Annexure II

Abstract of the Bill of Quantity for the Rehabilitation Works

Sl. No.	Description	Unit	Qty.	Rate in Rs.	Amount in Rs.
A	**Special Repair Work**				
1	Scaffolding	m^2	391.00	660.00	258060.00
2	Surface Preparation	m^2	293.19	650.00	190570.25
3	Anchoring the main Reinforcement	Nos	81.00	660.00	53460.00
4	Additional Reinforcement	kg	663.00	96.00	63648.00
5	Shear connector	Nos	196.00	180.00	35280.00
6	Sacrificial anode	Nos	127.59	2250.00	287066.25
7	Anti-Corrosive coating	litres	12.66	2400.00	30380.40
8	Epoxy Jointing Compound	m^2	66.59	1050.00	69914.25
9	Form work	m^2	61.00	600.00	36600.00
10	Micro Concrete Jacketing	m^3	6.00	60000.00	360000.00
11	Polymer Modified Mortar	m^2	66.59	2400.00	159804.00
12	Curing compound	m^2	127.59	225.00	28706.63
13	Water Proofing	m^2	165.60	540.00	89424.00
14	Debris Removing	m^3	26.16	800.00	20930.46
				Total Amount in Rs	**16,83,844.24**

Note: The quantity and rates of following items are not included in the BOQ

General civil Works of demolitions during repairing and the removal of Doors, Windows and re-fixing is not included, Painting works are not included.

Detailed Specification for the Abstract of the Bill of Quantity for the Rehabilitation

Sl. No	Items	Unit	Qty.	Rate	Amount in Rs.
1	**Scaffolding:** Providing, erecting and dismantelling safe Pipe scaffolding and / or H frame including working platform for external and internal area of building to facilitate all works with proper arrangements etc. complete. Measurement for payment shall be made in square meter of Scaffolding carried out.	Sq.m	391.00	660.00	2,58,060.00
2	**Surface Preparation:** Labour charges for chipping the spalled and old concrete of the column, beam/slab and other elements. Check for the phenolphthalein test and if there is no change in colour, chip the same further down until, reaching the good or uncontaminated concrete. Clean the surface and make sure that surface is clean and free from loose particle. The rate shall include the cost of all the operations and etc complete	Sq.m	293.19	650.00	190570.25
3	**Anchoring Main Reinforcement:** Mark the position of holes to be drilled for anchoring the rebar into the floor/slab, column and beam. Drill 20mm dia holes in the marked places using rotary hammer drilling machine of reputed make to a depth of 75mm into the floor/slab, column and beam. Clean the holes neatly and wash the same with jet of water. Allow it to dry and make sure that no fine dust particles are present in the holes. Mix the base and hardener of the polyester resin using a spatula and push the same into the holes with a proper tool so that the bottom most point of the hole receives the material. The filling is to be done for a minimum portion of 1/3rd of the hole depth. Now insert the rebar to be anchored for the provision of main reinforcement, gently and finish the surface around the rebar area using the same material which comes out of the hole excessively. The rate is inclusive of the steel.	nos.	81.00	660.00	53460.00
4	**Anti-corrosive Coating:** Clean the rebars using the rust remover if there exists any rust, otherwise clean the rebar free of foreign material. Mix the base and hardener of the anti-corrosive coating like Nitozinc Primer of Fosroc or equivalent mechanically using a slow speed heavy duty drilling machine fitted with mixing paddle. Apply the mixed materials to the cleaned rebar and allow it to dry complete. The rate shall include the cost of all the operations etc complete	Lit.	12.66	2400.00	30380.40
5	**Epoxy Jointing Compound:** Clean the concrete surface, remove the loose particle, if any. Make sure that the form work is ready for positioning. Mix the	Sq.m	66.59	1050.00	69914.25

