

CONSTRUCTION CONTRACT

THIS CONSTRUCTION CONTRACT (“Contract”) is made and entered into on the date of the last signature set forth below, by and between the City of Littleton, a municipal corporation within the State of Colorado (“City”), and **Tryg Group, LLC**, a Colorado limited liability company (“Contractor”). The Contractor and the City are referred to as a “Party” or collectively the “Parties.”

RECITALS AND REPRESENTATIONS

WHEREAS the City issued a solicitation for bids no.19-2025, and the Contractor submitted a bid to perform the work; and

WHEREAS the City has elected to accept the Contractor’s bid.

NOW, THEREFORE, in consideration of the mutual covenants herein set forth, the Parties agree as follows:

1.1 **Contract Documents and Exhibits.** The term “Contract Documents” consist of this Contract together with the following:

Exhibit A	Scope of Work
Exhibit B	Bid Schedule
Exhibit C	General Conditions
Exhibit D	Construction Contract Forms
Exhibit E	Drawings and Specifications
Exhibit F	Special Conditions [<i>none</i>]

All exhibits referred to in this Contract are attached hereto and are, by reference, incorporated herein for all purposes. Exhibit D is provided as a form and is not intended to be considered final. The City expressly reserves the right to modify Exhibit D contract forms, in its sole discretion. In the event any matter, term, provision, or condition that is the subject of this Contract requires clarification or is in dispute, or is the subject of a difference of opinion, the purpose and intent of the Contract shall be first ascertained by reference to the Contract Documents in their entirety. In the event of any dispute or differences between the respective documents that constitute the Contract Documents, then the Contractor shall secure the written instructions from the City before proceeding with the performance of the services affected by such conflicts, omissions or discrepancies.

1.2 **Project.** The Contractor shall commence and complete the Scope of Work (“Work”), **Exhibit A**, in accordance with the Contract Documents, as defined herein. The Contractor agrees to perform and complete the Work in a proper and workmanlike manner, consistent with the highest standards of professional and construction practices and in full compliance with, and as required by or pursuant to, this Contract, and with the greatest economy, efficiency, and expedition consistent therewith, with only new, undamaged and first quality equipment, materials and supplies. The Contractor shall, at its own expense, furnish all labor, materials, tools, supplies,

machinery, utilities, permits, licenses, and other equipment that may be necessary for the completion of the Work, as outlined in the Contract Documents. No work shall commence until a Notice to Proceed has been issued, and if required by the City, until after approval by the City Council in accordance with the City Charter and City Code.

- 1.3 **Commencement and Completion of the Project.** The Contractor understands and agrees that all Work required under this Contract shall be fully completed by **July 31, 2026**. The Contractor acknowledges and understands that it is an essential term of this Contract that Contractor maintain a rate of progress in the Work that will result in completion of the Work in accordance with the Contract Documents, and to that end, Contractor agrees to proceed with all due diligence to complete the Work in a timely manner in accordance with the Contract Documents.
- 1.4 **Contract Price.** The City accepts the Contractor's bid for the estimated quantities and costs as set forth in the Bid Schedule, **Exhibit B**, in the total amount of **\$2,584,375.00**. The City shall make payment(s) to Contractor in the manner and at such times as set forth in the General Conditions of such amounts as are required by the Contract Documents. The City shall deduct and retain five (5) percent from the total amount of each approved invoice, including Change Orders. The City may also deduct in addition to retainage as stated above, the additional amount(s) of any and all outstanding claims pursuant to Colorado Revised Statute ("C.R.S.") §38-26-107 from each approved invoice. The City has appropriated sufficient funds for the completion of this work.
- 1.5 **Payments to Constitute Current Expenditures.**
 - 1.5.1 Notwithstanding any other term, provision, or condition herein, all financial obligations of the City are contingent on funds for that purpose being appropriated, budgeted and otherwise made available by the City Council. The City's obligations under the Contract shall not constitute a multiple-fiscal year direct or indirect debt or other financial obligation of the City within the meaning of Article X, Section 20 of the Colorado Constitution.
 - 1.5.2 Further, pursuant to 103.6(2) of Article 91, Title 24, C.R.S., no Change Order, Amendment, or other form of order or directive by the City which requires additional compensable work to be performed, and which work causes the aggregate amount payable under this Contract to exceed the amount appropriated for the original Contract, shall be executed, or shall work be performed by the Contractor, unless the City provides written assurances to the Contractor that lawful appropriations to cover the costs of such additional work have been made or unless such work is covered under a remedy-granting provision of this Contract. For purposes of this paragraph, "remedy-granting provision" shall be defined as set forth in C.R.S. §24-91-103.6(4).
- 1.6 **Confidentiality.** Notwithstanding any provision in the Contract Documents to the contrary, the City is obligated to comply with the Colorado Open Records Act (C.R.S. §§24-72-101 *et seq.*), which may require the City to disclose all or a portion of

communications relating to the Contract, or terms of same, or of any transaction under the Contract, and other related matters. The Contractor shall familiarize itself with the Colorado Open Records Act. In no event shall the City be liable to the Contractor for the disclosure of all or a portion of communications, or relating documents, or electronic imaging, including all documents and exhibits that may be included as part of this Contract.

1.7 Insurance.

1.7.1 The Contractor shall not commence work, and shall not allow any subcontractor to commence work, until it has obtained all insurance required herein and such insurance has been approved by City. For the duration of the Contract, the Contractor must maintain the insurance coverage required in this section. The City's acceptance of a certificate of insurance or other proof of insurance that does not comply with all insurance requirements set forth in this Contract shall not act as a waiver of the Contractor's breach of Contract or of any of the City's rights or remedies under this Contract.

1.7.2 The Contractor shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant to the Contract Documents by reason of its failure to procure or maintain insurance, or by reason of its failure to procure or maintain insurance in sufficient amounts, durations, or types.

1.7.3 The Contractor shall procure and maintain at its own cost and shall cause each subcontractor of the Contractor to procure and maintain at its own cost (or shall insure the activity of Contractor's subcontractors in Contractor's own policy with respect to), the minimum insurance coverages listed below. Such coverages shall be procured and maintained with forms and insurers acceptable to the City. All coverages shall be continuously maintained from the date of commencement of the Work. In the case of any claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage.

1. Workers' Compensation and Employers' Liability insurance with minimum limits of FIVE HUNDRED THOUSAND DOLLARS (\$500,000) each accident, FIVE HUNDRED THOUSAND DOLLARS (\$500,000) disease - policy limit, and FIVE HUNDRED THOUSAND DOLLARS (\$500,000) disease - each employee. The policy shall cover obligations imposed by the Workers' Compensation Act of Colorado and any other applicable laws for any employee engaged in the performance of Work.
2. Commercial General Liability insurance with minimum combined single limits of ONE MILLION DOLLARS (\$1,000,000) each occurrence and TWO MILLION DOLLARS (\$2,000,000) aggregate. The policy shall be applicable to all premises and operations. The policy shall include coverage for bodily injury,

broad form property damage (including completed operations), personal injury (including coverage for contractual and employee acts), blanket contractual, independent contractors, products, and both ongoing and completed operations. The policy shall include coverage for explosion, collapse, and underground hazards (XCU). The policy shall contain a severability of interests provision.

