ITEM NO.	DESCRIPTION	SPEC REF.	UNIT	QTY	Unit Price	Total
	Bill 1: Preliminary and General					
1,1	Technical Submissions		sum	1		
1,2	Workshop Drawings		sum	1		
1,3	Transport		sum	1		
1,4	Rigging		sum	1		
1,5	Compliance With Health and Safety Regulations		sum	1		
1,6	Attendance		sum	1		
1,7	Training		sum	1		
1,8	Operating & Maintenance Manuals and As Built Drawings		sum	1		
1,9	Testing and Commissioning c/w Pressure Testing		sum	1		
1,10	P & G'S		sum	1		
	TOTAL CARRIED FORWARD					

ITEM NO.	DESCRIPTION	SPEC REF.	UNIT	QTY		
	TOTAL BROUGHT FROM PREVIOUS PAGE				R	-
2	**HEATING, VENTILATION, AIR CONDITIONING (HVAC) INSTALLATIONS**					
2,1	**The provision of HVAC fixtures/ fittings should include MicroSound Fan Filter Units: - fan-powered HEPA filter module is 99.99% efficient @ 0.3 microns with solid state speed control and RFI suppression, a safety switch and junction box mounted to the pre-filter frame, louvered pre - filter grilles complete with OBD for pressure control and Certification Testing of particles, velocity and pressurization per WHO cleanroom guidelines** **The clean rooms will be air conditioned by means of DX Split Air Handling Units (By General HVAC Contractor). The DX Split Air Handling Unit will be located on fourth floor complete with primary and secondery filters (95% efficent EU 09) to achieve 40-60% relative humidity and 20 – 24 oC temperature in the clean room. Externally insulated ductwork will run from the unit to the various room and terminating with the supply air diffusers complete with HEPA filters (99.97% EU12). The extract air duct will have low level mounted grilles in all rooms with area classification Class 100. The extract fan will be mounted outside the building at high level connecting to the extract ductwork complete with primary and secondery filters (95% efficent EU 09) and HEPA. Pressure sensors will be installed to in all rooms to monitor pressure.**					
2.1.1	AHU-01 (Horizontal) double skin DX Split air handling unit 132.7kW total cooling capacity c/w VSD 5.5°C/11°C cooling coil with 24°C/11.2°C on/off coil, 55kW heating capacity with 55°C/45° heating coil, supply air is 7500l/s, primary filter with an average arresstance of 82%, secondary filter with an average arresstance of 95%, and HEPA filters. F/A is 7500l/s with motorised fresh air damper, stainless steel drain pan, heating coil mounted upstream of the unit before the cooling coil, light. Serving Labs 1-7. 50% ± 10% RH, 650Pa.					
	Supply		No	1	R	-
	Install		No	1	R	-
2.1.2	AHU-02 (Horizontal) double skin DX Split air handling unit 95.6kW total cooling capacity c/w VSD 5.5°C/11°C cooling coil with 24°C/11.2°C on/off coil, 45kW heating capacity with 55°C/45° heating coil, supply air is 8500l/s, primary filter with an average arresstance of 82%, secondary filter with an average arresstance of 95%, and HEPA filters. F/A is 8500l/s with motorised fresh air damper, stainless steel drain pan, heating coil mounted upstream of the unit before the cooling coil, light. Serving Labs 8-13. 50% ± 10% RH, 650Pa.					
	Supply		No	1	R	-
	Install		No	1	R	-
2.1.3	Supply and install the following plants and equipment. Tenderer is expected to be familiar with the specifed manufacturers and is to submit appropriate brochures of the specified items (or an equivalent product of another acceptable manufacturer as shall be agreed with the Client and Consultants. Outdoor air-cooled VRF condensing units, capable of multiple indoor units and zone, with extended range refrigerant piping. Operating outdoor temperature is 40°C. High COP. Refrigerant shall be R410A. E.g. Mitsubishi, LG, or approved equal. Note that the capacities stated below are for the combined floor load and are not additions of the individual capacities of the indoor units.					
	Supply		No	1	R	-
	Install		No	1	R	-
	TOTAL CARRIED FORWARD				R	-