	base and hardener of the epoxy resin jointing compound and apply the same to the prepared surface. Care should be taken that the micro concrete need to be done within 5 hours maximum from the time of application of epoxy jointing compound Nitobond EP of Fosroc or equivalent. The rate shall include the cost of all the operations and etc complete				
6	**Shear Connectors:** Drilling 12mm dia. holes up to a depth of 75mm maximum and fixing 8mm dia. L shaped anchor rods as shear connectors at every 300mm c/c on the surfaces of the columns/beams or any other structural member as the case may be. Clean the same using water and make sure that there are no fine particles present in the hole. Mix the base and hardener of the polyester resin with the spatula thoroughly. Fill the drilled and cleaned holes to a minimum depth of 1/3rd of the hole with the prepared polyester resin. Make sure that the resin has reached till the end of the hole. At this stage push the shear connector gently into the hole and finish the excess resin which comes out of the hole and allow the shear connectors not to be disturbed for minimum 20 minutes - complete. The rate shall include the cost of all the operations and etc complete	Nos.	196.00	180.00	35280.00
7	**Additional Reinforcement:** Check the diameter of the existing rebars and if the diameter is less than 30% of the original diameter, provide additional reinforcement. Cut the required bars as main reinforcement to the required length with proper development length. Tie them to the prefixed shear connectors so that the additional rebar acts monolithically with the existing ones and core concrete. In the case of the shear reinforcement also, if the diameter of the rebars are reduced, provide 8mm dia. stirrups in the form of 2 "U" shaped bars. Tie them properly so that it has a tight contact with the main bars. The rate shall include the cost of all the operations and etc complete	kg	663.00	96.00	63648.00
8	**Formwork:** Centring and shuttering including strutting, propping, etc, as per the required line and length at all different floor levels as per the standard specification-complete. Form work should be rigid to prevent loss of grout or mortar concrete from concrete at all stages & appropriate to the methods of placing & compacting as per standard specification. It should be made of suitable material i.e., timber, plywood, plastic depending upon the type of finish specified. The rate shall include the cost of all the operations and etc complete	sqm	61.00	600.00	36600.00

9	**Micro- Concrete:** Stock sufficient quantity of micro concrete and 12mm downgraded chips on site to enable the completion of the pouring in a continuous operation. An approved concrete mixer or a slow speed heavy duty drilling machine fitted with mixing paddle shall be used. Mix the micro concrete and the 12mm down grade chips in the ratio of 1: 0.5 by weight with required quantity of water as per the data sheet and place the same to the prefixed formwork well before the epoxy jointing compound dries up. Remove the formwork after 24 hours in the case of columns and after a period of 72 hours in the case of slab and beam and check for any surface defects and if so apply the polymer modified mortar - complete. The rate shall include the cost of all the operations and etc complete	cu.m	6.00	60000.00	360000.00
10	**Polymer Modified Mortar:** Chip off the corrosion damaged areas on the beam/ column/ slab/wall or any other structural members. Clean reinforcement using Reebaklens RR of Fosroc or equivalent and make sure that there are no traces of rust on the surface of existing rebars. Check for the depth of carbonation using the phenolphthalein indicator and make sure that the contaminated concrete is removed completely. Wet the surface with potable water and make sure that the surface is kept moist so that the water cement ratio in the polymer modified mortar is maintained. Supply and application of Nitobond SBR or equivalent soon after the finishing is over, apply the curing compound complete. The rate shall include necessary scaffolding and platform and cost of all the operations and etc complete.	sqm	66.59	2400.00	159804.00
11	**Provision of Galvanic Anode:** Prior to installation of the self-sacrificial anode Galvashield XPI units, check the continuity of the steel reinforcement. Any loss of continuity will require additional electrical connections or restoration of continuity by effective means. Select a location for the Galvashield XPI as close as practical to the edge of the repair zone. Galvashield XPI units should be positioned around/along the repair boundary. In addition to standard substrate preparation, the Galvashield XPI anode(s) shall be thoroughly pre-soaked in clean water for a minimum of 10 minutes and a maximum of 20 minutes, prior to the application of the repair mortar. Tighten tie wires using Galvashield Fixing Tool so that no free movement is possible, thus ensuring good electrical continuity. To test electrical continuity between tie wires and reinforcement bar, a continuity meter like electrical multi meter should be used. The rate shall include the cost of all the	Nos.	127.59	2250.00	287066.25

	operations and etc complete				
12	**Curing Compound**: Immediately after striking the form work or after completion of the repair works, the surface should be sprayed with water once and followed by application of membrane-based curing compound like Concure WB of Fosroc or equivalent diluted with water in the ratio of 1: 1 as a curing membrane - Complete. The rate shall include the cost of all the operations and etc complete	Sqm	127.59	225.00	28706.62
13	**Water Proofing:** All the surfaces which are to receive the waterproofing coating like Brushbond of Fosroc or equivalent, must be free from dirt or any other form of foreign matter which might affect adhesion. Acid wash and water wash the surface and allow it to surface dry condition. Mix the part A and part B of the polymer modified cementitious coating mechanically using an electrically operated drilling machine fitted with mix paddle. Apply the same in two coats over the prepared surface one after the other dries up with a minimum interval of 4 hours between the coats. Providing pressure grouting in all the vertical and horizontal joint including the suspected areas.	Sq.m	165.60	540.00	89424.00
14	**Debris Removing:** Remove the debris from the spot followed by stacking at the ground floor and carting away the same from the site complete. The cost including the loading the debris to the vehicle.	Cu.m	26	800	20930.46
				Total Amount in Rs	**16,83,844.24**

