4. SPECIFICATION OF WORKS

Sl.No.	Specifications
1.	Establishing the exact location of in-situ reinforcement, foundation bolts, and insert plates cover available in critical areas before repairs to be done using GPR scan in a linear pattern to detect the steel reinforcement/ prestress tendons, conduits, etc. in existing RCC elements by using Ground/ Wall penetrating radar system comprising of three antennas for marking their locations. The scope of work includes scanning structural elements on site, and preparation and submission of 3D images to locate in-situ elements (one report per girder). Checking clear concrete cover at all above considered points by cover meter test including all necessary arrangements to carry out the test.
2	Raising of scaffolding to reach the entire surface area of the bridge up to 10.00 m height above ground level, made with MS tube, horizontal and vertical tub joint with cup and lock system with MS tubes, challis, MS clamp and maintaining it in a serviceable condition for execution work of cleaning and/ or pointing and/ or applying protection coating and inspection of work at required locations and removing it thereafter, etc complete. (Item includes making of temporary support for scaffolding for the substructure, cost of scaffolding for the substructure, cost of scaffolding, labor, material, safety devices, etc. all complete)
3	Repairing of honey combed or spillway area by chipping out the damaged spalled or honey combed portion of concrete up to rusted rebars, cleaning of all rust, scale, and lose materials, scaffolding, compressed air machinery, etc. complete. (item includes use of air compressor, chipping machine, and scaffolding for height 8 to 10 meter)
4	Providing and applying latex/acrylic cement bond coat on the old concrete face (1:1) prior to application of any type of mortar or section build-up using cementitious media to ensure a bond between old concrete & new concrete by brush application including cleaning of the surface, mixing of components by weight, application, etc complete. Applicator to ensure that cementitious buildup mortar is applied before final setting of bonding medium. Basic Rate of material :140/ltr
5	Providing & Applying Dura Clean- WR for cleaning the TMT bars, steel structure, etc. of the structure by Waterjet cleaning/ grinding the surface with a grinder machine, or wire brush, removing existing corrosion from the metal surface also means) and removing loose particles(using other mechanical/manual apply on the prepared surface of Dura guard/ Dymet as coats corrosion preventive coat on prepared TMT bars, steel structure, metal surface, etc. to protect it from corrosion, etc. as per manufacturer's specification (using other manual/mechanical means) complete as per specification including the cost of all materials, machinery, labour, and insurance charges as directed by the Engineer in charge.
6	Providing and fixing zinc alloy based galvanic disk type sacrificial anodes (50 mm dia, 18 mm thick) as approved by Engineer in charge of the reinforcement, that should have a 3 years track record of use in PWD projects, 4year track record in corrosive region of abroad and pass 500 hor-trs salt spray test as per ASTM B I17. Tl-re anode shall be connected to the reinforcement steel by connectors provided with the anode. Sacrificial Galvanic Anode should have following minimum properties: 1. Base: Zinc alloy. 2. Conformance: ASTM 81418 Type II 3. Zinc Mass: Min 40 g per anode 4. Geometry: Disc Type 5. Diameter: 50 mm

	5, Height: 18 mm 6. Surface Area 6751 sq mm It shall be applied as per the manufacturer's specification. Installation of sacrificial anodes must be done through Authorised Applicator only' Authorised applicator certificate to be submitted from suppliers along with trained man power certificates. (If scaffolding is required, same shall be provided and will be paid under relevant item) Make Galvashield XPI of vector, SRM Corroswap of SRMPL & Life anode 55 of Artazn) (Rate of application is 1 anode per sqm as per the manufacturers specification)
7	Providing Repairing of honeycombs Modified Morter including material, and minor damages with Polymer labour complete in all respect. (prepacked mortar to be used)
8	Re-casting of bracket with micro-concrete and 10mm aggregate (1-:1) with Leakproof shuttering all man power and equipment complete in all respect
9	Cutting and opening v grooves of required dimension in the crack and filling it with a non-shrink epoxy putty made of materials approved by an engineer in charge in required proportion as specified including laying and fixing of working platform, all safety precautions etc. complete
10	Providing and fixing of 12mm nozzle in the crack portion @ 500 c/c including material, labour complete in all respect
11 (a)	Providing grouting of nozzles with Low Viscosity Epoxy grout including material, labour complete in all respect
11 (b)	Filling voids /honey combed with high-pressure injection grouting of Polymer cement grout (10% of Polymer by Weight of Cement)
12	Providing and fixing procured prestressed laminate of approved material of approved size and thickness with compatible and approved structural adhesive including surface preparation, grinding concrete surface, cleaning it with a wire brush, removing oil, laitance, providing and applying appropriate primer of approved sealant material, marking the fixing area on the structural element, cutting the laminate plate to the required size, applying compatible and approved structural adhesive oh the plate in a parabolic manner, pasting the plate on the desired area by using a tamping roller to avoid any air voids including the application of prestressing force and holding laminates in position till the setting of adhesives including all materials, labour, equipment, tools, and plant complete.
a	Applying prestressing to the laminate with hydraulic system to the required force as per approved design with ail manpower and equipment complete in all respects' using SRM C LAM 48 x 6mm
b	Providing and fixing in a groove with compatible epoxy 100 x 1.4 mm carbon laminate as per specification including cleaning of dust priming the surface etc.
13	Providing and Fixing Alloy end Anchor plate made of approved material of required size, shape and thickness for prestressing laminate and anchoring it in equipment, tools and plant complete. EP/ SRMPL /Eq
14	Providing and fixing Alloy end Anchor plate made of approved material of required required size, shape and thickness for non-prestress laminate and anchoring it all material, labour, equipment tools and plant complete. EP/ SRMPL /Eq
15	Strengthening structural elements with a fiber wrapping system comprise of carbon fiber approved by engineer incharge with approved saturant by dry layup system including, complete wrapping the fiber sheet to structural element at desired orientation using tamping roller to avoid any air, voids, including sand pasting,

