



# Cutten School District

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Superintendent/Principal  
Sue Ivey

CUTTEN ELEMENTARY SCHOOL DISTRICT  
**BOARD OF TRUSTEES**  
**SPECIAL BOARD MEETING AGENDA**

**April 22, 2021 5:30 pm**

Join Zoom Meeting

<https://zoom.us/j/93520156433?pwd=M1I3L0ZiMis5ZmxvOG4zSHFhQ3ZkZz09>

Meeting ID: 935 2015 6433

Passcode: Cutten

Join by telephone: +1 669 900 6833

**1.0 CALL TO ORDER**

**2.0 CONSENT AGENDA**

- 2.1 Adoption of 2021-22 District Calendar Revision
- 2.2 Declaration of 1989 Ford Truck as Surplus

**3.0 VISITOR COMMENTS ON NON-AGENDA ITEMS**

The Board reserves the right to limit speakers to three minutes only. The Board may comment, but cannot take action at this time. The Board President may refer the matter to the Superintendent for review, if appropriate.

**4.0 INFORMATION / POSSIBLE ACTION ITEMS**

- 4.1 Consider Approval of *CSED Heating and Ventilation Project, Phase 1, Phase 2, and Phase 3* Design-Build Contracts with BESC, Inc.

**5.0 BOARD MEMBER & ADMINISTRATOR COMMENTS / COMMUNICATION**

**6.0 ADJOURNMENT**

NOTICE: Any writing, not exempt from public disclosure under Government Code Section 6253.5, 6254, 6254.3, 6254.7, 6254.15, 6254.16, or 6254.22, which is distributed to all or a majority of the members of the governing board by any person in connection with a matter subject to discussion or consideration at an open meeting of the board is available for public inspection at Ridgewood School, 2060 Ridgewood Drive, Eureka.

**CUTTEN SCHOOL DISTRICT**  
2021 - 2022 School Calendar

MONTH	MON	TUES	WED	THURS	FRI	HOLIDAYS & IMPORTANT DATES	DAYS TAUGHT
Teacher Duty Days - Aug. 23, 24 & 25							
August 26	23	24	25	26	27	<i>Aug. 26 - First day of school for students</i>	
to	30	31	1	2	3		
September 17	6	7	8	9	10	Parent interviews Sept. 30-Oct. 3	
<b>First Month</b>	13	14	15	16	17	Labor Day - Sept. 6	16
September 20	20	21	22	23	24		
to	27	28	29	30	1		
October 15	4	5	6	7	8		
<b>Second Month</b>	11	12	13	14	15		20
October 18	18	19	20	21	22		
to	25	26	27	28	29		
November 12	1	2	3	4	5	Staff Development Day Nov. 1	
<b>Third Month</b>	8	9	10	11	12	Veterans Day - Nov. 11 official, & Nov. 12	17
November 15	15	16	17	18	19	<input checked="" type="checkbox"/>	
to	22	23	24	25	26	Thanksgiving Break - Nov. 22-26	
December 10	29	30	1	2	3		
<b>Fourth Month</b>	6	7	8	9	10		15 P1
December 13	13	14	15	16	17		
to	20	21	22	23	24		
January 21	27	28	29	30	31	Winter Break - Dec. 20 - Dec. 31	
	3	4	5	6	7		
	10	11	12	13	14		
<b>Fifth Month</b>	17	18	19	20	21	Martin Luther King Day - Jan. 17	19
January 24	24	25	26	27	28		
to	31	1	2	3	4		
February 18	7	8	9	10	11		
<b>Sixth Month</b>	14	15	16	17	18		20
February 21	21	22	23	24	25	Presidents' Week Feb. 21-25	
to	28	1	2	3	4	<input checked="" type="checkbox"/>	
March 18	7	8	9	10	11	Conference Week - Mar. 7-11	
<b>Seventh Month</b>	14	15	16	17	18		15
March 21	21	22	23	24	25		
to	28	29	30	31	1		
April 15	4	5	6	7	8		
<b>Eighth Month</b>	11	12	13*	14*	15*	Spring Break - Apr. 11-15	15 P2
April 18	18	19	20	21	22		
to	25	26	27	28	29		
May 13	2	3	4	5	6		
<b>Ninth Month</b>	9	10	11	12	13		20
May 16	16	17	18	19	20		
to	23	24	25	26	27		
June 10	30	31	1	2	3	Memorial Day - May 30	
<b>Tenth Month</b>	6	7	8	9	10		19
June 13	13	14	15	16	*17	<i>June 16 - Last day of school for students</i>	
to							
June 16						*No school, Teacher duty day	
<b>Eleventh Month</b>							4
<b>TOTAL STUDENT DAYS</b>							<b>180</b>

End of Trimester <input checked="" type="checkbox"/>	1st Trimester	58
Conference Week		
Local Recess	2nd Trimester	54
Legal Holiday		
First/Last Day of School	3rd Trimester	68
Teacher Duty Day		

\*Make-up Days April 13, 14, 15  
Back to School Nights:  
Cutten - Sept. 1  
Ridgewood - Sept. 2

## CONTRACT

This Master Design Build Contract ("Contract") is made by and between the Cutten District ("District"), and BESC, Inc. ("Contractor").

District and Contractor hereby agree as follows:

### 1. Description of Work

The Contractor will provide the design, construction, commissioning and installation of a fully integrated and operational Heating and Ventilation project at Cutten and Ridgewood Schools in the Cutten Elementary School District.

The Contractor agrees to furnish all labor, materials, equipment, plant, tools, supervision, appurtenances, and services, including transportation and utilities, required to perform and satisfactorily complete all work required for the following project ("Project") in full conformance with the Contract Documents:

#### **CESD Heating and Ventilation Project, Phase 1**

It shall be the responsibility of the Contractor to obtain DSA approval of the Project plans, if applicable. No construction work shall commence at any site prior to DSA approval of the Project plans.

### 2. Contract Documents

The Contract Documents consist of the Complete Proposal Documents, as submitted by Contractor, including applicable drawings and calculations, the Contract, any Amendment thereto, Schematic Drawings and Specifications, Supplementary General Conditions, if any, General Conditions, Detailed Project Schedule, Request for Proposals (if applicable), Disabled Veteran Business Enterprises Requirements (if applicable), Labor Compliance Program (if applicable), all addenda, required bond(s) and insurance certificates, and all of which are incorporated herein by this reference. All Contract Documents are intended to coordinate so that any work called for in one document and not mentioned in another document is to be executed as if mentioned in all documents.

### 3. Proposals & Compensation

As full compensation for Contractor's complete and satisfactory performance of the work and activities described in the Contract Documents, District agrees to pay Contractor, and Contractor agrees to accept the sum of \$399,083.00, which shall be paid to the Contractor according to the Contract Documents.

### 4. Prevailing Wages

This Project is subject to prevailing wage requirements, and contractor and its Subcontractors are required to pay all workers employed for the performance of this contract no less than the applicable prevailing wage rate for each such worker. If this project is for a public works project over \$25,000 or for a maintenance project over \$15,000, bidder acknowledges that the project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations in accordance with California Labor Code sections 1725.5 and 1770 *et seq.*

### 5. Time for Completion

The starting date of the Contract shall be the day listed by the District in the Notice to Proceed and the Contractor shall fully complete all the work as detailed in accordance with Exhibit A, Project Milestone Schedule. Time is of the essence in the performance of this Contract.

### 6. Liquidated Damages

Liquidated damages for Contractor's failure to complete the Contract within the time fixed for completion inclusive of milestone dates are established in the amount of \$200.00 per day per each Milestone until that Milestone is completed.

IN WITNESS WHEREOF, the parties agree to the terms of this Contract on the day and year written below.

