



Bids and Awards Committee – for Goods and Services

November 20, 2019

BID BULLETIN NO. 3

This Bid Bulletin No. 3 is issued to modify or amend items in the Bid Document with Solicitation No.: 19-10-142 for the **Supply and Installation of Airconditioning Systems/Units**.

For the above-mentioned project, the following revisions in the bidding documents were effected:

1) Amendments to the Title of the Project

<i>Before</i>	<i>Revised</i>
Supply and Installation of Airconditioning System/Units	Supply and Installation of Heating, Ventilation, and Air-conditioning (HVAC) System/Units

2) Amendments to Invitation to Bid

<i>Paragraph Number</i>	<i>Before</i>	<i>Revised</i>
2	The <i>PHILIPPINE SCIENCE HIGH SCHOOL – MAIN CAMPUS</i> now invites bids for <i>the Supply and Installation of Air-conditioning System/Units</i> . Delivery of the Goods is required 45 calendar days . Bidders should have completed, within <i>two (2) years</i> from the date of submission and receipt of bids, a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II. Instructions to Bidders.	The <i>PHILIPPINE SCIENCE HIGH SCHOOL – MAIN CAMPUS</i> now invites bids for <i>the Supply and Installation of Heating, Ventilation, and Air-conditioning (HVAC) System/Units</i> . Delivery of the Goods is required 120 calendar days . Bidders should have completed, within <i>two (2) years</i> from the date of submission and receipt of bids, a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II. Instructions to Bidders.

3) Amendments to Section III – BID DATA SHEET

<i>ITB Clause</i>	<i>Before</i>	<i>Revised</i>
17.1	Bids will be valid until March 10, 2019 .	Bids will be valid until March 26, 2020 .

4) Amendments to Section VII – TECHNICAL SPECIFICATIONS

<i>Before</i>	<i>Revised</i>
<p>A. Refrigerant Piping, Fittings and Accessories</p> <ul style="list-style-type: none"> ● Quantities ● Indoor Y-Branches, ARBLN07121, 16 units ● Indoor Y-Branches, ARBLN14521, 31 units ● Outdoor Y-Branches, ARCNN21, 5 units ● Outdoor Y-Branches, ARCNN31 1 unit ● B.I. Sheets, 1.2x2.4m x Gauge 18 6 sheets ● G.I. Sheets, 1.2x2.4m x Gauge 24 4 sheets 	<p>A. Ductworks and Accessories</p> <ul style="list-style-type: none"> ● Quantities ● Indoor Y-Branches, ARBLN07121, 16 units ● Indoor Y-Branches, ARBLN14521, 31 units ● Outdoor Y-Branches, ARCNN21, 5 units ● Outdoor Y-Branches, ARCNN31, 1 unit ● B.I. Sheets, 1.2x2.4m x Gauge 18, 6 sheets ● G.I. Sheets, 1.2x2.4m x Gauge 24, 4 sheets ● PVC Pipe, 100mmØ, for Toilet Exhaust, 35 l. m. ● Primer, Straps, Hangers & Support, 1 lot ● Welding Materials, 1 lot
<ul style="list-style-type: none"> ● Refrigerant piping assembly as used in this section includes pipes, flanges, bolting, gaskets, valves, relief devices, fittings, and the pressure containing parts of other piping components. It also includes hangers and supports and other equipment items necessary to prevent overstressing the pressure containing parts 	<ul style="list-style-type: none"> ● Refrigerant piping assembly as used in this section includes pipes, flanges, bolting, gaskets, valves, relief devices, fittings, and the pressure containing parts of other piping components. It also includes hangers and supports and other equipment items necessary to prevent overstressing the pressure containing parts
<ul style="list-style-type: none"> ● Piping - ANSI 15 and ANSI B31.5 ● Compatible with fluids for which they are being used and capable of withstanding the pressures and temperatures of the service that they are handling 	<ul style="list-style-type: none"> ● Piping - ANSI 15 and ANSI B31.5 ● Compatible with fluids for which they are being used and capable of withstanding the pressures and temperatures of the service that they are handling
<ul style="list-style-type: none"> ● Tubing ● Refrigerant piping shall be seamless copper tubing, hard drawn, type L, ASTM B88. Tubing used for refrigerant service shall be cleaned, sealed, capped or plugged prior to being shipped from the manufacturer's plant. ● Fittings for copper tubing shall be wrought copper or bronze, brazing or 	<ul style="list-style-type: none"> ● Tubing ● Refrigerant piping shall be seamless copper tubing, hard drawn, type L, ASTM B88. Tubing used for refrigerant service shall be cleaned, sealed, capped or plugged prior to being shipped from the manufacturer's plant. ● Fittings for copper tubing shall be wrought copper or bronze, brazing or

