

Nagpur Metro Rail Corporation Limited (NMRCL)

Name of Work: Construction of NHAI Flyover originating from Ujjawal Nagar on the North-South corridor of Nagpur Metro Rail Project to Manish Nagar in Nagpur.

Tender No. N1C-13/2016


Corrigendum II

Date: 02/11/2016

Tender No. (As uploaded in the E-Tender Portal): - No. 69

Sr. No.	Enclosure
1	Revised Bill of Quantities (Part 4 of Bid Documents) as Annexure-A
2	Revised Evaluation & Qualification Criteria (Section III) as Annexure-B

It is also hereby informed that the date of Pre-bid meeting, amended through Corrigendum I and currently scheduled on 05/11/2016 at 11:00 AM, is revised as on 07/11/2016 at 11:00 AM in the office of Nagpur Metro Rail Corporation, Metro House, Bungalow No. 28/2, CK Naidu Road, Anand Nagar, Civil Lines, Nagpur.


**General Manager,
(Procurement),
NMRCL, Nagpur**

Project: Construction of ROB and RUB at Manish Nagar		Tender No: NIC 13/2016		
SL.NO.	SCHEDULE NO.	SUB. SCHEDULE DESCRIPTION.	AMOUNT	
1	SCHEDULE : 01 GENERAL	Survey	226952	18485495
		Barricading bords and plantation	6353443	
		Geotechnical works	1818300	
		Misc works of traffic management works	1,00,86,800.00	
2	SCHEDULE : 02 Foundation	Pile Foundation	18,49,80,481	19,23,96,465
		Open Foundation	5,24,598	
		Flyover Piers	68,91,387	
3	SCHEDULE : 03 Superstructure	Flyover Superstructure	9,80,42,821	13,84,12,049
		PART 3- ROB Span Superstructure	4,03,69,229	
4	SCHEDULE : 04 Underpass	Open U-trough / Closed Box Sections	14,46,25,655	17,66,34,119
		2.Underpass section below Railway Tracks	3,20,08,464	
5	SCHEDULE : 05 Approaches	RE Wall	63,56,468	1,67,97,690
		Anti-Crash Barrier	1,04,41,222	
6	SCHEDULE : 06 Miscellaneous (Structures)	Wearing Course	2,87,84,732	5,38,23,152
		Bearings	1,26,54,000	
		Expansion Joint	65,29,284	
		Drainage	55,75,945	
		Footpath and Kerb	2,38,691	
		Access opening	40,500	
7	SCHEDULE : 07 Load test	Load test	17,07,750	5,01,12,608
8	SCHEDULE : 08 Road Works	Site Clearance	35,04,740	
		Earthwork	1,26,66,962	
		Pavement	2,96,97,685	
		Road Furniture	25,35,471	

9	SCHEDULE : 09 <i>Electrical works</i>	Electrical Items	2,08,24,635	2,08,24,635
10	SCHEDULE : 10	Unforeseen items	2,25,00,000	2,25,00,000
		Grand Total Amount	689986213	689986213

Annexure-A

Sr. No.	Item Description	Unit	Quantity	Rate	Amount
1	GENERAL SCHEDULE : 01				
	GENERAL				
	1. SURVEY				
1.1	<p>Detailed survey along the corridor shall be carried out with the following details:</p> <p>a) Establishing GPS stations (at every proposed station locations) at the interval of not more than 200-250 m. The GPS station shall be fixing concrete pillar 600 mm x 600 mm x 1000 mm on building roof free with a proper concrete platform. Stainless Steel (SS) Plate 100 mm x 100 mm x 4 mm with center punch shall be fixed on the top of the station. GPS instrument accuracy shall be minimum horizontal 5 mm + 0.5 ppm and vertical 10 mm + 0.5 ppm in static observation. The base line measurement shall be based on minimum 4 hrs. static observations and other observations shall be with minimum 2 hrs. Static observations. (The observation time may be increased if the no. of satellite is less than 8 as the project corridor is a urban section.)</p> <p>b) Closed traversing shall be carried out storing in total station Angle and Distance from GPS to GPS with an accuracy of 1: 50000 by observing minimum 3 sets of face right and 3 set of face left. Stations shall be established at an interval not more than 200 m. Closing error shall be distributed with least square method and Bowditch Method in commercial software compatible to the instrument used for traversing. The same commercial software shall be supplied to NMRC. Traverse pillar shall be established on permanent structure or providing and fixing concrete pillar 400mm x 400mm x 600mm along the alignment. Total station raw data, calculations shall be submitted to the employer along with before and after adjustment co-ordinates in tabular form.</p> <p>c) Detailed Topographical survey shall be carried out with adjusted traverse co-ordinates. All surface features, ground levels, and over-ground utilities shall be taken. Total Station raw data and calculations shall be submitted to Employer for No Objection. Drawings, raw data and calculations shall be submitted in soft and hard copy.</p> <p>d) A closed circuit leveling shall be run along the entire route connecting one pair of GPS to another pair of GPS station. The accuracy of the leveling will be $(6\sqrt{K})$, where the k is length of the leveling loop. Digital leveling/Auto level instrument shall be used to establish bench mark. Raw data from digital level shall be submitted along with adjusted and unadjusted levels in tabular form.</p> <p>e) For Viaduct portion, survey has to be done from boundary line to boundary line or 50m from each side of alignment,</p> <p>f) Establish all control points, traverse, bench mark and TBM. Fixing and Validating Centre line of corridor, GAD and pier locations duly considering feasibility of the pier locations on account of physical site constraints, utilities (by physical verification) and on the basis of Geotechnical Investigation Reports, vertical & horizontal clearances and establishing traverse points and bench mark for the elevated section including modifications, if any, as per drawings. No extra amount will be paid to redo or to re-establish any of the survey points. The work shall be maintained during the Contract Period including the extended contract period till the completion of the work. Rate includes all survey work including preparation of revised GAD in consultation with the Engineer. However, physical verification of utilities and Geotechnical investigations will be paid separately under relevant Schedules.</p> <p>NOTE:</p> <p>i. Digital leveling instrument to be used for the work shall have the minimum accuracy of the order of ± 0.3 mm per km double run with least count not more than 0.01 mm</p> <p>ii. Total station instrument shall have minimum accuracy for:</p> <p>a) Angle measurements (Hz, V) of the order of 1"</p> <p>b) Distance measurement of the order of 1mm+2ppm</p> <p>iii. Payment at 50% of total cost of the item on checking and verification of all control points and submission of drawings and approval of the same by the employer.</p> <p>iv. Payment at 40% of total cost of the item equally distributed over the duration of the contract and will be paid on prorata basis.</p> <p>v. Payment at 10% of total cost of the item on satisfactory completion of work along with the final bill.</p>	KM	2	113476	226952
1.2	2. BARRICADING BOARDS , SITE OFFICE				
	<p>Providing 2.0 m high temporary barricade (all contractor's materials) and arrangement for traffic signals during construction at site, for day and night as per requirement and tender drawings. During construction barricading and arrangement for traffic diversion has to be kept continuously and maintained properly till the completion of all the activities. The construction barricade will have different width in different portion of the alignment as directed by the engineer keeping in view the movement of traffic at the ground level and minimum inconvenience to and safety of public. (The rate is inclusive of display of Safety slogans on the board as per the requirements of NMRCL.)</p> <p>The construction barricading will be limited to a width of 8.0m (outside to outside of barricading). This can be increased at specific locations with approval of Engineer.</p> <p>(Note: Barricading may be required to be shifted laterally number of times but the same will be paid only once).</p> <p>The Payment schedule for item shall be as follows:</p>	RM	2000	2700	5400000
1.2.1	<p>(i) On completion of Piling, Pile cap, open foundation and piers as approved by Engineer- 70% of accepted amount.</p> <p>(ii) After completion of all activities of Viaduct including removal of barricades and restoration of site with latest specification and as per the instructions of the Engineer, 30 % of accepted amount.</p> <p>(iii) Once barricade has been provided and work started, removal of barricade is not permitted till completion of viaduct including construction of pile, pile cap, pier and pier caps. Erection of girders, segments till completion of entire super structure.</p> <p>(iv) While erecting barricade, the bottom gap between barricade and road should be plugged with cement concrete from inside.</p> <p>(v) There should be minimum openings at the end of barricade to allow access of lorries and machine to site work area. Even these spacing should have proper opening/closing arrangements.</p> <p>(vi) Adequate blinking lights on barricade during night time must be ensured. The cost of this item should include provision for power pack/ Genset etc. so as to ensure the blinking of lights in night time as long as barricades are in position at the work spot.</p>				