3. Comprehensive Automobile Liability insurance with a minimum combined single limit for bodily injury and property damage of ONE MILLION DOLLARS (\$1,000,000) with respect to each of Contractor's owned, hired and/or non-owned vehicles assigned to or used in performance of the Work. The policy shall contain a severability of interests provision.
4. Installation Floater/Inland Marine insurance with minimum limits of not less than the insurable value of the work to be performed at completion. The value shall include the aggregate value of any City-furnished equipment and materials to be erected or installed by the Contractor not otherwise insured. The policy shall protect the Contractor and the City from all insurable risks of physical loss or damage to materials and equipment not otherwise covered, while in warehouses or storage areas, during installation, during testing, and after the Work under this Contract is completed. The policy shall be of the "all risks" type, with coverages designed for the circumstances which may occur in the particular Work to be performed under this Contract. The policy shall provide for losses to be payable to the Contractor and the City as their interests may appear. The policy shall contain a provision that in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery against the Contractor or the City.

1.7.4 The City of Littleton shall be included as additional insured for Commercial General Liability and Comprehensive Automobile Liability insurance. The City of Littleton shall be included as additional insured or loss payee for Installation Floater/Inland Marine insurance. All policies of insurance providing additional insured status shall be primary insurance, and any insurance carried by the City, its officers, or its employees, shall be excess and not contributory insurance to that provided by Contractor. The additional insured endorsement for the Commercial General Liability insurance required above shall not contain any exclusion for bodily injury or property damage arising from completed operations. The Contractor shall be solely responsible for any deductible losses under each of the policies required above.

1.7.5 Certificates of insurance shall be completed by the Contractor's insurance company as evidence that policies providing the required coverages, conditions, and minimum limits are in full force and effect, and shall be subject

to review and approval by the City. The certificate cannot contain "endeavor to" language in the portion of the certificate addressing cancellation. The City of Littleton shall be included as Certificate Holder. The City reserves the right to request and receive a certified copy of any policy and any endorsement thereto.

- 1.7.6 The coverages afforded under the policies shall not be cancelled, terminated or materially changed until at least thirty (30) days' prior written notice has been given to the City. Failure on the part of the Contractor to procure or maintain policies providing the required coverages, conditions, and minimum limits shall constitute a material breach of Contract upon which the City may immediately terminate the Contract, or at its discretion may procure or renew any such policy or any extended reporting period thereto and may pay any and all premiums in connection therewith, and all monies so paid by the City shall be repaid by Contractor to the City upon demand, or the City may offset the cost of the premiums against any monies due to Contractor from the City.
- 1.7.7 The Parties hereto understand and agree that the City is relying on, and does not waive or intend to waive by any provision of this Contract, the monetary limitations (presently \$387,000 per person and \$1,093,000 per occurrence) or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, C.R.S. § 24-10-101 et seq., as from time to time amended, or otherwise available to the City, its officers, or its employees.
- 1.8 **Taxes.** The City of Littleton is not subject to taxation. The Contractor shall not invoice the City for any state, federal or local taxes whatsoever. Upon written notification by the City, the Contractor shall reimburse the City in a timely manner for any taxes erroneously paid by the City.
- 1.9 **Waiver of Breach.** A waiver by any Party to the Contract or the breach of any term or provision of the Contract shall not operate or be construed as a waiver of any subsequent breach by either Party.
- 1.10 **No Third-Party Beneficiaries.** It is expressly understood and agreed that enforcement of the terms and conditions of this Contract, and all rights of action relating to such enforcement, shall be strictly reserved to the City and the Contractor and nothing contained in this Contract shall give or allow any such claim or right of action to any other third-party on this Contract. It is the express intention of the City and the Contractor that any person other than the City or the Contractor receiving services or benefits under this Contract shall be deemed to be an incidental beneficiary only.
- 1.11 **Independent Contractor.** The Contractor shall perform the Work as an independent contractor and shall not be deemed by virtue of this Contract to have entered into any partnership, joint venture, employer/employee or other relationship with the City other than as a contracting party and independent contractor.

- 1.12 **Accessibility Standards.** The Contractor shall comply with the accessibility standards for an individual with a disability adopted by the Colorado Office of Information Technology, in accordance with C.R.S. § 24-85-103 and its implementing regulations. Notwithstanding the foregoing, this requirement shall not be applicable to contracts or agreements for professional services, as defined by C.R.S. § 24-30-1402, or to any portion or part of the contract or agreement that is providing professional services. Further, the contractor shall indemnify, hold harmless, and assume liability on behalf of the city and the city's officers, employees, and agents, for all costs, expenses, claims, damages, liabilities, court awards, attorney fees and related costs, and any other amounts incurred by the city in relation to the contractor's noncompliance with the accessibility standards for an individual with a disability adopted by the Colorado Office of Information Technology, in accordance with C.R.S. § 24-85-103, and its implementing regulations.
- 1.13 **Non-Discrimination.** In connection with the performance of the Work, the Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, national origin, ethnicity, citizenship, immigration status, sex, gender, age, sexual orientation, gender identity or gender expression, marital status, source of income, military status, protective hairstyle, genetic information, pregnancy, or disability, or any other status protected by applicable law. The Contractor will take affirmative action to ensure applicants are employed, and employees are treated during employment, without regard to their race, color, religion, national origin, ethnicity, citizenship, immigration status, sex, gender, age, sexual orientation, gender identity or gender expression, marital status, source of income, military status, protective hairstyle, genetic information, pregnancy, disability, or any other status protected by applicable law. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.
- 1.14 **Indemnification.** The Contractor agrees to investigate, defend, indemnify and hold harmless the City, its officers, employees, insurers, and self-insurance pool, from and against all liability, claims and demands on account of any losses, injuries, and damages, including but not limited to, alleged personal injury claims, and/or death claims, or property damage claims, or errors and omissions, which arise solely out of the Contractor's and/or any of its agents' officers or employees performance of the Contractor's obligations under this Contract. The City is prohibited by Article XI, Section 1, Colorado Constitution, from indemnifying any individual or entity. Therefore, the City does not indemnify the Contractor, successors, or assigns under this Contract. Notwithstanding the foregoing, nothing herein is intended to constitute a covenant, promise, or agreement to indemnify and hold harmless the City from any liability or damages directly caused by or attributable to the City's own negligence, nor is anything herein intended to be nor may be construed as a waiver of the immunities, protections, or limitations on damages provided to the City by the Colorado Governmental Immunity Act, C.R.S. §§24-10-101 et seq., as it may from time to time be amended.

