ADDENDUM #2

FIRE STATION #6 CONSTRUCTION PROJECT
BID # 23/24-005 / PWP # WA-2024-131
BIDS DUE NO LATER THAN: 1:45 PM ON FEBRUARY 14, 2024
PUBLIC BID OPENING: 2:00 PM ON FEBRUARY 14, 2024

This addendum is to notify all potential proposers of clarifications made to the Bid documents as stated below.

1) **Reminder of Bid Document Delivery** – Due to hybrid schedules and staff reductions, in-person staff availability is limited. Bidders wishing to physically deliver their bids on the bid due date shall note that the Engineering Office will receive bids in the lobby of City Hall beginning at 1PM on February 14, 2024. Bids are due no later than 1:45PM. Bids may also be delivered to the Purchasing Department physical dropbox/mailbox also located in the lobby of City Hall.

2) **Sheet A2.01, Room Finish Schedule, calls out CMU-2 and CMU-1 for the wall finish at the apparatus bays. CMU-1 is #296 Groundface and CMU-2 is 125B Groundface. Can you confirm that the interior of the apparatus bay CMU walls show and are integral colored and groundface CMU? The exterior covers in metal panels. There is a significant cost difference between gray 12" CMU, and premium color groundface 12" CMU.** The intention is to provide a premium finish on the CMU that is left exposed. The apparatus bay walls are exposed to the interior and should be CMU-2 finish.

3) **The barn door spec calls for the barn doors and hardware to be by Rustica Hardware. They also call for a full flush door, which Rustica does not offer, nor do they offer a veneer matching the other interior wood doors (Plain Sliced White Oak). Are alternates for doors and hardware for the barn doors acceptable?** Alternate doors and hardware are acceptable but shall be of equal or higher quality than what is specified; provide product information during the submittal process.

4) **The Numeral 6 sign shown on A6.01. There aren't material specs for this. Is this number going to be illuminated? We were thinking of a painted 3" deep reverse channel letter. It can be illuminated or non-illuminated.** Refer to sheet A7.21 for additional information for the number. Refer to specification section 10 1400 - "signage" for "dimensional letter" requirements for more detail.

5) **Monument sign letters and numeral shown on AS2.01. There aren't material specs for this. Is this number going to be illuminated? We were thinking of a painted 3" deep reverse channel letter. It can be illuminated or non-illuminated. For the logo and remaining letters on the monument sign, we were thinking of 1/4" painted aluminum letters. Is this acceptable?** Refer to specifications section 10 1400 – "signage" for "dimensional letter" requirements.

6) **Will there be Low VOC (LVOC) requirements on this project? The PVC Roofing specs make mention of a solvent based (non LVOC compliant) membrane adhesive and solvent based (LVOC compliant) membrane adhesive.** Provide LVOC compliant membrane adhesive.

7) **Roof assemblies' details 1-3 on Sheet A4.11 conflict with specs. A. Specs call for 5/8" & 1/2" Dens Deck Prime roof board. Roof assembly in plans only show cover board. Is a substrate board required? Which thickness applies? B. Membrane is mechanically fastened per roof assembly in plans. Specs call for it to be adhered. What is the attachment method for the membrane?** A. Provide roof board per specifications – ½" Dens Deck Prime. B. Adhere membrane per specifications.

8) **Keynote #5 on A1.41 indicates the crew lockers are OFOI, however, Elevation 3B/A8.03 and section 12/A8.11 show details of this cabinet in the casework drawings. Can you confirm these are excluded from the casework package?** Cabinets in dorm rooms scheduled to be OFOI. Elevation and section provided for contractor coordination of required backing.

9) **Are the units shown in Storage 134 and 135 on A1.41 also OFCI, similar to Keynote #12 in Linen 126 on the same page?** Correct, the units in storage 134 and 135 will be OFCI along with linen 126 and keynote #12.

10) **Q1: The single line diagram on E0.10 shows the UPS as a 15KVA system feeding a 60A UPS panel. On keynote #3 on E2.10 the UPS is listed as a 3KW Eaton 9SX 3000HW unit. The schedule on E0.20 for the UP panel shows a panel load of 10.48KVA. The Specifications under Manufacturers list (among others) the Eaton 93PM series Powerware, which start at 10KVA systems & go up in 5KVA increments. Which system is correct? 3KW or the 15KVA?** Provide 15 kVA UPS.

11) **The plans are not clear as to the requirement of the floor boxes. Spec section 26 26 26 seems to show floor boxes not for this application. What is the requirement for the floor boxes shown on plan sheet E2.10? Please provide a detail or part # that we can cross. Provide Legrand RFB series four gang cast iron box with cover. Final requirements shall be confirmed with owner prior to procurement.** Provide Legrand RFB series four gang cast iron box with cover. Final requirements shall be confirmed with owner prior to procurement.

12) **Plan sheet T1.00 seems to show in ground pull boxes needed for the 4" site conduits. What is the spec for these pull boxes? Extensions? Traffic rated? Detail?** Provide 24"x36"x24" Quazite Tier 8 handhole with cover and TELECOMMUNICATIONS name plate, #B13243624A or equal. Provide handhole extension as required to accommodate as-built installation depth.

13) **Please provide specifications for the E.I.F.S.?** Refer to specifications section 07 2400 "Exterior Insulation and Finish System" in the bid book.

14) **Please provide the specifications for the above ground fuel tank per Sheet Note #16 on Sheet AS1.01.** The fuel tank shall be a 1,000 gallon tank provided by the contractor. Owner shall review during the submittal process.

15) **Sheet S-1, Key Note #9 calls for a patio fence, "See Landscape Plans". The Landscape Plans do not identify the patio fence. Please clarify.** Refer to Architectural sheet A9.01 for patio fencing information.