	(vii) After completion of the entire work, the release barricades will be the property of the contractor and he is also responsible for shifting all such release materials away from the site.				
1.2.2	Providing and maintaining the furnished site office, computers/ laptops/ printers, communication facilities etc. as per drawing and specifications for the use of Engineer and his representatives; at one location for a period of 24months as per contract conditions.	Per sqm of area	125	7000	875000
1.2.3	Cutting, Removal, transporting, disposal of trees/handing over to the concerned department as per the instruction of Engineer of girth (measured at height of 1.0M above ground level) including excavation, backfilling and levelling of the ground as directed and specified in technical specification.				
	(a) Up to 30 CM. Girth	Nos.	50	465.65	23283
	(b) Beyond 30 CM. Girth up to and including 50 CM. Girth	Nos.	20	668	13360
1.2.4	Planting saplings of Belto Foura (Red Poomaruthu), Belonex Gegiya (Poomaruthu), Cashina Festila (Kanikonna), Cabobia Rosia, Decoma Scanin, Chembakom, Gulmore etc. as approved, not less than 120cm tall including digging the holes to the required size and depth, providing new cow dung/manure etc. maintaining the growth for six months including watering, uprooting weeds, applying pesticides etc., as and when required, replacing the sapling in case of loss etc. complete (water and electricity shall be arranged by the contractor at his cost.)	Nos.	500	83.6	41800
1.3	3. GEOTECHNICAL WORKS				
1.3.1	Drilling 150mm dia boreholes in all types of soil including mobilisation of machinery, conducting all SPT.vane shear test , collection of undisturbed and disturbed samples, setting up machinerv, shifting etc.	Metres	1000	1149.5	1149500
	Including all lab, field tests & report preparation(pile foundation recommendations including safe pile capacities , pile settlement calculations, etc incorporating all field and laboratory testing) as per IRC: 78/ IS codes.				
1.3.2	Drilling Nx size boreholes in all kinds of rock including mobilisation of machinery, collection of samples, working platform etc. Including all lab, field tests & report preparation(pile foundation recommendations including safe pile capacities, pile settlement calculations, etc incorporating all field and laboratory testing) as per IRC: 78/ IS codes	Metres	200	3344	668800
1.4	4. MISC WORKS OF TRAFFIC MANAGEMENT WORKS				
	Deployment of adequate manpower for 8 hrs. shift for day and night management of traffic in intersections, roadway influenced by contractor and traffic diversions at various levels.				
1.4.1	InCharge	Shift	800	486	3,88,800.00
1.4.2	Super visor	Shift	2000	459	9,18,000.00
1.4.3	Traffic Guards	Shift	20000	439	87,80,000.00
	Note: The deployment to be done with prior approval of NMRC.L. The personnel at (a), (b) & (c) above should be familiar with traffic rules and regulations.				
	TOTAL OF SCHEDULE 01 :				1,84,85,494.50
	NOTE : Rate as mentioned above is inclusive of applicable taxes, royalties etc.				
	SCHEDULE : 02				
	Foundation				
2.1	Pile Foundation				
	No of Piles 1200mm dia	NOS	70	0	0
2.1.1	Providing and installing cast-in-situ vertical bored piles of depth as per drawing with M40/20 grade of reinforced cement concrete (using portland slag cement including all operations such as mobilisation, installation and shifting of piling rig etc, in all soil strata, road, footpath including boulders and kankar and soft rock / weathered rock, empty boring as required. The Cost shall also include built up of pile up to the required level. Pile measurement shall be from cut-off level to founding level. The stated length include test piles for initial load tests.The item includes disposal of earth, muck slush released from piles, at contractor's dumping ground with all leads and lifts as per the approved methods & specifications. The cost shall also includes the cost of empty boring wherever required. Reinforcement shall be paid separately. Rate shall include the cost of required dosage of admixture in concrete for obtaining required workability as per approval of Engineer. Drilling shall be done by use of hydraulic rig using temporary casing of required depth (min of 4.5m), polymer slurry to be used and as directed by the Engineer. (Use of bentonite slurry is not permitted). Socketing shall be as per specification and the decision of Engineer shall be final.	RM	882	10,462	92,32,341
2.1.2	Providing, placing and driving in position 6 mm thick permanent M.S. liner upto required depth with 12 mm thick M.S. cutting edge of 0.50 m length at bottom including fabricating, cutting the M.S.sheet to required diameter and shape, welding the joints and driving with the help of required machineries including all materials, labour and lift etc. complete.	RM	182	15,542	28,28,662
2.1.3	Providing M 15/20 concrete for Minimum 100mm thick PCC below pile cap, open foundation slabs extending 100mm all around beyond pile cap, open foundation slabs. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer.	CUM	48	3,713	1,78,214

2.1.4	<p>Providing M 40/20 grade, reinforced cement concrete (using portland slag cement) for following concrete works: Pile cap including excavation upto required level from lowest ground level through existing concrete and water bound macadam road / bituminous road / concrete road / soil/morrum/ hardrock /soft rock old structures below ground as encountered of all thicknesses including dismantling other structures , dead utilities , including dewatering, pumping and bailing out water, strutting and shoring, curing etc. This item also includes formwork and backfilling in foundation with good earth including watering, compacting with a vibratory plate compactor. The Cost shall also include cutting/ chipping of pile up to cut off level or up to good concrete and built up of pile up to required level are also included in this item. The cost includes loading, unloading and disposal of surplus excavated material along with pile heads using covered trucks to contractor's dumping yard with all leads and lifts and as directed by the Engineer. The contractor has to ensure that during transportation the carried material does not spill out. Reinforcement shall be paid separately. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer.(10% of the amount shall be withheld.Out of this,5 % of the amount shall be released after disposal of excavated material including pile heads at contractor's dumping yard and 5 % of the amount shall be released after completing road restoration works on pile caps.Payment for road restoration works will be paid under relevant items of road works)</p>				
	(a) + backfilling with coarse sand	CUM	648	7,225	46,81,800
	(b) extra over (a) above for backfilling with excavated material	CUM	578	-92	-53,176
2.1.5	<p>Providing TMT reinforcement steel of Fe 500 grade or above, from approved make, handling, straightening, cutting, bending, tying, lap welding, placing in position including 18 gauge GI binding wire in diamond form at each reinforcement junction in all structural concrete at all heights and depths with all leads & lifts complete as per specifications and as directed including welding involved towards stray current protection effects as per the system approved by Engineer. This would include any additional Reinforcement provided for earthing requirement also. Note: i) No laps joints, are permitted in rebars provided in superstructures segments and piers, pier caps . ii) For pile reinforcement, welding of lap joint shall be without extra cost. iii) For other structural members, lap joints are permitted. iv) The cost quoted should cover all welding, Laps, standard laps, chair, bend deduction as per relevant IS code, as required and nothing extra is payable on this account. v) Stage Payment at 60% of the accepted rate or 80% of the invoice value whichever is minimum shall be paid on receipt of material at site and its certification by the Engineer against submission of original invoice and manufacturer Test reports and the indemnity bond.The total stage payment made at any given time shall not exceed 10% of the accepted value of this item.</p>	MT	2567	64,335	16,51,46,790
2.1.6	Carrying out initial vertical load tests on piles as per relevant IS Codes including all arrangements for measuring settlement / deflections and submitting reports. This includes, cost of all the piles (including test pile, and reaction piles, if required), reinforcement, making of pile head ready for testing at the desired level, supporting / reaction arrangement (including reaction piles/soil/rod anchors, if any) for the kentledge load for 2.5 times the theoretical design vertical load capacity. The test arrangements designed shall cater for additional 25% above test load. (Cost of pile to be tested is paid in item 2.1.1)	NOS	1	14,19,446	14,19,446
2.1.7	Carrying out initial lateral load tests as per relevant IS Codes including all arrangements for measuring deflections and submitting reports as per specification and tender drawing. This includes making of pile head ready for testing at the desired level, supporting / reaction arrangement (include reaction piles/ soil/ rock anchors, if any) for the kentledge load. (Cost of pile is paid in item 2.1.1)	NOS	1	4,74,754	4,74,754
2.1.8	Carrying out routine load tests on working piles for 750T for 1.2m diameter pile.	NOS	1	3,10,067	3,10,067
2.1.9	Carrying out dynamic routine vertical load tests as directed by the Engineer and as per NMRC's standards, including all arrangements for measuring deflections and submitting reports. This includes making of pile head ready for testing at the desired level, supporting / reaction arrangement (incl. reaction piles/soil/rock anchors, if any) for the kentledge load.	NOS	18	43,519	7,61,583
2.2	Open Foundation				
2.2.1	<p>Providing and laying M40/20 grade cement concrete (cement as per technical specification) for reinforced cement concrete for open foundation, basement, slab, ancillary, building foundation slab, retaining wall bottom slab including excavation through in/existing concrete and water bound macadam road /bituminous road / cement road of all thicknesses including dismantling other structures, dead utilities thicknesses, soft and stiff clays including dismantling other structures, dead utilities etc.,including dewatering, pumping and bailing out water.This item includes cost of centering, shuttering, scaffolding, curing and all related operations as required to complete the work. backfilling in foundation including watering, compacting with a vibratory plate compactor and loading, leading and disposal of surplus excavated material using lockable and covered trucks so as to ensure that during transportation the carried material does not spill out. The item includes disposal of earth, muck, slush released from piles, top cutted portion of pile at contractor's own disposal ground for all leads. Reinforcement shall be paid separately. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer. (15% of the amount shall be withheld.Out of this,7.5 % of the amount shall be released after disposal of excavated material at contractor's dumping yard and 7.5 % of the amount shall be released after completing road restoration works.Payment for road restoration works will be paid under relevant items of road works) Measurement shall be considered only the total volume of pile cap concrete (excluding PCC below pile cap)The gap shall be filled with either with coarse sand or compressible filler board of high density as directed by Engineer/as per GFC drawings.</p>				
	(a) + backfilling with coarse sand	CUM	74	7,225	5,31,038
	(b) extra over (a) above for backfilling with excavated material	CUM	70	-92	-6,440