ITEM NO.	DESCRIPTION	SPEC REF.	UNIT	QTY		
	TOTAL BROUGHT FROM PREVIOUS PAGE				R	-
	Supply		No	1	R	-
	Install		No	1	R	-
2.1.5	Diameter 28mm copper pipe		m	15	R	-
2.1.6	Diameter 32mm copper pipe		m	15	R	-
2.1.7	Header for connection of indoor units		Item	3	R	-
2.1.8	Y branch pipe for connection of outdoor units		Item	5	R	-
2.1.9	Y branch pipe for connection of indoor units		Item	2	R	-
	Pipe Insulation					
2.1.10	Diameter 28mm copper pipe		m	15	R	-
2.1.11	Diameter 32mm copper pipe		m	15	R	-
	VENTILATION EXTRACTION					
	EF-01 Extract Air Fan with a volume flow rate 'of 6.47 m³/s at a pressue of 400 Pa c/w two(2) x sound attenuators, Hepa filters, Pressure controllers and all necessary fittings					
	Supply		No	1	R	-
	Install		No	1	R	-
2.1.12	EF-02 Extract Air Fan with a volume flow rate 'of 8.5 m³/s at a pressue of 400 Pa c/w two(2) x sound attenuators, Hepa filters, Pressure controllers and all necessary fittings					
	Supply		No	1	R	-
	Install		No	1	R	-
	EF1 Extract Fan. Diameter 400mm with a volume flow rate 'of 0.45 m³/s at a pressue of 250 Pa c/w two(2) x sound attenuators and all necessary fittings and controllers					
	Supply		No	1	R	-
	Install		No	1	R	-
	Supply, Deliver & Install Heat Recovery Ventilator c/w with all neccesary fittings, accessories &					
	Supply		No	0		
	Install		No	0		
2.2	**AIR FLOW CONTROLS**					
2.2.1	Flow control / Balancing Dampers single or multi leaf. E.g GDL, Trox or approved equivalent Allow for the provision of balancing dampers as indicated on drawing and/or specification and/or schedules					
	Supply		No	30	R	-
	Install		No	30	R	-
2.3	**VENTILATION DUCTS (EXTERNALLY INSULATED)**					
2.3.1	**Installation of Ducts shall included alll fixing to complete the installation**					
	Supply Air Ducts					
	Category 1		$_m$2	280	R	-
	Category 2		$_m$2	0		
	Category 3		$_m$2	120	R	-
	Category 4		$_m$2	45	R	-
	Category 5		$_m$2	65	R	-
	SA Fittings					
	Category 1		ea	35	R	-
	Category 2		ea	0		
	Category 3		ea	25	R	-
	Category 4		ea	15	R	-
	Category 5		ea	24	R	-
	TOTAL CARRIED FORWARD				R	-

ITEM NO.	DESCRIPTION	SPEC REF.	UNIT	QTY		
	TOTAL BROUGHT FROM PREVIOUS PAGE				R	-
	Extraction Air Ducts (Uninsulated)					
	Category 1		$_m$2	35	R	-
	Category 2		$_m$2	0		
	Category 3		$_m$2	150	R	-
	Category 4		$_m$2	45	R	-
	Category 5		$_m$2	5	R	-
	Fittings					
	Category 1		ea	35	R	-
	Category 2		ea	0		
	Category 3		ea	25	R	-
	Category 4		ea	15	R	-
	Category 5		ea	24	R	-
	AIR TERMINALS					
	Install and connect with all necessary fittings and accessories. All Clean Room Supply Diffusers to be installed c/w Hepa Filters					
	Extract air disc valves with neck diameter 150mm		No	6	R	-
	Extract Air Louves 850x600 c/w Hepa Filters		No	2	R	-
	Supply Air diffusers (Swirl type) c/w Plenum Boxes 600x600 with neck diameter 300mm		No	30	R	-
	Extract Air Grilles 500x300 c/w Humidity sensors		No	30	R	-
	Humidifiers c/w duct sensors		No	13	R	-
	Door grills 300x300		No	4	R	-
	Electrical Installation		Item	1	R	-
	TOTAL FOR RESOURCE CENTRE CARRIED TO SUMMARY PAGE				**R**	-

Excluding VAT