- 1.15 **Governing Law and Venue.** The Contract shall be governed by the laws of the State of Colorado. Venue for any action arising under the Contract or for the enforcement of the Contract shall be in the appropriate court for Arapahoe County, Colorado.
- 1.16 **Additional Documents or Action.** The Parties agree to execute any additional documents and to take any additional action that is necessary to carry out this Contract.
- 1.17 **Binding Effect.** This Contract shall inure to the benefit of, and be binding upon, the Parties, their respective legal representatives, successors, heirs, and assigns; provided, however, that nothing in this paragraph shall be construed to permit the assignment of this Contract except as otherwise expressly authorized herein.
- 1.18 **Integration, Amendment, and Severability.** This Contract represents the entire agreement between the Parties and there are no oral or collateral agreements or understandings. This Contract may be amended only by an instrument in writing signed by the Parties or as otherwise provided herein. If any other provision of this Contract is held invalid or unenforceable, no other provision shall be affected by such holding, and all of the remaining provisions of this Contract shall continue in full force and effect.
- 1.19 **Binding Authority.** The Contractor represents and affirms that the signature page hereof accurately states the full legal name of Contractor (whether as a corporation, partnership, limited liability company, sole proprietorship, or other), contains all requisite signature(s) on behalf of Contractor, has been properly acknowledged by attestation, notary acknowledgment, or both, and in all other respects is effective to bind Contractor, in accordance with all applicable statutes, regulations, resolutions, rules, bylaws, agreements, or similar sources of authority or limitation. This Contract may be executed in counterpart(s), each of which shall be deemed to be an original, and all of which, taken together, shall constitute one instrument.
- 1.20 **Subject to Legislative Approval and Compliance with Law.** The Contractor acknowledges and agrees that if a Change Order is required under the terms of the Contract, the City shall not incur any liability whatsoever for claims of payment, compensation, damages, or adjustment of any kind by the Contractor due to any delays for the required approvals and execution under Section 1.3 of the General Conditions, **Exhibit C**. The Contractor further acknowledges and agrees that this Contract's execution may be contingent upon approval by the City Council, in compliance with all applicable provisions of the City Charter and City Code. The City shall not incur any liability whatsoever if this Contract is not approved by City Council.
- 1.21 **Notices.** All notices required under this Contract shall be in writing and shall be sent by registered or certified mail, return receipt requested, to the addresses of the Parties herein set forth. A Party may change its mailing address by giving written notice of such change of address to other Party.

Notice to City: City of Littleton
City Manager
2255 West Berry Avenue
Littleton, CO 80120

Notice to Contractor: Tryg Group, LLC
11989 W Colfax
Lakewood, CO 80215

- 1.22 **Force Majeure.** Neither Party shall be responsible for a delay in its respective performance under this Contract, other than a delay in payment for Work already performed, if such delay is caused by extraordinary weather conditions or other natural catastrophes, war, terrorist attacks, sabotage, computer viruses, riots, strikes, lockouts or other industrial disturbances, epidemics, pandemics, acts of governmental agencies or authorities, discovery of hazardous materials or differing and unforeseeable site conditions, or other events beyond the reasonable control of the claiming Party. Contractor shall be entitled to an equitable adjustment to the project schedule and compensation in the foregoing circumstances.
- 1.23 **Electronic Signatures and Electronic Records.** The Contractor consents to the use of electronic signatures by the City. The Contract, and any other documents requiring a signature hereunder, may be signed electronically by the City in the manner specified by the City. The Parties agree not to deny the legal effect or enforceability of the Contract solely because it is in electronic form or because an electronic record was used in its formation. The Parties agree not to object to the admissibility of the Contract in the form of an electronic record, or a paper copy of an electronic document, or a paper copy of a document bearing an electronic signature, on the ground that it is an electronic record or electronic signature or that it is not in its original form or is not an original.

[signature page to follow]

CITY OF LITTLETON, COLORADO

ATTEST

Kyle Schlachter
MAYOR

Colleen Norton
CITY CLERK

APPROVED AS TO FORM:

Reid Betzing
CITY ATTORNEY



CONTRACTOR

Rich Kleinhans
Account Manager

Date

Exhibit A

Scope of Work

Work includes removal and replacement of the Museum's key mechanical systems to ensure long term reliability, increase energy efficiency, and improve control over interior environmental conditions.

During open hours, the Museum is an active space with City employees and public visitors. The Contractor's work hours shall be Monday through Friday 7:00 AM – 4:00 PM. Building closures shall be minimal, but may be necessary for systems changeover or crane work; any closures shall require prior City approval and coordination.

In general, the Contractor shall:

- Coordinate cross-department work with City staff.
- Phase work to mitigate extended periods of limited building condition control.
- Install temporary barriers (drains, doorways, etc.) to limit debris and dust from expanding outside of work zone, taking special care to limit use of floor drains to prevent clogs and backups.
- Conduct plan reviews and obtain necessary permits.
- Utilize a Verisco-approved vendor for roofing work.

A. MECHANICAL:

The Contractor shall supply and install new equipment as follows:

- (3) Roof-mounted AHUs RTU-1, RTU-2, and RTU-3
- (3) Roof-mounted steam humidifiers SH-1, SH-2, and SH-3
- (2) Aerco BMK2000 boilers B-1 and B-2
- (2) Building pumps P-1 and P-2 (secondary loop), replacing existing pumps in the boiler room and providing new Variable Frequency Drives (VFDs)
- (2) Boiler pumps P-3 and P-4
- (1) Air separator AS-1
- (1) Expansion tank ET-2
- (1) Water softener WSS-1
- (1) Electric unit heater EUH-1
- (1) Pot Feeder

Demolition and Preparation

The Contractor shall shut down, isolate, and apply lock-out/tag-out procedures to the existing equipment as described below.

- Disconnect all electrical, controls, gas piping, and water piping.
- Demolish and remove (properly recycle or dispose of):
 - (3) Roof-mounted AHUs (RTU-1, RTU-2, and RTU-3)
 - (2) Existing PK Modu-Fire heating boilers (B-1 and B-2)
 - (1) Existing Hurst boiler and steam generator (B-3)
 - (2) Hot water unit heaters
 - (2) Building heating water pumps and associated VFDs (P-3 and P-4), with VFDs to be removed from their current location
 - (2) Boiler pumps (P-1 and P-4) and associated VFDs
 - (1) Air separator (AS-1)
 - (1) Expansion tank (ET-2)
 - (1) Accumulator tank

- (1) Water softener brine tank and resin tanks
- (1) Pot feeder
- Remove any associated combustion air intakes, flues, water and gas piping, conduits and wiring, and controls no longer required for the new system.
- Provide roofing patch for roof openings that are no longer required.
- Demolish and remove (2) existing exterior doors in the boiler room.