<p>solder joint type ANSI B16.18 or ANSI B16.22. Copper flared type tubing may be made only in annealed copper tubing ASTM B280 and in nominal sizes smaller than one-inch only for connection to equipment and no larger than 1-3/8 inches diameter for other connections</p>	<p>solder joint type ANSI B16.18 or ANSI B16.22. Copper flared type tubing may be made only in annealed copper tubing ASTM B280 and in nominal sizes smaller than one-inch only for connection to equipment and no larger than 1-3/8 inches diameter for other connections</p>
<ul style="list-style-type: none"> ● Corrosion Prevention ● Unless specified otherwise, equipment fabricated from ferrous metals that do not have a zinc coating shall be treated for prevention of rust with a factory coating or paint system that will withstand 125 hours in a salt-spray fog test except that equipment located outdoors shall be tested for 500 hours. ● The salt spray fog test shall use a 20 percent sodium chloride solution. ● Immediately after completion of the test, the coating shall show no signs of blistering, wrinkling or cracking, no loss of adhesion, and the specimen shall show no signs of rust creepage beyond 1/8 inch on either side of the scratch mark. ● The film thickness of the factory coating or paint system applied on the equipment, shall be not less than film thickness used on the test specimen 	<ul style="list-style-type: none"> ● Corrosion Prevention ● Unless specified otherwise, equipment fabricated from ferrous metals that do not have a zinc coating shall be treated for prevention of rust with a factory coating or paint system that will withstand 125 hours in a salt-spray fog test except that equipment located outdoors shall be tested for 500 hours. ● The salt spray fog test shall use a 20 percent sodium chloride solution. ● Immediately after completion of the test, the coating shall show no signs of blistering, wrinkling or cracking, no loss of adhesion, and the specimen shall show no signs of rust creepage beyond 1/8 inch on either side of the scratch mark. ● The film thickness of the factory coating or paint system applied on the equipment, shall be not less than film thickness used on the test specimen
<ul style="list-style-type: none"> ● Safety Standards ● Design, Manufacture and Installation of Mechanical Refrigeration Equipment: ASHRAE Safety Code for Mechanical Refrigeration. ● Machinery Guards: Fully guard drive mechanisms, or other moving parts. Provide guards fabricated of steel and expanded metal, rigidly mounted, and readily removed without disassembly. 	<ul style="list-style-type: none"> ● Safety Standards ● Design, Manufacture and Installation of Mechanical Refrigeration Equipment: ASHRAE Safety Code for Mechanical Refrigeration. ● Machinery Guards: Fully guard drive mechanisms, or other moving parts. Provide guards fabricated of steel and expanded metal, rigidly mounted, and readily removed without disassembly.
<p>N/A</p>	<p>B. Refrigerant Piping, Fitting and Miscellaneous</p>

N/A	<ul style="list-style-type: none"> ● Quantities ● Ref. Pipe,Hard Drawn, 6mmØ, 6m long, ¼ ● Ref. Pipe,Hard Drawn, 9mmØ, 6m long, ⅜ ● Ref. Pipe,Hard Drawn, 12mmØ, 6m long, ½ ● Ref. Pipe,Hard Drawn, 15mmØ, 6m long, ⅝ ● Ref. Pipe,Hard Drawn, 19mmØ, 6m long, ¾ ● Ref. Pipe, Hard Drawn, 28mmØ, 6m long,1-⅛ ● Ref. Pipe,Hard Drawn,40mmØ, 6m long, 1-⅜ ● Elbow, 6mmØ, Short Radius,¼ ● Elbow, 9mmØ, Short Radius,⅜ ● Elbow, 12mmØ, Short Radius,½ ● Elbow, 15mmØ, Short Radius,⅝ ● Elbow, 19mmØ, Short Radius,¾ ● Elbow, 28mmØ, Short Radius,1-⅛ ● Elbow, 40mmØ, Short Radius,1-⅜ ● Rubber Insulation, 22mmØ,1/2 (1.8m/pc) ● Rubber Insulation, 22mmØ,5/8 (1.8m/pc) ● Rubber Insulation, 42mmØ,1-1/8 (1.8m/pc) ● Rubber Insulation, 42mmØ,1-3/8 (1.8m/pc) ● PVC Drain, 19mmØ, 3m long, ● Welding Materials (Oxy-Acetylene & Silver Rod)
N/A	C. Ventilating Fans and Blowers
N/A	<ul style="list-style-type: none"> ● Quantities ● Cassette Centrifugal Fan, 60W, 118L/S, 230/1/60, 20 units ● 52" 3-Blade Ceiling Fan, 66Watts, 230/1/60, 36 units ● Wall Mtd. Propeller Type Exhaust Fan, 118 L/S, 230/1/60, 5 units ● Kitchen & Store Room Exhaust, SISW, 944 L/S, 380/3/60, 1 unit