\_\_\_\_\_  
District

\_\_\_\_\_  
Contractor

Resolution No. \_\_\_\_\_

\_\_\_\_\_  
Contractor License No.  
and Expiration Date

\_\_\_\_\_  
Date

By: \_\_\_\_\_  
Individual Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

For: \_\_\_\_\_  
Corporation or Partnership  
If Corporation, Seal Below.

**Attachment 3**  
**Scope of Work**  
**CESD Heating & Ventilation Project - PHASE 1**

HVAC Improvement Project for RIDGEVIEW ELEMENTARY SCHOOL

The Work shall be completed as described below:

1. PHASE 1 - Contractor shall replace nine (9) gas unit heaters located at Ridgewood Elementary school. This phase includes the demolition, removal and recycling of existing natural gas Unit Heaters, with replacement by a ducted or ductless split system heat pumps for classrooms 4, 5, 7, 8, 9, 10, 11, and 12, and replacement with a ducted split system heat pump for the “Commons” multi-purpose room.

Phase 1 also includes the installation of appropriately sized Energy Recovery Ventilator (ERV), or Heat Recovery Ventilator (HRV) with MERV 13 filtration, to the rooms listed above. The purpose of the ERV/HRV is to bring in fresh, filtered outside air (OSA) into the classroom at CFM levels that meet or exceed per person occupancy as outlined in Title 24 Table 102.1-A, ASHRAE 52.2, 62.1 and 90.1, and an economizer to the ducted fan coil for the Commons room.

Phase 1 also includes the installation of appropriately sized bi-polar ionization devices to be installed in either the heat pump fan coil section or the ERV/HRV equipment for classrooms 4, 5, 7, 8, 9, 10, 11, 12, and the Commons room.

Phase 1 also includes the installation of communicating thermostats with Carbon Dioxide (CO<sub>2</sub>) and Relative Humidity (RH) sensors, and a cloud-based communication “gateway” that will provide real time temperature, CO<sub>2</sub> and RH conditions to a Smart phone or computer, with adjustment capabilities from the Smart phone or computer.

Phase 1 also includes engineering and drawings associated with all three phases of the project, and submission of engineered plans and engineering report to the Division of the State Architect (DSA) for approval.

### **General Scope of Work**

The following conditions apply to all measures included in this agreement:

- Efficiencies for all new equipment must meet or exceed current Title 24, and all installations must follow ASHRAE Standards 52.2, 55, 62.1, 90.1, 100, and 180.
- Work for all Trades shall be certified payroll at Prevailing Wage for this region per California Public Works contractor regulations.
- All Contractors and Subcontractors shall have a registered, valid, current D.I.R. Public Work’s contractor number.
- Engineering: Mechanical, Electrical, Plumbing and Structural calculations, engineering and engineered drawings shall be provided by BESC, Inc. with engineers licensed by the State of California.
- DSA reviews, certifications, permits and inspections by governing authority are included. DSA required structural, seismic or safety upgrades are not included

- Close-out and completion of other DSA open jobs are not included. Days of delay by others shall not count against Contractor for completion of work in this contract
- Commissioning and start-up reports are included.
- HVAC replacement equipment shall be high efficiency using environmentally compliant R410a refrigerant. As available from manufacturer, single-phase split heat pump systems will have a minimum SEER rating of 16.0 and minimum HSPF rating of 10.0. Equipment will have a minimum 5-year compressor and 10-year heat exchanger manufactures warranty.
- Split system heat pumps must have a minimum SEER rating of 16 or higher, and an HSPF of 10.0 or higher.
- Energy Recovery Ventilators (ERV) or Heat Recovery Ventilators (HRV) and Economizers must be able to deliver fresh outside air (OSA) to the minimum OSA per Title 24 Table 120.1-A, ASHRAE Standard 62.1 and ASHRAE Standard 90.1, for each occupied space.
- Fan coils without ERV/HRV fresh air assist, must be capable of delivering minimum OSA per Title 24 Table 120.1-A, ASHRAE 62.1 and ASHRAE Standard 90.1.
- All new mechanical equipment installed shall have a minimum 5-year equipment warranty for compressors, heat exchangers and fans, and 5-year calibration warranty for CO<sub>2</sub> sensors installed whether free standing or part of a thermostat.
- Contractor shall determine and document the minimum required outside air (OSA) for each space receiving replacement equipment.
- Contractor shall verify all ventilation is reaching the served zone, how is distributed and that there is adequate distribution. Further, Contractor shall measure and document supply air volume (CFM), return air volume (CFM), and exhaust inlets.
- If economizers are present on the new equipment Contractor must verify economizer functions are capable of modulating from a 100% closed to a 100% open position
- Demand Control Ventilation (DCV) - Contractor shall simulate CO<sub>2</sub> levels above and below DCV set points, verify and document that fresh outside air is supplied when CO<sub>2</sub> levels exceed the test set point and return to normal set position when CO<sub>2</sub> levels drop back to a safe range.
- All equipment installed shall be commissioned for start-up by qualified testing or adjusting personnel. Commissioning agent shall review control sequences to verify systems will maintain intended ventilation, temperature, and humidity conditions during school operation.
- Filters provided shall have a Minimum Efficiency Reporting Value (MERV) of 13, or the highest available that will not adversely affect function or performance of the mechanical equipment installed. Contractor shall verify highest MERV filter to be used by performing and documenting static pressure drop, as well as recording fan motor RPM, voltage and amps. Contractor shall verify air volume under a maximum pressure drop condition, that with the filter(s) in place, pressure drop is within manufacturers specifications (i.e. minimum CFM per ton, or minimum supply air temperature).
- Thermostats shall include a built-in CO<sub>2</sub> sensor and be capable of visually alerting classroom personnel when CO<sub>2</sub> levels exceed 1,100 ppm in the building space and by Smart phone or computer alerts. Thermostat CO<sub>2</sub> monitor must have a range of 400 ppm to 2,000 ppm or greater, and be certified by the manufacturer to be accurate within 75 ppm at 1,000 ppm of CO<sub>2</sub> concentration. Thermostat must be able to engage mechanical fresh air devices to bring in outside air. Thermostats must be able to communicate to a controller that can provide real time conditions and historical information to a “dashboard” accessible from a Smart phone or computer. Contractor shall test thermostat/CO<sub>2</sub> functions, verify and document performance is acceptable.

**MEASURE 1 - Building Automation System (BAS) Controls**

**Locations - 8 Classrooms and “Commons” Room at Ridgewood Elementary**

**Quantity - 9 Thermostats with CO<sub>2</sub> and RH Sensors, 1 “Gateway” Controllers,**

## Repeaters as necessary to boost signal

### Approach -

To provide adequate control of temperatures and CO<sub>2</sub> levels and to control the amount of fresh outside air being brought into the building space to meet the minimum CFM requirements per occupant, BESC, Inc. will provide a turnkey installation of the Pelican brand wireless control system to the rooms specified above. The wireless system will be applied to heat pump systems to the classrooms, and will respond to temperature and CO<sub>2</sub> conditions.