16) **Specs call for self-adhered membrane, but also call for membrane adhesive. Is self-adhered membrane to be used or regular membrane adhered with membrane adhesive?** The architect could not locate where self-adhered roof membrane is specified. Vapor retarder is indicated to be self-adhered. PVC roof membrane shall be specified to be adhered with membrane adhesive.

17) **Roof assembly attachment – assembly per specs has membrane adhered, cover board fastened, 2nd and subsequent insulation layers adhered, first insulation layer fastened, vapor barrier self adhered, and substrate board fastened. This is a very costly roof assembly. Can we change the roof assembly attachment methods to be membrane adhered and cover board fastened with all layers underneath loose laid (except for vapor barrier)?** The contractor shall follow the installation as specified in the plans and bid specifications.

18) **Since the building pad was certified back in 2023, who will be responsible for recertifying the pad and any associated costs?** The contractor shall be responsible for scarifying, recompacting and meeting the compaction standards outlined in the plans and shall include this in the bid. Special inspection and testing will be performed by Wood Rodgers and will be provided under a separate contract by the owner. The pad certification, existing elevations and the difference between current conditions and final grade have been provided on the city's bid website for this project.

19) **Hardware Schedule is showing Hardware Group #2, but does not show up on Door Schedule. Just want to confirm that Hardware Group #2 is not being used on this project? Door #147 is shown as panel type 'H'. What is panel type 'H'?** Hardware set 02 is not used. Revise panel type for door #147 to 'F'.

20) **Pair Doors #152 calls for electric strike 6300, but is a cylindrical lock (should be 6400?) It also shows no power supply or power transfer for inactive leaf. Door contact?** No exception taken; provide full hardware set required for operation.

21) **Under specification section 07 4619 - Corrugated Metal Panels - Calls for Perforations in the metal panels (2.3 Item C.). Please confirm that is accurate?** Specifications are accurate for perforated metal panels per "Building Material Schedule – Exterior" on A2.01

22) **I noticed that on the finish schedule, room #142 is requesting Concrete Sealer F1, but on the floor finish plan A1.31 and the material schedule, they are calling for a Hermetic Fire Apparatus flooring F7. Can you please provide some clarification?** Provide 'F7' per finish plan and material schedule.

23) **F-5 color Dark Gray 0563 Johnsonite version has been discontinued, can you please provide a replacement color selection?** Material F-5 is provided by Tarkett and appears to be still available online.

24) **Please note that under specification 05 1200-1.4G and 05 1200-1.5C steel fabricators are required to have IAS accreditation. AISC is not listed as an alternative in the specifications. Please confirm if AISC is an acceptable certification.** Yes, AISC is an acceptable alternative.

25) **The vertical rebar at CMU wall is showing one continuous bar around openings. Can vertical rebar at the CMU wall be spliced? Please provide splice details.** Lap splices are allowed per Note 11 in the CMU wall schedule. Splices are per the General Notes E.6.

26) **The roof plan shows tapered insulation crickets with only a ¼" inch slope. The slope of the roof deck is a ¼" inch as well. Typically, that results in ponding water. Will the tapered insulation crickets be increased to a ½" inch slope?** An increase in roof slope would require an increase in parapet height therefor the original roof slope shall be maintained.

27) **A2.12 Door Jamb Details show backer rod and continuous sealant at these details. Is it acceptable to remove the shim and place door jamb directly to CMU block?** No this is not acceptable, the space around the jamb is required for adequate sealing around door frames.

28) **BICSI is referenced in T0.20, Spec Section 27.0526, 2.3. Does this apply to only the cable, or contractors as a whole?** BICSI compliance is referenced for ground bars and associated brackets on sheet T0.20. Equipment and materials must be BICSI compliant. All work performed under Division 27 specifications must be supervised by a BICSI RCDD professional. See Quality Assurance Section 27 05 00/1.7B.

29) **Can you please provide the Engineers Checklist for the Special Inspections?** Special inspection requirements are on sheet S0.1. Additionally, refer to the attached building department special inspection form sent with the permit submittal.

30) **2" and smaller Viega Megapress is mentioned as an approved gas piping fitting system, Can Viega Megapress XL be used for 2-1/2"-4" as well?** Yes, Viega Megapress XL may be used for 2.5” to 4” piping.

31) **Can I have you address the need for snow melt and heat trace on the next Addendum? There is specification 26 05 17 under electrical but nothing shown on the plans that I can see. Is snow melt or heat trace required on this project? If so where and what circuits are required?** Heat trace is NOT required for any underground plumbing within the perimeter of the building. Snow Melt was removed from the design per City of Sparks

32) **Could you please provide more clarification/detail on the rock mulch 3/4” pathway pebbles @ 4” depth? The RT Donovan pathway pebbles are measuring at 3/8” minus.** Landscape Architect takes no exception to the use of the currently available 3/8" minus pathway pebbles in lieu of the 3/4" pathway pebbles as originally specified on bid set plans.

33) **Is there a specification for plumbing pipe information?** Yes. It is included in Specification Section 211000.

34) **On page P0.11 there are details for seismic support, both plans and the plumbing specifications say seismic support is to be designed by the seismic engineer. Are there any drawings or details for seismic support beyond existing seismic support for water heaters?** No. The contractor is to provide stamped and signed submittal of all seismic supports and equipment restraints for review and approval.

35) **The IDF room layout on T4.01 depicts a wall cabinet but the part number SC-CAB-1 on drawing T0.02 states a full height cabinet. We assume it should be a wall cabinet not a full cabinet, but can you please confirm.** Provide 19U wall mount enclosure, CPI #11840-736.

