



Institute of
Business Administration
Karachi

Leadership and Ideas for Tomorrow

BIDDING DOCUMENT

FOR

SUPPLY, CONSTRUCTION, INSTALLATION AND

COMMISSIONING OF 750 kW_p ON-GRID SOLAR POWER SYSTEM

ROOF, CAR & BUS PORT MOUNTED

AT

INSTITUTE OF BUSINESS ADMINISTRATION KARACHI (MAIN CAMPUS)

VOLUME-III

BILL OF QUANTITIES

JULY 2020



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PREAMBLE TO SCHEDULE OF PRICES (BILL OF QUANTITY)

A GENERAL

1. The Bill of Quantities shall be read in conjunction with the Conditions of Contract, Specifications and Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work executed and measured by the Contractor and verified by the Engineer and valued at the rates and prices entered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix as per the Contract (in case of item not mentioned in Bill of Quantities).
3. The rates and prices entered in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the contract include ***all costs of contractor's plant, labour, supervision, materials, execution, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out or implied in the contract.*** Furthermore all duties, taxes and other levies payable by the contractor under the contract, or for any other cause, as on the date 14 days prior to deadline for submission of Bids in case of ICB/NCB respectively, shall be included in the rates and prices and the total bid price submitted by the bidder.
4. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the contractor will have failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities and shall not be paid separately.
5. The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities, and where no items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related items of the works.
6. General directions and description of work and materials are not necessarily repeated nor summarised in the Bill of Quantities. References to the relevant sections of the bidding documents shall be made before entering prices against each item in the priced Bill of Quantities.
7. Provisional sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer in accordance Conditions of Contract.

B UNITS & ABBREVIATIONS

B-1 Units of Measurement, symbols and abbreviations expressed in the Bidding documents

shall comply with the SI units.

The following abbreviations shall be used :

Local Currency Component	LCC
Foreign Currency Component (Not applicable)	FCC
Pak Rupees	PKR
US Dollar	US\$
Number	No
Provisional Sum	PS
Percent	%

C Rates & Prices

C-1 Except as otherwise expressly provided under the conditions of contract, the rates and amounts entered in the Schedule of Prices shall be the rates at which the contractor shall be paid and shall be the full inclusive value of the work set forth or implied in the contract

C-2 Unless otherwise stipulated in the Conditions of Contract , the rates and prices entered by the bidder shall not be subject to adjustment during the performance of the contract.

C-3 The bidder shall be deemed to have obtained all information as to port clearance facilities and charges, loading and unloading facilities and charges, storage facilities, and charges, transport facilities and charges, congestion and other conditions to be expected to Karachi port and or any other port of Pakistan and all requirements related thereto.

The Contractor shall be responsible to make complete arrangement for handling & safe transportation to site.

The bidder shall be deemed to have included all clearing, forwarding and other incidental costs in this regard in this bid.

C-4 The bidder shall provide for all parts of the works to be completed in every respect for commercial operation. Notwithstanding that any details accessories etc required for the complete installation and satisfactory operation of the plant are not mentioned in the specifications, such details shall be considered as included in the contract price.

SCHEDULE OF PRICES

SUMMARY OF BID PRICES

Item no.	Description	TOTAL INSTALLED	AMOUNT	TOTAL UNIT GENERATION
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		CAPACITY KWp		YEARLY (Minimum)
2(A)	Design, Procurement, Supply, Installation, Testing and Commissioning of On Grid Solar Power System . (BUS PORT)	219.4		320,400
2(B)	Design, Procurement, Supply, Installation, Testing and Commissioning of On Grid Solar Power System . (CAR PORT)	400.68		574,800
2(C)	Design, Procurement, Supply, Installation, Testing and Commissioning of On Grid Solar Power System(ADAMJEE CAR PORT)	171.7		247,200
2(D)	Design & Construction of Control Room Civil Work : a) Control Room 12'-0"x16'-0" 1 No			
2(E)	Design, Supply, Install, Testing & Commission of Fuel Control System.			
2(F)	Design, Supply, Install, Remote Monitoring Unit			
2(G)	Design, Supply, Install, Weather Station			
2(H)	Grid Study & Net Metering including all relevant accessories as per KE requirement.			
	TOTAL AMOUNT OF THE PROJECT COST	791.78		1142400

PROJECT TITLE : Designing, supply, Erection Testing, Commissioning of Bus Port, Car Port, & Roof Mounted Grid Tied Utility Interactive Photo Voltaic Solar Power System at IBA Main Campus Karachi

**BUS PORT CLEARANCE HEIGHT FROM ROAD LEVEL 20'-0" MINIMUM
BILL OF QUANTITY**

ABSTRACT OF COST

Sr No	Product	Capacity	Unit	Quantity	Price (PKR)
	Photovoltaic Solar System works				
	General: The system is designed to cover the Essential loads in IBA Karachi Main Campus				
1	The system will be grid interactive connected which will allow many power sources options. The system will import from the grid when loads are being more than the generated from PV and supply surplus electricity to the grid when PV generates more than the loads.				
2	Contractor shall submit shop drawings for all civil, electrical and a complete photovoltaic solar system works, including a single line diagram showing all the components of the PV system, DC and AC distribution boards, PV Arrays lay out , connections and cables, wires cross section for all the system to be approved by the Engineer before executing the work.				
3	Contractor shall submit the catalogs of each component showing the requested specifications stated at the bill of quantity.				
4	The contractor shall submit the Manufacture testing certificate, country of origin, certified characteristics, test performance curves, spare parts regular (as recommended by manufacturer , maintenance manuals and manufacturers warranty for each components of the system.				
5	As-built drawings shall be submitted after handing over the work.				
6	All junction boxes and DBs will be lockable type.				
7	Upon completion of the installation, the contractor shall organize an on site training program involving nominated employer's staff. Such a program shall be carried out during the commissioning phase. The cost of the training shall be deemed to have been included in the tendered rates.				
8	The price includes all builders' works, making good and reinstatement including necessary materials and workmanship as well as removal of unwanted materials to dump sites approved by the engineer to complete the job successfully.				
9	All the following items include supply, install, commission and operate of the complete PV solar system.				
10	Contractor must provide Bank Maintenance Guarantee for period One years for all components of the solar system.				
	BOQ of BUSPORT with 5 Degree Tilt Estimated Capacity = 219.4 KWp				
Sr No	Product	Unit	Qty	Unit Price	AMOUNT
1	MODULE MOUNTING STRUCTURE (MMS)				