<i>Total of schedule 2</i>					18,55,05,078
NOTE : Rate as mentioned above is inclusive of applicable taxes, royalties etc.					
<i>SCHEDULE : 03</i>					
<i>Part 1- Substructure</i>					
3.1	Flyover Piers				
3.1.1	Providing M50/20 concrete (cement as per technical specification) for Piers, pier cap, portal beam and bearing pedestal/seismic stopper a including centering, approved steel shuttering, scaffolding and all related operations as required to complete the work as specified in drawings. Reinforcement shall be paid separately. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer.	CUM	853	8,079	68,91,387
<i>Total of schedule 3A</i>					68,91,387
NOTE : Rate as mentioned above is inclusive of applicable taxes, royalties etc.					
<i>Part 2- Superstructure</i>					
3.2	Flyover Superstructure				
3.2.1	Providing and laying M50/20 Grade cement concrete for Concreting and curing precast segments of all spans (straight or curved) in the casting yard, bolt holes for fixation of Blisters for temporary Pre-Stressing, provision for future external Pre-Stressing arrangement, lifting the segments from the mould and shifting the same to the stacking yard. The cost shall be inclusive of the cost proportionate treatment for each cubic meter of concrete for having provided all infrastructure in the casting yard, gantry cranes, moulds, casting beds, mobile cranes, stores, concrete batching plant, establishing labs, cut-outs, shear keys, bulkheads, end block in situ concrete after stressing etc. where specified, all curing arrangements as required, all handling etc. complete. Reinforcement steel shall be paid separately under relevant BOQ item. Payment for Prestressing system (includes strands, anchorages, sheathing, vent pipe .etc) will be measured under relevant BOQ item. Rate shall include the cost of required dosage of admixture in concrete for obtaining required workability as per specification and approval of Engineer. The Rate shall also include UPV testing (by approved NABL and as approved and directed by Engineer) for all end segments.	CUM	4076	11,653	4,74,99,609
(i) The removal of inside shutters must be carried out using semi automatic hydraulic equipment.					
(ii) At the end of the work all the infrastructure facilities provided in casting yard may be taken back by the Contractor.					
3.2.2	Loading, transporting precast segments from casting yard to work site, launching and erection in position with launching girder, including the erection and shifting of launching girder, cost of all temporary supports, launching girder, erection equipment, transporting etc, applying epoxy-based bonding agent on end surfaces of segments after dry matching including temporary prestressing required during its curing period and positioning on bearings etc.	MT	10190	1,839	1,87,40,192
3.2.3	Supplying and post threading uncoated stress-relieved low relaxation steel conforming to IS :14268, class-2 in I-Girders, Pre cast/ cast in-situ/ Segmental PSC Box Girder including providing 107mm ID (for 19K15) or 86mm ID (for 12K15), corrugated HDPE duct (both sides) -3.3mm thick in case of 19K15 & 2.8mm thick in case of 12K15 with couplers & vent pipes, spacers, end anchorages, stressing using 19K15 or 12K15 system and grouting, epoxy protection of anchorages, sealing of PT anchorage recess with concrete (same grade as structure) and all related operations to complete the work. (Note: the details shown on the drawing all likely to change and nothing extra will be paid to the contractor on this account).	MT	135.8133	143514	1,94,91,110
3.2.4	Providing and applying epoxy based paint of approved colour and shade to exterior surface in two or more coats including scaffolding preparing the surface to receive paint etc. Complete. Rate includes preparation of surface, application of one or more coats of primer as per manufacture's recommendation.	SQM	48282	255	1,23,11,910
3.3	PART 3- ROB Span Superstructure				
3.3.1	Supply, fabrication and erection of Welded / Rivetted / Bolted type Composite plate girders of 64 m or as approved of Bow String Span at site as per approved drawings, Indian Railway Unified Standard Specifications (W&M) - 2010 (amended up to date) and Indian Railways standard specification for fabrication and erection of steel girder bridges and locomotive turntables (Fabrication Specifications) Serial No B1-2001 (amended up to date) including all incidental works etc., supplying and fixing in position of shop welding / shop bolting with nuts and washers, field bolts, etc. required for complete fabrication of the girders and transportation of the fabricated materials at site and stacking of the same at places as directed by Engineer including metalizing as per clause No 39.2.1 of B1-2001 over the structural members with all contractor's labour, fuel, consumables, machinery, loading, unloading, tools & plants, material, lead and lift complete in all respect, as a complete job as per specifications and as directed by Engineer. Notes: - 1) Steel (Plates and Rolled sections) should conform to IS: 2062-2011. It shall have Sub quality 'BR' & Grade E450 (Fe 570).12 mm thick & above plates shall be fully killed and fully normalized / controlled cooled.2) The steel shall be procured only from those firms, which are Established, Reliable, Indigenous & Primary Producers of Steel, having Integrated Steel Plants (ISP), using iron ore as the basic raw material and having in house iron rolling facilities, followed by production of liquid steel & crude steel. 3) (a) 40 % of rate payment shall be made after steel material required for fabrication (as per drawing) is received at site. (b) 15 % of rate payment shall be made on acceptance of fabricated components at site. (c) 20 % of rate payment shall be made after erection & launching. (d) 25 % of rate payment shall be made after final approval of NMRCL and successful completion of all works included in this item including metallising and finishing complete. 4) No deduction for holes and no addition for rivets / bolts / welds / HSFG Bolts etc. shall be made. 5) The contractor shall submit the detailed erection drawing and Launching scheme along with necessary design calculations for approval from the Consultant appointed by NMRCL before erection and launching of girder. 6) Temporary supports if any required for the erection / launching shall be erected after the approval of Engineer. Nothing extra shall be payable on this account. 7) The contractor shall take all safety precautions that will be necessary in consultation with Engineer as per extant rules / guidelines. Nothing extra shall be payable on this account. 8) Notwithstanding above, the contractor shall be fully responsible for any mishap that may occur as a result of negligent working. 9) Contractor has to take every precautionary measure for safety of running train during and after launching of girder. 10) The rate includes launching under traffic blocks wherever required. However, the rate does not include the cost of possession of traffic / OHE block. 11) The Block required shall be arranged by NMRCL. The duration of the block shall be as approved by Engineer. If the Block granted is not made available due to unavoidable reasons, nothing extra / no compensation shall be paid. 12) However penalties, if any, levied by NMRCL caused due to any careless working or otherwise of violation of the Terms and Conditions of the track /OHE block, shall be payable by the contractor. Meant for Bow String Span of 64 m over the rail way crossing along the alignment as per tender drawings.	MT	326	1,19,577	3,89,82,151

3.3.2	Providing and laying in-situ cement concrete of M50 grade of trap/granite/quartzite/ gneiss metal for R.C.C work in deck slab for bow-string girder for ROB span including steel formwork, steel centering, compaction by vibrating finishing uneven and honeycombed surface with C.M.1:3 of sufficient minimum thickness to give a smooth and even surface or roughening the surface if special finish is to be provided, curing and finishing in cement plaster (excluding reinforcement, including cover block). The C.M. 1:3 plaster is considered for rendering uneven and honey- combed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc.	CUM	122	8,079	9,88,870
3.3.3	Providing and applying HB PU Paint of approved make to new structural steel work, including scaffolding if necessary, cleaning and preparing surface including primer coat complete. (Sample and brand is to be got approved by engineer before use). The rate shall also included required surface preparation (Sand Blasting) for application of Zinc Epilux or equivalent primers,and two or more coats of HB PU paint as per specifications.	SQM	1562	255	3,98,208
Total of schedule 3B					13,84,12,049
NOTE : Rate as mentioned above is inclusive of applicable taxes, royalties etc.					
SCHEDULE : 04					
Part 1- Underpass					
4.1 Open U-trough / Closed Box Sections					
4.1.1	Providing M 15/20 concrete for Minimum 100mm thick PCC below foundation slabs extending 100mm all around beyond closed box section. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer.	CUM	1072	3,713	39,81,003
4.1.2	Providing and laying in-situ cement concrete of M40 grade for closed box section span including steel formwork, steel centering, compaction by vibrating finishing uneven and honeycombed surface with C.M.1:3 of sufficient minimum thickness to give a smooth and even surface or roughening the surface if special finish is to be provided, curing and finishing in cement plaster (excluding reinforcement, including cover block). The C.M. 1:3 plaster is considered for rendering uneven and honey- combed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc.	CUM	15462	7,800	12,06,01,260
4.1.3	Providing and laying 600 mm thick filter media behind RE wall complete as per drawing and technical specification and as directed by Engineer.	CUM	3706	105	3,89,120
4.1.4	Providing and fixing 8mm thck multi-wall clear polycarbonate sheet with specially designed powder coated Al, ALCOX system, EPDM rubber gasket, GE silicon sealent cold forged etc all complete for canopy over the open U-trough sections, including support columns, necessary foundation bolts with template during the casting of concrete, connections, fittings etc., complete as per specifications and as directed by Engineer. Item includes all structural steel works required for the sheeting as per approved drawing.	SQM	5808	3,384	1,96,54,272
4.2 2.Underpass section below Railway Tracks					
4.2.1	Casting RCC box of M-45 for prescribed loading conforming to 25T loading 2008 & clear opening of as per approved drawing(Single/twin cells), with requisite steel cutting edge, suitably designed drag shield necessary intermediate jacking points, thrust bed etc. for box pushing process across double/multiple line section including, excavation and or filling in approach of bank for casting of boxes pushing of boxes with jack & other arrangements of adequate capacity under traffic running condition/block period, excavation as arising during pushing, disposal to contractor's dumping yard as specified including all dewatering needed all temporary works required in above connection including protection measures for maintaining Railway safety e.g. retention of earth slope under box, maintaining of track over and in approaches by contractor's labour under supervision of Rly/NMRCL/GC, Suitable grout etc. by contractor's men, materials, tools, plants, equipments, power supply etc. required for completing the work in all respect to the satisfaction of engineer-in-charge. The cost of concrete, cement & reinforcement, anticorrosive treatment for reinforcement will, however be paid extra by operating separate items indicated in schedule - (for R.C.C Box proper only). Rock requiring blasting if met during will be paid relevant PWD SOR 2015-16. Rate includes:-(a) Cost of thrust bed & other efficient arrangement required for box pushing in most expeditions manner. (b) Cost of providing and fixing steel drag shield (properly designed GI antidrug sheet) cutting edge as per approved design is included in item. (c) Protecting the side slope of cut bank inside RCC Box, during pushing with earth filled gunny bags of any other method approved by Engineer-in-charge & making all other required arrangements for safe passage of trans at all limits & maintaining track parameters to prescribed standard. (d) Filling of sand after required cutting to fill up undulations in rock below RCC Box for easy pushing RCC Box. (e) Closing and plugging the gap between two units of push box with suitable method to make the joints watertight by polyurethane based grout or similar. (f) Back of box by course grade internal like course sand or stone dust etc. after completion of box pushing. (g) The design and excavation scheme should aim for minimum spell of speed restriction with least interference to traffic. Note: 1. Drawing for RCC box attached in tender document. 2. The cost of M-40 grade of concrete for closed box section along with the reinforcement steel (for the main box to be pushed under Railway track) is not included in this item and will be paid separately. 3. The rate includes the design of the Jaching system, thrust bed etc required for pushing of RCC box and submission of relavent drawings	Per metre length of box Per Sqm of clear opening	2400	13,269	3,18,45,600
4.2.2	Providing and laying in-situ cement concrete of M40 grade for underpass staircase section span including plywood/ steel formwork, steel centering, compaction by vibrating finishing uneven and honeycombed surface with C.M.1:3 of sufficient minimum thickness to give a smooth and even surface or roughening the surface if special finish is to be provided, curing and finishing in cement plaster (excluding reinforcement, including cover block). The C.M. 1:3 plaster is considered for rendering uneven and honey- combed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (wooden centering/ formwork will not be allowed).	CUM	21	7,800	1,62,864
Total of schedule 4					17,66,34,119
NOTE : Rate as mentioned above is inclusive of applicable taxes, royalties etc.					
SCHEDULE : 05					
Part 1- Approaches					
5.1	RE Wall				