36) **The drawings show an Exposed fastener system (Ref: 19 & 20/A4.12), but the Specifications for Phenolic Wall panels Page 6 paragraph 2.3, A.1. Call for a Concealed system using 10mm thick panels. Additionally, Page 5 paragraph 2.2, B.3. calls for an 8mm panel that is used in Exposed Fastener systems. Please clarify what thickness the panels should be (8 or 10mm), and whether the faster system is to be exposed or concealed.** Provide 8mm exposed fastener panel system per detailing.

37) **Please clarify membrane thickness. Specs call for 72 mil but with a 30-year warranty. 80 mil is required for a 30-year warranty.** Specifications indicate a 72 mil at a minimum, provide an 80 mil product to meet the specifications and warranty requirements.

38) **Will GAF Manufacturer roofing materials be accepted? Spec is calling SIKA SARNIFIL with acceptable looking like only DUROLAST AND CARLISLE.** Generally, no exception taken with GAF manufacturer, a substitute request per specification section 01 2500 will need to be submitted for approval.

39) **Paint Specification 099000 Section 2.5.6 indicates that "Semi-Gloss:…use this sheen at all locations". Is it the Architects intent to have a level 5 drywall finish throughout the entire project because Specification 092116 Section 3.5.1.B states "Level 5: Walls and Ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated".** Specification 099000 2.5.A.6 is a typical umbrella requirement 'unless noted otherwise' review entire specifications for system locations. Intent is for typical walls to have an 'eggshell' sheen.

40) **Will the entire project require, at a minimum, Mold Resistant gypsum board per 092116 Section 2.2.B.3? Or will the project be enclosed and conditioned prior to gypsum board installation, therefore regular firecode Type X gypsum board will be acceptable?** This is the responsibility of the general contractor's schedule and is a means and methods.

41) **The control system specifications have been revised to allow Alerton control systems only. All City of Sparks control systems are currently Alerton Controls and to streamline management of the systems throughout the City and maintain continuity in parts the City will stay with an Alerton Control System on this project. See the attached revised section 230900 that shall be used instead of the original section in the bid document.**

42) **New Millenium Joist and Deck requested consideration for the dovetail acoustical roof deck as an alternate installation to what is specified in the bid.** The structural engineer has reviewed this material and takes no exception for it's use as an alternative.

Please note and adjust your bid according to the revisions, additions, deletions, clarifications, or modifications as presented on this Addendum #1, which are made a part of this bid. NOTE: To avoid disqualification, this Addendum 1 (and any other addenda) must be signed by an authorized representative of the bidding firm in the space provided and must be submitted with your firm's sealed proposal. Failure to return this addendum, duly signed, may be cause for rejection of the bid. ALL ADDENDA SHOULD BE SIGNED AND PLACED IN SEQUENTIAL ORDER AND ATTACHED TO THE FRONT OF THE BID PACKAGE, COMPLETE WITH ALL REQUIRED DOCUMENTS.

_____ Brian Cason

CONTRACTOR BUSINESS NAME

Brian D. Cason, S.E., P.E.
Capital Projects Manager

X_____
Authorized Signature

February 9, 2024

_____
Printed Name of Person Signing

Building & Safety Division
431 Prater Way
Sparks, Nevada 89431
Phone: (775) 353-2306
Fax: (775) 353-2470

SPECIAL INSPECTION & TESTING AGREEMENT

(All references are per the International Building Code)

Project Name: Sparks Fire Station

Project Address: Wingfield Hills Rd, Sparks, NV 89436

Building Permit Number: _____

BEFORE A PERMIT CAN BE ISSUED: The registered desig professional in respons ble charge shall fill out the Agreement and include the name of each inspector as well as their appropria e license/certification number. Two (2) copies of this form are to be submitted to the City prior to the issuance of a build ng permit. If changes are made as to who will perform the special inspections a new form shall be submitted and urned o the Building & Safety Division for approval.

STATEMENT OF SPECIAL INSPECTIONS: In addition o this Agreement, a "Statement of Special Inspections" shall be provided per IBC 1704.3. This Statement shall be made as part of the approved plans, and be placed in a conspicuous location, such as the first page of the construction plans or the f rst page of the structural sheets.

SPECIAL INSPECTORS: All special inspectors shall be approved by the Building & Safety Divis on prior to performing any duties. The special inspector shall provide proof of certifica on as a special inspector for each inspection item and be approved by the Building & Safety Division.

SPECIAL INSPECTION REPORTS: Special inspection reports are to meet the requireme ts of IBC 1704.2.4. **A final report shall be submitted to the City of Sparks stating that all special inspection and structural testing items were completed and are in conformance with the approved design drawings and specifications.**

GENERAL SPECIAL INSPECTION ITEMS (per IBC Chapter 17) *[Only checked items are required]*			
Areas requiring special inspection:	Name of Age cy:	Name of Inspector:	License/Cert. No. with expiration date
Other than Structural Steel (IBC Table 1705.2.2) ☒ Steel floor & roof decks ☒ Welding of reinforcement ☒ Cold-formed steel			
Structural Steel ☒ Welding (Per N5.4 of AISC 360-10) ☒ Details (Per N5.7 of AISC 360-10) ☒ High-strength bolts (Per N5.6 of AISC 360-10)			
Concrete Construction *(per IBC Table 1705.3)* ☒ Reinforcement, embeds, anchors ☒ Formwork ☒ Materials ☐ Shotcrete ☐ Post-tensioned/Pre-stressed Concrete ☐ Erection of precast concrete			

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SPECIAL INSPECTION & TESTING AGREEMENT