	Designing, Supplying, Fabrication & Installation of PV Mounting structure (MMS) for Bus Port Minimum height 20'-0" from FFL /Road Level. The Module Mounted Structure (MMS) shall Comprising of Corrosion resistant anodized aluminum Section or hot dipped galvanized Steel Profile. The mounting structures and the foundations must be designed structurally to be suitable to withstand all static loads (weight of modules, wind loads etc) min. wind pressure 150 KM /hour in harsh environment. The design submission must be as per ASTM-A36, ASTM-123 and ASCE 7-10, for anodized aluminum AL6005/6063.The mounting structure components are bonded together to guaranty potential equalization. The tilt angle shall be not less than 5° for self-cleaning purposes and not more than 8° and for optimal exposure to direct solar irradiation. The work is to be carried out strictly as per approved drawing, design and specification and the rate quoted is inclusive of the following:	Kwp.	219.4		
a	Designing of the structure as per design specification approved				
b	Lay out at Site				
c	Footing & Foundation work as per approved drawing and specification.				
d	Placing of Anchor Bolts & Base Plate as per design & length & Details.				
e	Supply, Fabrication & Erection of Column, Beams, purlins & braces as per approved design				
f	Tilt angle is to be maintained as per Site Condition.				
g	RCC Drain with RCC grating Cover is to be provided to drain out rain/ cleaning water.				
h	Re do the Pavement work to its original condition after completion of the work.				
i	The Contractor shall remove all the debris and clear the site as per direction				
j	The contractor shall submit the detail technical shop drawing before execution of work.				
k	After completion of the work the contractor shall submit the as built drawing.				
Sr No	Product	Unit	Qty	RATE	AMOUNT
2	<u>PV Modules – 219.4 Kwp:</u>				

	<p>Supply, install, Testing & Commissioning (SITC) Mono Crystalline 144 Cells Photovoltaic Solar Modules Tier - 1 Type anti-reflective high transparency low iron tempered glass, with earthing provision. The modules STC parameters must be as under</p> <p>(a). Min. Power Pmax 530 or above Wp rated power (b), open circuit voltage (Voc) +/- 5 % 49.05V–49.65V (c) MPP Voltage Vmpp 41.2 V – 41.8 V (d) MPP Current Impp 12.75 A – 13.04 A (e) Short Circuit Current Isc +/-5 % 13.65A–13.92 A. (f) Module Efficiency 20.0 – 20.5 % (g) Operating Temp. Degree Centigrade - 40 ~ +85 (h) Maximum System Voltage 1500 V UL 1000 V IEC (i) Maximum Series Fuse Rating 25 A (j) Junction Box Protection Degree , IP 68 (k) connection box, 4.0 mm2 conductor cross section, (m) cable with , MC4 male and female connectors, (o) Anodized Aluminum Frame and Support Bars (p) PVC duct, Clamps & Accessories ,support and labels to be stalled under PV Array.</p> <p>The Contractor Shall provide manufacturer warranty for solar panel for a period not less than 25 years. Contractor must submit all the required certificates for each PV solar panel from manufacturer as per specification.</p> <p>All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	Kwp.	219.4		
3	GRID -TIED INVERTER (PCU)				
	<p>Supply, install, testing & commissioning (SITC) DC/AC grid tie 3-phase inverter with data communication unit with Ethernet connection .The inverter with must be suited to any PV module configuration, and depending on the system design and installation proposed and for the future extended also. (Leading Market brand, having annual production greater than 1GW). The DC max power input rating should be at-least 1.2 times of AC power at standard test condition (STC). The inverter unit shall be suitable for indoor and outdoor installations with IP65. The inverter must include the safety concepts such as (triple protection with opti protect, electronic strings fuses, self-learning string failure detection, DC surge arrester type (2) to ensure max availability. All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p> <p>Make:Sungrow/Huawei/SMA Power Rating: 100 KW & above .</p>	EACH	2		
	Brief specification is as under :				
a	MPPT Voltage Range : 550V-850V,				
b	MPPT Operating Voltage Range : 200V ~ 1000V,				
c	Min 09 Independent MPP Trackers ,				
d	Minimum Efficiency 98.0 % ,				
e	Warranty : 5 Years				
f	Certification Required : CE, IEC 61727, IEC 62109-1/2				
4	BREAKER BOXES				

a	DC BOX				
	Supply , installation, testing & commissioning (SITC) of DC Box/ Array Junction Box with all accessories for out-door usage with water proof enclosure . Each Junction Box Shall be provided with suitable Metal Oxide Varistors (Mov's),Surge Arrestors, one fuse, one SPD (Surge Protection device) and one DC Protection per string. DC Protection 16A, 1200VDC Qty : 09 nos DC SPD's Type 2 Qty : 09 nos (Refer Single Line Diagram Sheet E-09)	EACH	2		
b	AC BREAKER BOXES				
i)	Supply, installation, testing & commissioning (SITC) of of AC Breakers Box with all related accessories for outdoor usage with water proof enclosure. AC Breaker 200A, 4P, MCCB , 600V , Qty : 02 Main AC Breaker 400A, 4P, MCCB, 600V, Qty: 01 (Refer Single Line Diagram Sheet E-09)	EACH	1		
ii)	Supply, installation, testing & commissioning (SITC) of of LV Panel with all related accessories including termination of cables in existing panel. AC Breaker adj 400A, 4P, MCCB , 600V , Qty : 01 AC Breaker adj 800A, 4P, MCCB , 600V , Qty : 01 Main AC Breaker adi 1000A, 4P, MCCB, 600V, Qty: 01 (Refer Single Line Diagram Sheet E-09)	EACH	1		
5	CABLES				
a	DC Cables				
	Supply, Installation & Testing of DC Cable, 1 Core 4mm ² Cu/XLPE/XLPE cable complete in all respect with accessories to connect the PV solar cells together and to the inverter directly to have a complete operational circuit, clamps , trays and cable end terminations which shall be DC plug and socket connectors . The allowable voltage drop for DC cables between PV Arrays and inverter less than 1%. Minimum voltage capacity 1500VDC, Highest permissible voltage conductor/conductor should be 1.8kV DC, Standard Double insulated : Cross link polyolefin. Tinned copper conductor : Certified from DIN VDE 0295 CL.5, Fine-wire, IEC 60228 CL.5. Cable should be Certified from TUV Approved. Standard: EN50618	Meter	3520		
b	AC Cables				
	supplying, connecting, and termination of the XLPE CU cables with all required works, in different sizes of ducts or pipes for internal cables , , clamps and all needed fittings to connect cables terminals from source to destination. According to drawings, specifications, instructions, and demands of the supervising engineer. as follow:				
i)	4C x 70mm ² , Cu 0.6/1kV XLPE/PVC Pure Copper	Meter	20		
ii)	4C x 240 mm ² , Cu 0.6/1kV XLPE/PVC Pure Copper	Meter	30		
c	Earthing Cables				