Installation

The Contractor shall:

- Provide and install (2) new non-louvered exterior boiler room doors.
- Perform concrete work to extend the existing concrete pad for new boilers and the new water softener.
- Set in place and provide rigging services, where required, for:
 - (2) New heating boilers B-1 and B-2
 - (2) New building heating water pumps P-3 and P-4, with associated VFDs mounted near the pumps
 - (1) New expansion tank ET-2
 - (1) Water softener WSS-1
- Hang the new electric unit heater EUH-1.
- Provide curb adaptor on the roof next to existing AHU curbs to accommodate new humidifiers, including roofing services to seal in new curb extensions.
- Provide curb adaptors for new AHUs to set on existing curbs.
- Provide a crane to lift new curb adaptors, AHUs, and steam humidifiers.
- Install new water piping and insulation (where required) per drawings for new boilers, boiler pumps, building pumps, expansion tank, and water softener.
- Install neutralizer kits on new boilers and pipe to a nearby floor drain.
- Incorporate new air separator (AS-1), pot feeder, and associated valves, strainers, circuit setters, gauges, and test ports.
- Provide new combustion air intake and flue piping for (2) new boilers, re-using existing roof penetrations and patching the roof where required.
- Install new water piping, per drawing, from the water softener to feed (3) new steam humidifiers.
- Rework existing and provide new gas lines to feed (2) new boilers.
- Install new gas piping to serve (3) new steam humidifiers.
- Provide electrical power to new boilers and boiler pumps.
- Rework existing power to old building pumps to power new building pumps and associated VFDs.
- Provide power to feed new steam humidifiers.
- Re-use existing power to repower the new water softener.
- Provide power to the new electric unit heater.
- Reconnect existing power to (3) new roof-mounted air handlers.
- Install (2) new Emergency Power Off (EPO) switches for boiler shutdown, one at each boiler room entrance.
- Remove lock-out/tag-out.
- Open water valves and fill the system.
- Turn on electrical power to the new system(s).
- Prepare equipment for start-up.
- Perform factory start-up on new equipment.
- Perform test and balance of heating water loop boilers, pumps, and coils at AHUs.
- Perform test and balance cubic feet per minute check at AHUs (does not include

- building ductwork or diffusers).
- Perform clean-up of all work areas.

B. CONTROLS:

Existing Trane Tracer SC+ System Controllers shall be reused. The City will provide the Contractor with access to existing blueprints and Tracer Ensemble controls. Trane shall assist with system programming and project oversight, and conduct Building Automation System (BAS) checkout and verification. The heating water system and AHUs will be controlled and monitored through the BAS.

Heating Water System

The Contractor shall:

- Remove and replace the existing heating water system equipment and piping, including existing water boilers, steam boiler, pumps, expansion tanks, etc.
- Provide high voltage wiring.
- Remove the existing Trane MP581 controller and enclosure. All existing control devices associated with the heating water system will be demolished with the piping.
- Provide a new Trane UC600 BACnet controller.
- Provide and install a new enclosure.
- Coordinate 120VAC power to the enclosure.
- Wire new BACnet communication link to the existing Tracer SC+.
- Install (2) new boilers (B-1 and B-2).
 - Wire BACnet communication link to the primary boiler.
 - Wire Cascade communication link to the secondary boiler.
 - Wire (2) factory-provided common temperatures sensors (HWS and HWR).
 - Provide and wire primary boiler enable / disable (relay), alarm status (relay), and setpoint.
- Install (2) new boiler circulation pumps (P-1 and P-2).
 - Provide and wire pump start / stop (relay) to associated boiler.
 - Provide and wire pump status (current switch) for each pump.
- Install (2) new distribution pumps (P-3 and P-4).
 - Wire BACnet (communication link each pump VFD)
 - Provide and wire pump start / stop (relay), status (current switch), and signal for each pump.
- Provide and wire (1) new HW system differential pressure transducer.
- Provide and wire (2) new temperature sensors (HWS and HWR).
- Reuse (1) existing glycol feeder.
 - Wire glycol feeder low level alarm (dry contacts).
- Rewire (1) existing outside air temperature / humidity sensor.
- Rewire (1) existing domestic circulation pump start / stop and status.
- Rewire (1) existing exhaust fan EF-6 start / stop and status.
- Rewire (1) existing exhaust fan EF-7 status.
- Rewire (1) existing crawlspace intake damper open / close.
- Provide (2) new EPO switches.
 - Coordinate boiler shutdown with electrical work.
 - Wire EPO switch status.
- Provide six months of controls troubleshooting to ensure two full seasons of proper operation.

AHU (RTU-1)

The Contractor shall:

- Remove existing AHU and replace with (1) new VAV AHU (RTU-1).
- Provide high voltage wiring.
- Remove existing Trane MP581 controller, expansion modules, and enclosures. All existing control devices associated with the AHUs will be demolished, unless otherwise instructed.
- Provide and wire new XM70 expansion module to existing UC600 BACnet controller. All devices are factory-installed, however the Contractor shall provide field wiring / installation as follows:
 - Wire new BACnet communication link to the Tracer SC+.
 - Provide new two-Way HW control valve and wire 2-10VDC signal and feedback.
 - Provide new two-way CHW control valve and wire 2-10VDC signal and feedback.
 - Rewire existing under-floor control damper 2-10VDC signal.
 - Provide and wire (reusing wire) new combo space CO2, humidity, and temperature sensor #1.
 - Provide and wire (reusing wire) new combo space CO2, humidity, and temperature sensor #2.
 - Provide and wire (reusing wire) new combo space CO2, humidity, and temperature sensor #3.
 - Provide and wire (reusing wire) new combo space CO2, humidity, and temperature sensor #4.
 - Provide and install new steam humidifier SH-1 with appropriate roof curb adapter.
 - Wire new BACnet communication link to the Tracer SC+.
 - Wire factory-provided airflow switch and high limit humidistat.
 - Provide and wire new discharge air humidity sensor.
 - Provide and wire new building pressure transducer and install poly-tubing to building static pressure reference and outside air reference.
 - Provide and wire new return plenum pressure transducer and install poly-tubing to duct static pressure reference.
 - Wire supply air and return air smoke detectors to unit for emergency shutdown circuit. *(Supply air and return air smoke detectors shall be provided, installed, and powered by the City or its separate contractor.)*
 - Provide and wire high static pressure switch, and install poly-tubing to duct pressure reference. *(Contractor shall not combine poly-tubing to the duct static pressure reference and high static pressure reference--they will remain separate.)*

AHU (RTU-2)

The Contractor shall:

- Remove existing units and replace with (1) new VAV AHU (RTU-2).
- Provide high voltage wiring.
- Remove existing Trane MP581 controller, expansion modules, and enclosures. All existing control devices associated with the AHUs will be demolished, unless otherwise instructed.
- Provide and wire new XM70 expansion module to existing UC600 BACnet controller. All devices are factory-installed, however the Contractor shall provide field wiring / installation as follows:
 - Provide new two-way HW control valve and wire 2-10VDC signal and

- feedback.
- Provide new two-way CHW control valve and wire 2-10VDC signal and feedback.
- Provide and wire (reusing wire) new space CO2 sensor for conference room 114.
- Provide and wire (reusing wire) new space humidity sensor #1 for room 120.
- Provide and wire (reusing wire) new space humidity sensor #2 for hall 123.
- Provide and wire (reusing wire) new space humidity sensor #3 for office 116.
- Provide and wire (reusing wire) new space humidity sensor #4 for library 113.
- Provide and wire (reusing wire) new space humidity sensor #5 for storage room 135.
- Provide and install new Steam Humidifier SH-2 with appropriate curb adapter on roof.
- Wire new BACnet communication link to Tracer SC+.
 - Wire factory-provided airflow switch and high limit humidistat.
 - Provide and wire new discharge air humidity sensor.
- Install poly-tubing to the duct static pressure reference from factory-installed duct static pressure transducer.
- Provide and wire new building pressure transducer and install poly-tubing to the building static pressure reference and outside air reference.
- Provide and wire new return plenum pressure transducer and install poly-tubing to the duct static pressure reference.
- Wire supply air and return air smoke detectors to unit for emergency shutdown circuit. *(Supply air and return air smoke detectors shall be provided, installed, and powered by the City or its separate contractor.)*
- Provide and wire high static pressure switch and install poly-tubing to the duct pressure reference. *(Contractor shall not combine poly-tubing to the duct static pressure reference and high static pressure reference--they will remain separate.)*