	<ul style="list-style-type: none"> ● Kitchen & Store Room Exhaust, SISW, 378 L/S, 380/3/60, 1 unit ● Kitchen Fresh Air Wall Mtd, 700 L/S, 380/3/60, 1 unit
B. Multi-V-Air-Conditioning System	D. Multi-V-Air-Conditioning System
<ul style="list-style-type: none"> ● Quantities ● 15-TR, 380/3Ø/60HZ, 5 units ● 25.0TR, 380/3Ø/60HZ, 1 unit ● 1.0TR Multi-V, Ceiling Mtd. FCU, 12 units ● 1.5TR Multi-V, Ceiling Mtd. FCU, 4 units ● 2.0TR Multi-V, Ceiling Mtd. FCU, 2 units ● 2.5TR Multi-V, Ceiling Mtd. FCU, 24 units ● 3.0TR Multi-V, Ceiling Mtd. FCU, 5 units ● Wide Wired Remote Controller, 47 units 	<ul style="list-style-type: none"> ● Quantities ● 15-TR, 230/3Ø/60HZ, 5 units ● 25.0TR, 230/3Ø/60HZ, 1 unit ● 1.0TR Multi-V, Ceiling Mtd. FCU, 12 units ● 1.5TR Multi-V, Ceiling Mtd. FCU, 4 units ● 2.0TR Multi-V, Ceiling Mtd. FCU, 2 units ● 2.5TR Multi-V, Ceiling Mtd. FCU, 24 units ● 3.0TR Multi-V, Ceiling Mtd. FCU, 5 units ● Wide Wired Remote Controller, 47 units
<ul style="list-style-type: none"> ● The air-conditioning systems shall be designed, constructed, and rating tested in accordance with ARI Standard 210 for air-conditioning equipment of capacities below 135,000 Btu's per hour and ARI Standard 300 for equipment with capacities of 135,000 Btu's per hour and greater. ● Units shall be ARI certified. Units with capacities below 135,000 Btu's per hour shall be listed in the ARI Directory of Certified Unitary Air-Conditioners 	<ul style="list-style-type: none"> ● The air-conditioning systems shall be designed, constructed, and rating tested in accordance with ARI Standard 210 for air-conditioning equipment of capacities below 135,000 Btu's per hour and ARI Standard 300 for equipment with capacities of 135,000 Btu's per hour and greater. ● Units shall be ARI certified. Units with capacities below 135,000 Btu's per hour shall be listed in the ARI Directory of Certified Unitary Air-Conditioners
<ul style="list-style-type: none"> ● Performance Rating ● Cooling capacity of unit shall meet the sensible heat requirements and total requirements indicated. ● In selecting unit size, make true allowance for "sensible to total heat ratio" to satisfy required sensible cooling capacity. ● Submittals shall include catalog selection data which accounts for sensible to total heat ratio, entering air-conditions at evaporator, and condenser air-conditions 	<ul style="list-style-type: none"> ● Performance Rating ● Cooling capacity of unit shall meet the sensible heat requirements and total requirements indicated. ● In selecting unit size, make true allowance for "sensible to total heat ratio" to satisfy required sensible cooling capacity. ● Submittals shall include catalog selection data which accounts for sensible to total heat ratio, entering air-conditions at evaporator, and condenser air-conditions
● Air-Conditioners, Multi-V System	● Air-Conditioners, Multi-V System

<p>(VRF)</p> <ul style="list-style-type: none"> ● The air-conditioning system shall consist of Ceiling mounted type evaporator-blower unit and remote air-cooled condensing unit. ● The separate assemblies shall be designed to be used together and ratings shall be based on the use of the matched assemblies. ● Submit data to demonstrate that the units will produce the capacity requirement specified or indicated on the drawings 	<p>(VRF)</p> <ul style="list-style-type: none"> ● The air-conditioning system shall consist of Ceiling mounted type evaporator-blower unit and remote air-cooled condensing unit. ● The separate assemblies shall be designed to be used together and ratings shall be based on the use of the matched assemblies. ● Submit data to demonstrate that the units will produce the capacity requirement specified or indicated on the drawings
<ul style="list-style-type: none"> ● Evaporator Fan ● see "Air Ventilation Equipment" 	<ul style="list-style-type: none"> ● Evaporator Fan ● see "Air Ventilation Equipment"
<ul style="list-style-type: none"> ● Compressors ● Provide hermetic, semi-hermetic rotary, inverter type provided with all the minimum standard equipment and accessories listed therein. ● Compressor speed for compressors above 20 tons shall not exceed 1750 rpm. Provide compressors with automatic capacity reduction of at least 50 percent for units over 10 tons. Compressors shall start unloaded. ● Provide each compressor with devices to protect the compressor from short-cycling when shut-down by safety controls. ● Provide a pump-down cycle of the non-recycling start type for each compressor 20 tons and over. ● Provide compressors with vibration isolators. ● Compressor motor shall be suitable for electric power characteristics as indicated. Motor shall conform to NEMA NG-1. ● Motor starters shall conform to NEMA ICS. ● Motors shall be constant speed, squirrel-cage induction, open type or 	<ul style="list-style-type: none"> ● Compressors ● Provide hermetic, semi-hermetic rotary, inverter type provided with all the minimum standard equipment and accessories listed therein. ● Compressor speed for compressors above 20 tons shall not exceed 1750 rpm. Provide compressors with automatic capacity reduction of at least 50 percent for units over 10 tons. Compressors shall start unloaded. ● Provide each compressor with devices to protect the compressor from short-cycling when shut-down by safety controls. ● Provide a pump-down cycle of the non-recycling start type for each compressor 20 tons and over. ● Provide compressors with vibration isolators. ● Compressor motor shall be suitable for electric power characteristics as indicated. Motor shall conform to NEMA NG-1. ● Motor starters shall conform to NEMA ICS. ● Motors shall be constant speed, squirrel-cage induction, open type or