	Supply, Installation & Testing of Earthing Cable, Including PVC Pipe with related accessories. Brand : Pakistan Cable or Equivalent as Engineer approved.				
i)	Single Core 4 sqmm, CU/PVC/FLEX(Green)	Meter	140		
ii)	1 core, 10 sqmm, Bare Conductor	Meter	150		
iii)	1 core, 35 sqmm, CU/PVC/FLEX(Green).	Meter	20		
iv)	1 core, 120 sqmm, CU/PVC/STD(Green)	Meter	30		
6	EARTHING SYSTEM				
	Earthing System. Supply, installation, testing and commissioning of Earth Electrodes (Rod Type) for Earthing System with 25mm dia 3 meters (10 feet) long driven copper rod, complete with clamps lugs, washers/bolts, connected with 2x70mmsq bare copper earth conductors to Earth connecting point including 50mm dia G.I pipe/UPVC pipe class 'D/E' up to Earth Chamber, job includes cad-welding of copper conductor to earth electrode rod at one end and provision/ fixing of cable lugs at other end, including all accessories and RCC inspection chamber, heavy duty G.I. Cover having earth symbol, etc., as per the Specifications and Drawings and to the entire satisfaction and approval of the Engineer. Earthing result should be less than 5 Ohm for AC combiner, less than 1 Ohm for DC combiner and less than 10 ohm for Structure/lighting protection system.	Each	6		
7	LIGHTNING PROTECTION SYSTEM				
i)	Supply, Installation ,Testing & Commissioning of Air rod with Base, rod length 500 mm high from PV panels, rod diameter 15mm, thread size M16, conductor material copper With all related accessories as per drawing & specification	Each	10		
ii)	Supply, Installation ,Testing & Commissioning of lighting protection pole 20 ft long with RCC foundation with all related accessories as per drawing & specification	Each	10		
iii)	Supply, Installation ,Testing & Commissioning of test clamp. Test Clamp shall be made of copper	Each	6		
iv)	Supply, Installation & Testing of 1 core, 70 sqmm, CU/PVC/STD(Green) Earthing Cable, Including PVC Pipe with related accessories.	Meter	400		
8	CABLE TRAY				
	Supply and installation of following sizes 16 SWG heavy duty G.I Perforated Cable Tray 150mm x 75mm with 16 SWG G.I. Covers as per details given in the drawings and specifications. Complete with all installation material such as angle iron support of size,MS round bar, elbows, Tee , nuts, bolts, washer, Hiltidrop-in anchour, etc, complete in all respect, as per the Specification and Drawings.	Meter	10		
9	MISC. CIVIL WORK				

a	Providing , Laying in Position, RCC rain water disposal Channel size 3'-0"x2'-0" (average) with slope with RCC Perforated Cover 2" thick as per design & direction to collect & dispose rain water to a sump out side the station .Concrete min . Class B and MS steel Grade 60 Deformed.	Job	1		
b	Supply and installation of 150 mm dia RCC Pipe for DC/AC cable, including excavation, sand bedding, back-filling, manholes etc., complete in all respects, in the following sizes:	Meter	80		
c	Construction of concrete manholes / cable chambers (900 mm x 900 mm x 900 mm deep) with heavy duty RCC covers with anti-rust paint , including all required sleeves for pulling under ground power cables laid in pipes.	Each	2		
d	Construction of concrete manholes / cable chambers (600 mm x 600 mm x 900 mm deep) with heavy duty RCC covers with anti-rust paint , including all required sleeves for pulling under ground power cables laid in pipes.	Each	1		
e	Re-fixing Paver as in Position including providing sand etc required & Removal /Cutting of trees etc	Job	1		
	TOTAL AMOUNT FOR BUS PORT				

BOQ of CARPORT with 5 Degree Tilt Estimated Capacity = 400.68 KWp. MIN. HT. 12'-0"					
Sr No	Product	Unit	Qty	Unit Price	AMOUNT
1	MODULE MOUNTING STRUCTURE (MMS)				

	Designing, Supplying, Fabrication & Installation of PV Mounting structure (MMS) for Car Port Minimum height 10'-0" from FFL /Road Level. The Module Mounted Structure (MMS) shall Comprising of Corrosion resistant anodized aluminum Section or hot dipped galvanized Steel Profile. The mounting structures and the foundations must be designed structurally to be suitable to withstand all static loads (weight of modules, wind loads etc) min. wind pressure 150 KM /hour in harsh environment. The design submission must be as per ASTM-A36, ASTM-123 and ASCE 7-10, for anodized aluminum AL6005/6063.The mounting structure components are bonded together to guaranty potential equalization. The tilt angle shall be not less than 5° for self-cleaning purposes and not more than 8° and for optimal exposure to direct solar irradiation. The work is to be carried out strictly as per approved drawing, design and specification and the rate quoted is inclusive of the following:	Kwp.	400.68			
a	Designing of the structure as per design specification approved					
b	Lay out at Site					
c	Footing & Foundation work as per drawing and specification .					
d	Placing of Anchor Bolts & Base Plate as per design & length & Details.					
e	Supply, Fabrication & Erection of Column, Beams , purlins & braces as per design					
f	Tilt angle is to be maintained as per Site Condition.					
g	RCC Drain with RCC grating Cover is to be provided to drain out rain/ cleaning water.					
h	Re do the Pavement work to its original condition after completion of the work.					
i	The Contractor shall remove all the debris and clear the site as per direction					
j	The contractor shall submit the detail technical shop drawing before execution of work.					
k	After completion of the work the contractor shall submit the as built drawing.					
Sr No	Product	Unit	Qty	RATE	AMOUNT	
2	<u>PV Modules – 400.68 Kwp:</u>					