The Pelican wireless, Web enabled wireless mesh system, and is accessible remotely to manage climate controls to each individual space, including temperatures, start-stop times, overrides, and perform diagnostics quickly and remotely. With this system, programming can be performed remotely via a computer, Smart phone or other portable electronic device. Includes trend data, analytic and fault monitoring

### Inclusions -

- All software and hardware, including gateways and repeaters necessary to make controls system functional
- One GW400 5 VDC; 200 mA Ethernet Gateway (AC adapter provided) to Cutten Elementary and Ridgewood Elementary schools. Frequency: 2.4 GHz, IEEE 802.15.4 - complies with Class B, Part 15 of FCC rules. Operating temperature range of -4°F to 122°F. DHCP (default) or Static IP address. (1) 10 foot long CAT5 Ethernet cable. One (1) 120 VAC power adapter.
- Twenty-two (22) TS250H thermostats capable of sensing temperature, Humidity and CO<sub>2</sub> levels. Hardwire, 24VAC, 60Hz, 50mA. Voltage Rating: 23-30VAC. Relay Current 1.0A running. Operating temperature range of -4°F to 122°F. Integrated room CO<sub>2</sub> sensor range 0-2,000 ppm with +/- 50ppm accuracy, and auto-calibration. Front plate tamper-proof security screw. Four (4) minute compressor short cycle protection. Temporary schedule override. Thermostat keypad lockout. Auxiliary/emergency heat efficiency algorithm. Humidity dead band protection. High limit CO<sub>2</sub> (air quality control).
- Thermostat wire with adequate number of conductors to perform all thermostat/equipment functions
- Sensors and thermostats tied to each of the 22 heat pumps and ERV/HRV units installed as noted above
- Thermostats shall have a visual alert mechanism built in to the thermostat so that building occupants can see. Thermostats will also send an alert signal to Smart phones and computers so administrative and facility personnel can respond accordingly
- Programming of the system to operate at predetermined temperatures, time schedules, and to monitor and respond CO<sub>2</sub> levels in the room
- Establish user protocols to provide advanced analytics and adjustment authorizations to district personnel per district established clearances
- Program in “view only” for general personnel, and “dashboard” and operational functions available to authorized personnel
- Commissioning, start-up and start-up reports completed by a technician qualified by Pelican Wireless Systems, or by a certified Testing and Balancing professional

- Submittals, operations and maintenance manuals
- Ongoing training to technical/maintenance/administrative staff on the use of the new controls system and dashboard functions for the 1<sup>st</sup> year.

**MEASURE 2 -**

**Split System Heat Pumps**

**Locations -**

**8 Classrooms and “Commons” Room at Ridgewood Elementary**

**Quantity -**

**9 Classroom units, 1 ducted unit for Commons Room**

**Approach -**

The desire of the school district is to switch from natural gas appliances to energy efficient all electric appliances. To replace the natural gas “garage” style unit heaters that do not allow for any mechanical outside air ventilation, we have chosen high efficiency split system heat pumps with minimum SEER ratings of 16 and minimum heating HSPF ratings of 10.0.

Dependent upon the layout of the room ceiling space, electrical and other resources, the indoor units will either be ducted or ductless. Ducted systems will consist of one to three supply air locations, and one to three return air locations. Ductless systems will consist of one outdoor condenser and either a high wall mounted or ceiling mounted fan coil. These systems, regardless of finished configuration, will operate in conjunction with temperature set-points, time schedules, and CO<sub>2</sub> levels in the room. The heat pumps will also operate with the presence of either an outside air economizer or separate ERV/HRV device.

**Inclusions -**

- All mechanical, structural and electrical engineering and engineered drawings with approval from the DSA
- Pre-assessment and load calculations must be made and submitted for DSA approval prior to ordering any equipment under their purview
- Installation technicians must follow all safety guidelines and use appropriate Personal Protection Equipment (PPE), including that recommended by the CDC to prevent the spread of SARS-CoV-2
- Shut off existing gas and electrical lines to existing unit heaters. Remove and cap gas lines. Remove gas unit heaters and recycle/dispose of off-site.
- Cap gas flue at the ceiling of the room if not being re-used
- Set a level cement base (or other approved material) for new condensers at Ridgewood elementary school
- Frame base (or rack) above corridor halls at Cutten elementary for placement of condensers at that location
- Secure condensers as per Code requirements for local earthquake zone.
- Locate new outdoor power disconnect installed by others for each classroom.
- Run properly sized power wiring from outdoor disconnect supplied by others (from HVAC sub-panel to outdoor conduit connection point).
- Connect wiring from disconnect to HVAC equipment per



manufactures instructions and supported line drawings

- Install separate shielded stranded copper conductor wire between indoor and outdoor equipment with a 600 volt rating and double insulated copper wire. This must be used as the communication wire from the outdoor unit to the indoor unit. (Do not use thermostat wire for connection between indoor and outdoor units)
- Properly connect both the power supply and control lines to the terminal block per the connection diagram for the appropriate unit capacity and voltage
- All wires must be sized per NEC (National Electric Code)
- Ground the unit in accordance with NEC and local electrical codes
- Use the manufacturer supplied lock nuts to secure the conduit
- Reinstall the field wiring cover
- Install new thermostat communication (minimum shielded 16GA) control wire as necessary with enough conductors to perform all heat pump and associated devices functions
- Provide communicating thermostatic controls with programming capability to link heat pump and fresh air equipment functions
- For ducted systems: Insulate and weatherproof all external ductwork, joints and roof openings with counter flashing and mastic in accordance with applicable Codes. Ducts passing through unconditioned spaces shall be insulated and covered with a vapor barrier. Supply and return ducts penetrating ceilings or side-walls shall comply with fire codes
- For ducted systems provide new supply and return air duct transitions, and if necessary, accessible filter box. Seal and insulate
- For ducted systems, install supply air diffusers and return air grilles
- For ducted systems, provide fresh outside air supply duct to return before pre-filter
- For ductless systems, install ceiling cassette supply air fan-coils or high wall mounted fan coils, as conditions for that space allow
- Balance outdoor air setting to minimum OSA required for area served
- For split system heat pumps, provide new and properly sized, insulated (minimum 3/8"/10mm insulation), and weatherized refrigerant piping from outdoor unit to indoor unit. All brazing of pipe-work shall be performed with dry nitrogen in pipe to eliminate oxidation. Bend tubing with bending tools to avoid kinks and flat spots. Keep the tubing free of dirt, sand, moisture and other contaminants to avoid damaging the refrigerant systems. Avoid sags in the suction line to prevent the formation of oil traps. Only cut pipe with a pipe cutter.
- Connect the liquid line and gas piping to the indoor unit. Tighten the flare nut using a torque wrench. Tighten as specified in IOM
- Evacuate refrigerant lines by using either the deep vacuum or triple evacuation method. After evacuation is complete, fully close the low side of the manifold gage and stop the vacuum pump operation.
- Check factory settings for refrigerant lines longer than 25-feet to add refrigerant as described by manufacturer IOM, up to the allowable length as specified in the System Requirements section of the IOM.
- Pressure test new refrigerant tubes using dry nitrogen to check the

- pipe-work per manufactures instructions to ensure no leakage
- If required by manufacturer of new equipment, evacuate new refrigerant system to appropriate micron gage levels
- Install condensate drain lines as necessary
- Install secondary condensate drain pans and drain lines as necessary
- Per start-up requirements with certified testing and balancing personnel, balance outdoor air settings. Test and document for minimum and maximum ventilation rates
- Weigh-in refrigerant charge based upon actual quantity of refrigerant required, weighed at time of commissioning
- Start-up and commissioning of new system includes vacuum drying at commissioning as required by manufactures instruction
- Install refrigerant line-set covers where necessary. Seal all holes and seams. Paint to match
- Submittals, including installation, operations and maintenance manuals
- Review operation, and maintenance care with customer
- Ongoing training to technical/maintenance/administrative staff on the use of the new controls system and dashboard functions for the 1<sup>st</sup> year.