<p>hermetically sealed, low-starting current, high- torque type, and shall be furnished with reduced voltage or and magnetic across-the- line type motor starter with weather-resistant enclosures</p>	<p>hermetically sealed, low-starting current, high- torque type, and shall be furnished with reduced voltage or and magnetic across-the- line type motor starter with weather-resistant enclosures</p>
<ul style="list-style-type: none"> ● Coils ● Fan Coil Unit Cooling Coils Cooling Coils shall conform to ARI 410. ● Direct-expansion coils shall be fin-and-tube type constructed of seamless copper or aluminum tubes and copper or aluminum fins mechanically bonded or soldered or helically wound to tubes. ● Casing and tube support sheets shall be not lighter than 16-gage (0.0635-inch nominal thickness) galvanized steel, formed to provide structural strength. ● Suction header shall be seamless copper tubing or seamless or resistance welded steel tube with copper connection. ● Supply header shall consist of a distributor to distribute the refrigerant liquid through seamless copper tubing, equally to all the circuit in the coil. ● Tubes shall be circuited to insure minimum pressure drop and maximum heat transfer. ● Circulating shall permit refrigerant flow from liquid inlet to suction outlet without causing oil staging or restricting refrigerant flow in coil. ● Rack coil shall be tested at the factory under water at not less than 300 psi air pressure and shall be suitable for 200 psi working pressure. ● Each coil shall be completely dehydrated and scaled at the factory upon completion of pressure tests. ● Coil shall be mounted for counterflow service ● The air-cooled condenser coil shall be extended-surface fin-and-tube type with seamless copper or aluminum 	<ul style="list-style-type: none"> ● Coils ● Fan Coil Unit Cooling Coils Cooling Coils shall conform to ARI 410. ● Direct-expansion coils shall be fin-and-tube type constructed of seamless copper or aluminum tubes and copper or aluminum fins mechanically bonded or soldered or helically wound to tubes. ● Casing and tube support sheets shall be not lighter than 16-gage (0.0635-inch nominal thickness) galvanized steel, formed to provide structural strength. ● Suction header shall be seamless copper tubing or seamless or resistance welded steel tube with copper connection. ● Supply header shall consist of a distributor to distribute the refrigerant liquid through seamless copper tubing, equally to all the circuit in the coil. ● Tubes shall be circuited to insure minimum pressure drop and maximum heat transfer. ● Circulating shall permit refrigerant flow from liquid inlet to suction outlet without causing oil staging or restricting refrigerant flow in coil. ● Rack coil shall be tested at the factory under water at not less than 300 psi air pressure and shall be suitable for 200 psi working pressure. ● Each coil shall be completely dehydrated and scaled at the factory upon completion of pressure tests. ● Coil shall be mounted for counterflow service ● The air-cooled condenser coil shall be extended-surface fin-and-tube type with seamless copper or aluminum