	<p>Supply, install, Testing & Commissioning (SITC) Mono Crystalline 144 Cells Photovoltaic Solar Modules Tier -1 Type anti-reflective high transparency low iron tempered glass, with earthing provision. The modules STC parameters must be as under</p> <p>(a).Min. Power Pmax 530 or above Wp rated power (b), open circuit voltage (Voc) +/- 5 % 49.05V–49.65V (c) MPP Voltage Vmpp 41.2 V – 41.8 V (d) MPP Current Impp 12.75 A – 13.04 A (e) Short Circuit Current Isc +/-5 % 13.65A–13.92A. (f) Module Efficiency 20.0 – 20.5 % (g) Operating Temp. Degree Centigrade - 40 ~ +85 (h) Maximum System Voltage 1500 V UL 1000 V IEC (i) Maximum Series Fuse Rating 20 A (j) Junction Box Protection Degree , IP 68 (k) connection box, 4.0 mm² conductor cross section, (m) cable with, MC4 male and female connectors, (o) Anodized Aluminum Frame and Support Bars (p) PVC duct, Clamps & Accessories, support and labels to be stalled under PV Array. 3 bypass diodes per module, and 1 bypass diode per each string of modules and 1 bypass diode for each array of modules, Modules must have in built blocking diodes, The Contractor Shall provide manufacturer warranty for solar panel for a period not less than 25 years. Contractor must submit all the required certificates for each PV solar panel from manufacturer as per specification. All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	Kwp.	400.68		
3	GRID -TIED INVERTER (PCU)				
	<p>Supply, install, testing & commissioning (SITC) DC/AC grid tie 3-phase inverter with data communication unit with Ethernet connection .The inverter with must be suited to any PV module configuration, and depending on the system design and installation proposed and for the future extended also. (Leading Market brand, having annual production greater than 1GW). The DC max power input rating should be at-least 1.2 times of AC power at standard test condition (STC). The inverter unit shall be suitable for indoor and outdoor installations with IP65. The inverter must include the safety concepts such as (triple protection with opti protect, electronic strings fuses, self-learning string failure detection, DC surge arrester type (2) to ensure max availability. All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p> <p>Make: Sungrow /Huawei/SMA</p> <p>Power Rating: 100 KW or above.</p>	EACH	4		
	Brief specification is as under :				

a	MPPT Voltage Range : 550V-850V,				
b	MPPT Operating Voltage Range : 200V ~ 1000V,				
c	Min 06 Independent MPP Trackers ,				
d	Minimum Efficiency 98.0 % ,				
e	Warranty : 5 Years				
f	Certification Required : CE, IEC 61727, IEC 62109-1/2				
4	BREAKER BOXES				
a	DC BOX				
	Supply, installation, testing & commissioning (SITC) of DC Box/ Array Junction Box with all accessories for out door usage with water proof enclosure. Each Junction Box Shall be provided with suitable Metal Oxide Varistors (Mov's), Surge Arrestors, one fuse, one SPD (Surge Protection device) and one DC Protection per string. DC Protection 16A, 1200V Qty : 10 nos DC SPD's Type 2 Qty : 10 nos (Refer Single Line Diagram Sheet E-09)	EACH	4		
b	AC BREAKER BOXES				
	Supply, installation, testing & commissioning (SITC) of of AC Breakers Box with all related accessories for out door usage with water proof enclosure. AC Breaker 200A, 4P, MCCB , 600V , Qty : 04 Main AC Breaker 800A, 4P, MCCB, 600V, Qty: 01 (Refer Single Line Diagram Sheet E-09)	EACH	1		
5	CABLES				
a	DC Cables				
	Supply , Installation,& Testing of DC Cable, 1 Core 4mm2 including XLPE/XLPE Pipe complete in all respect with accessories to connect the PV solar cells together and to the inverter directly to have a complete operational circuit, clamps , trays and cable end terminations which shall be DC plug and socket connectors . The allowable voltage drop for DC cables between PV Arrays and inverter less than 1%. Minimum voltage capacity 1500VDC, Highest permissible voltage conductor/conductor should be 1.8kV DC, Standard. Double insulated : Cross link polyolefin. Tinned copper conductor : Certified from DIN VDE 0295 CL.5, Fine-wire, IEC 60228 CL.5. Cable should be Certified from TUV Approved. Standard: EN50618	Meter	8000		
b	AC Cables				
	supplying, connecting, and termination of the XLPE CU cables with all required works, in different sizes of ducts or pipes for internal cables , , clamps and all needed fittings to connect cables terminals from source to destination. According to drawings, specifications, instructions, and demands of the supervising engineer. as follow:				
i)	4C x 70mm ² , Cu 0.6/1kV XLPE/PVC Pure Copper	Meter	50		
ii)	2 x 4C x 240 mm ² , Cu 0.6/1kV XLPE/PVC Pure Copper	Meter	30		
c	Earthing Cables				
	Supply, Installation & Testing of Earthing Cable, Including PVC Pipe with related accessories.				

	Brand : Pakistan Cable or Equivalent as Engineer approved.				
i)	Single Core 2.5/4 sqmm, CU/PVC/FLEX(Green)	Meter	260		
ii)	1 core, 10sqmm, Bare Conductor	Meter	250		
iii)	1 core, 35 sqmm, CU/PVC/FLEX(Green).	Meter	50		
iv)	1 core, 120 sqmm, CU/PVC/STD(Green)	Meter	240		
6	EARTHING SYSTEM				
	Earthing System. Supply, installation, testing and commissioning of Earth Electrodes (Rod Type) for Earthing System with 25mm dia 3 meters (10 feet) long driven copper rod, complete with clamps lugs, washers/bolts, connected with 2x70mmsq bare copper earth conductors to Earth connecting point including 50mm dia G.I pipe/UPVC pipe class 'D/E' up to Earth Chamber, job includes cad-welding of copper conductor to earth electrode rod at one end and provision/ fixing of cable lugs at other end, including all accessories and RCC inspection chamber, heavy duty G.I. Cover having earth symbol, etc., as per the Specifications and Drawings and to the entire satisfaction and approval of the Engineer. Earthing result should be less than 5 Ohm for AC combiner, less than 1 Ohm for DC combiner and less than 10 ohm for Structure/lighting protection system.	Job	6		
7	LIGHTNING PROTECTION SYSTEM				
i	Supply, Installation ,Testing & Commissioning of Air rod with Base, rod length 500 mm high from PV panels, rod diameter 15mm, thread size M16, conductor material copper With all related accessories as per drawing & specification	Each	23		
ii	Supply, Installation ,Testing & Commissioning of lightning protection pole 12 ft long with RCC foundation with all related accessories as per drawing & specification	Each	23		
iii	Supply, Installation ,Testing & Commissioning of test clamp. Test Clamp shall be made of copper	Each	6		
iv	Supply, Installation & Testing of 1 core, 70 sqmm, CU/PVC/STD(Green) Earthing Cable, Including PVC Pipe with related accessories.	Meter	650		
8	CABLE TRAY				
i)	Supply and installation of following sizes 16 SWG heavy duty G.I Perforated Cable Tray 150mm x 75mm with 16 SWG G.I. Covers as per details given in the drawings and specifications. Complete with all installation material such as angle iron support of size,MS round bar, elbows, Tee , nuts, bolts, washer, Hiltidrop-in anchour, etc, complete in all respect, as per the Specification and Drawings	Meter	30		
ii)	Supply and installation of following sizes 16 SWG heavy duty G.I Perforated Cable Tray 300mm x 75mm with 16 SWG G.I. Covers as per details given in the drawings and specifications. Complete with all installation material such as angle iron support of size,MS round bar, elbows, Tee , nuts, bolts, washer,	Meter	30		