AHU (RTU-3)

The Contractor shall:

- Remove existing unit and replace with (1) new Trane VAV AHU (RTU-3).
- Provide high voltage wiring.
- Remove existing Trane MP581 controller, expansion modules, and enclosures. All existing control devices associated with the AHU will be demolished, unless otherwise instructed.
- Provide and wire new XM70 expansion module to existing UC600 BACnet controller. All devices are factory-installed, however the Contractor shall provide field wiring / installation as follows:
 - Provide new two-way HW control valve and wire 2-10VDC signal and feedback.
 - Provide new two-way CHW control valve and wire 2-10VDC signal and feedback.
 - Provide and wire (reusing wire) new space temperature sensor.
 - Provide and wire (reusing wire) new space humidity sensor #1.
 - Provide and wire (reusing wire) new space humidity sensor #2.
 - Provide and install humidifier SH-3 and appropriate roof curb adapter.

- Wire new BACnet communication link to Tracer SC+.
- Wire factory-provided airflow switch and high limit humidistat.
- Provide and wire new discharge air humidity sensor.
- Provide and wire new building pressure transducer and install poly-tubing to the building static pressure reference and outside air reference.
- Provide and wire new return plenum pressure transducer and install poly-tubing to duct static pressure reference.
- Wire supply air and return air smoke detectors to unit for emergency shutdown circuit. *(Supply air and return air smoke detectors shall be provided, installed, and powered by the City or its separate contractor.)*
- Provide and wire high static pressure switch and install poly-tubing to duct pressure reference. *(Contractor shall not combine poly-tubing to the duct static pressure reference and high static pressure reference--they will remain separate.)*

C. POST-CONSTRUCTION COMMISSIONING & FUNCTIONAL PERFORMANCE TESTING:
The Contractor shall diagnose, repair, and optimize the terminal box operation and energy usage to ensure efficient and reliable performance, as described below.

Preliminary Assessment

- Perform site visit to understand the current HVAC system layout, terminal box locations, and energy usage patterns.
- Review existing documentation, including HVAC system design plans, maintenance records, previous inspection reports, and energy consumption data.
- Interview Museum staff to gather information on observed issues, frequency, and impact on Museum operations and energy usage.

System Diagnostics

- Perform a detailed inspection of each terminal box to identify operational issues such as improper airflow, damper malfunction, sensor inaccuracies, and control failures.
- Utilize diagnostic tools and equipment to measure airflow rates, temperature, humidity, and pressure levels at various points in the system.
- Check calibration and functionality of sensors and controllers associated with terminal boxes.
- Conduct energy audit to identify areas of high and inconsistent energy usage within the HVAC system and other energy-consuming systems.

Data Analysis

- Analyze collected data to pinpoint root causes of terminal box malfunctions and high energy usage.
- Evaluate performance of terminal boxes in relation to overall HVAC system efficiency and energy consumption.
- Identify patterns or trends that may indicate systemic issues or specific problem areas contributing to high energy usage.

Corrective Actions

- Develop list of recommended corrective actions based on diagnostic findings and energy audit results.
- Prioritize actions based on severity of issues and impact on Museum operations,

- environmental conditions, and energy usage.
- Implement repairs, adjustments, or replacements of faulty components such as dampers, actuators, sensors, and controllers.
- Recalibrate sensors and controllers to ensure accurate readings and proper operation.
- Address energy inefficiencies by optimizing HVAC system settings, improving insulation, and upgrading to energy-efficient components.

System Optimization

- Fine-tune terminal boxes to optimize airflow and environmental control within Museum.
- Adjust control settings to achieve desired temperature, humidity, and pressure levels while maintaining energy efficiency.
- Integrate terminal box operation with central HVAC system to ensure coordinated and balanced performance.
- Implement energy-saving measures such as scheduling HVAC operation based on occupancy, utilizing VFDs, and enhancing building automation systems.

Verification and Testing

- Conduct post-repair testing to verify terminal boxes are operating correctly and efficiently.
- Monitor system performance and energy usage over a specified period to ensure stability, reliability, and reduced energy consumption.
- Perform additional adjustments if necessary, based on monitoring results.

Documentation and Reporting

- Document all findings, actions taken, and results achieved during retro-commissioning process.
- Provide comprehensive report detailing issues identified, corrective actions implemented, system performance improvements, and energy savings.
- Include recommendations for ongoing maintenance, monitoring, and energy management to prevent future issues and sustain energy efficiency.

Training and Handover

- Train Museum maintenance staff on proper operation and maintenance of terminal boxes, associated HVAC components, and energy management practices.
- Provide detailed handover package including manuals, maintenance schedules, energy-saving tips, and contact information for future support.

Manual and Document Turnover

- Provide all operation information in both PDF and hard copy/paper format, including:
 - as-built drawings
 - equipment manuals and warranties
 - operation and maintenance documentation package
 - final commissioning report

EXCLUSIONS:

- ✓ Any after-hours work shall be requested in writing at least 24 hours in advance, and must be pre-approved by the City (it is assumed all spaces are accessible within a day's notice)
- ✓ Supply or return air smoke detectors
- ✓ Repair, replacement, or troubleshooting of any existing HVAC or BAS equipment not included in this scope of workFire alarm / smoke control
- ✓ Structural engineering or structural modifications
- ✓ Chilled water loop clean, flush, or replacement of glycol
- ✓ Draining, freezing, or tapping of chilled water loop if unable to isolate
- ✓ Asbestos or asbestos abatement
- ✓ Any painting and/or drywall repairs
- ✓ Fire, smoke, and sound caulking
- ✓ Fire system work
- ✓ Any code violations requiring repairs Engineering or engineered drawings
- ✓ Any work performed in addition to the scope of work set forth above will be performed on a time and materials basis pursuant to TRYG Group's then-current rate schedule
- ✓ If any new tariffs, duties, or similar government-imposed charges or increases to existing tariffs, existing duties or similar existing government-imposed charges, affect the products outlined in this proposal prior to equipment shipment, a detailed explanation and documentation of costs impacted (*freight, import duties, or specific material increases*) that support any tariff surcharges shall be provided to the City for approval prior to ordering the products

