenance & are designed to withstand wind velocities up to 180 Kms/per hr for 1hr experienced during cyclonic storms.

2 DESIGN & CONSTRUCTION: should be as below

- Fitted with Nylon made Typhonic Bearing.
- Double top cap ensured permanent alignment in inverted cap design.
- Corrugated Foil Framed vanes gives rigidity strength, air flow and provides protection against weather change.
- Highly sensitive Roller Bearing Systems, Housing UPPER and LOWER Bearings.
- Drives out Dust soil grit and forging material and retains complete lubrication in the unit.
- Available in fabrication from Aluminum & Stainless Steel.
- A Translucent opel base which allows 22% of natural day light inside the building (Optional).
- Impact and Trust resistant easy and quick to install.
- Light weight.

3 The item include all material labour machine, taxes etc complete, nothing shall be paid extra

NS/8 Manufacturing, Supply and Installation of rubberized Level crossing pads.

The designed of rubberized level crossing system should be such that there is no requirement of check rail and it is easy to remove and reinsert the rubber pads when even required. Two set of tools required for removing and re-inserting the rubber pads should be supplied to the Engineer - in-charge free of cost, The maintenance period will be 24 (twenty four) months after completion of this work. SD may be released after maintenance period but warranty period will be 02 years after maintenance period and during this period if any defect is found the contractor will replace the same free of cost.

Special Notes: (a) Brief scope of work is: Manufacturing and installation of rubberized level crossing pads of approved quality having Width approx. 3.50 Mtr., conforming to specification given in the tender schedule, The rate includes sales tax and duties, warranty etc. required to complete the work. (b) Tenderer should submit his own drawing acceptable to the Railways. (c) (d) (e) In case of level Crossing on any crossover, the measurement of the rubberized surface will be taken in total area and will be converted Into Track Meter using the relation (1 Tr. Mtr. = 3.50 Sq. Mtr). Considering the safety reasons in use of rubberized level crossing, tenderer should have proven technology and proprietary on rubberized level crossing system. Tenderer should also have own manufacturing and quality control facilities. Necessary documents in this regard should be submitted along-with the tender documents. Tenderer should meet the manufacturing and quality control requirements as mentioned in this tender document.

2. Manufacturing & Quality Control:

- i. The rubber pads are manufactured out of special grades of natural or synthetic rubbers or Suitable blend thereof, reinforced with high reinforcing materials and compounded with other ingredients and specialty additives (proprietary item-of manufacturer) to meet the ultimate performance.
- ii. Molding of rubber pad should be done in specially designed hydraulic press at single impression with 'Two stage curing system' at minimum 800 tones pressure having automatic digital temperature controller.
- iii. Tenderer should have own RHEOMETER for quality control unvulcanised rubber compound prior to manufacturing of rubber pad.
- iv. RCC Beams used in this system should be casted at 1:1:2 ratio.

3. Rubber Properties: The rubber material should conform to the following test requirements.

S. No	Pro ert	Method of Test	Test Condition	Reuirement
1	Hardness	ASTM D 2240 AS 1683 152 IS 3400 Pt 2	Original Accelerated Ageing for 96 Hrs at 70 de C	30 Shore A Ma Change from orinal 08 Max
2	Tensile Strength	ASTM D 412 AS 1180.2 IS 3400 Pt 1	Original	20Mpa (Min)

		ASTM D 573 AS 1180.2 IS 3400 Pt 4	Accelerated Ageing for 96 Hrs at 70 deg C	15 Mpa (Min)
3	Elongation at Break	ASTM D 412 AS 1180.2 IS 3400 Pt 1	Original	250 % (Min)
		ASTM D 573 AS 1180.2 IS 3400 Pt 4	Accelerated Ageing for 96 Hrs at 70 deg C	200 % (Min)
4	Compression Set	ASTM D 395 AS 1683.13B IS 3400 Pt 10	22 Hrs at 70 deg C in air oven at 25% com ression	1 % (Max)
5	Resistance to Ozone Cracking	ASTM D 1149 AS 1683.24 IS 3400 Pt 20	1 ppm at 20% strain at 40 deg C for 100 Hrs	1 visible crack
6	Abrasion Resistance	BS 903 A9	Method - B 1000 revolution	0.50 cc (max)
7	Water- Resistance	ASTM D 471 IS 3400 Pt 6	Change in mass after Immersion in water for 96 Hrs at ambient tem erature	02 % (Max)

8	Load Test	To be applied vertically on the full surface of the rubber ad	At 60 tonne 1 Sq. Ft	No. puncture or rupture of rubb observed.
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Note: Contractor should have all in-house testing facilities for their own quality control and should submit the test report along with the tender document. Railway may conduct above tests as far as practicable from any Govt. approved laboratory at contractor's expense.