	Hiltidrop-in anchour, etc, complete in all respect, as per the Specification and Drawings				
9	MISC. CIVIL WORK				
a	Providing , Laying in Position, RCC rain water disposal Channel size 3'-0"x2'-0" (average) with slope with RCC Perforated Cover 2" thick as per design & direction to collect & dispose rain water to a sump out side the station .Concrete min . Class B and MS steel Grade 60 Deformed.	Job	1		
b	Supply and installation of 150 mm dia RCC Pipe for DC/AC cable, including excavation, sand bedding, back-filling, manholes etc., complete in all respects, in the following sizes:	Meter	100		
c	Construction of concrete manholes / cable chambers (600 mm x 600 mm x 900 mm deep) with heavy duty RCC covers with anti-rust paint , including all required sleeves for pulling under ground power cables laid in pipes.	Each	5		
d	Re-fixing Paver as in Position including providing sand etc required & Removal /Cutting of trees etc	Job	1		
	TOTAL AMOUNT FOR CAR PORT (4 Nos)				

BOQ of ADAMJEE CARPORT with 5 Degree Tilt Estimated Capacity = 171.7 KWp. MIN. HT. 12'-0"					
Sr No	Product	Unit	Qty	Unit Price	AMOUNT
1	MODULE MOUNTING STRUCTURE (MMS)				

	Designing, Supplying, Fabrication & Installation of PV Mounting structure (MMS) for Car Port Minimum height 10'-0" from FFL /Road Level. The Module Mounted Structure (MMS) shall Comprising of Corrosion resistant anodized aluminum Section or hot dipped galvanized Steel Profile. The mounting structures and the foundations must be designed structurally to be suitable to withstand all static loads (weight of modules, wind loads etc) min. wind pressure 150 KM /hour in harsh environment. The design submission must be as per ASTM-A36, ASTM-123 and ASCE 7-10, for anodized aluminum AL6005/6063. The mounting structure components are bonded together to guaranty potential equalization. The tilt angle shall be not less than 5° for self-cleaning purposes and not more than 8° and for optimal exposure to direct solar irradiation. The work is to be carried out strictly as per approved drawing, design and specification and the rate quoted is inclusive of the following:	Kwp.	171.7		
a	Designing of the structure as per design specification approved				
b	Lay out at Site				
c	Footing & Foundation work as per drawing and specification .				
d	Placing of Achor Bolts & Base Plate as per design & length & Details.				
e	Supply, Fabrication & Erection of Column, Beams , purlins & braces as per design				
f	Tilt angle is to be maintained as per Site Condition.				
g	RCC Drain with RCC grating Cover is to be provided to drain out rain/ cleaning water.				
h	Re do the Pavement work to its original condition after completion of the work.				
i	The Contractor shall remove all the debris and clear the site as per direction				
j	The contractor shall submit the detail technical shop drawing before execution of work.				
k	After completion of the work the contractor shall submit the as built drawing.				
Sr No	Product	Unit	Qty	RATE	AMOUNT
2	<u>PV Modules – 171.7 Kwp:</u>				

	<p>Supply, install, Testing & Commissioning (SITC) Mono Crystalline 144 Cells Photovoltaic Solar Modules Tier -1 Type anti-reflective high transparency low iron tempered glass, with earthing provision. The modules STC parameters must be as under</p> <p>(a).Min. Power Pmax 530 or above Wp rated power (b), open circuit voltage (Voc) +/- 5 % 49.05V–49.65V (c) MPP Voltage Vmpp 41.2 V – 41.8 V (d) MPP Current Impp 12.75 A – 13.04 A (e) Short Circuit Current Isc +/-5 % 13.65A–13.92A. ‘(f) Module Efficiency 20.0 – 20.5 % (g) Operating Temp. Degree Centigrade - 40 ~ +85 (h) Maximum System Voltage 1500 V UL 1000 V IEC (i) Maximum Series Fuse Rating 20 A (j) Junction Box Protection Degree , IP 68 (k) connection box, 4.0 mm2 conductor cross section, (m) cable with, MC4 male and female connectors, (o) Anodized Aluminum Frame and Support Bars (p) PVC duct, Clamps & Accessories, support and labels to be stalled under PV Array.</p> <p>3 bypass diodes per module, and 1 bypass diode per each string of modules and 1 bypass diode for each array of modules, Modules must have in built blocking diodes, The Contractor Shall provide manufacturer warranty for solar panel for a period not less than 25 years. Contractor must submit all the required certificates for each PV solar panel from manufacturer as per specification. All works and materials must be according to the drawings, specifications and supervisor engineer instruction’s and approval.</p>	Kwp.	171.7		
3	GRID -TIED INVERTER (PCU)				
	<p>Supply, install, testing & commissioning (SITC) DC/AC grid tie 3-phase inverter with data communication unit with Ethernet connection .The inverter with must be suited to any PV module configuration, and depending on the system design and installation proposed and for the future extended also. (Leading Market brand, having annual production greater than 1GW). The DC max power input rating should be at-least 1.2 times of AC power at standard test condition (STC). The inverter unit shall be suitable for indoor and outdoor installations with IP65. The inverter must include the safety concepts such as (triple protection with opti protect, electronic strings fuses, self-learning string failure detection, DC surge arrester type (2) to ensure max availability. All works and materials must be according to the drawings, specifications and supervisor engineer instruction’s and approval.</p> <p>Make: Sungrow/Huawei/SMA</p> <p>Power Rating: 60KW</p>	EACH	3		
	Brief specification is as under :				
a	MPPT Voltage Range : 550V-850V,				