Exhibit B Bid Schedule

	Manufacturer	Description	UOM	Quantity	Total Cost	Vendor Comment
1	Trane	AHU (RTU-1) & associated parts	Each	1	\$198,000.00	
2	Trane	AHU (RTU-2) & associated parts	Each	1	\$198,000.00	
3	Trane	AHU (RTU-3) & associated parts	Each	1	\$198,000.00	
4	Aerco	Boiler 1 (B-1)	Each	1	\$54,000.00	
5	Aerco	Boiler 2 (B-2)	Each	1	\$54,000.00	
6	Carel	Steam humidifier (SH-1)	Each	1	\$51,000.00	
7	Carel	Steam humidifier (SH-2)	Each	1	\$51,000.00	
8	Carel	Steam humidifier (SH-3)	Each	1	\$51,000.00	
9		Water Softener System (WSS-1)	Each	1	\$8,500.00	
10	Taco	Boiler Pump (P-1) and associated VFD	Each	1	\$5,000.00	
11	Taco	Boiler Pump (P-2) and associated VFD	Each	1	\$5,000.00	
12		HW Expansion Tank (ET-2)	Each	1	\$3,000.00	
13	Trane	Electric Unit Heater (EUH-1)	Each	1	\$2,000.00	
14		Non-louvered Exterior Boiler Room Doors	Each	2	\$7,200.00	
15		Curb Adapters for AHUs	Each	3	\$6,000.00	
16		Crane Services	Lump-Sum	1	\$43,000.00	
17		Pot Feeder	Each	1	\$2,000.00	
18	Grundfos	Building Pump (P-3) and associated VFD	Each	1	\$10,000.00	
19	Grundfos	Building Pump (P-4) and associated VFD	Each	1	\$10,000.00	
20		Air Separator (AS-1)	Each	1	\$3,000.00	
21		All other mechanical equipment costs	Lump-Sum	1	see line 25	
22		Mechanical Labor	Lump-Sum	1	\$224,700.00	
23		Post-Construction Commissioning & Functional Performance Testing	Lump-Sum	1	\$43,500.00	
24		Electrical Labor	Lump-Sum	1	\$42,400.00	
						650 gallons of Glycol in heating loop Roofing of new curbs Trane BAS Controls Hydronic Piping Subcontractor Labor Hydronic Piping and materials Insulation Sheet metal for RTU ductwork connections boiler exhaust flue gas piping and materials concrete pads test and balance permit and plan review fees 100% performance, labor, material bond 2 yr warranty boiler combustion air flue, demo, extra filters, porta potty, barricades, labels, debris barriers, shop drawings, project management labor, misc. materials, mobilization
25		(if applicable) other costs not included above	Lump-Sum	1	\$1,019,047.00	
26		VAV repairs labor & materials allowance (up to 3% of total project cost)	Lump-Sum	1	\$60,028.00	
BID TOTAL: \$2,349,375.00						
		Force Account (only if authorized by the City)	Lump-Sum	1	\$235,000.00	

TOTAL: \$2,584,375.00



Exhibit C General Conditions

SECTION 1 SCOPE OF WORK

1.1. PLANS AND SPECIFICATIONS:

1.1.1. The Contractor shall perform all items of Work covered and stipulated in the Specifications, Bid Schedule, Contract, General Conditions and Special Provisions, together with any authorized alterations, Extra Work and Change Orders, all in accordance with the Plans. The Contractor shall furnish, unless otherwise provided in the Specifications and/or Special Provisions, all materials, implements, machinery, equipment, tools, supplies, transportation and labor necessary to perform and complete the Work.

1.1.2. The Contractor shall be responsible for taking all steps reasonably necessary to ascertain the nature and location of the Work, and the general and local conditions which can affect the Work or the cost of the Work. Failure by the Contractor to do so will not relieve it from responsibility for successfully performing Work without additional expense to the City. The City will not be responsible for any understanding or representations concerning conditions unless such understanding or representations are expressly stated in the Contract.

1.2. **SPECIAL WORK:** Should any construction or conditions which are not thoroughly stipulated or set forth by the Specifications be anticipated on any proposed Project, Special Conditions for such Work may be prepared and attached hereto as **Exhibit F**, and shall be considered as part of the Specifications, the same as though contained fully therein. Should any Special Conditions conflict with the Specifications, the Special Conditions will govern.

1.3. CHANGES AND INCREASED OR DECREASED QUANTITIES OF WORK:

1.3.1. Without invalidating the Contract, the Project Manager and/or City reserves and shall have the right, without notice to any Sureties, by written Change Order, to make any changes, from time to time, to the character and quantity of the Work, including but not limited to, the Drawings, Specifications, Plans or Addenda, as may be considered necessary or desirable to complete fully and acceptably the Work in a satisfactory

manner. Such Change Order shall set forth with specificity the changed Work to be done and shall set forth any changes or extensions to the time of completion.

1.3.2. Increase in Cost and Required Approvals.

- i. Such Change Orders shall not increase the total cost of the Work, based on the original estimate of quantities and unit prices contained in the Bid Schedule, by more than 10% (ten percent) without the approval of the City of Littleton City Manager or authorized designee. Contractor shall be entitled to the cost of said increased units at the original price within the original bid, but not to an adjustment of unit price.
- ii. In the event said Change Order increases the total cost of the Contract based upon the unit price bid by more than 10% (ten percent), an equitable adjustment will be made and the Contract modified accordingly by a written Change Order, to be approved by the City of Littleton City Manager or authorized designee, and subject to City Council approval; provided, however, that except for claims based on errors in the Contract, no claim for change hereunder will be allowed for cost incurred more than twenty (20) days before the Contractor gives written notice as herein required; and in the case of errors in the Contract for which the City is responsible, the adjustment will be increased costs, reasonably incurred by the Contractor in attempting to comply with such errors in the Contract.
- iii. Any Change Order or other amendment that increases the total cost of the Contract to be equal to or greater than five hundred thousand and 00/100 dollars (\$500,000.00) shall require the approval of City Council.
- iv. In case a satisfactory adjustment in price cannot be reached for any item requiring a written Change Order, the City reserves the right to terminate the Contract as to said item as it applies to the terms in question and make such arrangements as may be deemed necessary to complete the Work.
- v. The Contractor shall require subcontractors to certify to the best of their knowledge and belief that the cost and pricing data submitted are accurate, complete, and current as of the date of execution, which date shall be as close as possible to the date of agreement on the negotiated price of the Change Order.
- vi. The Contractor shall not start Work on any alteration until the agreement, whether by Change Order or more formal amendment, setting forth the adjusted prices has been executed by the City and the Contractor, subject to all requirements of Title 1, Chapter 15 of the City of Littleton Code and the City's procurement policy. All changes or approvals for increasing the Work as required and authorized herein, shall be in written form and approved and signed by the City prior to the Work being done. All such writings and approvals shall be specific as to the nature of the Work and the quantities involved. Any Work performed without prior written approval of the City shall

not be binding on the City.

1.3.3. *Field Order for Minor Changes.* The Project Manager ("Project Manager") may at any time, by issuing a Field Order, order minor changes in the Work not involving an increase or decrease in the Contract amount and not involving a change in the time for completion. If the Contractor believes that any order for minor changes in the Work involves changes in the Contract amount or time for completion, the Contractor shall not proceed with the minor changes so ordered and shall within seven (7) days of the receipt of such order notify the Project Manager in writing of the estimate of the changes in the amount and time for completion. Such estimate shall thereafter be treated as a Change Order Request.