5.1.1	Providing Reinforced Earth Structure with pre-cast cement concrete wall of 180mm thick in M-35, Synthetic Geogrid as per Clause 310.2 & filling approved material including designing, assembling, joining and laying synthetic geogrid, foundation for pre-cast elements in CC M 15, filter media of 600mm thick along wall, filling between wall by approved soil, compacting upto required max density. Item includes all labour, material, machinery required for work complete as per engineer-in-charge. (RE Wall height from 0m to 5m). (Note : Payment will be made as per area of facia panels used.)	SQM	865	4,326	37,41,557
5.1.2	Providing and laying 500 mm thick Sub Base complete as per specifications and as directed by engineer	CUM	464	265	1,22,857
5.1.3	Providing and laying 330 mm thick Granular Sub Base complete as per specifications and as directed by engineer	CUM	306	898	2,75,112
5.1.4	Providing and laying 250 mm thick Wet Mix Macadam complete as per specifications and as directed by engineer	CUM	123	1,241	1,52,539
5.1.5	Providing and laying 110 mm thick Dense Bituminous Macadam as per specifications and as directed by engineer	CUM	42	7,865	3,30,791
5.1.6	Providing and laying 40 mm thick Bituminous Concrete complete as per specifications and as directed by engineer	CUM	37	8,862	3,29,179
5.1.7	Providing and applying tack coat in two layers as per specifications and as directed by engineer	SQM	929	36	33,152
5.1.8	Providing M 15/20 concrete for Minimum 100mm thick PCC below approach slab and crash barrier extending 100mm all round. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer.	CUM	47	3,713	1,74,502
5.1.9	Providing and laying in-situ cement concrete of M25 grade for underpass friction slab section span including steel formwork, steel centering, compaction by vibrating finishing uneven and honeycombed surface with C.M.1:3 of sufficient minimum thickness to give a smooth and even surface or roughening the surface if special finish is to be provided, curing and finishing in cement plaster (excluding reinforcement, including cover block). The C.M. 1:3 plaster is considered for rendering uneven and honey- combed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc.	CUM	164	6,917	11,33,589
5.1.10	Providing and laying in-situ M30 cement concrete of trap/ granite/ quartzite/ gneiss metal for approach slab including necessary steel formwork, steel centering, compaction by vibrating finishing, curing etc. complete. The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc.	CUM	9	7,080	63,190
Total of schedule 5A					63,56,468
NOTE : Rate as mentioned above is inclusive of applicable taxes, royalties etc.					
Part 2 - Anti-Crash Barrier					
5.2	Over Flyover				
5.2.1	Providing and casting special grade in controlled cement concrete of M40/20 grade for R.C.C work for anti-crash barrier over segmental box girder for flyover, approach to flyover(over RE wall) and central median / anticrash barrier in the underpass including centering and scaffolding or launching including necessary plant and machinery for the job, shuttering, vibrating, curing , finishing in C.M. 1:3 etc. complete Steel and plywood formwork. (MOST 12.1 / 1500 , 1600 , 1700).	CUM	929	7,800	72,46,200
5.3	Part 5 - Pier Protection at-grade				
5.3.1	Provision of reinforced cement concrete anticrash protective barrier on either face of the piers of the flyover with M40 grade concrete with HYSD reinforcement conforming to IRC:21 and dowel bars 25 mm dia, 450 mm long at expansion joints filled with pre-moulded asphalt filler board, keyed to the structure on which it is built and installed as per design given in the enclosure to MOST circular No. RW/NH - 33022/1/94-DO III dated 24 June 1994, as per dimensions in the approved drawing and at locations directed by the engineer, all as specified, complete.	CUM	458	6,977	31,95,022
Total of schedule 5B					1,04,41,222
NOTE : Rate as mentioned above is inclusive of applicable taxes, royalties etc.					
SCHEDULE : 06					
Miscellaneous (Structures)					
6.1	Part 1 - Wearing Course				
6.1.1	Providing and laying 56 mm thick wearing course (50mm thick Bituminous Concrete and 6mm thick waterproofing layer) with paving grade bitumen 14 % by weight of total mix, filler, fine & coarse aggregate, meeting the requirements given in table 500-29, of MORT&H Specifications prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated finegrained hard stone chipping of 13.2 mm nominal size at the rate of 0.005 cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces is not less than 100 degree celcius, protruding 1 mm to 4 mm over mastic surface, etc. complete (excluding tack coat, mix design is required for each case).	SQM	6208	1,356	84,15,458
6.1.2	Providing and laying in-situ cement concrete of M25 grade for wearing course with 15cm thick including steel formwork, steel centering, compaction by vibrating finishing uneven and honeycombed surface with C.M.1:3 of sufficient minimum thickness to give a smooth and even surface or roughening the surface if special finish is to be provided, curing and finishing in cement plaster (excluding reinforcement, including cover block). The C.M. 1:3 plaster is considered for rendering uneven and honey- combed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (wooden centering/ formwork will not be allowed).	CUM	2009	10,138	2,03,69,274
6.2	Part 2 - Bearings				
6.2.1	Providing and fixing as per approved drawings, fixed spherical bearings of 200T vertical load capacity	NOS	27	2,70,000	72,90,000
6.2.2	Providing and fixing as per approved drawings guided spherical bearings of 200T vertical load capacity	NOS	54	60,000	32,40,000