**Excludes -**

- After Hours/Overtime Labor
- Hazardous materials identification and abatement
- Duct system replacement for any existing equipment
- Security Cages for outdoor units
- Concrete patching
- Trenching for refrigerant piping if necessary
- Electrical conduit and wiring from main (or subpanel), and electrical disconnects at each classroom service point to be provided by others
- Any and all concealed or below grade obstructions, suitability of existing materials or equipment, performance of existing systems or implementation of the designs of others, structural, or electrical upgrades other than noted above, or seismic work, temporary power or air conditioning, fire life safety system and wiring, aesthetic screens, as well as all hazardous materials abatement, and any work not specifically addressed in proposal.
- Any DSA or School District adjustment to engineering, structural upgrades, design, drawings, ASBUILTS or scope of work

**MEASURE 3 -**

**Energy Recovery Ventilator and MERV 13 Filtration**

**Locations -**

**8 Classrooms at Ridgewood Elementary**

**Quantity -**

**8 Classroom units**

**Approach -**

The classrooms with unit heaters have no outside air ventilation or adequate filtration. Title-24 Code Table 120.1-A states that each

classroom must have 15 cfm per person of fresh outside air (OSA) in order to dilute CO<sub>2</sub> levels in the room. Conditions indicate that a separate Energy Recovery Ventilator (ERV) with minimum MERV 13 rated filters must be installed to the classrooms to make up OSA shortfall provided by the heat pump system, so that the minimum 15 cfm per person is met. ERV's will have filters on supply and exhaust.

#### Inclusions -

- All mechanical, structural and electrical engineering and engineered drawings with approval from the DSA
- Pre-assessment and load calculations must be made and submitted for DSA approval prior to ordering any equipment under their purview
- Installation technicians must follow all safety guidelines and use appropriate Personal Protection Equipment (PPE), including that recommended by the CDC to prevent the spread of SARS-CoV-2
- For classrooms without above ceiling attic space, penetrations through the sidewall or through existing fixed window spaces, must be made in order to route fresh, outside air ducting and exhaust air ducting.
- For classrooms with attic space, the ERV ducting may be routed to the outside through the ceiling for the fresh OSA and exhaust air regardless of whether the ERV is mounted inside the classroom or in the attic
- Ducting that terminates at the outside wall shall receive a screen and louver cover for the opening and walls be sealed with fire caulk
- If DSA requires, modify existing electrical circuits to accommodate appropriate circuit breaker for new ERV unit and install a 115v outlet within 6-feet of the ERV so that it may be plugged into a power source
- All wires must be sized per NEC (National Electric Code)
- The ERV unit must be grounded
- Provide communicating thermostatic controls with programming capability to link heat pump and fresh air ERV equipment functions
- When choosing mounting location, provide adequate service access for maintenance for filters and the core
- Use ERV integral flanges for mounting to a wall or hanging from a ceiling. Ensure adequate clearances for access door latches. DSA must approve hanging method including anchors, hangers, bolt size, length, type, etc.
- Also, secure the ERV with straps or clamps so that it cannot fall or tip in the event of an accident, structural failure or earthquake
- Ducts passing through unconditioned spaces shall be insulated and covered with a vapor barrier. Supply and return ducts penetrating ceilings or side-walls shall comply with fire codes
- Balance outdoor air setting to minimum OSA required for area served
- Before installing cover ERV unit openings so that drywall, construction dust or other particulates are kept out of unit
- Install ERV unit in the classroom above head height or in the attic at a height so that it is serviceable from a 6-foot ladder for filter changes etc.
- Locate at the back of the classroom near the door or outside wall
- Ducts from the ERV unit to the outside must be insulated with a

sealed vapor barrier on both inside and outside of the insulation (or with closed-cell foam insulation)

- The fresh air inlet should be at least 10-feet away from chimneys, furnace flues, water heater exhausts and other sources of carbon monoxide, humidity or other contamination
- Inner and outer vapor barriers of insulated duct to collars on duct adapters and wall caps must be sealed with appropriate tape or other means to prevent migration of moisture into insulation
- The exhaust outlet and fresh air inlet openings on the outside of the building should be at least 10-feet apart to avoid cross contamination
- Do NOT exhaust through the roof. (Condensate will form in cold weather and could run back into the unit). Route exhaust duct slightly downhill to a horizontal discharge wall cap. Provide vent cover to prevent the entry of rain to fresh air or exhaust air ducts
- Keep insulated duct runs as short and direct as possible. Suspend and support per code and DSA approval
- Do not duct fresh supply air directly towards building occupants
- At start-up, test the airflow rate for both the Fresh Air and Exhaust Air so that they are roughly equal (or “balanced”) for best performance. Refer to manufacturer specification sheet for CFM/ESP curves
- Many ERV’s are not suitable for speed control by rheostat. Check ERV installation guide to see if it is capable of using a speed control device. If not, damage will occur to the blowers. For ERV’s that are not suitable for speed control by rheostat, balance air flows by using dampers
- Submittals, including installation, operations and maintenance manuals
- Review operation, and maintenance care with customer
- Ongoing training to technical/maintenance/administrative staff on the use of the new controls system and dashboard functions for the 1<sup>st</sup> year.

#### Excludes -

- After Hours/Overtime Labor
- Hazardous materials identification and abatement
- Duct system replacement for any existing equipment
- Security Cages
- Electrical conduit and wiring from main (or subpanel), and electrical disconnects at each classroom service point to be provided by others
- Any and all concealed obstructions, suitability of existing materials, implementation of the designs of others, structural upgrades or seismic work other than noted above, temporary power or air conditioning, fire life safety system and wiring, aesthetic screens, as well as all hazardous materials abatement, and any work not specifically addressed in this proposal.
- Any DSA or School District adjustment to engineering, design, additional structural requirements or scope of work

## EXHIBIT "A"

### Project Milestone Schedule

A Schedule of Values will be completed within two weeks of Award of Contract, and before issuance of a Notice to Proceed.

The CESD Heating & Ventilation Project – Phase 1 will take approximately fourteen (14) weeks to complete once DSA has approved equipment and design drawings, and after equipment arrives. Equipment will be ordered upon the Notice to Proceed. Final Subcontractor job walks will be conducted immediately after Award of Contract.

Week 1	DSA appointment to review drawings and scope of work Final Subcontractor job walks
Week 2	DSA design and equipment approvals (Thermostats and structural approval for Heat Pumps and ERV's) Ordering of equipment and materials
Week 3	Updated Schedule of Values completed
Week 3-4	Installation of thermostats with CO2 sensors and Gateway cloud based controller. Operational testing performed upon installation. Final start-up completed after all HVAC equipment is installed; (heat pumps and ERV units). Line set and electrical layout for heat pump equipment.
Week 4-9	Installation and start-up of heat pump equipment Installation of ERV equipment for smaller rooms (under 20-maximum occupancy)
Week 13-18	Installation of larger ERV equipment for rooms with over 20-occupants
Week 19	Final commissioning and start-up
Week 20-22	Final inspections

Due to equipment arrival dates, anticipated fully completed project time is September 30<sup>th</sup>, 2021. Fully functioning heat pumps and thermostats should be completed and commissioned by August 20, 2021. Every effort will be made to also have functioning ERV units by the start of the fall year, dependent upon the arrival of the ERV equipment.

This schedule is predicated on DSA clearance of previously opened jobs that are closed and approved by the DSA.

## CONTRACT

This Master Design Build Contract ("Contract") is made by and between the Cutten District ("District"), and BESC, Inc. ("Contractor").

District and Contractor hereby agree as follows:

### 1. Description of Work

The Contractor will provide the design, construction, commissioning and installation of a fully integrated and operational Heating and Ventilation project at Cutten and Ridgewood Schools in the Cutten Elementary School District.

The Contractor agrees to furnish all labor, materials, equipment, plant, tools, supervision, appurtenances, and services, including transportation and utilities, required to perform and satisfactorily complete all work required for the following project ("Project") in full conformance with the Contract Documents:

#### **CESD Heating and Ventilation Project, Phase 2**

It shall be the responsibility of the Contractor to obtain DSA approval of the Project plans, if applicable. No construction work shall commence at any site prior to DSA approval of the Project plans.