b	MPPT Operating Voltage Range : 200V ~ 1000V,				
c	Min 06 Independent MPP Trackers ,				
d	Minimum Efficiency 98.0 % ,				
e	Warranty : 5 Years				
f	Certification Required : CE, IEC 61727, IEC 62109-1/2				
4	BREAKER BOXES				
a	DC BOX				
	Supply, installation, testing & commissioning (SITC) of DC Box/ Array Junction Box with all accessories for out door usage with water proof enclosure . Each Junction Box Shall be provided with suitable Metal Oxide Varistors (Mov's),Surge Arrestors, one fuse, one SPD (Surge Protection device) and one DC Protection per string. DC Protection 16A, 1200V Qty : 07 nos DC SPD's Type 2 Qty : 07 nos (Refer Single Line Diagram Sheet E-09)	EACH	3		
b	AC BREAKER BOXES				
i	Supply, installation, testing & commissioning (SITC) of of AC Breakers Box with all related accessories for out door usage with water proof enclosure. AC Breaker 120A, 4P, MCCB , 600V , Qty : 03 Main AC Breaker 400A, 4P, MCCB, 600V, Qty: 01 (Refer Single Line Diagram Sheet E-09)	EACH	1		
ii	Supply, installation, testing & commissioning (SITC) of of LV Panel with all related accessories including termination of cables in existing panel Main AC Breaker 400A, 4P, adj MCCB, 600V, Qty: 01 (Refer Single Line Diagram Sheet E-09)	EACH	1		
5	CABLES				
a	DC Cables				
	Supply , Installation,& Testing of DC Cable, 1 Core 4mm2 including XLPE/PVC Pipe complete in all respect with accessories to connect the PV solar cells together and to the inverter directly to have a complete operational circuit, clamps , trays and cable end terminations which shall be DC plug and socket connectors . The allowable voltage drop for DC cables between PV Arrays and inverter less than 1%. Minimum voltage capacity 1500VDC, Highest permissible voltage conductor/conductor should be 1.8kV DC, Standard. Double insulated : Cross link polyolefin. Tinned copper conductor : Certified from DIN VDE 0295 CL.5, Fine-wire, IEC 60228 CL.5. Cable should be Certified from TUV Approved. Standard: EN50618.	Meter	2530		
b	AC Cables				
	supplying, connecting, and termination of the XLPE CU cables with all required works, in different sizes of ducts or pipes for internal cables , , clamps and all needed fittings to connect cables terminals from source to destination. According to drawings, specifications , instructions, and demands of the supervising engineer. as follow:				
i)	4C x 35mm ² , Cu 0.6/1kV XLPE/PVC Pure Copper	Meter	25		

ii)	4C x 185 mm ² , Cu 0.6/1kV XLPE/PVC Pure Copper Armoured Cable	Meter	70		
c	Earthing Cables				
	Supply, Installation & Testing of Earthing Cable, Including PVC Pipe with related accessories. Brand : Pakistan Cable or Equivalent as Engineer approved.				
i)	Single Core 2.5/4 sqmm, CU/PVC/FLEX(Green)	Meter	110		
ii)	1 core, 10sqmm Bare Conductor	Meter	120		
iii)	1 core, 16 sqmm, CU/PVC/FLEX(Green).	Meter	25		
iv)	1 core, 95 sqmm, CU/PVC/STD(Green)	Meter	70		
6	EARTHING SYSTEM				
	Earthing System. Supply, installation, testing and commissioning of Earth Electrodes (Rod Type) for Earthing System with 25mm dia 3 meters (10 feet) long driven copper rod, complete with clamps lugs, washers/bolts, connected with 2x70mmsq bare copper earth conductors to Earth connecting point including 50mm dia G.I pipe/UPVC pipe class 'D/E' up to Earth Chamber, job includes cad-welding of copper conductor to earth electrode rod at one end and provision/ fixing of cable lugs at other end, including all accessories and RCC inspection chamber, heavy duty G.I. Cover having earth symbol, etc., as per the Specifications and Drawings and to the entire satisfaction and approval of the Engineer. Earthing result should be less than 5 Ohm for AC combiner, less than 1 Ohm for DC combiner and less than 10 ohm for Structure/lighting protection system.	Job	6		
7	LIGHTNING PROTECTION SYSTEM				
i	Supply, Installation ,Testing & Commissioning of Air rod with Base, rod length 500 mm high from PV panels, rod diameter 15mm, thread size M16, conductor material copper With all related accessories as per drawing & specification	Each	10		
ii	Supply, Installation ,Testing & Commissioning of lighting protection pole 12 ft long with RCC foundation with all related accessories as per drawing & specification	Each	10		
iii	Supply, Installation ,Testing & Commissioning of test clamp. Test Clamp shall be made of copper	Each	6		
iv	Supply, Installation & Testing of 1 core, 70 sqmm, CU/PVC/STD(Green) Earthing Cable, Including PVC Pipe with related accessories.	Meter	200		
8	CABLE TRAY				
	Supply and installation of following sizes 16 SWG heavy duty G.I Perforated Cable Tray 150mm x 75mm with 16 SWG G.I. Covers as per details given in the drawings and specifications. Complete with all installation material such as angle iron support of size,MS round bar, elbows, Tee , nuts, bolts, washer, Hiltidrop-in anchour, etc, complete in all respect, as per the Specification and Drawings	Meter	10		
9	MISC. CIVIL WORK				

a	Providing , Laying in Position, RCC rain water disposal Channel size 3'-0"x2'-0" (average) with slope with RCC Perforated Cover 2" thick as per design & direction to collect & dispose rain water to a sump out side the station .Concrete min . Class B and MS steel Grade 60 Deformed.	Job	1		
b	Supply and installation of 150 mm dia RCC Pipe for DC/AC cable, including excavation, sand bedding, back-filling, manholes etc., complete in all respects, in the following sizes:	Meter	10		
c	Construction of concrete manholes / cable chambers (600 mm x 600 mm x 900 mm deep) with heavy duty RCC covers with anti-rust paint , including all required sleeves for pulling under ground power cables laid in pipes.	Each	1		
d	Dismantling & Re-fixing Existing Steel Shade at some designated place as in Position including providing Footing, foundation , CC flooring etc Complete as required & Removal /Cutting of trees etc	Job	1		
TOTAL AMOUNT FOR ADAMJEE CAR PORT					