<p>construction.</p> <ul style="list-style-type: none"> ● Aluminum alloy conforming to ASTM B210, alloy 1100, shall be used for the tubes, and aluminum alloy conforming to chemical requirements of ASTM B209, alloy 7072, shall be used for fins and sheets. ● Fins shall be soldered or mechanically bonded to tubes and installed in a metal casing. ● Coils shall be air tested under water for leakage. ● After testing, dry coils for remote type units to remove free moisture, and cap to prevent entrance of foreign matter. ● Evacuate and seal coils at the factory 	<p>construction.</p> <ul style="list-style-type: none"> ● Aluminum alloy conforming to ASTM B210, alloy 1100, shall be used for the tubes, and aluminum alloy conforming to chemical requirements of ASTM B209, alloy 7072, shall be used for fins and sheets. ● Fins shall be soldered or mechanically bonded to tubes and installed in a metal casing. ● Coils shall be air tested under water for leakage. ● After testing, dry coils for remote type units to remove free moisture, and cap to prevent entrance of foreign matter. ● Evacuate and seal coils at the factory
<ul style="list-style-type: none"> ● Filter Boxes ● Provide filter boxes with either hanged access doors or removable panels. ● Filter boxes shall have racks for filters arranged for angle pattern. ● Filters shall be of type indicated and shall conform to paragraph hereinafter entitled, "Filters" 	<ul style="list-style-type: none"> ● Filter Boxes ● Provide filter boxes with either hanged access doors or removable panels. ● Filter boxes shall have racks for filters arranged for angle pattern. ● Filters shall be of type indicated and shall conform to paragraph hereinafter entitled, "Filters"
<ul style="list-style-type: none"> ● Mixing Boxes ● Mixing boxes shall be of physical size to match the basic unit and include equal sized flanged openings, each sized to handle full air flow. ● Arrangement of openings shall be as indicated. ● Provide openings with dampers of opposed blade type. ● All damper shafts shall be connected together by one continuous linkage bar. ● Arrange dampers for manual operation so that when one starts to close from its opened position, the other starts to open from its closed position 	<ul style="list-style-type: none"> ● Mixing Boxes ● Mixing boxes shall be of physical size to match the basic unit and include equal sized flanged openings, each sized to handle full air flow. ● Arrangement of openings shall be as indicated. ● Provide openings with dampers of opposed blade type. ● All damper shafts shall be connected together by one continuous linkage bar. ● Arrange dampers for manual operation so that when one starts to close from its opened position, the other starts to open from its closed position
<ul style="list-style-type: none"> ● Controls ● Condenser Controls ● Provide load pressure control to insure 	<ul style="list-style-type: none"> ● Controls ● Condenser Controls ● Provide load pressure control to insure

<p>condensing temperature for proper system operation at all ambient temperatures down to 40 degrees F.</p> <ul style="list-style-type: none"> ● Condenser Start-up Control ● Provide condenser with a start-up control package which permits start-up compressor regardless of low ambient temperatures. ● Package shall temporarily bypass system low pressure-start to permit start-up whenever minimum ambient temperature is below design evaporator coil suction temperature 	<p>condensing temperature for proper system operation at all ambient temperatures down to 40 degrees F.</p> <ul style="list-style-type: none"> ● Condenser Start-up Control ● Provide condenser with a start-up control package which permits start-up compressor regardless of low ambient temperatures. ● Package shall temporarily bypass system low pressure-start to permit start-up whenever minimum ambient temperature is below design evaporator coil suction temperature
<ul style="list-style-type: none"> ● Refrigerant Circuits ● Entire refrigerant circuit shall be dehydrated, purged, and charged with refrigerant and oil at factory. ● Factory oil charge shall be the full amount required for operation 	<ul style="list-style-type: none"> ● Refrigerant Circuits ● Entire refrigerant circuit shall be dehydrated, purged, and charged with refrigerant and oil at factory. ● Factory oil charge shall be the full amount required for operation
<ul style="list-style-type: none"> ● Corrosion Protection ● Units shall be factory corrosion protected in accordance with paragraph entitled, Corrosion Prevention 	<ul style="list-style-type: none"> ● Corrosion Protection ● Units shall be factory corrosion protected in accordance with paragraph entitled, Corrosion Prevention
C. Cleaning and painting	E. Cleaning and painting
<ul style="list-style-type: none"> ● Provide cleaning and periodic maintenance 	<ul style="list-style-type: none"> ● Provide cleaning and periodic maintenance
D. Identification Tags and Plates	F. Identification Tags and Plates
<ul style="list-style-type: none"> ● Provide equipment, thermometers, valves, and controllers with tags numbered and stamped for their use. ● Plates and tags shall be of brass or suitable non-ferrous material, securely mounted or attached. Minimum letter and numeral size shall be 1/8 inch 	<ul style="list-style-type: none"> ● Provide equipment, thermometers, valves, and controllers with tags numbered and stamped for their use. ● Plates and tags shall be of brass or suitable non-ferrous material, securely mounted or attached. Minimum letter and numeral size shall be 1/8 inch
E. Manufacturer qualifications	G. Manufacturer qualifications
<ul style="list-style-type: none"> ● Manufacturer shall be firms of long-term operation (minimum of 10 years of experience), technically proficient and experienced in this trade and has accomplished works similar to the project specifications. Shall be ISO 9001 certified company 	<ul style="list-style-type: none"> ● Manufacturer shall be firms of long-term operation (minimum of 10 years of experience), technically proficient and experienced in this trade and has accomplished works similar to the project specifications. Shall be ISO 9001 certified company