### 2. Contract Documents

The Contract Documents consist of the Complete Proposal Documents, as submitted by Contractor, including applicable drawings and calculations, the Contract, any Amendment thereto, Schematic Drawings and Specifications, Supplementary General Conditions, if any, General Conditions, Detailed Project Schedule, Request for Proposals (if applicable), Disabled Veteran Business Enterprises Requirements (if applicable), Labor Compliance Program (if applicable), all addenda, required bond(s) and insurance certificates, and all of which are incorporated herein by this reference. All Contract Documents are intended to coordinate so that any work called for in one document and not mentioned in another document is to be executed as if mentioned in all documents.

### 3. Proposals & Compensation

As full compensation for Contractor's complete and satisfactory performance of the work and activities described in the Contract Documents, District agrees to pay Contractor, and Contractor agrees to accept the sum of \$197,176.00, which shall be paid to the Contractor according to the Contract Documents.

### 4. Prevailing Wages

This Project is subject to prevailing wage requirements, and contractor and its Subcontractors are required to pay all workers employed for the performance of this contract no less than the applicable prevailing wage rate for each such worker. If this project is for a public works project over \$25,000 or for a maintenance project over \$15,000, bidder acknowledges that the project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations in accordance with California Labor Code sections 1725.5 and 1770 *et seq.*

### 5. Time for Completion

The starting date of the Contract shall be the day listed by the District in the Notice to Proceed and the Contractor shall fully complete all the work as detailed in accordance with Exhibit A, Project Milestone Schedule. Time is of the essence in the performance of this Contract.

### 6. Liquidated Damages

Liquidated damages for Contractor's failure to complete the Contract within the time fixed for completion inclusive of milestone dates are established in the amount of \$200.00 per day per each Milestone until that Milestone is completed.

IN WITNESS WHEREOF, the parties agree to the terms of this Contract on the day and year written below.

\_\_\_\_\_  
District

\_\_\_\_\_  
Contractor

Resolution No. \_\_\_\_\_

\_\_\_\_\_  
Contractor License No.  
and Expiration Date

\_\_\_\_\_  
Date

By: \_\_\_\_\_  
Individual Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

For: \_\_\_\_\_  
Corporation or Partnership  
If Corporation, Seal Below.

**Attachment 3**  
**Scope of Work**  
**CESD Heating & Ventilation Project - PHASE 2**

HVAC Improvement Project for CUTTEN ELEMENTARY SCHOOL

The Work shall be completed as described below:

1. PHASE 2 - Contractor shall install appropriately sized ERV's or HRV's to classrooms 1-11, and classroom 14 at Cutten Elementary school. The purpose of the ERV/HRV is to bring in fresh, filtered outside air (OSA) into the classroom at CFM levels that meet or exceed per person occupancy as outlined in Title 24 Table 102.1-A, ASHRAE 52.2, 62.1, and 90.1.

Phase 2 also includes the installation of communicating thermostats with Carbon Dioxide (CO<sub>2</sub>) and Relative Humidity (RH) sensors, and a cloud-based communication "gateway" that will provide real time temperature, CO<sub>2</sub> and RH conditions to a Smart phone or computer, with adjustment capabilities from the Smart phone or computer. These thermostats will be installed to classrooms 1-11, 14 and in the multi-purpose room.

**General Scope of Work**

The following conditions apply:

- Efficiencies for all new equipment must meet or exceed current Title 24, and all installations must follow ASHRAE Standards 52.2, 55, 62.1, 90.1, 100, and 180.
- Work for all Trades shall be certified payroll at Prevailing Wage for this region per California Public Works contractor regulations.
- All Contractors and Subcontractors shall have a registered, valid, current D.I.R. Public Works contractor number.
- Engineering: Mechanical, Electrical, Plumbing and Structural calculations, engineering and engineered drawings shall be provided by BESC, Inc. with engineers licensed by the State of California.
- DSA reviews, certifications, permits and inspections by governing authority are included. DSA required structural, seismic or safety upgrades are not included
- Close-out and completion of other open jobs are not included. Days of delay by others, including DSA shall not count against Contractor for completion of work in this contract
- Commissioning and start-up reports are included.
- Energy Recovery Ventilators (ERV) or Heat Recovery Ventilators (HRV) and Economizers must be able to deliver fresh outside air (OSA) to the minimum OSA per Title 24 Table 120.1-A, ASHRAE Standard 62.1 and ASHRAE Standard 90.1, for each occupied space.
- All new mechanical equipment installed shall have a minimum 5-year equipment warranty for compressors, heat exchangers and fans, and 5-year calibration warranty for CO<sub>2</sub> sensors installed whether free standing or part of a thermostat.
- Contractor shall determine and document the minimum required outside air (OSA) for each space receiving replacement equipment.
- Contractor shall verify all ventilation is reaching the served zone, how is distributed and that there is adequate distribution. Further, Contractor shall measure and document supply air volume (CFM), return air volume (CFM), and exhaust inlets.
- All equipment installed shall be commissioned for start-up by qualified testing or adjusting



personnel. Commissioning agent shall review control sequences to verify systems will maintain intended ventilation, temperature, and humidity conditions during school operation.

- Filters provided shall have a Minimum Efficiency Reporting Value (MERV) of 13, or the highest available that will not adversely affect function or performance of the mechanical equipment installed. Contractor shall verify highest MERV filter to be used by performing and documenting static pressure drop, as well as recording fan motor RPM, voltage and amps. Contractor shall verify air volume under a maximum pressure drop condition, that with the filter(s) in place, pressure drop is within manufacturers specifications (i.e. minimum CFM per ton, or minimum supply air temperature).
- Thermostats shall include a built-in CO<sub>2</sub> sensor and be capable of visually alerting classroom personnel when CO<sub>2</sub> levels exceed 1,100 ppm in the building space and by Smart phone or computer alerts. Thermostat CO<sub>2</sub> monitor must have a range of 400 ppm to 2,000 ppm or greater, and be certified by the manufacturer to be accurate within 75 ppm at 1,000 ppm of CO<sub>2</sub> concentration. Thermostat must be able to engage mechanical fresh air devices to bring in outside air. Thermostats must be able to communicate to a controller that can provide real time conditions and historical information to a “dashboard” accessible from a Smart phone or computer. Contractor shall test thermostat/CO<sub>2</sub> functions, verify and document performance is acceptable.

**MEASURE 1 - Building Automation System (BAS) Controls**

**Locations - 12 Classrooms at Cutten Elementary**

**Quantity - 12 Thermostats with CO<sub>2</sub> and RH Sensors, 1 “Gateway” Controller, Repeaters as necessary to boost signal**

**Approach -** To provide adequate control of temperatures and CO<sub>2</sub> levels and to control the amount of fresh outside air being brought into the building space to meet the minimum CFM requirements per occupant, BESC, Inc. will provide a turnkey installation of the Pelican brand wireless control system to the rooms specified above. This wireless system will be applied to heat pump systems to the classrooms, and will respond to temperature and CO<sub>2</sub> conditions.

The Pelican wireless, Web enabled wireless mesh system, and is accessible remotely to manage climate controls to each individual space, including temperatures, start-stop times, overrides, and perform diagnostics quickly and remotely. With this system, programming can be performed remotely via a computer, Smart phone or other portable electronic device. Includes trend data, analytic and fault monitoring

**Inclusions -**

- All software and hardware, including gateways and repeaters necessary to make controls system functional
- One GW400 5 VDC; 200 mA Ethernet Gateway (AC adapter provided) to Cutten Elementary and Ridgewood Elementary schools. Frequency: 2.4 GHz, IEEE 802.15.4 - complies with Class B, Part 15 of FCC rules. Operating temperature range of -4°F to

122°F. DHCP (default) or Static IP address. (1) 10 foot long CAT5 Ethernet cable. One (1) 120 VAC power adapter.