GENERAL SPECIAL INSPECTION ITEMS (per IBC Chapter 17) - *continued* *[Only checked items are required]*			
Areas requiring special inspection:	Name of Agency:	Name of Inspector:	License/Cert. No. with expiration date
Masonry Construction (IBC 1705.4) ☒ Prior to Construction (Article 1.15, TMS-602) ☒ As Construction Begins (Article 1.19.2, TMS-402) ☒ Prior to Grouting (Table 1.19.2, TMS-402) ☒ During Construction (Per TMS-402 & TMS-602)			
Wood Construction ☐ High-Load Diaphragms (IBC 1705.5.1) ☐ Wood Trusses > 60ft (IBC 1705.5.2)			
☒ Soils (IBC Table 1705.6)			
☐ Driven Deep Foundations (IBC Table 1705.7)			
☐ Cast-in-place Deep Foundations (IBC Table 1705.8)			
☐ Helical Pile Foundations (IBC 1705.9)			
☐ Sprayed Fire-Resistant Materials (IBC 1705.14)			
☐ Mastic & Intumescent Coatings (IBC 1705.15)			
☐ EIFS (IBC 1705.16)			
☐ Fire-Resistant Penetrations (IBC 1705.17)			
☐ Smoke Control (IBC 1705.18)			
☒ Other See structural drawings (IBC 1705.1.1)			
☐ Other _____ (IBC 1705.1.1)			

SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE (IBC Section 1705.11) *[Only checked items are required]*			
Areas requiring special inspection:	Name of Agency:	Name of Inspector:	License/Cert. No. with expiration date
☒ Structural Steel (IBC 1705.12.1 & AISC 341-10)			
☐ Structural Wood (IBC 1705.11.1)			
☐ Cold-formed Steel (IBC 1705.11.2)			
☐ Plumbing, Mechanical & Electrical Components (1705.12.6)			
☐ Architectural Components (IBC 1705.12.5)			
☐ Storage Racks (IBC 1705.12.7)			

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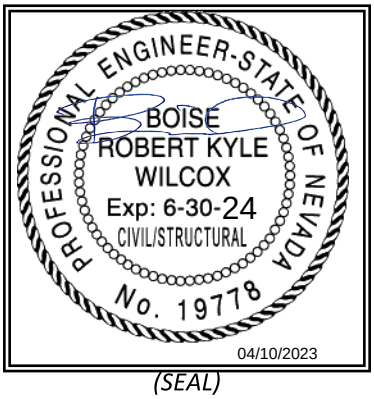
SPECIAL INSPECTION & TESTING AGREEMENT

Declaration by Engineer of Record

I, the design professional in responsible charge for his project, declare hat the above listed special inspection and structural test g items are required for this project in accordance with IBC Chapter 17.

04/10/2023

Signature Date



(SEAL)

Declaration by Owner

I, the Owner of the project, declare that the abo e lis ed firm(s) or individual(s) are hired by me to perform special inspections and structural testing for the project pursuant to IBC 1704.2.

Brian Cason 2-9-24

Signature Date

CONTRACTOR RESPONSIBILITY: Each contractor in olved with the construction of wind or seismic force-resisting systems shall comply with the requirements of IBC 1704.4. The contractor is responsible for providing the special inspector access to approved plans and co ract documents at the job si e. All special inspection records shall be retained at the job site by the contractor and shall be made available to the Building Department upon request. A final report shall be provided to the Bu lding Department by the Contractor upon project completion and final inspection.

Declaration by General Contractor

I, the General Contractor of the project, agree o comply with the "Contractor Responsibility" items noted above.

Signature Date

Approved by the Building and Safety Division

Signature Date

SECTION 230900
TEMPERATURE CONTROLS

PART 1 - GENERAL

1.1 CONDITIONS OF THE CONTRACT

A. The Conditions of the Contract (General, Supplementary, and other Conditions) and Section 230000 (Heating, Ventilating, and Air Conditioning) are hereby made a part of this Section.

B. For convenience or reference the Specifications are separated into Divisions and Sections. Such separations shall not operate to make the Engineer an arbitrator to establish subcontract limits between the Prime Contractor and his Subcontractors. In any case, the Prime Contractor is responsible to the Owner for a complete project.

PART 2 - SCOPE OF WORK

2.1 GENERAL

A. The control system shall provide direct digital control with a Windows-based user interface. Third party viewing software is not acceptable. The manufacturer and/or his authorized representative shall be responsible for all work under this section of the specifications. Only pre-approved manufacturers and contractors will be allowed and shall be as follows (no substitutions):

Manufacturers	Northern Nevada Contractors	Telephone
Alerton Controls	Building Control Services	(775) 826-8998

B. Furnish and install microprocessor-based energy management and control system (EMCS) as an extension to the existing Carson City (CC) Alerton EMCS system.

C. Update the existing Alerton Compass software (most current edition) on existing servers and client computers at the Corp Yard Facilities office and central data center. When third party software is necessary to allow for control system programming and/or editing of graphic displays that software (most current edition) shall also be provided to Carson City.

D. There shall be no annual maintenance or licensing fees of any kind required to be paid by the Owner at any time during the ongoing use of the installed system and software. Licenses shall be issued and authorized as directed by Carson City.

E. The Alerton Controls system shall be configured with multiple Ethernet connections to allow for remote network access and for direct connection of multiple computers via local area network. The Alerton Controls system shall utilize 'Compass' web-based graphic interface software (most current version). Communication with large equipment controllers shall be via BACnet IP Ethernet backbone at 100.0 Mbps minimum speed. All large equipment controllers shall be furnished with integral hand-off-auto switches. Communication between equipment controllers and application specific controllers shall be via BACnet MS/TP network at 76.8k minimum speed. All Alerton Controls system points and trend logs shall be available as native BACnet objects and BACnet trend logs at the BACnet IP Ethernet backbone.