<p>F. Installation</p>	<p>F. Installation</p>
<ul style="list-style-type: none"> ● Application and installation practices for unitary air-conditioning systems shall conform to the requirements of an acceptable industry standard for installation of unitary systems. 	<ul style="list-style-type: none"> ● Application and installation practices for unitary air-conditioning systems shall conform to the requirements of an acceptable industry standard for installation of unitary systems.
<ul style="list-style-type: none"> ● General ● Install equipment and components in a manner to insure proper and sequential operation of the equipment and its controls. ● Installation of equipment not covered herein or in manufacturer's instructions shall be installed as recommended by manufacturer's representative. ● Provide proper foundations for mounting of equipment, accessories, appurtenances, piping and controls including, but not limited to, supported vibration isolators, stands, guides, anchors, clamps, and brackets. ● Foundations for equipment shall conform to equipment manufacturer's recommendation, unless otherwise shown in the drawings. ● Set anchor bolts and sleeves accurately using properly constructed templates. ● Anchor bolts shall be of adequate length and provided with welded-on plates on the head end embedded in the concrete. ● Level equipment bases, using jacks or steel wedges, and neatly grouted-in with a non-shrinking type of grouting mortar. ● Locate equipment so that working space is available for all necessary servicing such as shaft removal, disassembling compressor cylinders and pistons, replacing or adjusting drives, motors, or shaft seals, access to water heads and valves of shell and tube equipment, tube cleaning or replacement, access to automatic controls, refrigerant charging, 	<ul style="list-style-type: none"> ● General ● Install equipment and components in a manner to insure proper and sequential operation of the equipment and its controls. ● Installation of equipment not covered herein or in manufacturer's instructions shall be installed as recommended by manufacturer's representative. ● Provide proper foundations for mounting of equipment, accessories, appurtenances, piping and controls including, but not limited to, supported vibration isolators, stands, guides, anchors, clamps, and brackets. ● Foundations for equipment shall conform to equipment manufacturer's recommendation, unless otherwise shown in the drawings. ● Set anchor bolts and sleeves accurately using properly constructed templates. ● Anchor bolts shall be of adequate length and provided with welded-on plates on the head end embedded in the concrete. ● Level equipment bases, using jacks or steel wedges, and neatly grouted-in with a non-shrinking type of grouting mortar. ● Locate equipment so that working space is available for all necessary servicing such as shaft removal, disassembling compressor cylinders and pistons, replacing or adjusting drives, motors, or shaft seals, access to water heads and valves of shell and tube equipment, tube cleaning or replacement, access to automatic controls, refrigerant charging,

<p>lubrication, oil draining and working clearance under overhead lines.</p> <ul style="list-style-type: none"> ● Provide electric isolation between dissimilar metals for the purpose of minimizing galvanic corrosion. 	<p>lubrication, oil draining and working clearance under overhead lines.</p> <ul style="list-style-type: none"> ● Provide electric isolation between dissimilar metals for the purpose of minimizing galvanic corrosion.
<ul style="list-style-type: none"> ● Way Ceiling Cassette Air-Conditioning System ● Install system as indicated, in accordance with the requirements of ASHRAE 15-76 and as recommended in the manufacturer's installation and operational instructions. ● The following Split-Package Air Conditioner (SPAC), Ceiling Mounted-Inverter Type are to be installed, refer to Schedule of Equipment. 	<ul style="list-style-type: none"> ● Way Ceiling Cassette Air-Conditioning System ● Install system as indicated, in accordance with the requirements of ASHRAE 15-76 and as recommended in the manufacturer's installation and operational instructions. ● The following Split-Package Air Conditioner (SPAC), Ceiling Mounted-Inverter Type are to be installed, refer to Schedule of Equipment.
<ul style="list-style-type: none"> ● Electrical Work ● Electric motor driven equipment specified herein shall be provided complete with motors, motor starters, and controls. ● Electrical equipment and wiring shall be in accordance with Building Code. ● Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for the motor control wiring required for controls and devices but not indicated. 	<ul style="list-style-type: none"> ● Electrical Work ● Electric motor driven equipment specified herein shall be provided complete with motors, motor starters, and controls. ● Electrical equipment and wiring shall be in accordance with Building Code. ● Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for the motor control wiring required for controls and devices but not indicated.
<ul style="list-style-type: none"> ● Piping ● Piping Sleeves Pipe sleeves shall be as Galvanized Iron, Schedule 20. ● Provide refrigerant driers, sight glass liquid indicators, moisture indicators, and strainers in refrigerant piping for remote installations when not furnished by the manufacturer as part of the equipment. ● Locate strainers close to equipment they are to protect. ● Provide a strainer in the common refrigerant liquid supply to two or more thermal valves in parallel when each 	<ul style="list-style-type: none"> ● Piping ● Piping Sleeves Pipe sleeves shall be as Galvanized Iron, Schedule 20. ● Provide refrigerant driers, sight glass liquid indicators, moisture indicators, and strainers in refrigerant piping for remote installations when not furnished by the manufacturer as part of the equipment. ● Locate strainers close to equipment they are to protect. ● Provide a strainer in the common refrigerant liquid supply to two or more thermal valves in parallel when each