- Twenty-two (22) TS250H thermostats capable of sensing temperature, Humidity and CO<sub>2</sub> levels. Hardwire, 24VAC, 60Hz, 50mA. Voltage Rating: 23-30VAC. Relay Current 1.0A running. Operating temperature range of -4°F to 122°F. Integrated room CO<sub>2</sub> sensor range 0-2,000 ppm with +/- 50ppm accuracy, and auto-calibration. Front plate tamper-proof security screw. Four (4) minute compressor short cycle protection. Temporary schedule override. Thermostat keypad lockout. Auxiliary/emergency heat efficiency algorithm. Humidity dead band protection. High limit CO<sub>2</sub> (air quality control).
- Thermostat wire with adequate number of conductors to perform all thermostat/equipment functions
- Sensors and thermostats tied to each of the 22 heat pumps and ERV/HRV units installed as noted above
- Thermostats shall have a visual alert mechanism built in to the thermostat so that building occupants can see. Thermostats will also send an alert signal to Smart phones and computers so administrative and facility personnel can respond accordingly
- Programming of the system to operate at predetermined temperatures, time schedules, and to monitor and respond CO<sub>2</sub> levels in the room
- Establish user protocols to provide advanced analytics and adjustment authorizations to district personnel per district established clearances
- Program in “view only” for general personnel, and “dashboard” and operational functions available to authorized personnel
- Commissioning, start-up and start-up reports completed by a technician qualified by Pelican Wireless Systems, or by a certified Testing and Balancing professional
- Submittals, operations and maintenance manuals
- Ongoing training to technical/maintenance/administrative staff on the use of the new controls system and dashboard functions for the 1<sup>st</sup> year.

**MEASURE 2 -**

**Energy Recovery Ventilator and MERV 13 Filtration**

**Locations -**

**12 Classrooms at Cutten Elementary**

**Quantity -**

**12 Classroom units**

**Approach -**

The classrooms with unit heaters have no outside air ventilation or adequate filtration. Title-24 Code Table 120.1-A states that each classroom must have 15 cfm per person of fresh outside air (OSA) in order to dilute CO<sub>2</sub> levels in the room. Conditions indicate that a separate Energy Recovery Ventilator (ERV) with minimum MERV 13 rated filters must be installed to the classrooms to make up OSA shortfall provided by the heat pump system, so that the minimum 15 cfm per person is met. ERV's will have filters on supply and exhaust.

**Inclusions -**

- All mechanical, structural and electrical engineering and engineered drawings with approval from the DSA

- Pre-assessment and load calculations must be made and submitted for DSA approval prior to ordering any equipment under their purview
- Installation technicians must follow all safety guidelines and use appropriate Personal Protection Equipment (PPE), including that recommended by the CDC to prevent the spread of SARS-CoV-2
- For classrooms without above ceiling attic space, penetrations through the sidewall or through existing fixed window spaces, must be made in order to route fresh, outside air ducting and exhaust air ducting.
- For classrooms with attic space, the ERV ducting may be routed to the outside through the ceiling for the fresh OSA and exhaust air regardless of whether the ERV is mounted inside the classroom or in the attic
- Ducting that terminates at the outside wall shall receive a screen and louver cover for the opening and walls be sealed with fire caulk
- If DSA requires, modify existing electrical circuits to accommodate appropriate circuit breaker for new ERV unit and install a 115v outlet within 6-feet of the ERV so that it may be plugged into a power source
- All wires must be sized per NEC (National Electric Code)
- The ERV unit must be grounded
- Provide communicating thermostatic controls with programming capability to link heat pump and fresh air ERV equipment functions
- When choosing mounting location, provide adequate service access for maintenance for filters and the core
- Use ERV integral flanges for mounting to a wall or hanging from a ceiling. Ensure adequate clearances for access door latches. DSA must approve hanging method including anchors, hangers, bolt size, length, type, etc.
- Also, secure the ERV with straps or clamps so that it cannot fall or tip in the event of an accident, structural failure or earthquake
- Ducts passing through unconditioned spaces shall be insulated and covered with a vapor barrier. Supply and return ducts penetrating ceilings or side-walls shall comply with fire codes
- Balance outdoor air setting to minimum OSA required for area served
- Before installing cover ERV unit openings so that drywall, construction dust or other particulates are kept out of unit
- Install ERV unit in the classroom above head height, or in the attic at a height so that it is serviceable from a 6-foot ladder for filter changes etc.
- Locate at the back of the classroom near the door or outside wall
- Ducts from the ERV unit to the outside must be insulated with a sealed vapor barrier on both inside and outside of the insulation (or with closed-cell foam insulation)
- The fresh air inlet should be at least 10-feet away from chimneys, furnace flues, water heater exhausts and other sources of carbon monoxide, humidity or other contamination
- Inner and outer vapor barriers of insulated duct to collars on duct adapters and wall caps must be sealed with appropriate tape or other means to prevent migration of moisture into insulation
- The exhaust outlet and fresh air inlet openings on the outside of the building should be at least 10-feet apart to avoid cross

contamination

- Do NOT exhaust through the roof. (Condensate will form in cold weather and could run back into the unit). Route exhaust duct slightly downhill to a horizontal discharge wall cap. Provide vent cover to prevent the entry of rain to fresh air or exhaust air ducts
- Keep insulated duct runs as short and direct as possible. Suspend and support per code and DSA approval
- Do not duct fresh supply air directly towards building occupants
- At start-up, test the airflow rate for both the Fresh Air and Exhaust Air so that they are roughly equal (or “balanced”) for best performance. Refer to manufacturer specification sheet for CFM/ESP curves
- Many ERV’s are not suitable for speed control by rheostat. Check ERV installation guide to see if it is capable of using a speed control device. If not, damage will occur to the blowers. For ERV’s that are not suitable for speed control by rheostat, balance air flows by using dampers
- Submittals, including installation, operations and maintenance manuals
- Review operation, and maintenance care with customer
- Ongoing training to technical/maintenance/administrative staff on the use of the new controls system and dashboard functions for the 1<sup>st</sup> year.

Excludes -

- After Hours/Overtime Labor
- Hazardous materials identification and abatement
- Duct system replacement for any existing equipment
- Security Cages
- Electrical conduit and wiring from main (or subpanel), and electrical disconnects at each classroom service point to be provided by others
- Any and all concealed obstructions, suitability of existing materials, implementation of the designs of others, structural upgrades or seismic work other than noted above, temporary power or air conditioning, fire life safety system and wiring, aesthetic screens, as well as all hazardous materials abatement, and any work not specifically addressed in this proposal.
- Any DSA or School District adjustment to engineering, design, additional structural requirements or scope of work

## EXHIBIT "A"

### Project Milestone Schedule

A Schedule of Values will be completed within two weeks of Award of Contract, and before issuance of a Notice to Proceed.

The CESD Heating & Ventilation Project – Phase 2 will take approximately eight (8) weeks to complete once DSA has approved equipment and design drawings, and after equipment arrives. Equipment will be ordered upon the Notice to Proceed. Final Subcontractor job walks will be conducted immediately after Award of Contract.

Week 1	DSA appointment to review drawings and scope of work Final Subcontractor job walks
Week 2	DSA design and equipment approvals (Thermostats and structural approval for ERV's) Ordering of equipment and materials
Week 3	Updated Schedule of Values completed
Week 3-19	Installation of thermostats with CO <sub>2</sub> sensors and Gateway cloud based controller. Operational testing performed upon installation. Interim start-up tied to ERV's performed after ERV installation. Final start-up completed after all HVAC equipment is installed; (heat pumps [Phase 3] and ERV units [Phase 2]).
Week 13-19	Installation of ERV equipment
Week 20	Final commissioning and start-up of ERV's and Thermostats
Week 21-23	Final inspections

Due to equipment arrival dates, anticipated fully completed project for installing thermostats with CO<sub>2</sub> sensors is July 31<sup>st</sup>, and ERV's is October 31<sup>th</sup>, 2021. Every effort will be made to also have functioning ERV units by the start of the fall year, dependent upon the arrival of the ERV equipment.