6.2.3	Providing and fixing as per approved drawings sliding spherical bearings of 200T vertical load capacity	NOS	27	54,000	14,58,000
6.2.4	Providing and fixing as per approved drawings fixed spherical bearings of 300T vertical load capacity	NOS	1	4,05,000	4,05,000
6.2.5	Providing and fixing as per approved drawings guided spherical bearings of 300T vertical load capacity	NOS	2	90,000	1,80,000
6.2.6	Providing and fixing as per approved drawings sliding spherical bearings of 300T vertical load capacity	NOS	1	81,000	81,000
6.3	Part 3 - Expansion Joint				
6.3.1	Providing and laying of a strip seal expansion joint catering to maximum horizontal movement up to 70 mm, complete as per approved drawing and standard specifications to be installed by the manufacturer/ supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation.	RM	468	13,940	65,19,644
6.3.2	Providing Expansion joints with 25 mm thick bitumenous pad or water-stop joints for closed/open box sections as per detailed drawings.	SQM	11	856	9,640
6.4	Part 4 - Drainage				
6.4.1	Construction of underground drain 1m x 1m (inside dimensions) lined with RCC M25/20, 15cm thick covered with RCC slab 10cm thickness on the edge of the roads as per MoRTH specifications and as directed by engineer. Rate inclusive of reinforcement, shuttering, concreting, curing, excavation in all types of soil/concrete/boulder/rock/hard rock/structure etc. and with all leads and lift. the debris and surplus material has to be disposed at contractor's dumping yard. Payment will be made for running metre of drain measured individually on LHS and RHS on the road	RM	2000	2,724	54,48,000
6.4.2	Providing UPVC (SWR) grade 110 mm outer diameter pipe for water spouts as per drawing over deck slab.	NOS	333	233	77,622
6.4.3	Providing and fixing AC/UPVC pipes of 110 mm diameter and of required length for runners and down take pipes including connectors, bends & junctions as directed complete.	RM	0	224	21
6.4.4	Sump and pump arrangement for collection of runoff at both ends of the underpass box, complete as per technical specification	NOS	4	10,500	42,000
6.4.5	Providing and laying in-situ cement concrete of M25 grade of trap/granite/quartzite/gneiss metal for RCC work in drainage collection sump including scaffolding, compaction, finishing, plywood/steel formwork, steel centering. The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only (excluding reinforcement, including cover block). Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (wooden centering/formwork will not be allowed).	CUM	1	6,917	8,301
6.5	Part 5 - Footpath and Kerb				
6.5.1	Providing and laying in-situ cement concrete of M30 grade of trap/granite/quartzite/gneiss metal for PCC work Kerb and Kerb stone along RE wall and along footpath in the RUB under Railway line, including scaffolding, compaction, finishing, plywood/steel formwork, steel centering. The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only (excluding reinforcement, including cover block). Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc.	CUM	26	7,734	1,97,341
6.5.2	Providing and laying interlocking blocks incl. murrum filling and sand etc. behind kerbs along RE wall and along footpath in the RUB under Railway line, as per approved drawing as per specification and as directed by Engineer.	SQM	207	200	41,350
6.6	Part 6 - Access opening				
6.6.1	Manholes (0.9mx0.9m) as per approved drawing with locking arrangement system provided at the soffit of the box girder for access	NOS	27	1,500	40,500
6.7	Part 7 - Load Test				
6.7.1	Load test of concrete superstructure with a test load of 100T on 31m span, complete including loading arrangement as per IRC SP 37. and as per direction of Engineer-in-charge	MT	1	17,07,750	17,07,750
6.7.2	Load test of composite ROB superstructure with a test load of 100T on 36m span, complete including loading arrangement as per IRC SP 37.	NOS	1	0	0
Total of schedule 6					5,55,30,902
NOTE : Rate as mentioned above is inclusive of applicable taxes, royalties etc.					
SCHEDULE : 07					
Road Works					
7.1	Part 1 - Site Clearance				
7.1.1	Clearing and grubbing road land complete as per Clause 201 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).	HA	2	59,344	1,37,700
7.1.2	Dismantling including disposal of unserviceable material and stacking the serviceable material complete as per Clause 202 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).				
	a) Pavement bituminous course	CUM	939	710	6,66,479
	b) Non bituminous base/sub base course	CUM	2703	405	10,95,561
	c) Filling of wells falling within construction zone	NOS	8	1,72,500	13,80,000
7.1.3	Service charges for arranging for item "Shifting of Utilities" complete as per Clause 201 of MoRTH Specifications for Road and Bridge Works(Fifth Revision) & as per the project requirement.(Actual cost of shifting shall be paid separately).				
	a) Telephone lines including poles	NOS	3	5,000	15,000
	b) Low Tension Electric line poles	NOS	42	5,000	2,10,000
7.2	Part 2 - Earthwork				

7.2.1	Earthwork in excavation necessary for the construction of roadway in all types of soil all complete as per Clause 301 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).				
	a) Ordinary soil	CUM	43876	116	50,67,734
	b) Weathered rock	CUM	18804	260	48,96,615
7.2.2	Construction of subgrade and shoulders satisfying the requirements of minimum soaked CBR value as indicated in the specification with approved material with all leads and lifts all complete as per Clause 305 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).	CUM	9325	290	27,02,371
7.2.3	Filling in median/island with approved material obtained from roadway excavation with all leads and lifts all complete as per Clause 305 & 407 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).	CUM	2	128	242
7.3	Part 3 - Pavement				
7.3.1	Providing and laying Granular Sub-base (drainage layer) complete as per Clause 401 Grading-I (Table -400-2) of MoRTH Specifications for Road and Bridge Works (Fifth Revision).	CUM	4289	898	38,50,878
7.3.2	Providing and laying Wet Mix Macadam base of required thickness on prepared surface complete as per Clause 406 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).	CUM	4455	1,241	55,28,592
7.3.3	Providing bituminous primer coat over granular surface with bitumen emulsion SS1 Grade complete as per Clause 502 of MoRTH Specifications for Road and Bridge Works (Fifth Revision) @ 6.0 to 9.0 kg/10 sq.m.	SQM	16204	41	6,63,537
7.3.4	Providing tack coat with bituminous Emulsion RS 1 Grade all complete as per Clause 503 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).				
	(i) On granular surface treated with primer and on hungry bituminous surface @2.5 to 3.0 kg/10 sq.m.	SQM	16204	18	2,89,234
	(ii) On Bituminous surface @ 2.0 to 2.5 Kg/10 sq.m.	SQM	16204	18	2,89,234
7.3.5	Providing & laying Dense Bituminous Macadam course (VG 40 Grade) of required thickness on prepared surface complete as per Clause 507 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).	CUM	1653	7,865	1,30,03,935
7.3.6	Providing & laying Bituminous Concrete course of required thickness on prepared surface complete as per Clause 509 of MoRTH Specifications for Road and Bridge Works (Fifth Revision) with Polymer Modified Bituminous binder	CUM	648	8,862	57,43,852
7.3.7	Providing and laying factory made coloured chamfered edge Cement Concrete paver blocks of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of fine sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with jamuna sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks, lawns, drive ways or light traffic parking etc. complete as per manufacturer's specifications & direction of Engineer-in-Charge.				
	80mm thick C.C. paver block of M-30 grade with approved colour, design & pattern.	SQM	350	938	3,28,423
7.4	Part 4 - Road Furniture				
7.4.1	Construction of plain cement concrete kerb(I) M-20 grade (unit Qty: Concrete M20 - 0.178 cum/Lm)	RM	85	311	26,418
7.4.2	Construction of plain cement concrete L kerb(L) M-20 grade (unit Qty: Concrete M20 - 0.14 cum/Lm)	RM			
7.4.3	Painting concrete Kerb complete with suitable paint	SQM	29	79	2,276
7.4.4	Pavement marking with hot applied thermoplastic paints conforming to ASTM D36/BS-3262 (Part - I) as per drawing & Clause 803 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).				
	a) Lane/centre line/edge line/ pedestrian crossing marking and any other markings along strips.	SQM	2136	730	15,59,048
7.4.5	Supplying and fixing at site retro-reflectorised type sign boards/signs made of encapsulated lense type of reflective sheeting fixed over aluminum sheeting 2.0 mm thick complete including vertical pipes/ angles/ posts etc. all complete as per drawing and Clause 801 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).				
	a) Mandatory signs				
	b) Stop signs- size/ height 750mm	NOS	4	5,456	21,823
	c) Speed limit- size 900mm	NOS	4	3,114	12,457
	d) Give way signs- size/ height 900mm	NOS	4	3,994	15,977
	e) Prohibitory signs- size/ dia 750mm	NOS	4	6,593	26,372
	f) Cautionary sign for speed <50, 600mm size	NOS	11	3,691	40,598
	g) Cautionary sign for speed >80, 1200mm size	NOS	4	23,667	94,668
	h) Advance direction sign-route marker sign	NOS	6	6,945	41,668
	i) Flag type direction sign	NOS	7	7,940	55,581
	j) Facility informatory signs	NOS	7	7,772	54,405
7.4.6	Providing and erecting overhead signs complete as per drawing and Clause 802 of MoRTH Specifications for Road and Bridge Works (Fifth Rev)				
	a) Full Width overhead sign including gantry (22 m)	NOS	1	1,39,804	1,39,804
	b)chevron signs	NOS	21	4,040	84,848
7.4.7	Providing and fixing retro-reflectorised road delineators complete as per drawing and Clause 805 of MoRTH Specifications for Road and Bridge Works (Fifth Revision).				
	a) One way-Hazard markers	NOS	4	1,592	6,367
	b) Two Way-Hazard markers	NOS	6	1,592	9,551
	d) Road normal studs	NOS	1448	237	3,43,610
Total of schedule 7					
4,84,04,858					
NOTE : Rate as mentioned above is inclusive of applicable taxes, royalties etc.					
SCHEDULE : 08					