<p>thermal valve has a built-in strainer.</p> <ul style="list-style-type: none"> ● Install strainers with screen down and in direction of flow as indicated on strainers body. ● Solenoid valves shall be installed in horizontal lines with stem vertical and with flow in direction indicated on the valve. ● If not incorporated as internal part of the valve, provide strainers upstream of the solenoid valve. ● Provide service valves upstream of the solenoid valve, upstream of the strainer, and downstream of the solenoid valve. ● Remove the internal parts of the solenoid valve when brazing the valve. ● Inspect the building to measure the total length of piping to be used for all air-conditioning units and install the pipings whether the flooring/ceiling is finished or not. 	<p>thermal valve has a built-in strainer.</p> <ul style="list-style-type: none"> ● Install strainers with screen down and in direction of flow as indicated on strainers body. ● Solenoid valves shall be installed in horizontal lines with stem vertical and with flow in the direction indicated on the valve. ● If not incorporated as internal part of the valve, provide strainers upstream of the solenoid valve. ● Provide service valves upstream of the solenoid valve, upstream of the strainer, and downstream of the solenoid valve. ● Remove the internal parts of the solenoid valve when brazing the valve. ● Inspect the building to measure the total length of piping to be used for all air-conditioning units and install the pipings whether the flooring/ceiling is finished or not.
<ul style="list-style-type: none"> ● Auxiliary Drain Pans, Drain Connections, and Drain Lines ● Provide auxiliary drain pans under all drain pans of the units located above finished ceilings or over mechanical or electrical equipment where condensate overflow over unit drain pan may cause damage to ceilings, piping, and equipment below. ● Provide drain lines for all drain and auxiliary drain pans. Trap the drain from bottom pan of air-conditioning units to insure complete pan drainage. Drain lines shall be full size of opening. 	<ul style="list-style-type: none"> ● Auxiliary Drain Pans, Drain Connections, and Drain Lines ● Provide auxiliary drain pans under all drain pans of the units located above finished ceilings or over mechanical or electrical equipment where condensate overflow over unit drain pan may cause damage to ceilings, piping, and equipment below. ● Provide drain lines for all drain and auxiliary drain pans. Trap the drain from the bottom pan of air-conditioning units to ensure complete pan drainage. Drain lines shall be full size of opening.
<ul style="list-style-type: none"> ● Air Filters ● Provide access panels for all concealed valves, controls, dampers, and other fittings requiring inspection and maintenance. 	<ul style="list-style-type: none"> ● Air Filters ● Provide access panels for all concealed valves, controls, dampers, and other fittings requiring inspection and maintenance.
<ul style="list-style-type: none"> ● Inspection Plates and Test Holes ● Inspection plates and test holes where required in casings for air balance 	<ul style="list-style-type: none"> ● Inspection Plates and Test Holes ● Inspection plates and test holes where required in casings for air balance

<p>measurements shall conform to SMACMA High Pressure Low Velocity Duct Construction Standards.</p> <ul style="list-style-type: none"> ● Test holes shall be a factory-fabricated, air-tight, non- corrosive test hole with screw cap and gasket. ● Extend cap through insulation. 	<p>measurements shall conform to SMACMA High Pressure Low Velocity Duct Construction Standards.</p> <ul style="list-style-type: none"> ● Test holes shall be a factory-fabricated, air-tight, non- corrosive test hole with screw cap and gasket. ● Extend cap through insulation.
<ul style="list-style-type: none"> ● Flashing and Pitch Pockets ● Provide flashing and pitch pockets for equipment support and roof penetrations and flashing where piping or ductwork passes through exterior walls 	<ul style="list-style-type: none"> ● Flashing and Pitch Pockets ● Provide flashing and pitch pockets for equipment support and roof penetrations and flashing where piping or ductwork passes through exterior walls
<p>G. Field tests and inspections</p>	<p>G. Field tests and inspections</p>
<ul style="list-style-type: none"> ● Tests ● All tests shall be performed and materials and equipment required for test shall be furnished by the Contractor. ● Tests after installation and prior to acceptance shall be performed in the presence of a representative of the Owner and subject to his approval. ● Equipment and material certified as having been successfully tested by the manufacturer in accordance with referenced specifications and standards will not require retesting before installation. ● Equipment and materials not tested at the place of manufacturer will be tested before or after installation, as applicable, where necessary to determine compliance with referenced specifications and standards. 	<ul style="list-style-type: none"> ● Tests ● All tests shall be performed and materials and equipment required for test shall be furnished by the Contractor. ● Tests after installation and prior to acceptance shall be performed in the presence of a representative of the Owner and subject to his approval. ● Equipment and material certified as having been successfully tested by the manufacturer in accordance with referenced specifications and standards will not require retesting before installation. ● Equipment and materials not tested at the place of manufacturer will be tested before or after installation, as applicable, where necessary to determine compliance with referenced specifications and standards.
<ul style="list-style-type: none"> ● Leak Testing ● Upon completion of installation of the air-conditioning equipment, test all factory as well as field refrigerant piping with an electronic-type leak detector to acquire a leak tight refrigerant systems. ● If leaks are detected at the time of installation or during the guarantee period, remove the entire refrigerant charge from the system, correct the leaks and retest the system. 	<ul style="list-style-type: none"> ● Leak Testing ● Upon completion of installation of the air-conditioning equipment, test all factory as well as field refrigerant piping with an electronic-type leak detector to acquire a leak tight refrigerant systems. ● If leaks are detected at the time of installation or during the guarantee period, remove the entire refrigerant charge from the system, correct the leaks and retest the system.