1.3.4. *Equitable Adjustment.*

- i. If the Contractor intends to assert a claim for an equitable adjustment under this Section, the Contractor shall, within 30 (thirty) days after receipt of a written Change Order or the furnishing of a written notice of requested changes by the Project Manager, submit to the Project Manager a written statement setting forth the general nature and monetary extent of such claim. No claim by the Contractor for an equitable adjustment hereunder will be allowed unless asserted as described above.
- ii. In the event the Contractor and the City are unable to agree upon the Contractor's entitlement to an equitable adjustment or upon the amount thereof, or in the event that it is in the best interest of the City to have the Work proceed pending negotiation of amount of an equitable adjustment, the City may direct the Contractor to perform the Work in accordance with the Change Order, direction, instruction, interpretation, or determination, with any Work price adjustments and progress payments for the Work to be determined on a Force Account basis in accordance with Section 7.6 of the General Conditions. The Contractor shall continue diligently to perform the Work in accordance with the City's order, direction, instruction, interpretation, or determination during negotiations with respect to the Contractor's entitlement to an equitable adjustment hereunder or to the amount of any Work price adjustment hereunder or to the amount or any Work price adjustment or time extension. The Contractor and the City may agree on certain aspects of an equitable adjustment and take those aspects out of operation of Force Account provisions.

1.3.5. *Payments for Change Orders.*

- i. Payment will not be made for Work or materials which are required under the Contract Documents and which are not specifically mentioned, indicated or otherwise provided for in the Bid Schedule, if, in the opinion of the Project Manager, the Work or materials are susceptible of classification under or reasonably inferred to be included. in the Bid Schedule.
- ii. In the event the Contractor is ordered to perform Work under this Section for which payments are not determined hereunder, which in the opinion of the

City it is impracticable to have performed by the Contractor's own employees, the Contractor will, subject to the written approval of the Project Manager, be paid the actual cost of such Work and, in addition thereto, an amount of 10% (ten percent) of the actual costs to cover the Contractor's superintendence, administration and other overhead expenses. The terms and conditions of any subcontract which the Contractor may propose to enter into in connection with Work under the provisions of this Section, shall be subject to the written approval of the City before such subcontract is executed.

- iii. In cases other than those described above, the City and the Contractor (on its own behalf and on behalf of its subcontractors) shall endeavor to negotiate a reasonable price and line adjustment in a Change Order on terms appropriate to the changed Work. The Contractor will be required to submit a sufficiently detailed price bid supported with sufficient documentation so that the City can determine that (1) the bid reflects all impacts on the Work from Work additions, deletions and modifications shown in the Change Order; (2) the proposed prices are set out in such a way that their reasonableness can be evaluated against prices based on adequate price competition, unit prices, established catalog or market prices of commercial items sold in substantial quantities to the general public, prices set by law or regulation, recognized published price lists and indices, independently developed cost estimate and other appropriate price comparisons; and (3) cost-increase provisions relating to Work changes are complied with, including but not limited to City of Littleton City Manager or City Council approvals. If any prices or other aspects are conditional, such as on firm orders being made by a certain date or the occurrence or non-occurrence of an event, the Contractor shall identify these aspects in the Change Order Request. A negotiated Change Order shall set forth prices, scheduling requirements, time extensions and all costs of any nature arising out of the issuance of a Change Order except for those cost and time aspects explicitly reserved on the face of the Change Order.

1.3.6. *Claims for Concealed or Unknown Conditions.* If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents; or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing Party shall be given to the other Party promptly before conditions are disturbed and in no event later than seven (7) days after first observance of the conditions. Site conditions which an experienced and prudent contractor could have anticipated by visiting the site, familiarizing themselves with the local conditions under which the work is to be performed and correlating observations with the requirements of the Contract Documents, shall not be considered as claims for concealed or unknown conditions, nor shall the locations of utilities which differ from locations provided by the utility companies. The Project Manager will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or the required time for, performance of any part of the Work, will recommend an equitable adjustment in the cost and/or time. If the Project Manager determines that

the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Project Manager shall so notify the Contractor in writing, stating the reasons. Claims by either Party in opposition to such determination must be made within twenty-one (21) days after the Project Manager has given notice of the decision. If the City and Contractor cannot agree on an adjustment in the cost and/or time, the adjustment shall be subject to further proceedings pursuant to Section 1.3.4 and Section 1.3.9 of the General Conditions, which shall apply to claims by either Party, notwithstanding language in said Sections that they apply only to claims brought by the Contractor.

- 1.3.7. *Inspection, Recordkeeping.* For any Change Orders, the Contractor shall maintain, and the City or the City's representatives shall have the right to examine books, records, documents and other evidence and accounting principles and practices sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of the Contract changes. At the request of the City, the Contractor shall submit any documents reasonably necessary to permit adequate evaluation of the cost or pricing data submitted including, but not limited to, computations, projections, price competition, catalog and market prices, etc. If inadequate or incomplete documentation is submitted, the City may refuse to complete negotiation until such a time that satisfactory documentation is submitted. The requirements of Section are in addition to other audit, inspection and record keeping provisions elsewhere in the Contract Documents.
- 1.3.8. Changes involving aggregate increases and decreases in excess of one hundred thousand dollars and 00/100 (\$100,000.00) shall be subject to the following:
- a. A change, defined for the purposes of this Section, involves aggregate increases and decreases in excess of one hundred thousand dollars and 00/100 (\$100,000.00) if the total value of Work affected, without regard to any increases or decreases, exceeds this amount. For example, a Change Order adding Work in the amount of seventy-five thousand dollars and 00/100 (\$75,000.00) and reducing Work in the amount of fifty-thousand dollars and 00/100 (\$50,000.00) will be considered to involve aggregate increases and decreases of \$125,000.00.
 - b. The Contractor shall submit, in support of all items not based upon unit prices or lump sum prices contained in the Contract or upon the established prices at which commercial items are sold in substantial quantities to the public, statements by vendors that the prices charged the Contractor are not greater than the prices charged by the respective vendors to their most favored customers for the same items in similar quantities.
 - c. Pricing shall be reduced accordingly, and the Contract shall be modified in writing accordingly to reflect such reduction, if any price (including profit and fee) negotiated in connection with any price adjustment was increased by any significant sums because:

- (1) The Contractor furnished cost or pricing data which were not complete, accurate, or current as certified in the Contractor's pricing data; or
- (2) Adjustments or any subcontract provisions therein required, furnished costs or pricing data which were not complete, accurate, and current as certified in the subcontractor's pricing data.

Any reduction in the Contract price due to defective subcontractor data of a prospective subcontractor, when the subcontract was not subsequently awarded to such subcontractor, will be limited to the amount (plus applicable overhead and profit markup) by which the actual subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor, provided the actual subcontract price was not affected by defective cost or pricing data; or the Contractor shall require subcontractors to certify to the best of their knowledge and belief that the cost and pricing data submitted are accurate, complete, and current as of the date of execution, which date shall be as close as possible to the date of agreement on the negotiated price of the Change Order.