NOTE:

1. All materials to be supplied by the contractor should be get approved by the Engineer in charge before use.
2. Unless specifically mentioned in the schedule of rates all materials required for execution of work will be supplied by the contractor free of cost as per standard specifications and approved by the Engineer-in-charge.
3. All works are to be done as per programme fixed by the Engineer- in-charge or authorized representative and as per their, direction only

4. The Railway will not be responsible for compensation towards contractor's idle labour case traffic block cannot be arranged to the contractor 'as per programme due to unforeseen reasons.
5. The agency should depute a trained and cert fled supervisor duly certified by AXEN,
6. The vehicles and equipment of contractor's can drafted by Railway Administration in case of accidents / natural calamities-involving human lives. And payment in respect of that would be made by operating the item as-a non scheduled item.
7. The Contractor should furnished a list of vehicles and equipments available with them along with the tender documents.
8. All safety measure will be taken by the contractors- for movement of traffic during the operation.
9. In the case of items for which neither brands are specified nor ISI marked items are available, the sample shall be got approved from the Engineer-in-charge.
10. Even after approval of sample, if it is found at any point of time during execution that materials actually used is differing from the approved sample, the contractor shall remove the defective materials and the entire cost of redoing the work will be borne by the contractor.
11. If required some of the essential works are to be executed in night time and stipulated period with proper safety precautions for which no extra payment will be made.
12. Before offering the rates in the tender, the tenders are required to inspect the site thoroughly and satisfy themselves as to the nature of work involved and all possible difficulties for executing the work.
13. The cost of the work & quantities shown above are rough and are for guidance only. The quantities given above are subject to change according to needs of the Railway and variation thereof to any extent will not be the basis of any claims against Railway.
14. The Schedule items are based on USSOR 2021 of N.W.Rly.
15. Any amendment jn USSOR 2021 shall binding on the tenderer and no claim shall be entertained on this account.
16. The work shall be carried out as per Unified Standard Specification 2021 (Amended up to date).
17. The rates should be inclusive of all labour and materials, taxes, lead, lift, loading, unloading, sales tax etc Nothing extra payment other than the accepted rates will be made in any circumstances.
18. The contract shall be governed by General Condition of Contract and Instructions to the Tenderers 2022 (Amended up to-date).
19. All Tools and plants and mechanical equipments as required to execute the - work shall be arranged by the contractor.

CONDITIONLAG PHASENS/09- Providing, jointing, laying, testing and commissioning of HOPE PE-100/PN-6 (suitable for pulling method for jointing) pipes for sewer line as per 15-14743:1996 by trenchless method adopting any suitable technology below ground at required depth including carriage etc. complete in all respect construction of thrust pit and receiving pit required size upto 3 metre depth and soil investigation, making suitable arrangement for barricading of pits, traffic diversion, lights, traffic permission from relevant authority (though department will assist in getting the permission), refilling of pits in compacted layers of 150 mm including disposal of surplus material with all lift and lead upto 50 metre as per specification and the direction of the Engineer.

- 1 As per description of the item in schedule.
- 2 The actual Length measured at site shall be paid in meter.
- 3 The rates are inclusive of cost of all materials, fitting and labour involve completing& finishing the work in all respect including all taxes, lead and lift complete.

NS/10- - Erecting welding and fixing in position 52kg / 90R / 75 R/60 R rails over the steel

girders to facility the movement of gantry :- This item is for fixing 60 Kg./52Kg. / 90R rails over a pit line with bearing plate as directed by Engineer-in- charge to corrected spacing, gauge, alignment and level of track with necessary fittings and duly providing full components of rail fittings with all lead and lifts with contractors labour, tools and plants etc. complete as per specification and as directed by the Engineer-in-charge. Fittings i.e. Fish Plate, fish bolts will be supplied by Railway free of cost, Bearing Plates will be supplied by contractor and payment will be paid separately. Mode of payment / measurement: The payment shall be done as per actual work done at site. The TRM shall be the base for measurement.

Special Condition Specifications for Non schedule items-(Schedule-D)-NS-01 to NS-45-as per description of item in schedule.

SPECIAL CONDITIONS/SPECIFICATION FOR NS ITEMS SCHEDULE:-

Contractor should ensure that the material is not damaged/lost during transit otherwise necessary recovery as per provisions in the special conditions of contract will be made for material lost/damaged during transit.

1. All necessary permits etc. for transportation will be arranged by contractor at his own cost.
2. Lead will be measured along the shortest rail route,
3. Rates are all inclusive of the work with contractor's own tools and plants, equipments, vehicles, consumables, etc. inclusive of all lead and lift, crossing of track or any other obstructions etc.
4. The contractor will not start any work without the representative of Railway at site.
5. Wherever road vehicle and/or machinery are required to work in close vicinity of Railway line the work shall be so carried out that there is no infringement to the Railway schedule of dimensions. Special care will be taken for turning/reversal of road vehicle/machinery without infringing running traffic/safety of running trains.
6. The supervisors/workmen should be counselled about safety measures. A competency certificate to contractor's supervisors as per Performa annexed to para 819 of IRPWM 2020 (with up-to-date correction slips) will be issued by AEN/XEN in charge of the work, which will be valid only for the work for which-it has been issued.
7. Unloaded P-way or any other materials after unloading along railway track should be kept clear off moving dimensions and: stacked as per specified height and distances from running tracks.
8. Supplementary site-specific instructions wherever considered necessary issued by Engineer-in charge will be followed by contractor.
9. The Railway will not entertain any claim for any' detentions at level crossings during transit and no extra payment will be made for crossing of track obstructions, Nalliah's, descents, ascents, or any other incidental charges,
10. The contractor should carefully study the sites, stacking area and the availability of roads to reach the site and the unloading sites before tendering. The Railway does not undertake to provide any service road. It-should be clearly understood that the responsibility for construction and maintaining service roads both within and outside Railway land is of the contractor.
11. The contractor should arrange proper type of transport well in time for transporting