Detailed Estimation

1. Polymer Modified Mortar

Sl. No.	Description	Unit	No	L	B	D	QTY
1	**Surface Preparation**	sqm					
	RC Columns						
	6 Nos		6.00	4.00	0.60		14.40
	RC slab						
	in the first floor		4.00	2.00	2.00		16.00
	RC beams						
	11 nos at the exterior		11.00	5.00	0.50		27.50
							57.90
	Round off with 15 % extra						**66.59**
2	**Anti-corrosive coating**						
	to the above-mentioned area						
	subtotal						5.79
	Round off with 15 % extra						**6.66**
3	**Epoxy Jointing Compound**						
	to the above-mentioned area						
	subtotal						57.90
	Round off with 15 % extra						**66.59**
4	**Polymer Modified Mortar**						
	to the above-mentioned area						
	subtotal						57.90
	Round off with 15 % extra						**66.59**
5	**Curing Compound**						
	to the above-mentioned area						
	subtotal						57.90
	Round off with 15 % extra						**66.59**
6	**Debris**						
	to the abovementioned area						
	subtotal						4.34
	Round off with 15 % extra						**4.99**
7	**Galvashield XPI (Consider 1 per sqm)**						
	subtotal						57.90
	Round off with 15 % extra						**66.59**

2. Micro Concrete Jacketing

Sl. No.	Description	Unit	No	L	B	D	QTY
1	**Surface Preparation**						
	RC Columns	Sq.m					
	3 Nos - D1, D7 & C7		3	8.00		1.56	37.44
	RC slab						
	in the ground floor area near grid A1-A2		1	4.00		4.00	16.00
	sub total						**53.44**
	Round off with 15 % extra						**61.00**
2	**Anchoring the Reinforcement**	Nos					

	RC columns 3 nos		30				30.00
	RC slab		40				40.00
						Sub total	**70.00**
	Round off with 15 % extra						**81.00**
3	**Additional Reinforcement**						
	RC Columns						
a	Main rod 10 nos of 16 mm dia at columns	kg	30	8.00	1.58		379.20
b	Ties 8 mm @ 150mmc/c at columns	kg	159	1.56	0.40		97.98
	RC slab in the ground floor						
	Main rod 40 nos of 10 mm dia at columns	kg	40	4.00	0.62		99.20
						Total qty	**576.38**
	Round off with 15 % extra						**663.00**
4	**Shear connectors**						
	RC columns	Nos	64				64
	RC slab	Nos	107				107
						Total Qty	**170.67**
	Round off with 15 % extra						**196.00**
5	**Anti-Corrosive coating**						
	to the areas mentioned in item 1						
						Total	53.44
						Total	**5.34**
	Round off with 15 % extra						**6.00**
6	**Form Work**						
	to the areas mentioned in item 1						
	subtotal						53.44
	Round off with 15 % extra						**61.00**
7	**MICRO CONCRETING**						
	RC Columns		3	8.00	1.56	0.10	3.74
	RC Slab		1	4.00	4.00	0.10	1.60
	subtotal						5.34
	Round off with 15 % extra						**6.00**
8	**Galvashield XPI (Consider 1 per sqm)**						
	to the areas mentioned in item 1						
	subtotal					**Total Qty**	**53.44**
	Round off with 15 % extra						**61.00**
9	**Curing Compound**						
	to the areas mentioned in item 1						
	subtotal						53.44
	Round off with 15 % extra						**61.00**
10	**Debris**						
	to the above-mentioned area						
	subtotal						4.01
	Round off with 15 % extra						**4.61**

3. Water Proofing

Sl. No	Item	No	L in m	B in m	D in m	Quantity

1	**Surface Preparation - Removing of tiles**					
	Water tank area	1.00	12.00	12.00		144.00
	subtotal					144.00
	Round off with 15 % extra					**165.60**
2	**Water proofing**					
	to the above-mentioned area					
	subtotal					144.00
	Round off with 15 % extra					**165.60**
3	**Debris**					
	to the above-mentioned area					14.40
	subtotal					14.40
	Round off with 15 % extra					**16.56**