2.2 SPARE CONTROLLER CAPACITY

A. All controllers (except application-specific controllers for VAV terminal units) shall be furnished with a minimum of 5 percent spare capacity to allow for addition of both analog and digital inputs and outputs.

2.3 SUBMITTALS AND AS-BUILT DOCUMENTATION

A. The submittals shall include complete written control sequences for each item of equipment requiring control. The sequences shall include all setpoints, dead-bands, etc. required for successful operation of the specified equipment. The submitted sequences shall include all necessary sequencing details, whether or not those details are furnished as part of the Mechanical Engineer's written control sequences (such details are commonly excluded from the Mechanical Engineer's written control sequences) and all work associated with developing and incorporating those details shall be provided by the Temperature Control Contractor at no additional cost to the Owner. The written control sequences, initial setpoints, dead-bands, and the graphic displays shall all be reviewed and confirmed with the City of Reno prior to preparing and forwarding the finalized submittals.

B. The Temperature Control Contractor shall prepare and submit a complete listing of BACnet points that are to be set up as trended and stored historical data. The list shall be broken down to include each system and/or item of equipment and shall be reviewed with the City of Reno for approval prior to setting up the trending in the temperature control system. The BACnet trend log names shall also be provided for approval.

C. After all temperature control sequences have been finalized and have been approved by the City of Reno and the Engineer (and after the HVAC systems commissioning process has been completed) the Contractor shall provide as-built documentation which shall include both an electronic copy of the finalized programming and hard copy of the finalized programming (programming flow charts or line code as may be applicable) and written control sequences.

2.4 TRAINING

A. Upon completion of the commissioning process, the Temperature Control Contractor shall instruct the Owner's designated personnel on the operation of all control system software features, shall provide a complete explanation of the control sequence for each item of equipment, and shall provide instructions on the operation and maintenance of all control devices. Training time shall be a minimum of eight total hours (consisting of two separate 4 hour sessions). Both on site and in Classroom front end training.

2.5 WARRANTY PERIOD SERVICES

A. The Contractor shall provide full service for the temperature control system for a period of one year after the date of substantial completion. Service shall include, as a minimum, calibration of all sensors and other control devices, adjustments to setpoints, and modifications to control sequences or programming as required/desired to fine-tune and/or finalize all control sequences.

B. The Contractor shall provide a scheduled monitoring and reporting service for the duration of the one year warranty period. Monitoring shall be conducted via the remote control system interface (via modem or network connection) and the associated report shall be issued via email the same day that the monitoring is conducted. Monitoring shall be conducted on a weekly basis, preferably on either Monday or Tuesday. Reports shall include a specific listing of all alarms, all equipment failures, any noted operational problems or irregularities, and as set of screen prints.

2.6 SOFTWARE AND PROGRAMMING REQUIREMENTS

A. Provide a security/password system with two passwords (username and password) of up to four characters each. The security/password system shall allow access based on security as follows:

Level 1	Viewing only
Level 2	Room temperature and occupancy schedule adjustment
Level 3	Adjustment of all setpoints
Level 4	Full access to all setpoints and programming

B. The Temperature Control Contractor shall program the City of Reno Holidays into the EMCS software for the five years following the date of the installation.

C. Equipment Schedules – Schedules will be coordinated with City of Reno facilities department for either a separate or combined occupied/unoccupied schedule shall be provided for each air handling unit, fan coil unit, exhaust fan, and/or other individual air handling system as desired.

2.8 GRAPHIC DISPLAYS

A. All temperature setpoints and all other setpoints identified as adjustable in the written control sequence shall be adjustable from the appropriate graphic display(s). Setpoints listed in the contract documents are for initial set-up and trial of system operations. Control system shop drawings shall utilize the same (or similar) written sequences with all setpoints, throttling ranges, and differentials identified. As-built drawings shall include this same information with final setpoints resulting from startup, testing, and adjustment.

B. Monitored points and alarms for each system shall be shown on the displays with full color graphics and real-time data as listed below. Where indicated, graphic displays shall be dynamic (animated). All graphic displays shall be submitted to the City of Reno for review and modification.

C. All temperatures shall be displayed with zero decimal places.

D. All valve and damper positions shall be displayed as percent open and shall be displayed with zero decimal places.

E. All setpoints which are identified as "adjustable" in the written control sequences shall be adjustable via the associated graphic displays (including deadband between room setpoints).

F. All occupied mode and unoccupied mode room temperature setpoints shall have an adjustable deadband (adjustable from the associated graphic display).

G. All displays specified to be dynamic shall depict motion (as a minimum, dynamic displays shall include chiller compressors, boiler burners, rotating fan wheels, and rotating pump impellers).

H. All setpoints adjustable from the graphic displays shall be programmed with the deadband on one side of the setpoint (not split evenly across the setpoint) unless otherwise specified.

I. All outputs shall be programmed with the capability to override the controlled commands/positions via the associated graphic display (this requirement applies to all equipment, valves, dampers, fans, pumps, etc.).

J. Alarm data fields shall be displayed with a red text when an alarm condition exists.

K. A set of zone temperature summary screens shall indicate the current room temperature setpoint and current room temperature for each zone. A separate global setpoint and deadband shall be assigned to all zones associated with each air handling unit. The zone summary screens shall also include additional information for each zone such as the remote setpoint and deadband, discharge air temperature, valve position, fan command, fan status, deadband setpoint(s), etc. Summary screen format, function, and required display data shall be coordinated with the City of Reno prior to developing the graphic displays.