<ul style="list-style-type: none"> ● Evacuation, Dehydration, and Charging ● After system is found to be without leaks, evacuate the system using a reliable gage and a vacuum pump capable of pulling a vacuum of at least 1 mm lig absolute. ● Evacuate system in strict compliance with the triple-evacuation and blotter method or in strict accordance with equipment manufacturer's printed instructions. ● System leak testing, evacuation, dehydration, and charging with refrigerant shall comply with the requirement contained in an acceptable industry standard. 	<ul style="list-style-type: none"> ● Evacuation, Dehydration, and Charging ● After system is found to be without leaks, evacuate the system using a reliable gage and a vacuum pump capable of pulling a vacuum of at least 1 mm lig absolute. ● Evacuate system in strict compliance with the triple-evacuation and blotter method or in strict accordance with equipment manufacturer's printed instructions. ● System leak testing, evacuation, dehydration, and charging with refrigerant shall comply with the requirement contained in an acceptable industry standard.
<ul style="list-style-type: none"> ● Start-Up and Operation Tests ● The air-conditioning system and its components shall be started and initially placed under operation and checked to see that it is functioning correctly. ● Adjust safety and automatic control instruments as necessary to place them in proper operation and sequence. ● The operational test shall be not less than 8 hours. 	<ul style="list-style-type: none"> ● Start-Up and Operation Tests ● The air-conditioning system and its components shall be started and initially placed under operation and checked to see that it is functioning correctly. ● Adjust safety and automatic control instruments as necessary to place them in proper operation and sequence. ● The operational test shall be not less than 8 hours.
<ul style="list-style-type: none"> ● Performance Tests ● Upon completion of evacuation, charging, start-up, final leak testing, and proper adjustment of controls, the system shall be performance tested to demonstrate that it complies with the performance and capacity requirements of the specifications and plans. ● Test the system for not less than 8 hours, during which time hourly readings shall be recorded. ● At the end of the test period, the readings shall be averaged and the average shall be considered to be the system performance 	<ul style="list-style-type: none"> ● Performance Tests ● Upon completion of evacuation, charging, start-up, final leak testing, and proper adjustment of controls, the system shall be performance tested to demonstrate that it complies with the performance and capacity requirements of the specifications and plans. ● Test the system for not less than 8 hours, during which time hourly readings shall be recorded. ● At the end of the test period, the readings shall be averaged and the average shall be considered to be the system performance
<ul style="list-style-type: none"> ● Sound Tests, Air-conditioner- Split Type ● Sound pressure level measurements shall be conducted on units designated by the Owner. Calculate sound power levels by ASHRAE Systems Handbook and Product Directory. Submit test results and calculations 	<ul style="list-style-type: none"> ● Sound Tests, Air-conditioner- Split Type ● Sound pressure level measurements shall be conducted on units designated by the Owner. Calculate sound power levels by ASHRAE Systems Handbook and Product Directory. Submit test results and calculations

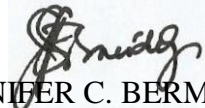
- 5) Additional attachment for the bidding document (please see attached file):
- 1) General Notes and Equipment Schedule (M0-1),
 - 2) Ground Floor AC & Ventilation (M1-1),
 - 3) Second Floor AC & Ventilation (M1-2),
 - 4) Third Floor AC & Ventilation (M1-3),
 - 5) Fourth Floor AC & Ventilation (M1-4),
 - 6) Load Schedule 1 (E2-02a),
 - 7) Load Schedule 2 (E2-02b), and
 - 8) Load Schedule 3 (E2-02c).

The excess units of HVAC at the attached Mechanical AC and Ventilation Layout compared to the Equipment Schedule will be deducted on the 3rd floor layout plan.

All bid bulletins shall be made part of bidding documents.

For guidance and information of all concerned.

Very truly yours,



JENNIFER C. BERMUDEZ
BAC Chairperson – for Goods and Services