CIVIL WORKS FOR CONTROL ROOMS & INVERTOR /PCU STATIONS

Sr No	Product	Unit	Qty	RATE	AMOUNT
1	CONTROL ROOM	Reference Specification			
	Design, Provide & Construct RCC Frame Structure Control Room Size 12'-0" x16'-0" for installation of Weather Station & Fuel Control System including all type of Masonry work with Aluminum Doors & windows & 12000 BTU AC .The rate include, all type of labour & material required. Max ht. of the Building 10'-0" from FFL. Non Skid Tiled floor and Plastic Emulsion on walls internal & Weather Shield on External walls as per direction of Engineer Incharge & approved design & drawing	Sq M	17.84		
2	INVERTOR ROOM				
	Design, Provide & Construct RCC Frame Structure Invertor Room Size 10'-0" x12'-0"ht. 10'-0" for installation of Grid Tied Invertors at a) Bus Port & Car Port b) Adam jee Car Port c) Auditorium Roof Port The rate including all type of Masonry work with Aluminum Doors & windows & 12000 BTU AC .The rate include, all type of labour & material required. Max ht. of the Building 10'-0" from FFL. Non Skid Tiled floor and Plastic Emulsion on walls internal & Weather Shield on External walls as per direction of Engineer Incharge & approved design & drawing	Sq M	33.54		
3	Providing & supply of adjustable & moveable trolley type ladder with working Plate form for cleaning of SPV maximum working height 20'-0"	Each	1		

FUEL SAVER CONTROLLER

Sr No	Product	Unit	Qty	RATE	AMOUNT
	Fuel Saver Controller				
	<p>Design, Supply, installation, testing and commission of SMA Or Equivalent Fuel Save Controller System Solution for the Integration of PV Power Plant into Electrical Net Work based on Gen Sets.</p> <p>Fuel Save Controller should performs the following tasks:</p> <ul style="list-style-type: none"> ➤ Monitoring of the gensets' power and operating status ➤ Monitoring of the load and grid status ➤ Calculation of suitable values for the maximum power output of the PV inverters according to defined parameter settings and the current status of gensets and load ➤ Control and communication interface to PV inverters ➤ Internal logging of all relevant system data ➤ Provision of relevant system data for local and remote monitoring ➤ Emergency shutdown of the PV inverters in case of a system malfunction <p>The bidder shall provide the complete technical details of the system .</p>	Each	1		

WEATHER STATION

Sr No	Product	Unit	Qty	RATE	AMOUNT
	WEATHER MONITORING STATION				
	<p>Design, Supply, installation, testing and commission of Weather monitoring System along with all necessary equipment and software which should I be capable of monitoring the solar radiance, wind velocity, module cell temperature, ambient temperature, humidity, wind direction and rain fall level. All sensors must be of class-A.</p> <p>The performance monitoring system shall use the present weather information and compare the solar power generated with the typical power to be produced with respect to the present available solar irradiance. The deviation of power generation shall be embedded in the automatic report generation documents, any degradation or performance deviation shall be alerted to the user through email. Based on this, the users initiate the maintenance/cleaning of solar panel, trouble shooting of the solar power system, etc.</p> <p>The weather information shall be recorded in the database continuously 24-hour basis and the same shall be viewed through the internet browser.</p> <p>The weather data stored in the database server shall be retrieved and displayed in the user intranet browser in user friendly tabular and graphical format. The user shall select the date range to view the history of weather data with date and time stamping.</p> <p>The automatic report generation feature in the server shall automatically generate the report based on the events or time duration and convert the same report in to PDF, word, excel, html and</p>	Each	1		

	<p>other formats and shall send to the specified e-mail ids as an attachment.</p> <p>The row, column, content, user email-id, shall be specified during the configuration setting by the user.</p> <p>The automatic report generation shall monitor the various user defined events continuously.</p> <p>For generating automatic reports and emailing process shall not require any human intervention.</p>			
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REMOTE MONITORING SYSTEM

Sr No	Product	Unit	Qty	RATE	AMOUNT
	DATA MANGER with REMOTE MONITORING SYSTEM				
	<p>Design, Supply, installation, testing and commission of Data Manger with Remote Monitoring System consists of the following parameter:</p> <ul style="list-style-type: none"> • Total energy generation of PV Plant • Instantaneous Power been generated by solar PV Plant • Performance ratio of PV plant. • Current load of client • Load profile v/s energy generation. <p>Data should be store on server for not more than 10 min time interval. Data must be access through internet via user friendly GUI.</p>	Each	1		

NET METERING

Sr No	Product	Unit	Qty	RATE	AMOUNT
	NET METERING				
	Service of Grid Study & Net metering application process as per K.E approved criteria complete in all respects or directed by Engineer. This also include the services charges & fee for assessment of Grid Load service charges for Load Inspector etc. Only the cost of Challan shall be paid by IBA.	Each	1		

DAYWORK SCHEDULE

1. General

- 1.1 Work shall not be executed on a Day work basis except by written Order of the Engineer. The rates for Day work items entered in the Schedule of Prices shall apply to any quantity of Day work ordered by the Engineer. Nominal quantities have been indicated against each item of Day work, and the extended total for Day work shall be carried forward as a provisional sum to the Summary of Bid Prices.

2. Day work - Labor

- 2.1 In calculating payments due to the Contractor for the execution of Day work, the hours for labor shall be reckoned from the time of arrival of the labor at the job Site to execute the particular item of Day work to the time of departure, but excluding meal breaks and rest periods. Only the times of classes of labor directly doing work ordered by the Engineer and for which they are competent to perform shall be measured.

The time of Plant Erectors or other expatriate supervisory personnel shall not be measured unless their time on Site is extended by Variation Order. The rates entered by the Bidder for these categories shall be daily rates inclusive of all allowances and overheads.

- 2.2 For labor other than Plant Erectors or other expatriate supervisory personnel, the Contractor shall be entitled to payment in respect of the total time that labor is employed on Day work, calculated at the basic rates entered by him in the Schedule of "Day work Rates – Labor" together with an additional percentage payment on basic rates representing the Contractor's profit, overheads, etc., as described below:

a) The basic rates for labor shall cover all direct costs to the Contractor, including (but not limited to) the amount of wages paid to such labor, transportation time, overtime, subsistence allowances and any sums paid to or on behalf of such labor for social benefits in accordance with Pakistan Labor laws. The basic rates will be payable in Pak. Rupees only, and

b) The additional percentage payment to be quoted by the Bidder and applied to costs shall be deemed to cover the Contractor's overheads, profits, superintendence, liabilities and insurances and allowances to labor, timekeeping and clerical and office work, the use of consumable stores, water, lighting and power; the use and repair of staging, scaffolding, workshops and stores, portable power tools, manual plant and tools; supervision by the Contractor's staff, foremen and other supervisory personnel; and charges incidental to the foregoing. Payments under this item shall be made in foreign currency and local currency at the percentages entered in the Day work Schedule.

- 2.3 Rates entered in the Day work Schedule shall apply to labor of trade and qualification as described and to labor of other trades with similar skill and qualification.