8	Electrical works				
8.1	Supplying and laying Rigid PVC conduit 16 SWG 32mm Dia. With necessary accessories in RCC work/false ceiling/false flooring as per specification No. WG-MA/CC, para no.1.2.1 (CSR 2015-16 Item No.: 1-1-12)	m	4000	129.15	516600
8.2	Supplying and erecting mains with 2 x 1.5 sq.mm F.R copper PVC insulated wire laid in provided conduit/trucking/inside pole/Bus bars or any other places as per specification No. WG-MA/BW (CSR 2015-16 Item No.:1-3-3)	m	6000	38.85	233100
8.3	Supplying and erecting LED street light fitting suitable 150W lamp with PF,0.95, class IP 65 and above. Housing of pressure die cast aluminium alloy and heat sink extruded aluminium as per specification no. FG-ODF/FLS2 (CSR 2015-16 Item No.: 2-9-10)	Each	180	28949.55	5210919
8.4	Dismantling the existing W.T. fluorescent fitting/S.V./M.V/MH lamp fitting from pole with brackets complete. (CSR 2015-16 Item No.: 2-14-3)	Each	50	82.95	4147.5
8.5	Supplying and erecting Quartz Electronic time switch having 24 hour dial to work on 250V 50 cycle A.C. having built in rechargeable Nickel Cadmium batteries to run the time switch on failure of supply having switch contract rating upto 16A to use independently or in conjunction with contractor. (CSR 2013-14 Item No.: 4-5-3)	Each	36	2274.3	81874.8
8.6	Supplying and erecting two pole power contractor 250V 32A for time switch complete erected on wooden block/provided box, with necessary materials. (CSR 2013-14 Item No.: 4-5-5)	Each	36	3687.6	132753.6
8.7	Supplying and erecting Triple pole material/iron clad switch & fuse 415/ 500V 32A on provided iron frame/board as per specification No. SW-SWR/MTP. (CSR 2015-16 Item No.: 5-1-6)	Each	14	1418.44	19858.16
8.8	Supplying ,erecting & marking SPMCB 6A to 32A, B-series (for lighting) in provided distribution board as per specification No. SWR/MCB (CSR 2015-16 Item No.: 5-3-3)	Each	306	173.25	53014.5
8.9	Supplying ,erecting & marking TPMCB 6A to 32A in provided distribution board as per specification No.SW- SWR/MCB (CSR 2015-16 Item No.: 5-3-14)	Each	48	816.95	39213.6
8.10	Supplying and erecting triple pole and neutral distribution board (TPNDB) surface/flush mounted SP/TP MCBs of total 12 ways, on iron frame/wooden board.(Vertical Busbar type) as per specification No. SW-SWR/MCDB. (CSR 2015-16 Item No.: 5-4-4)	Each	12	4265.1	51181.2
8.11	Providing, erecting & commissioning RCCB only of electromagnetic type with 30/100/300 mA sensitivity and having capacity of 40A. 4 pole complete as per specification No. SW-RCCB/RCCB (CSR 2013-14 Item No.: 5-6-5)	Each	40	2892.75	115710
8.12	Supplying and erecting H.C. pattern porcelain fuse bridges with base & HC type fuse links 250V 32A approved make erected on polished wooden block. (CSR 2013-14 Item No.: 5-10-7)	Each	30	123.9	3717
8.13	Providing and fixing sheet metal work in CRCA sheet with fabrication of boxes panel boards etc. including cutting,bending,drilling, welding, rivetting treated with anti-rust treatment and duly power coated or painted with one coat of red lead paint and 2 coats of enamel paint as directed. (CSR 2013-14 Item No.: 6-1-1)	KG	400	190.05	76020
8.14	Supplying and erecting Plywood 12mm thick fixed to wall or on provided panel board with necessary materials such as screws, wall fasteners supports, nuts bolts etc. complete. (CSR 2013-14 Item No.:6-1-13)	Sq.m	8	601.65	4813.2
8.15	Supplying and erecting iron work consisting of Various sections of M.S. and including Plates, Chequered Plates, Rods, Bars, MS pipes, etc. for panel board or any other purposes complete with bending, cutting, drilling and welding complete erected at the position with necessary materials duly painted with one coat of red oxide and two coats of enamel paint to match the switchgears or as per directions by the authority. (CSR 2013-14 Item No.: 6-1-19)	KG	400	116.55	46620
8.16	Supplying and erecting self locking arrangement with duplicate keys, made of brass duly erected, flush with surface of panel/ Cupboard. (CSR 2013-14 Item No.:6-1-20)	Each	12	208.95	2507.4
8.17	Supplying,erecting & terminating PVC armoured cable 4 core 16 sq.mm aluminium conductor with continuous 5.48 sq.mm (12 SWG) G.I. earth wire complete erected with glands & lugs, on wall/trusses/pole or laid in provided trench/ pipe as per specification No.CB-LT/ AL (CSR 2013-14 Item No.: 7-1-17)	m	8500	207.9	1767150
8.18	Supplying,erecting & terminating PVC armoured cable 3 1/2 core 25 sq.mm aluminium conductor with continuous 5.48 sq.mm (12 SWG) G.I. earth wire complete erected with glands & lugs, on wall/trusses/pole or laid in provided trench/ pipe as per specification. (CSR 2013-14 Item No.: 7-1-17)	m	1500	244.65	366975
8.19	Supplying & erecting G.I. pipe 'A' class 40mm dia. Erected for enclosing PVC armoured cable on wall/ pole as per specification No. CW-PLB/GP, para 4.2.1 & 4.2.2 (Chapter 17.5) (CSR 2013-14 Item NO.: 7-6-2)	m	100	281.4	28140
8.20	Supplying and laying (excluding excavation) 50mm outside dia. Double wall corrugated pipes(DWC) of HDPE for enclosing cable below ground/road surface, to required depth complete. (CSR 2013-14 Item No.: 7-6-11)	m	9000	114.45	1030050
8.21	Providing and erecting 8m high (clear height) galvanised OCTAGONAL pole with foundation bolts having bottom of 135mm A/F, top 70mm A/F on provided foundation as per specification No.OH-PL/OPL. (CSR 2013-14 Item No.:8-3-15)	Each	110	15866.55	1745320.5
8.22	Providing & erecting Galvanised 1500mm single arm sword type bracket with FRP dome and ball as per specification No.OH-PL/PBKT. (CSR 2015-16 Item No.: 8-3-30)		148	2735.46	404848.08
8.23	Re-erecting Outdoor stand Mounted Feeder Pillar for highmast of the same manufacturer with 32A TPN MCB incomer, single dial timer switch, 25 A TP contractor for automatic switching of luminaries, 2 no 9A contractors and raise/lower push button, a (CSR 2013-14 Item No.: 8-3-32)	Job	6	1672.65	10035.9
8.24	Dismantling the existing pole above 6m height with brackets, clamps, insulators, stay from the cement concrete foundation and making the site clear by refilling the pits with excavated materials and bringing it to the ground level. (CSR 2013-14 Item No.: 8-8-2)	Each	20	736.05	14721
8.25	Providing earthing with Galvanised cast iron earth plate size 60 x 60x 0.6m complete with all materials, testing & recording the results as per specification No. EA-EP. (CSR 2013-14 Item No.:9-1-1)	Each	30	4322.85	129685.5
8.26	Providing pipe type earthing with 40mm. Dia. G.I. pipe or 20mm dia. G.I. Road complete with all materials as per specification No. EA-EP. (CSR 2013-14 Item No.:9-1-4)	Each	312	1664.25	519246

8.27	Making the trench in Hard murum/Tar road of suitable width and depth as per IS for laying provided L.T. cable upto 10 sq.mm. complete. As per specification No. CW-EXN-CTR . (CSR 2013 Item No.: 16-1-2)	m	7200	175.35	1262520
8.28	Excavating Hard Rock or bituminous road (B.T) by chiselling for preparing pit for poles stay or earth plates or for laying cables, pipes & clearing the site by removing debris & making the site good. (CSR 2015-16 Item No.: 16-1-5)	cu.m	300	812.7	243810
8.29	Excavating Hard Murum/metal road (B.T) by chiselling for preparing pit for poles stay or earth plates or for laying cables, pipes & clearing the site by removing debris & making the site good. (CSR 2015-16 Item No.: 16-1-5)	cu.m	300	199.5	59850
8.30	Providing cement concrete for foundation or for concrete filling in 1:3:6 ratio with 20 to 25mm. Stone metal duly plastered with necessary curring for pole muffing or any other purposes. (CSR 2015-16 Item No.: 16-3-6)	cu.m	600	4507.65	2704590
8.31	Providing & casting of M-20 grade reinforced cement concrete (RCC) foundation suitable for 6m to 8m high octagonal/ conical G.I. pole considering the safe soil bearing capacity at site as 10 T/sq. m at 1.5m depth including supply of steel, concrete, exca. (CSR 2013-14 Item No.: 16-3-8)	Each	306	6415.5	1963143
Box Illumination					
8.32	Supply, Installation, Testing & Commissioning of 38W LED Recess mounted Luminaire with 6500K color temperature having 50000 burning hours life with minimum 70% lumen maintenance, CRI should be greater than 80, system lumen output should be minimum 3500 lumens and efficacy >92 lm/W. Housing should made of CRCA with opal diffuser. Electronic Driver should be in-built with life of 50000 hours, power factor >0.9 with THD <10%. LED make should be from CREE / Nichia / Philips Lumileds / LG. System Consumption should be less than 38W. Similar to PHILIPS CAT no: RC380B G2 LED35S-6500 PSU OD WH	NOS	325	6,100	19,82,500
Total of schedule 8					
					2,08,24,635
NOTE : Rate as mentioned above is inclusive of applicable taxes, royalties etc.					
SCHEDULE : 9					
9	Unforseen items				
9.1	Civil items from PWD SOR 2015-16 required to be operated but not considered in the above schedules from 1 to 8	LS	1	2,00,00,000	2,00,00,000
9.2	Electrical items from PWD SOR 2015-16(Electrical) required to be operated but not considered in the above schedules no.9	LS	1	25,00,000	25,00,000
Total of schedule 9					
					2,25,00,000
GRAND TOTAL					
					68,99,86,213

NAGPUR METRO RAIL PROJECT
BID DOCUMENT
FOR

Construction of NHA Flyover originating from Ujjawal Nagar on the North-South corridor of Nagpur Metro Rail Project to Manish Nagar in Nagpur

TENDER NO.
N1C-13/2016

PART 1: BIDDING PROCEDURE
SECTION III: EVALUATION & QUALIFICATION
CRITERIA



Nagpur Metro Rail Corporation Limited

Metro House, Bungalow No: 28/2,

Anand Nagar, CK Naidu Road,

Civil Lines, Nagpur-440001

Maharashtra, INDIA

Website: <http://www.metrotrainnagpur.com>

SECTION-III: Evaluation & Qualification Criteria

This Section contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders. In accordance with [ITB 35](#) and [ITB 37](#), no other factors, methods or criteria shall be used. The Bidder shall provide all the information requested in the forms included in [Section IV](#), Bidding Forms.