the railway materials. It will be the responsibility of the contractor to maintain and bear all the cost in connection with the operation of the proper means of transport and other services required for the purpose of executing the contract.

12. No claim for compensation will be entertained from the contractor if at any time for any period the Railway is unable to offer sufficient materials for the full utilization of his transport. He should arrange transport according to actual requirement to be given by the Engineer from time to time
13. The contractor shall transport and 'carry the materials expeditiously when required by the Railway so that works of Railway and other contractors do not suffer.
14. The contractor shall take such precautions as are necessary to ensure that the materials is firmly secured during transit, it will be on the transport contractor accounts. He will be required to compensate the Railway for damage or losses, if any.
15. No claim of any kind whatsoever will be entertained if the execution of the work is held up or delayed on any account. The contractor should plan the execution of the various works in close co-ordination with Engineer or his authorized representative.
16. The contractor shall be responsible to safeguard the railway material's unloaded from railway wagons, trucks/trailers till such time, it is handed over to the consignee at his depot or site as directed by the Engineer or his representative and contractors will be liable to pay the full cost of the materials to be worked out as per book rate/market rates, whichever is higher plus all other departmental charges for such railway material declared damaged during the unloading and stacking.
17. The Railway Administration may recommend to the concerned authority to issue necessary transport, permit for the works. The contractor shall however, furnish full justifications for the facilities to enable the Railway Administration to address the Government or other Authorities in this connection. The contractor shall also maintain regular log book of receipt or any delivery of the material of Railway, which the contractor are asked to load/ unload, lead to work, if so required by the Civil Authority. No claim would however be entertained by the Railway in case of delay in issue of permit, non-issue of any priority permit or any interruption in supply. The contractor shall protect and support as the case may be or as directed by the Engineer, all buildings, fences, wells, tower, drains, road, paths, waterways, banks, Railway ground and Earthwork. Electric lights, telegraphs, telephone lines and water service main pipes, cabins wires, specified/other than-those specified or directed to be removed or altered which may interfere with and which are likely to be affected, disturbed or engaged for execution, completion of the work. No payment 'shall be made by the Railway to the contractor for these works:
18. The contractor shall be responsible for all structural and decorative damage to property or injury caused by works or his workmen to person, animal or things and shall indemnify the Railway in respect thereof and shall be held entirely responsible for all works carried out by him, until it is finally taken over by the Railway. He will be liable to carried upon to make good any damages or loss which may occur to the buildings and works by inclemency of weather, floods etc. or due to any other cause during the entire period until work is taken over.
19. The contractor shall be required to nominate and arrange continuous, attendance 'of his/their authorized agents for various locations of works.
20. The Railway shall not be responsible for any loss or damage to contractor's men, materials, equipment, tools and plants etc. from any course whatsoever.
21. **RESPONSIBILITY FOR ANY MISHAP DEPARTMENT ACCIDENT ARISING OUT OF THIS WORK.**
 - i. Contractor shall ensure all precautionary measures so as not to endanger the safety of running of trains, trolleys and protect all men and materials, which shall be the responsibility for the contractor. The contractor should make a special note of this clause safety of train is of utmost importance.

Nothing extra shall be payable on this account.

- ii. At some time, contractor maybe required to bring men/material etc. from the other side of the existing tracks, and as such the rates quoted by him will be inclusive and all protection measures has to be taken for men and materials as well as safety of trains.
- iii. In the event of any train accident during the work on the existing running line, arising on accounts of contractor or his men not observing necessary safety precautions for the various operations required for the execution of this work the contractor shall be fully responsible for all damages and also he will have to pay charges of the accident/relief train arranged if any, In addition, the contractor would be responsible for payment on actual compensation for loss of any life or property of Railway and Railway users.

22. providing chaukidar at various location at site of work for look after the material with all expenses included:-

- i. Prime duty of chaukidar/ watchman is to safeguard the Railway material in his custody.
- ii. Entire responsibility of the Railway material at each specific location lies with the contractual agency in all respect.
- iii. Chaukidar will be provided by the agency when same is demanded and instructed by the engineer in charge or his representative at location decided by the Engineer in charge.
- iv. Round the clock watchmaking/ chaukidari has to be done irrespective of Sunday/holiday/festival/etc for the site work-& material