L. Each zone shall be capable of being set to any of three setpoints (depending on which setpoint is selected). The three available setpoints shall be the global setpoint (a single setpoint for all associated zones), the remote setpoint (a separate individually adjustable setpoint for each zone), and the local setpoint (adjustable at the room sensor by utilizing a slide or dial type control on the room sensor). The local setpoint adjustment range shall be programmed to allow adjustment only between a fixed temperature range (typically between 73ºF and 75ºF - range to be confirmed with the City of Reno prior to programming).

M. The current total cfm of all vav boxes associated with each vav air handling unit shall be calculated and displayed on the appropriate air handling unit screen.

N. Each variable frequency drive shall be programmed to display command, status (via current sensor), input speed, output speed, and alarm/failure status (via alarm contacts at each vfd).

O. Floor Plan(s) - Provide a display showing the building floor plan(s) with all space temperature sensors including identification of the associated terminal unit or fan coil unit number. Specifically identify each thermal zone on the associated floor plan (AutoCAD file with thermal zone borders can be obtained from the mechanical engineer at no cost to the Contractor).

P. The current room temperature status shall be indicated utilizing custom Omni Graphics thermal geometry outline area served with dynamic color and opacity based on zone temperature.

Q. The finalized sequence of operation shall be inserted into the graphics for viewing as a pdf file.

2.9 SPECIALTY CONTROL DEVICES AND REQUIREMENTS

A. Outdoor temperature sensor (dry bulb only) shall be Mamac Systems Model TE-213-F with solar radiation and precipitation shield, Dwyer Model TE-RND with solar radiation and precipitation shield, or approved equal.

B. Current sensors for fan and pump motors less than one horsepower shall be split core digital output type and shall have an adjustable setpoint capability.

C. Duct temperature sensor probes shall have a minimum length of 6 inches and shall be selected with longer lengths when required to ensure accurate temperature readings and to avoid dead air spaces.

D. Averaging sensors and freeze sensors shall be a minimum length of 20 feet. Longer lengths and/or multiple sensors shall be provided as required to ensure adequate coverage of the entire surface of each coil. Sensor capillary shall be installed in a serpentine arrangement with coverage extending to within 6” of each coil perimeter edge (both top and side edges) and shall be installed such that there is no more than 12” between horizontal passes. Averaging sensors shall provide for averaging of the entire length of the capillary element rather than an average of individual sensing locations.

E. Carbon Dioxide (CO_2) sensors for indoor applications shall be Vaisala Model GMW21 or approved equal (for wall mount applications). There shall be no display

F. Carbon Dioxide (CO_2) sensors for outdoor applications shall be Vaisala Model GMP343 or approved equal (for wall mount applications). There shall be no display

G. Chiller room exhaust fan differential pressure switches (when required at the emergency exhaust fan) shall be Dwyer Instruments Model 1640-0 with Kele Model SSS-1003 duct sensing probes. or approved equal.

H. Differential pressure sensors for dry applications shall be Veris Industries Model PX, Dwyer Model MS2-W102-LCD, or approved equal. Differential pressure sensors for wet applications shall be Veris Industries Model PW2 or approved equal (for wall mount applications). Verify desired/required sensing range prior to submitting and/or ordering. Sensor tubing connections shall be fitted with brass test tees for use by the test and balance contractor for verification/calibration.

I. Building static pressure sensor shall have a control range of ± .10" w.c. Sensor shall be Mamac Model PR-275-R2, Dwyer Model MS2-W101-LCD, Veris Industries Model PX-01-F (fast response), or Setra Model 264-0R1WB or approved equal, and shall be furnished with indoor and outdoor reference probes.

Outdoor static pressure reference probe shall be constructed of anodized aluminum and shall be capable of sensing static pressure to within 2% accuracy when subject to radial wind velocities of up to 80 mph with an approach angle of up to 30 degrees from horizontal ('Static Outside Air Probe' as manufactured by Air Monitor Corporation, or approved equal

Indoor static pressure reference probe(s) shall be suitable for flush mounting, shall be constructed of 10 gauge brushed aluminum, and shall be capable of sensing static pressure to within 1% accuracy when subject to air velocities of up to 1,000 fpm ('Shielded Static Air Probe No. 3' as manufactured by Air Monitor Corporation). Provide a surge dampener for each indoor static pressure probe/sensor (Schneider Electric Model 21-153 or Kele & Associates Model SD-01) or approved equal Interconnecting copper tubing between sensor and indoor/outdoor probes shall be 3/8" diameter.

J. Refrigerant leak monitor shall be MSA Model LE or approved equal photo-acoustic infrared sensor with single point sensing capability, dual alarm outputs, and the capability to transmit current refrigerant concentration (utilizing a 0 to 10 volt signal) for remote monitoring via the direct digital control system. Provide sensor suitable for sensing refrigerant R-134A (or as required for the specified chiller). Provide two remote sensing probes with end-of-line filters and interconnecting tubing as required to locate the probes as indicated on the drawings (or as field-directed by the mechanical engineer). Interconnecting tubing shall be installed such that the branch tubing to each sensor is the same length. Probes shall be mounted at approximately 6" above finished floor at or near each chiller. Sensor shall be factory calibrated to alarm at 1,000 ppm. The refrigerant leak monitor shall be furnished with a calibration/test kit (MSA Model 50G) and with the appropriate test gas cylinders as required for calibration, testing, and commissioning of the leak monitor. The sensor shall also be furnished with two spare end-of-line filters for future use by the Owner. Locate two alarm horn/strobes at each chiller room exit (one inside and one outside of each exit door). Install each horn/strobe at approximately 7'-6" above finished floor. Remote audible/visible alarm horn/strobes shall be suitable for either indoor or outdoor installation (Amseco Model CSHB-BG with blue light lens, or approved equal by Kele & Associates).