	applying second coat of saturant, rectify air voids if any, pasting the river sand on it to make surface rough to take any further finishes including all material, labour, equipment, tools and plant.
a	Strengthening structural elements by providing & fixing CARBON FIBER (Make Sika or BASF or FOSROC) Surface preparation: Grinding concrete substrate, cleaning it with wire brush removing oil, laitance if present, rounding sharp edges to min 25 mm radius, etc. complete profiling: providing & Applying compatible Mbrace primer on the prepared substrate, filling the holes and uneven surface with high strength epoxy putty, etc. complete if required. Wrapping the fiber sheet to structural element at desired orientation using tamping roller to avoid any air voids etc. complete. Sand pasting: Providing & Applying second coat of Saturant after min. 12 hrs, rectify air voids if any paste the rive sand on it to make the surface rough to take any further finishes (Mode of measurement: Per sq. mt of fiber sheet applied and not surface area of Concrete application & Quantity will be measured including wastage) The rate includes all type of material, application, equipment & scaffolding, etc complete. Rate is applicable for all heights & levels using SRM-CWRAP-UD-600 GSM Uni-directional Carbon fiber
b	P/Fixing of carbon fiber sheet with an adhesive including hanging scaffolding of all manpower and equipment complete in all respect using SRM-C-WRAP-BD500 GSM Bi-directional Carbon fiber & SRM-C-WRAP-UD-400 GSM Unidirectional Carbon fiber as per the details and drawings
16	Providing and fixing carbon Fiber anchor including drilling hole in the base concrete fixing the anchor using epoxy 50X55 system spreading the anchor fibers in star pattern including the application of saturant etc. complete
17	Crack Stitching: Cutting a 15 mm deep slit across the damaged or cracked element roughly 4 mm wide; providing and inserting noncorrosive Carbon fiber reinforced polymer plate about 10 mm wide 1.5 mm thick and 300 mm long CFRP element with inbuilt end holds i.e., SRM Stitch in the slit as above, filling slit with epoxy adhesive thereby binding both the weathered or deteriorated portions together allow it to cure filling the surface crack with epoxy filler wherever required, etc complete
18	**PosiTest AT-M with 50mm C1583 Kit:** Carrying out Pull-Off Adhesion testing with Automatic Adhesion testers confirming to ASTM C1583 (tensile strength of concrete overlays). Including using of 50mm C1583 Kit, ideal for measuring the tensile strength of concrete surfaces and concrete repairs and overlay materials.
19	**Concrete Tomography**: Conducting Concrete tomography (CT) from a single device using Enhanced Onsite Wireless 2D/3D Imaging Based on 24 Channel Pulse Echo Transducers Acquiring Concrete Scan In One Go with Wide Panoramic B-scan, Augmented Reality & 3D views, Al-Assisted Positioning, Feature Interpretation & Image stabilizer confirming to EN 12504-4. To carry out concrete diagnostics which can be used for improved quality assurance/ quality control during concrete structures construction and assist in rehabilitation decision making. [Mode of Measurement: Per point of the test).
20	Structural health monitoring system for a given span of a bridge, including providing, installing, and commissioning VW Strain Gauge Temperature sensor (6 nos), Bi axial Tilt meter (2 Nos), Tri Axial Accelerometer (3 Nos) including accessories and compatible data acquisition system complete
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	Tilt meter (2 Nos), Tri Axial Accelerometer (3 Nos) including accessories and compatible data acquisition system complete