Wherever a Bidder is required to state a monetary amount, Bidders should indicate the USD equivalent using the rate of exchange determined as follows:

- For construction turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year.
- Value of single contract - Exchange rate prevailing on the date of the contract.

Exchange rates shall be taken from the publicly available source identified in the [ITB 32.1](#). Any error in determining the exchange rates in the Bid may be corrected by the Employer.

1. Evaluation

In addition to the criteria listed in [ITB 35.2](#) the following criteria shall apply:

1.1 Assessment of adequacy of Technical Proposal with Requirements

The assessment of the Technical Proposal submitted by a Bidder shall comprise (a) evaluation of the Bidder's technical capacity to mobilize key equipment and key personnel to carry out the works, (b) manufacture / construction method, (c) manufacture / construction schedule (d) sufficiently detailed supply sources, in accordance with requirements specified in [Section VII](#) – Works Requirements.

“In accordance with [BDS16](#) and [BDS29](#), the ESHS Methodology submitted by the Bidder shall be evaluated to determine whether it is substantially responsive (i.e. without material deviation, reservation or omission) to the requirements specified in Section XI - SHE Specifications.”

1.2 Multiple Contracts - Not Applicable

1.3 **Alternative Completion Times** – Not Applicable

1.4 **Technical alternatives** – Not Applicable

1.5 **Specialized Subcontractors**

Only the specific experience of sub-contractors for specialized works permitted by the Employer will be considered. The general experience and financial resources of the specialized sub-contractors shall not be added to those of the Bidder for purposes of qualification of the Bidder.

2. Qualification							
No.	Subject	Requirement	Single Entity	Joint Venture/ Consortium			Document ation
				(existing or intended)			
				All Parties Combined	Each member	Any one member	
1.0	Eligibility						
1.1	Nationality	Nationality in accordance with ITB 4.3	Must meet requirement	Must meet requirement	Must meet requirement	Must meet requirement	Forms ELI – 1.1 and 1.2, with attachments
1.2	Conflict of Interest	No conflicts of interest in accordance with ITB 4.2	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.3	Agency Eligibility	Not being ineligible, as described in ITB 4.3	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Statement of Integrity (appendix to Letter of Bid)
2.0	Historical Contract Non-Performance						
2.1	History of Non-Performing Contracts	Non-performance of a contract ¹ did not occur as a result of contractor’s default in the past five (5) years.	Must meet requirement²	Must meet requirement	Must meet requirement ²	N/A	Form CON-2
2.2	Suspension Based on absence of Bid Security	Not under suspension based absence of a Bid Security pursuant to ITB 4.4 or withdrawal of a Bid pursuant ITB 19.9.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Application Submission Form

¹Non-performance, as decided by the Employer, shall include all contracts where (a) non-performance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Non-performance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism. Non-performance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

²This requirement also applies to contracts executed by the Bidder as JV member.

No.	Subject	Requirement	Single Entity	Joint Venture/ Consortium			Document ation
				(existing or intended)			
				All Parties Combined	Each member	Any one member	
2.3	History of Non-Performance	Applicant’s financial position and prospective long term profitability still sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Applicant	Must meet requirement	N/A	Must meet requirement	N/A	Form CON – 2
3.0	Financial Situation and Performance						
3.1	Financial Capabilities	<p>((i)The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements estimated as INR 7.80 Crs. (on the day of bid submission) for the subject contract(s) net of the Bidder’s other commitments</p> <p>Notes: 3.1 (i) The liquidity shall be ascertained from Net Working Capital {Current Assets – (current liabilities + provisions)} as per latest audited balance sheet and/or from the Banking reference(s). Banking reference(s) should contain in clear terms the amount that the Bank will be in a position to lend for this work to the applicant / member of the Joint Venture / Consortium. In case the Net Working Capital (as seen from the Balance Sheet) is negative, only the Banking reference(s) will be considered, otherwise the aggregate of the Net Working Capital and submitted Banking reference(s) will be considered for working out the Liquidity.</p> <p>In case the Bidder is a JV / Consortium and if</p>	Must meet requirement	Must meet requirement	Must meet requirement as per their % share in JV	N/A	Form FIN-3.1 and FIN-3.3

No.	Subject	Requirement	Single Entity	Joint Venture/ Consortium			Document ation
				(existing or intended)			
				All Parties Combined	Each member	Any one member	
		Banking Reference is issued by the bank in favour of the JV / Consortium for this Contract, then it will be considered for the Bidder and if the Banking reference(s) is issued in favour of any member of JV / Consortium it will be considered only for that member. In Case of JV / Consortium: Requirement of working capital is to be distributed between members as per their percentage participation and every member should satisfy the requirement for his portion. Example: Let member-1 has percentage participation = M and member-2 has percentage participation = N. If minimum working capital required is 'W' then working capital of member-1 $\geq (WM)/100$ and working capital of member-2 $\geq (WN)/100$					
i-a.	Bid Capacity	<p>Evaluation of Bid Capacity The Bidders will be qualified only if their available bid capacity is more than INR 70 Crs. Available bid capacity will be calculated based on the following formula: Available Bid Capacity= 2*A*N – B Where,</p> <p>A = Maximum of the value of construction works executed in any one year during the last five financial years reckoned up to 31st March 2016 (updated to base date price level assuming 5% inflation per year compounded annually) N = Number of years prescribed for completion of the present work B = Value of existing commitments as on</p>	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN-3.4

No.	Subject	Requirement	Single Entity	Joint Venture/ Consortium			Document ation
				(existing or intended)			
				All Parties Combined	Each member	Any one member	
		first day of the month of this Bid submission i.e. for on-going construction works during next 78 weeks. Proportionate value will be taken if it falls during the financial year. <ol style="list-style-type: none"> 1. The available bid capacity should be more than the INR 70 Crs. 2. A certificate issued from a chartered accountant certifying A and B value must be enclosed with the Technical bid 					
		(ii) The Bidder shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN – 3.4
		iii) The audited balance sheets for the last 5 (five) years (FY 2011-12, 12-13, 13-14, 14-15 & 15-16) shall be submitted and must demonstrate the current soundness of the Applicant’s financial position and indicate its prospective long-term profitability. In case Audited balance sheet FY 2015-16 is not available, the bidder may submit Audited Balance sheet for five years preceding FY 2014-15.	Must meet requirement	N/A	Must meet requirement	N/A	Form FIN – 3.1, with attachments

No.	Subject	Requirement	Single Entity	Joint Venture/ Consortium			Document ation
				(existing or intended)			
				All Parties Combined	Each member	Any one member	
		The Bidder should be a Profit (Net) making firm and should have made profit during any two of the last 5 financial years i.e. (FY 2011-12, 12-13, 13-14, 14-15 & 15-16)					
(ii-b)	Net Worth	Net worth of Bidder ending 31.03.16 should be minimum INR 7 Crs. In case of JV, Net worth will be evaluated only for the lead member.	Must meet requirement	N/A	N/A	Must meet requirement (for Lead Member only)	
3.2	Average Annual Construction Turnover	Minimum average annual construction turnover of INR 94 Crs. calculated as total certified payments received for contracts in progress and/or completed within the last 5 (five) years Note: 1. Last five years shall be 2011-12 to 2015-16.	Must meet requirement	Must meet requirement	Must meet the requirement in proportion to the percentage share in the JV.	N / A	Form FIN – 3.2
3.3	CDR	The bidder having undergone Corporate Debt Restructuring (CDR) in last five years must submit their banker’s certificate stating that their account with the bank is “standard account” as on	Must Submit	N/A	Must Submit	N/A	The Bidder who has not undergone

No.	Subject	Requirement	Single Entity	Joint Venture/ Consortium			Document ation
				(existing or intended)			
				All Parties Combined	Each member	Any one member	
		31/03/2016.					CDR in last five years must submit an undertaking to that effect.
4.0	Experience						
4.1	General Construction Experience	Experience under construction contracts in the role of prime contractor, JV member, for at least the last 10 (Ten) years , starting 1st June 2006 to 31st May 2016.	Must meet requirement	N/A	Must meet requirement	N/A	Form EXP – 4.1
4.2 (a)	Specific Construction & Contract Management Experience	I. A minimum number of similar contracts specified below that have been satisfactorily completed (this includes ongoing works also, provided amount received in the contract satisfies requirement as stated below) as a prime contractor, joint venture member during last 10 (Ten) years i.e., up till 31.09.2016 and (a) should have received at least INR 56 Crs each in a single contract, which must be for the work of construction of Road Bridge/Rail Bridge/Metro Rail Viaduct.	(a) Must meet requirement	(a) Must meet requirement	(a) Must meet requirement of atleast one contract		Form EXP 4.2(a)

No.	Subject	Requirement	Single Entity	Joint Venture/ Consortium			Document ation
				(existing or intended)			
				All Parties Combined	Each member	Any one member	
		<p style="text-align: center;">OR</p> <p>(b) should have received at least INR 35 Crs each in two contracts, which must be for the work of construction of Road Bridge/Rail Bridge/Metro Rail Viaduct.</p> <p style="text-align: center;">OR</p> <p>(c) should have received at least INR 28 Crs each in three contracts, which must be for the work of construction of Road Bridge/Rail Bridge/Metro Rail Viaduct.</p> <p style="text-align: center;">AND</p> <p>II. In addition, the sole bidder or any member of the JV should have carried out work of RCC box underpass (Road Under Bridge) by box push method under running railway track of minimum INR 5 Crs in a single contract.</p>	<p>(For b & c)</p> <p>Must meet requirement</p> <p>Must meet requirement</p>	<p>(For b &c)</p> <p>Must meet requirement</p> <p>Must meet requirement</p>	<p>(For b & c)</p> <p>Must meet minimum requirement of at least one contract</p> <p>Must meet requirement</p>	<p>(For b & c)</p> <p>Lead Member Must meet requirement of remaining contracts</p> <p>Must meet requirement</p>	