This schedule is predicated on DSA clearance of previously opened jobs that are closed and approved by the DSA.

## CONTRACT

This Master Design Build Contract ("Contract") is made by and between the Cutten District ("District"), and BESC, Inc. ("Contractor").

District and Contractor hereby agree as follows:

### 1. Description of Work

The Contractor will provide the design, construction, commissioning and installation of a fully integrated and operational Heating and Ventilation project at Cutten and Ridgewood Schools in the Cutten Elementary School District.

The Contractor agrees to furnish all labor, materials, equipment, plant, tools, supervision, appurtenances, and services, including transportation and utilities, required to perform and satisfactorily complete all work required for the following project ("Project") in full conformance with the Contract Documents:

#### **CESD Heating and Ventilation Project, Phase 3**

It shall be the responsibility of the Contractor to obtain DSA approval of the Project plans, if applicable. No construction work shall commence at any site prior to DSA approval of the Project plans.

### 2. Contract Documents

The Contract Documents consist of the Complete Proposal Documents, as submitted by Contractor, including applicable drawings and calculations, the Contract, any Amendment thereto, Schematic Drawings and Specifications, Supplementary General Conditions, if any, General Conditions, Detailed Project Schedule, Request for Proposals (if applicable), Disabled Veteran Business Enterprises Requirements (if applicable), Labor Compliance Program (if applicable), all addenda, required bond(s) and insurance certificates, and all of which are incorporated herein by this reference. All Contract Documents are intended to coordinate so that any work called for in one document and not mentioned in another document is to be executed as if mentioned in all documents.

### 3. Proposals & Compensation

As full compensation for Contractor's complete and satisfactory performance of the work and activities described in the Contract Documents, District agrees to pay Contractor, and Contractor agrees to accept the sum of \$347,236.00, which shall be paid to the Contractor according to the Contract Documents.

### 4. Prevailing Wages

This Project is subject to prevailing wage requirements, and contractor and its Subcontractors are required to pay all workers employed for the performance of this contract no less than the applicable prevailing wage rate for each such worker. If this project is for a public works project over \$25,000 or for a maintenance project over \$15,000, bidder acknowledges that the project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations in accordance with California Labor Code sections 1725.5 and 1770 *et seq.*

### 5. Time for Completion

The starting date of the Contract shall be the day listed by the District in the Notice to Proceed and the Contractor shall fully complete all the work as detailed in accordance with Exhibit A, Project Milestone Schedule. Time is of the essence in the performance of this Contract.

### 6. Liquidated Damages

Liquidated damages for Contractor's failure to complete the Contract within the time fixed for completion inclusive of milestone dates are established in the amount of \$200.00 per day per each Milestone until that Milestone is completed.

IN WITNESS WHEREOF, the parties agree to the terms of this Contract on the day and year written below.

\_\_\_\_\_  
District

Resolution No. \_\_\_\_\_

\_\_\_\_\_  
Date

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Contractor License No.  
and Expiration Date

By: \_\_\_\_\_  
Individual Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

For: \_\_\_\_\_  
Corporation or Partnership  
If Corporation, Seal Below.

# Attachment 3

## Scope of Work

### CESD Heating & Ventilation Project - PHASE 3

HVAC Improvement Project for CUTTEN ELEMENTARY SCHOOL

The Work shall be completed as described below:

1. PHASE 3 - After completion of necessary electrical infrastructure upgrades that are not part of this contract, the Contractor shall replace thirteen (13) gas unit heaters located at Cutten Elementary school. This phase includes the demolition, removal and recycling of existing natural gas Unit Heaters, with replacement by ducted or ductless split system heat pumps for classrooms 1-11, and 14, and replacement with a ducted split system heat pump for Cutten's multi-purpose room.

#### General Scope of Work

The following conditions apply to all measures included in this agreement:

- Efficiencies for all new equipment must meet or exceed current Title 24, and all installations must follow ASHRAE Standards 52.2, 55, 62.1, 90.1, 100, and 180.
- Work for all Trades shall be certified payroll at Prevailing Wage for this region per California Public Works contractor regulations.
- All Contractors and Subcontractors shall have a registered, valid, current D.I.R. Public Work's contractor number.
- Engineering: Mechanical, Electrical, Plumbing and Structural - calculations, engineered drawings shall be provided by BESC, Inc. with engineers licensed by the State of California.
- DSA reviews, certifications, permits and inspections by governing authority are included. DSA required structural, seismic or safety upgrades are not included
- Close-out and completion of other DSA open jobs are not included. Days of delay by others shall not count against Contractor for completion of work in this contract
- Commissioning and start-up reports are included.
- HVAC replacement equipment shall be high efficiency using environmentally compliant R410a refrigerant. As available from manufacturer, single-phase split heat pump systems will have a minimum SEER rating of 16.0 and minimum HSPF rating of 10.0. Equipment will have a minimum 5-year compressor and 10-year heat exchanger manufactures warranty.
- Split system heat pumps must have a minimum SEER rating of 16, and an HSPF of 10.0 or higher.
- Fan coils without ERV/HRV fresh air assist, must be capable of delivering minimum OSA per Title 24 Table 120.1-A, ASHRAE 62.1 and ASHRAE Standard 90.1.
- All new mechanical equipment installed shall have a minimum 5-year equipment warranty for compressors, heat exchangers and fans, and 5-year calibration warranty for CO<sub>2</sub> sensors installed whether free standing or part of a thermostat.
- Contractor shall determine and document the minimum required outside air (OSA) for each space receiving replacement equipment.
- Contractor shall verify all ventilation is reaching the served zone, how is distributed and that there is adequate distribution. Further, Contractor shall measure and document supply air volume (CFM), return air volume (CFM), and exhaust inlets.
- If economizers are present on the new equipment Contractor must verify economizer functions are capable of modulating from a 100% closed to a 100% open position
- Demand Control Ventilation (DCV) - Contractor shall simulate CO<sub>2</sub> levels above and below



DCV set points, verify and document that fresh outside air is supplied when CO<sub>2</sub> levels exceed the test set point and return to normal set position when CO<sub>2</sub> levels drop back to a safe range.

- All equipment installed shall be commissioned for start-up by qualified testing or adjusting personnel. Commissioning agent shall review control sequences to verify systems will maintain intended ventilation, temperature, and humidity conditions during school operation.
- Filters provided shall have a Minimum Efficiency Reporting Value (MERV) of 13, or the highest available that will not adversely affect function or performance of the mechanical equipment installed. Contractor shall verify highest MERV filter to be used by performing and documenting static pressure drop, as well as recording fan motor RPM, voltage and amps. Contractor shall verify air volume under a maximum pressure drop condition, that with the filter(s) in place, pressure drop is within manufacturers specifications (i.e. minimum CFM per ton, or minimum supply air temperature).
- Thermostats shall include a built-in CO<sub>2</sub> sensor and be capable of visually alerting classroom personnel when CO<sub>2</sub> levels exceed 1,100 ppm in the building space and by Smart phone or computer alerts. Thermostat CO<sub>2</sub> monitor must have a range of 400 ppm to 2,000 ppm or greater, and be certified by the manufacturer to be accurate within 75 ppm at 1,000 ppm of CO<sub>2</sub> concentration. Thermostat must be able to engage mechanical fresh air devices to bring in outside air. Thermostats must be able to communicate to a controller that can provide real time conditions and historical information to a “dashboard” accessible from a Smart phone or computer. Contractor shall test thermostat/CO<sub>2</sub> functions, verify and document performance.