3. Day work - Contractor's Equipment

- 3.1 The Contractor shall be entitled to payments in respect of Contractor's Equipment already on Site and employed on Day work at the basic rental rates entered by him in the "Schedule of Day work Rate - Contractor's Equipment". The said rates shall be deemed to include complete allowance. for depreciation, interest, indemnity and insurance, repairs, maintenance, supplies, fuel, lubricants and other consumables and all overheads, profit and administrative costs related to the use of such equipment.
- 3.2 In calculating the payment due to the Contractor for Contractor's Equipment employed on Day work, only the actual number of working hours will be eligible for payment, except that, where applicable and agreed with the Engineer, the travelling time from the part of the Site where the Contractor's Equipment was located when ordered by the Engineer to be employed on Day work and the time for the return journey thereto shall be included for payment.
- 3.3 The rental rates for Contractor's Equipment employed on Day work shall be stated in Pakistani Rupees but payments to the Contractor will be made in local and foreign currencies according to the rates entered in the Schedule.

4. Day work-Materials

- 4.1 The Contractor shall be entitled to the following payments in respect of materials used for Day work (except for materials for which the cost is included in the percentage addition to labor costs) which are actually incorporated into the Works:
- a) The net cost of such materials delivered to warehouse or work yard area or storage area at the Site. Such cost shall be calculated by the Contractor on the basis of the invoiced price and freight and insurance as certified by the Engineer on the basis of invoices produced.
 - b) Percentage addition, in local and/or foreign currency, of such net cost of materials to cover the Contractor's handling charges, overheads and profits.
- 4.2 Payment of the net cost to the Contractor of Day work materials shall be made in the same currency as the invoice. Payment of the addition for handling charges, overheads and profit shall be in local and/or foreign currency as entered in the Schedule of Day work - Materials.

2. (a) SCHEDULE OF PRICES – SUMMARY OF BID PRICES

		TOTAL PRICE
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Item No.	Description	Foreign Currency Component	Local Currency Component
2(b) 2(c) 2(d)	Equipment (at Site), and Erection, Testing & Commissioning. Civil Works Day Work	Refer Volume-III	
Total Bid Price (The amount to be entered in Paragraph 1 of the Form of Bid) (In Words)			

(Note: Total Price, in each currency, shall be provided in figures as well as in words)

**2. (b) SCHEDULE OF PRICES – EQUIPMENT,
ERECTION, TESTING & COMMISSIONING**

				Unit Rate	Total Price
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Item No.	Description	Unit	Qty	Foreign Currency Component						Local Currency Component					Foreign Currency Component	Local Currency Component
				FOB Price	Shipping	Insurance	Sea Port	CI F Pak Work	Erection & Other	Total	Customs Duty for	ExFactory Pakistan (For Local Goods)	Local Trans-	Erection & Other		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1.	Main Plant															
2.	Erection & Testing Equipment & Maintenance Tools (Mandatory)															
3.	Spare Parts (Mandatory)															
4.	Provisional Sum															
Refer Volume -III																
Total (to be carried to Summary of Bid Price)																

[Note: Ref: Col. 12 above, the bidder claiming margin of domestic preference for Goods manufactured in Pakistan shall also fill Appendix C to Instructions to Bidders.]

2. (c) SCHEDULE OF PRICES – CIVIL WORKS

Item No.	Description	Unit	Qty	Volume of Concrete per Foundation (m ³)	Weight of Steel per Foundation (kg)	Unit Rate of Concrete per m ³ (Rs.)	Unit Rate of Steel per kg (Rs.)	Unit Rate per Foundation (Rs.)	Total (Pak. Rupees)
Refer Volume-III									
Total (to be carried to Summary of Bid Price)									

2. (d) SCHEDULE OF PRICES DAYWORK

Item No.	Description	Nominal Quantity	UNIT RATE		TOTAL AMOUNT	
			FCC	LCC (PKR)	FCC	LCC (PKR)
1.	Daywork-Labour					
2.	Daywork - Contractor's Equipment					
3.	Daywork – Materials					
Total (to be carried to Summary of Bid Price)						

**2. (e) SCHEDULE OF PRICES – ADDITIONAL
RECOMMENDED ERECTION AND TESTING EQUIPMENT &
MAINTENANCE TOOLS**

1. The bidder shall propose in the space provided, a detailed list of Erection and Testing Equipment & Maintenance Tools which are recommended by him in addition to those specified by the Employer under Schedule 2(b) above.
2. The purchase of additional recommended Erection and Testing Equipment & Maintenance Tools would be at the discretion of the Employer and the cost of such equipment will not be taken into consideration in the evaluation of bids. However, the Contract Price will be adjusted to include the cost of additional Erection and Testing Equipment & Maintenance Tools which are selected by the Employer.
3. The list of Erection and Testing Equipment & Maintenance Tools shall include description as well as quantity of each item and the unit rate and prices for the total quantity proposed for each item of Erection and Testing Equipment & Maintenance Tools.

Item No.	Description	Unit	Qty	Unit Rate									Total Price			
				Foreign Currency Component					Local Currency Component				Component Currency	Foreign	Component Currency	Local
				Price	FOB	Shipping	Insurance	Sea Port	CIF Pak	Total	Customs Duty for Col No.8	ExFactory Pakistan (For Local Goods)				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1.	Erection Equipment			Refer Volume-III												
2.	Testing Equipment															
3.	Maintenance Tools															
Total (not to be carried to Summary of Bid Price)																

2. (f) SCHEDULE OF PRICES – ADDITIONAL RECOMMENDED SPARE PARTS

1. The bidder shall propose in the space provided, a detailed list of Spare Parts which are recommended by him in addition to those specified by the Employer under Schedule 2(b) above.
2. The purchase of additional recommended Spare Parts would be at the discretion of the Employer and the cost of such equipment will not be taken into consideration in the evaluation of bids. However, the Contract Price will be adjusted to include the cost of additional Spare Parts which are selected by the Employer.
3. The list of Spare Parts shall include description as well as quantity of each item and the unit rate and prices for the total quantity proposed for each item of Spare Parts.

Item No.	Description	Unit	Qty	Unit Rate									Total Price	
				Foreign Currency Component					Local Currency Component				Foreign Currency Component	Local Currency Component
				FOB Price	Shipping	Insurance	CIF Pak Sea Port	Total	Customs Duty for	ExFactory Pakistan	Local Transport	Total		
5	6	7	8	9	10	11	12	13	14	15				
Refer Volume III														
Total (not to be carried to Summary of Bid Price)														