No.	Subject	Requirement	Single Entity	Joint Venture/ Consortium			Document ation
				(existing or intended)			
				All Parties Combined	Each member	Any one member	
4.2 (b)	Quality & EHS Qualification Criteria	<p>1. ESHS qualification criteria: sub section 5 of the qualification table in Section III specifies new qualification criteria aiming to ensure that shortlisted contractors are sufficiently ESHS experienced and qualified to mitigate the E&S impact of the works satisfactorily</p> <p>2. Comprehensive and detailed ESHS Specifications for work sites management are included section VII.</p> <p>3. An ESHS Methodology is to be provided by the Bidder as a part of the Technical proposal; a specific form is provided in section IV. Bidding Forms- Technical Proposal; in its ESHS Methodology, the Bidder shall detail how it has planned to meet the requirements of the ESHS Specifications.</p> <p>4. An ESHS Cost Schedule is included in Section IV-Cost Schedules; the ESHS Cost Schedule ,to be completed and submitted by the Bidder ,identifies the specific costs related to the ESHS measures for worksites management specified in the ESHS Specifications and proposed by the Bidder in its ESHS Methodology.</p>	Must meet requirement	Must meet requirement	N/A	Must meet requirement (Lead Member)	Form PER-2 (for CV of EHS personnel)

No.	Subject	Requirement	Single Entity	Joint Venture/ Consortium			Document ation
				(existing or intended)			
				All Parties Combined	Each member	Any one member	
		<p>The above will enable ESHS evaluation of Bids to be performed. Bids evaluated as non –substantially to the ESHS requirements (as per evaluation methodology specified in the Section I- Instructions to Bidders –Evaluation and comparison of Bids) will be rejected on the following grounds:</p> <p>--The Bidders ESHS Methodology shows material deviation, reservation, or omission (as specified in clause IS29) towards the ESHS specifications. In particular, omission to provide detailed information on one of the sensitive issues explicitly listed in the ESHS Methodology form (Section IV) shall constitute sufficient ground to reject the Bid</p> <p>-The ESHS costs submitted by the Bidder in the ESHS Cost Schedule are inconsistent with the proposed ESHS Methodology (expertise and resources mobilized for instance); a breakdown of those ESHS costs may be requested in accordance with IS27 prior to evaluate the grounds for rejecting the Bid as per IS35.5</p> <p>5. Conditions of Contract (Section IX- Particular conditions): in accordance with</p>					

No.	Subject	Requirement	Single Entity	Joint Venture/ Consortium			Document ation
				(existing or intended)			
				All Parties Combined	Each member	Any one member	
		<p>the ESHS Specifications, clauses are included to enable when necessary suspension of interim payments, suspension of work ,and for the start of some operations to be subject to prior approval of information demonstrating compliance with the ESHS requirements.</p> <p>During the performance of the work ,ESHs clauses allow for sanctioning a contractor not meeting the requirements of the ESHS Specifications. As specified in the ESHS Specifications, the Engineer will monitor works and detect any non-compliance with the ESHS Specifications. A major non-compliance (maximum level) will incur suspension of interim payments until non-compliance is resolved, and ,in some cases, suspension of work will be imposed. In addition, starting operations on a worksite will require prior approval by the Engineer of the documentation provided by the Contractor to demonstrate compliance with ESHS Specifications at that site. Finally ,identification of specific ESHS Costs shall enable the decision to be made to not remunerate the Contractor for measures not properly implemented</p>					

Special Notes:-

1. Full (100%) experience for previous works of the JV shall be considered, if the claiming member of the JV has at least 65% share in previous consortium/ JV for the relevant referred Work Experience, else proportionate quantum of experience of previous works up to the percentage share of participation in the previous JV shall be considered. However if any member has less than **20%** share in previous JV/consortium, his experience shall not be considered for evaluation.
2. The JV/Consortium member having more than 50% share in the JV should be the lead member.
3. Existing JV/Consortium already worked/working in other metro rail/Highway/Airport project & meeting the eligibility criteria, mentioned in Bid Document, can bid as a same JV. For such case work experience criteria of Single Entity shall be applicable.

5. Personnel

The Bidder must demonstrate that it has the personnel for the key positions that meet the following requirements:

No.	Position	Minimum Requirement	Qualification	In Metro Rail / highway / Airport Development Works Experience (years)
1	Chief Project Manager (Team Leader)	1	Graduate in Civil Engineering	Minimum total experience of 20 years out of which, minimum 03 years as in-charge of Metro Rail / highway / Airport Development Works
2	Project Manager / Senior Site Engineer	3	Graduate in Civil Engineering	Minimum total experience of 10 years out of which, minimum 03 years as in-charge of Metro Rail / highway / Airport Development Works
3	Deputy Project Manager / Site Engineer	3	Graduate / Diploma in Civil Engineering	Minimum 10 years for Degree & 15 years for Diploma, out of which minimum 2 years in Metro Rail / highway / Airport Development Works.

4	Bridge Engineer	2	Graduate / Diploma in Civil Engineering	Minimum 10 years for Degree & 15 years for Diploma, out of which minimum 2 years in Metro Rail / highway / Airport Development Works.
5	Site Supervisor	12	Graduate / Diploma in Civil Engineering	Minimum 5 years for Degree & 8 years for Diploma in project execution works
6	Surveyor	1	Graduate / Diploma in Civil Engineering	Minimum 5 years for Degree & 8 years for Diploma in project execution works
7	Quality Assurance (QA)-Engineer	1	Graduate in Civil Engineering / Diploma in Quality Assurance	Minimum total experience of 10 years out of which minimum 05 years in QA (field) and at least one year as in-charge.
8	Material Engineer	1	Graduate / Diploma in Civil Engineering	Minimum 5 years for Degree & 8 years for Diploma in project execution works
9	Safety Manager	As per SHE Manual	As per SHE Manual	As per SHE Manual
10	Contract Expert	1	Graduate / Diploma in Civil Engineering	Minimum 5 years for Degree & 8 years for Diploma in project execution works
11	Lab Technician	1	Graduate / Diploma in Civil Engineering	Minimum 5 years for Degree & 8 years for Diploma in project execution works
12	Project Management Engineer	1	Graduate / Diploma in Civil Engineering	Minimum experience of 5 years and should be expert in AutoCad & project management software, preferably 5D BIM specialized.
13	Electrical engineer (part time)	1	Graduate / Diploma in Electrical Engineering	Minimum 5 years for Degree & 8 years for Diploma
14	Mechanical Engineer (part time)	1	Graduate / Diploma in Mechanical Engineering	Minimum 5 years for Degree & 8 years for Diploma
15	Expert on Environmental, Health & Social (part time)	1	Graduate in Environmental Sciences	Minimum 10 years of experience, out of which minimum 5 years in Metro Rail /

				highway / Airport Development Works
16	Expert on Social management (part time)	1	Master in Social Work (MSW) / Graduate in relevant subjects	Minimum 10 years of experience out of which minimum 5 years in Metro Rail / highway / Airport Development Works

The above requirements are the minimum. The contractor should be capable to deploy additional technical work force if required as per site condition.

The Bidder shall provide details of the proposed personnel and their experience records using Forms PER-1 and PER-2 included in Section IV, Bidding Forms.

6. Equipment

The Bidder must demonstrate that it has the key equipment listed hereafter:

No.	Equipment Type and Characteristics	Minimum Number required	Max permissible age in years
1	Piling equipment - hydraulic rig	2	5
2	Fully automatic and computerized batching plant (1 nos. of 60 cum) minimum or equivalent capacity in different configuration at casting yard with an RO of suitable capacity for proper quality of water	1	10
3	Concrete pumps with boom placers	3	10
4	Stationary concrete pumps with sufficient pipes	3	10
5	Launching girder for segmental construction (minimum one, which may increase as per requirement at site)	1	5
5	Cranes / road cranes in casting yard / site of suitable capacity	2	15 (Mobile crawler cranes); 10 (tyre mounted hydraulic crane)
6	Cranes / road cranes of suitable capacity for launching / erection	2	15 (Mobile crawler cranes); 10 (tyre mounted hydraulic crane)
7	Gantry of suitable capacity in casting yard	2	15
8	Minimum number of pre-casting beds (typical)	4	NA

No.	Equipment Type and Characteristics	Minimum Number required	Max permissible age in years
9	Transit mixers	10	10
10	Trailers for carrying segments – 75T capacity	4	10
11	Lab testing equipment – fully equipped for site tests	As per requirement	--
12	Launching Girder	As per the need and requirement	--

The Bidder shall provide further details of proposed items of equipment using Form EQU in Section IV, Bidding Forms.

Note:

- (a) In case contractor opts for short line method for casting, the no. of pre-Casting beds would increase accordingly.
- (b) These resources are for peak period of each activity. All plants and equipment need not to be mobilized simultaneously; plants and equipment as required as per the progress of the work shall be brought at site in advance as directed by engineer-in-charge.