**MEASURE -**

**Split System Heat Pumps**

**Locations -**

**12 Classrooms and 1 Multi-Purpose Room at Cutten Elementary**

**Quantity -**

**12 Classroom units, 1 ducted unit for Multi-Purpose Room**

**Approach -**

The desire of the school district is to switch from natural gas appliances to energy efficient all electric appliances. To replace the natural gas “garage” style unit heaters that do not allow for any mechanical outside air ventilation, we have chosen high efficiency split system heat pumps with minimum SEER ratings of 16 and minimum heating HSPF ratings of 10.0.

Dependent upon the layout of the room ceiling space, electrical and other resources, the indoor units will either be ducted or ductless. Ducted systems will consist of one to three supply air locations, and one to three return air locations. Ductless systems will consist of one outdoor condenser and either a high wall mounted or ceiling mounted fan coil. These systems, regardless of finished configuration, will operate in conjunction with temperature set-points, time schedules, and CO<sub>2</sub> levels in the room. The heat pumps will also operate with the presence of either an outside air economizer or separate ERV/HRV device.

**Inclusions -**

- All mechanical, structural and electrical engineering and engineered drawings with approval from the DSA
- Pre-assessment and load calculations must be made and submitted for DSA approval prior to ordering any equipment under their purview

- Installation technicians must follow all safety guidelines and use appropriate Personal Protection Equipment (PPE), including that recommended by the CDC to prevent the spread of SARS-CoV-2
- Shut off existing gas and electrical lines to existing unit heaters. Remove and cap gas lines. Remove gas unit heaters and dispose of off-site.
- Cap gas flue at the ceiling of the room if not being re-used
- Set a level cement base (or other approved material) for new condensers at Ridgewood elementary school
- Frame base (or rack) above corridor halls at Cutten elementary for placement of condensers at that location
- Secure condensers as per Code requirements for local earthquake zone.
- Locate outdoor power disconnect installed by others for each classroom.
- Run properly sized power wiring from outdoor disconnect supplied by others (from HVAC sub-panel to outdoor conduit connection point).
- Connect wiring from disconnect to HVAC equipment per manufactures instructions and supported line drawings
- Install separate shielded stranded copper conductor wire between indoor and outdoor equipment with a 600 volt rating and double insulated copper wire. This must be used as the communication wire from the outdoor unit to the indoor unit. (Do not use thermostat wire for connection between indoor and outdoor units)
- Connect both the power supply and control lines to the terminal block per the connection diagram for the appropriate unit capacity and voltage
- All wires must be sized per NEC (National Electric Code)
- Ground the unit in accordance with NEC and local electrical codes
- Use the manufacturer supplied lock nuts to secure the conduit
- Reinstall the field wiring cover
- Install new thermostat communication (minimum shielded 16GA) control wire as necessary with enough conductors to perform all heat pump and associated devices functions
- Provide communicating thermostatic controls with programming capability to link heat pump and fresh air equipment functions
- For ducted systems: Insulate and weatherproof all external ductwork, joints and roof openings with counter flashing and mastic in accordance with applicable Codes. Ducts passing through unconditioned spaces shall be insulated and covered with a vapor barrier. Supply and return ducts penetrating ceilings or side-walls shall comply with fire codes
- For ducted systems provide new supply and return air duct transitions, and if necessary, accessible filter box. Seal and insulate
- For ducted systems, install supply air diffusers and return air grilles
- For ducted systems, provide outside air duct to return before pre-filter
- For ductless systems, install ceiling cassette supply air fan-coils or high wall mounted fan coils, as conditions for that space allow
- Balance outdoor air setting to minimum OSA required for area served
- For split system heat pumps, provide new and properly sized,

insulated (minimum 3/8"/10mm insulation), and weatherized refrigerant piping from outdoor unit to indoor unit. All brazing of pipe-work shall be performed with dry nitrogen in pipe to eliminate oxidation. Bend tubing with bending tools to avoid kinks and flat spots. Keep the tubing free of dirt, sand, moisture and other contaminants to avoid damaging the refrigerant systems. Avoid sags in the suction line to prevent the formation of oil traps. Only cut pipe with a pipe cutter.

- Connect the liquid line and gas piping to the indoor unit. Tighten the flare nut using a torque wrench. Tighten as specified in IOM
- Evacuate refrigerant lines by using either the deep vacuum or triple evacuation method. After evacuation is complete, fully close the low side of the manifold gage and stop the vacuum pump operation.
- Check factory settings for refrigerant lines longer than 25-feet to add refrigerant as described by manufacturer IOM, up to the allowable length as specified in the System Requirements section of the IOM.
- Pressure test new refrigerant tubes using dry nitrogen to check the pipe-work per manufactures instructions to ensure no leakage
- If required by manufacturer of new equipment, evacuate new refrigerant system to appropriate micron gage levels
- Install condensate drain lines as necessary
- Install secondary condensate drain pans and drain lines as necessary
- Per start-up requirements with certified testing and balancing personnel, balance outdoor air settings. Test and document for minimum and maximum ventilation rates
- Weigh-in refrigerant charge based upon actual quantity of refrigerant required, weighed at time of commissioning
- Start-up and commissioning of new system includes vacuum drying at commissioning as required by manufactures instruction
- Install refrigerant line-set covers where necessary. Seal all holes and seams. Paint to match
- Submittals, including installation, operations and maintenance manuals
- Review operation, and maintenance care with customer
- Ongoing training to technical/maintenance/administrative staff on the use of the new controls system and dashboard functions for the 1<sup>st</sup> year.

#### Excludes -

- After Hours/Overtime Labor
- Hazardous materials identification and abatement
- Duct system replacement for any existing equipment
- Security Cages for outdoor units
- Concrete patching
- Trenching for refrigerant piping if necessary
- Electrical conduit and wiring from main (or subpanel), and electrical disconnects at each classroom service point to be provided by others
- Any and all concealed or below grade obstructions, suitability of existing materials or equipment, performance of existing systems

or implementation of the designs of others, structural, or electrical upgrades other than noted above, or seismic work, temporary power or air conditioning, fire life safety system and wiring, aesthetic screens, as well as all hazardous materials abatement, and any work not specifically addressed in proposal.

- Any DSA or School District adjustment to engineering, structural upgrades, design, drawings, ASBUILTS or scope of work

## EXHIBIT "A"

### Project Milestone Schedule

A Schedule of Values will be completed within two weeks of Award of Contract, and before issuance of a Notice to Proceed.

The CESD Heating & Ventilation Project – **Phase 3** will take approximately fourteen (14) weeks to complete once DSA has approved equipment and design drawings, and after electrical infrastructure upgrades have been completed by others, and equipment arrival. Equipment will be ordered upon the Notice to Proceed after electrical infrastructure upgrades have been signed off by the governing authority. Final Subcontractor job walks will be conducted immediately after Award of Contract.

Week 1	DSA appointment to review drawings and scope of work Final Subcontractor job walks
Week 2	DSA design and equipment approvals (structural design for heat pumps) Ordering of equipment and materials
Week 3	Updated Schedule of Values completed
Week 6-19	Installation of classroom and multi-purpose room heat pump systems.
Week 19	Final commissioning and start-up
Week 20-22	Final inspections

Due to the unknown date of completion and final inspection for the electrical infrastructure upgrades, the calendar start and completion dates are unknown at this time. BESC, Inc. will make every effort to compress the installation time frame as the school occupancy schedule allows. When Phase 3 is complete, Cutten Elementary school will have fully functioning heat pump systems, Thermostats with CO2 sensors and cloud-based communication, and fresh, FILTERED, outside air with MERV 13 filters via Energy Recovery Ventilators.

This schedule is predicated on DSA clearance of previously opened jobs that are closed and approved by the DSA.