K. Air filter differential pressure sensors shall be Dwyer Model MS2-W102-LCD, or approved equal.

L. Audible/visible alarm horn/strobe for seismic gas valves shall be Amseco Model CSHB-BG with blue light lens, or approved equal by Kele & Associates. The alarm horn/strobe shall be located on the building exterior adjacent to the seismic gas valve (mounted at 7'-6" above finished grade).

M. Water flow meters for chilled water and heating water systems shall be electromagnetic type (Onicon Model F-3100, Rosemount Model 8700, or approved equal). Turbine type flow meters will not be acceptable.

N. Water flow meters for chilled water and heating water system make-up water shall be ultrasonic type (Belimo Model FM075, Onicon Model F-4600, or approved equal). Turbine type flow meters will not be acceptable

2.10 MISCELLANEOUS REQUIREMENTS

A. All control devices shall be installed in reasonably accessible locations. Control devices that may require occasional calibration or adjustment shall be given special consideration with regard to being installed in a reasonably accessible location.

B. Room temperature sensors shall be programmable Alerton Microtouch type and shall be provided with an override pushbutton and setpoint lever Adjust with ability to be limited or locked out via operator workstation.

C. Room temperature sensors shall be labeled with the corresponding terminal unit or fan coil unit number. Labels shall be self-adhesive with black lettering (1/8" height lettering).

D. Room temperature sensors in laboratory areas shall be sealed at the wall penetration behind the sensor to prevent air migration into the sensor from adjacent areas (due to the negative pressure of labs as compared to adjoining spaces).

E. Room temperature sensors in public and hallway areas shall be blank plate stainless steel tamper resistant type.

F. Control Valves and Dampers
   1. Control valves shall be Belimo automatic control valves with electronic actuators.
   2. All large equipment air handlers, Chillers Boilers etc. valve and damper actuators shall be analog or floating actuators.
   3. Refer to control drawings for required type.

G. Relays
   1. Relays shall be plug-in type complete with sockets for panel mounting. Poles shall be required and contact rated for intended use.

H. VAV Damper and Valve Actuators
   1. Actuator shall be modulating, or floating "tri-state" type with permanently lubricated gear train sealed in duct tight enclosure. Actuator shall be sized to handle intended load plus 10% (refer to control drawings for required type).

I. Control Damper
   1. Control dampers are to be provided and installed by the Mechanical Contractor.

J. An as-built control diagram shall be laminated and secured inside of each temperature control panel prior to commencement of the final on-site mechanical systems commissioning sessions.

K. All low voltage wiring (whether plenum rated or not) shall be installed in raceways with the following conditions, clarifications, and exceptions.
   1. Raceways shall be as defined in the National Electrical Code and open cable trays shall not be construed as meeting the definition of a raceway.
   2. Low voltage wiring for temperature controls and energy management systems may be routed utilizing open cable trays above accessible ceilings. Low voltage wiring for temperature controls and energy management systems may also be installed utilizing appropriately spaced and neatly routed j-supports above accessible ceilings. Low voltage wiring routed in walls or at roof penetrations shall be installed in conduit.
   3. Where open cable trays are utilized above accessible ceilings the following conditions apply.
      a. Low voltage wiring routed in open cable trays shall be plenum-rated (whether or not the ceiling space is utilized as a return air plenum).
      b. Low voltage wiring concealed in walls, floors, and above inaccessible ceilings shall be routed in raceways.
      c. Low voltage wiring routed between conduit stubs and cable trays shall be secured with appropriately spaced j-supports.

L. Gas Monitors
   1. Gas monitor for CO^2 and combustibles shall be standalone type utilizing an electrochemical cell (for toxic gas monitoring) or a catalytic combustion cell (for explosive gas monitoring.) Gas monitor shall have an analog output for input to EMCS system. Gas monitor shall also have 2 alarm relays. Monitor shall be Honeywell Analytics Model E3SM with appropriate Sensor Cartridge for all gases except CO^2.

2.11 MISCELLANEOUS REQUIREMENTS

A. Chiller room signage shall comply with all requirements listed in Uniform Mechanical Code Chapter 11 and in ASHRAE Standard 15. All signage shall be submitted to the Owner for review and approval prior to ordering and installation. Provide plastic labels with a minimum lettering height of ½". Signage shall be in accordance with the requirements listed in this specification (although additional signage may be required in the applicable codes and standards).

B. Provide signage at each chiller room door to read as follows (signage as required by ASHRAE Standard 15-2019 Section 11.7):

Machinery Room - Authorized Personnel Only
No Entry Allowed During a Refrigerant Alarm Condition
Except by Trained and Authorized Personnel

Emergency Refrigerant Leak Procedures
If the refrigerant leak alarm is determined to be a reportable event please contact the following representatives:
City of Reno – Corp Yard
Address
Phone (Normal Business Hours)
Phone (Nights and Weekends)

2.12 INSTRUCTION

A. Furnish operation and maintenance manuals covering functions and operation of control system for use by Owner's operating personnel. A field instruction period lasting not less than one 4-hour session shall be provided followed by one 4 hour class room training session approximately 30 days later.

B. Provide control diagrams, reduced as required, diagrams shall show equipment, controls, etc. marked to correspond to identification on equipment.

C. Control Contractor shall maintain terminal and printer in his office to communicate with jobsite and for system troubleshooting, fine tuning system set points and assistance to owner on-site personnel.

D. Provide vandal proof type sensors or covers on all devices exposed to public.

2.13 LARGE EQUIPMENT AND GLOBAL CONTROLLER - ASCENT CONTROL MODULE (ACM)

A. General Requirements
   1. BACnet Conformance
      a. Building Controller shall be approved by the BTL as meeting the BACnet Building Controller requirements.
      b. Refer to Section 22.2 (BACnet Functional Groups) in the BACnet standard for a complete list of the services that must be directly supported to provide each of the functional groups listed above. All proprietary services, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
   2. Building controller shall be of scalable design such that the number of trunks and protocols may be selected to fit the specific requirements of a given project.
   3. The controller shall be capable of panel-mounted on DIN rail and/or mounting screws.
   4. The controller shall be capable of providing global control strategies for the system based on information from any objects in the system, regardless if the object is directly monitored by the building controller module or by another controller.
   5. The controller shall be capable of running up to six independent control strategies simultaneously. The modification of one control strategy does not interrupt the function or runtime others.
   6. The software program implementing the DDC strategies shall be completely flexible and user definable. All software tools necessary for programming shall be provided as part of project

software. Any systems utilizing factory pre-programmed global strategies that cannot be modified by field personnel on site, using a WAN or downloaded through remote communications are not acceptable. Changing global strategies using firm ware changes is also unacceptable.

7. Programming shall be object-oriented using control function blocks, and support DDC functions.
8. All flowcharts shall be generated and automatically downloaded to controller. Programming tool shall be supplied and be resident on workstation. The same tool shall be used for all controllers.
9. Programming tool shall provide means to graphically view inputs and outputs to each program block in real time as the program is executing. This function may be performed using the operator's workstation or field computer.
10. Controller shall have 6000 Analog Values and 6000 Binary Values
11. Controller IP configuration can be done via a direct USB connect with an operator's workstation or field computer.
12. Controller shall have at a minimum a Quad Core 996 GHz processor to ensure fast processing speeds.
13. Global control algorithms and automated control functions shall execute using a 64-bit processor.
14. Controller shall have a minimum of 1 GB of DDR3 SDRAM on a 533 MHz bus to ensure high speed data recording, large data storage capacity and reliability.
15. Controller shall support two on-board EIA-485 ports capable of supporting various EIA-485 protocols including but not limited to BACnet MS/TP and Modbus.

a. Ports are capable of supporting various EIA-485 protocols including but not limited to BACnet MS/TP and Modbus.

16. Controller shall support two gigabit speed Ethernet (10/100/1000) ports.
    a. Ports are capable of supporting various Ethernet protocols including but not limited to BACnet IP, FOX, and Modbus.
17. All ports shall be capable of having protocol(s) assigned to utilize the port's physical connection
18. The controller shall have at a minimum four on board inputs, two universal inputs and two binary inputs.
19. Schedules
    a. Building controller modules shall provide normal seven-day scheduling, holiday scheduling and event scheduling.
    b. Each building controller shall support a minimum of 380 BACnet Schedule Objects and 380 BACnet Calendar Objects.
20. Logging Capabilities
    a. Each building controller shall log a minimum 2000 objects at 15 minute intervals. Any object in the system (real or calculated) may be logged. Sample time interval shall be adjustable at the operator's workstation.
    b. Logs may be viewed both on-site and off-site using WAN or remote communication.
    c. Building controller shall periodically upload trended data to networked operator's workstation for long-term archiving if desired.
    d. Archived data stored in database format shall be available for use in third-party spreadsheet or database programs.

21. Alarm Generation
    a. Alarms may be generated within the system for any object change of value or state (either real or calculated).This includes things such as analog object value changes, binary object state changes, and various controller communication failures.
    b. Each alarm may be dialed out as noted elsewhere.
    c. Alarm log shall be provided for alarm viewing. Log may be viewed on-site at the operator's terminal or off-site using remote communications.
    d. Controller must be able to handle up to 2000 alarm setups stored as BACnet event enrollment objects, with system destination and actions individually configurable.
22. BACnet MS/TP
    a. BACnet MS/TP LAN must be software-configurable from 9.6 to 115.4 Kbps
    b. Each BACnet MS/TP LAN shall support 64 BACnet devices at a minimum
    c. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
23. BACnet IP
    a. The building controller shall comply with Annex J of the BACnet specification for IP connections. This device shall use Ethernet to connect to the IP internet work, while using the same Ethernet LAN for non-IP communications to other BACnet devices on the LAN.
    b. Must support interoperability on WANs and CANs and function as a BACnet Broadcast Management Device (BBMD).
    c. Each controller shall support at a minimum 128 BBMD entries.
    d. BBMD management architecture shall support 3000 subnets at a minimum.
    e. Shall support BACnet Network Address Translation.
    f. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
24. Expansion port
    a. Controller shall support two expansion ports.
    b. Combining the two on-board EIA-458 ports with fully loaded expansion ports the controller shall support 6 EIA-485 trunks simultaneously.

2.14.1 APPLICATION SPECIFIC CONTROLLER (VLC)

A. General Requirements
1. Each controller shall be microprocessor based and communicate with its respective GC and also be stand-alone maintaining its own control strategy in the event of communication failure with the GC or remote computer terminals. Each controller shall contain RAM and ROM and be capable of controlling heat pumps, boilers, cooling towers, pumps, etc. as specified in sequence of operation. Inputs shall be either analog or digital. Momentary type switch closure allows an input to be both analog and digital. Outputs shall be analog or digital with LED's provided to indicate status. Each controller is linked serially by a pair of wires and communicates to its respective GC at 4800 baud. Controllers default to last programmed temperature or to fixed operator selectable control whenever communication to GC is lost. Default mode shall be field changeable. All operating modes (except default) and set points shall be modified at the computer terminals. Each unit shall allow complete calibration of all temperatures.
2. System shall be capable of accomplishing any controller-to-controller command in a maximum of 1 second.

END OF SECTION 230900