- 1.3.9. In case a satisfactory adjustment in price cannot be reached for any item requiring a Change Order, the City reserves the right to terminate the Contract as to said item as it applies to the terms in question and make such arrangements as may be deemed necessary to complete the Work.

1.4. **OMITTED ITEMS:** The Project Manager may, in writing, order omitted from the Work any item other than Major Items, which are found by the Project Manager or City to be unnecessary to the Project and such omission shall not be a waiver of any condition of the Contract nor invalidate any of the provisions thereof. Major Items may be omitted by amendments to the Contract. The Contractor will be paid for all Work performed toward the completion of the item prior to such omission as provided in Section 7.5 of the General Conditions.

1.5. **EXTRA WORK:**

- 1.5.1. When additional Work is necessary for the proper completion of the Project for which no quantities or prices were given in the Contract, the same shall be called "Extra Work" and shall be performed by the Contractor when so directed in writing by the Project Manager. Extra Work shall be performed by the Contractor in accordance with these Specifications in a skillful and workmanlike manner and as may be directed by the Project Manager.
- 1.5.2. Prices for Extra Work shall be itemized and covered by a Change Order. Pricing shall be submitted by the Contractor and approved by the City prior to the actual starting of such Work, in accordance with Section 1.3 of the General Conditions. Should the Parties be unable to agree on unit prices for the Extra Work or if this method of pricing is impractical, the Project Manager may instruct the Contractor to proceed with the Work by day labor or Force Account as hereinafter provided in Section 7.6. of the General Conditions. Claims for Extra Work not authorized in writing by the Project

Manager prior to the Work being performed will be rejected and the Contractor shall not be compensated for.

- 1.5.3. Extra Work shall not include materials, labor or equipment which is incidental or appurtenant to the Work indicated on the drawings and in the Specifications. Such Work shall be completed and paid for as part of the Work to which it is appurtenant.

1.6. **UNAUTHORIZED WORK:** Work performed beyond the lines and grades shown on the Contract drawings, approved Work and Shop Drawings and Extra Work done without written authorization will be considered unauthorized work and the Contractor will receive no compensation therefore. If required by the City, unauthorized work shall be remedied, removed or replaced by the Contractor at the Contractor's expense. Upon failure of the Contractor to remedy, remove or replace unauthorized Work, the City may take action as provided in Section 2.11 of the General Conditions.

1.7. **MAINTENANCE AND CONTROL OF TRAFFIC:**

- 1.7.1. Unless the Contract specifically provides for the closing to traffic of any local road or highway while construction is in progress, such road or highway shall be kept open to all traffic by the Contractor. The Contractor shall also provide and maintain in a safe condition temporary approaches, crossings or intersections with roads and highways.
- 1.7.2. The Contractor will provide their own traffic control, including flagging, traffic control supervisor, and traffic control devices for the duration of the Project per the most current edition of the Manual on Uniform Traffic Control Devices ("MUTCD"). Traffic control plans will be required for City review and approval prior to commencement on Work.
- 1.7.3. The Contractor shall bear all expense of maintaining traffic over the section of road affected by the Work to be done under this Contract, and of constructing and maintaining such approaches, crossings, intersections and any accessory features without direct compensation, except as otherwise provided.

1.8. **REMOVAL AND DISPOSAL OF STRUCTURES AND OBSTRUCTIONS:** All structures or obstructions found on the site and shown on the Plans which are not to remain in place or which are not to be used in the new construction shall be removed as directed by the Project Manager. Unless specified in the Contract, this Work will not be paid for separately but will be included in the price bid for that portion of the Work requiring the removal of the obstruction. All material found on the site or removed therefrom shall become the property of the Contractor unless otherwise indicated. Materials determined by the Project Manager to be unsuitable for backfill shall be disposed of off the site at the Contractor's expense.

1.9. **USE OF MATERIALS FOUND ON THE WORK:**

- 1.9.1. The Contractor, with the approval of the Project Manager, may use in the proposed construction, any stone, sand, or gravel found on the site. The Contractor will not be

paid for such excavation unless specifically stated in the Contract, and the Contractor shall replace with other suitable material, without compensation, all of that portion of the material so removed and used as was contemplated for use in the embankments or otherwise. If it was intended that any or all of the material so excavated and used was to have been wasted, then the Contractor will not be required to replace it. The Contractor shall not excavate any material from the site which is not within the excavation as indicated by the slope and grade lines, without being authorized in writing by the Project Manager.

- 1.9.2. Specific job mix designs conforming to specifications for any Work shall be submitted for Project Manager approval within 10 (ten) days of the Notice to Proceed, or a minimum of seven (7) days prior to use of the material. This material approval applies to asphaltic concrete paving materials, concrete, aggregate base course, and fine grading material.

1.10. FINAL CLEAN UP:

- 1.10.1. During the Project's final cleanup, the Contractor shall remove from the site(s) all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The streets and adjacent properties in the Project shall be repaired to as good or better condition than existed prior to construction. This shall include removal of all dirt or mud from streets and lawns. No extra payment shall be made for these items. The Contractor shall leave the site(s) in a neat and presentable condition.

- 1.10.2. The Contractor shall provide written notification to the Project Manager that the Work is complete and the site is ready for final inspection. If the Project Manager determines that the Work is not complete, they will immediately notify the Contractor in writing stating the reasons. If the Project Manager determines the Work is complete, the City will inspect the Work within seven (7) r days and prepare a final cleanup list. When the final cleanup list is completed by the Contractor and inspected by the Project Manager, the Project Manager will initiate the acceptance and final payment procedures as set forth in Section 7.9 of the General Conditions. The final cleanup shall be completed before the expiration of the Contract's term as set forth in the Contract Documents.

- 1.11. **DELAYS:** No payment, compensation, damages, or adjustment of any kind, other than extension of time if received in writing from the City shall be made to, or claimed by, the Contractor because of hindrances or delays from any cause in the commencement, prosecution, or completion of the Work, whether caused by the City or any other party and whether avoidable or unavoidable other than as set forth in a Change Order described fully above.

SECTION 2 CONTROL OF THE WORK

- 2.1. AUTHORITY OF PROJECT MANAGER:** The Project Manager shall decide any

and all questions which may arise as to the quality and acceptability of the materials furnished, the Work performed, the manner of performance and the rate of progress of the Work. The Project Manager shall decide all questions which may arise as to the interpretation of the Plans and Specifications, all questions as to acceptable fulfillment of the Contract, all disputes and mutual rights by the contractors if there be more than one contractor on the Work, and all questions as to compensation. The decision of the Project Manager shall be final and shall have executive authority to make effective such decisions and to enforce the Contractor to carry out all orders promptly.

2.2. PLANS AND SHOP DRAWINGS:

This Section 2.2 shall be included in all subcontracts hereunder at all times.

- 2.2.1. The Contractor shall bring discrepancies between different Plans, or between Plans and Specifications, or regulations and codes covering the Work to the attention of the Project Manager in writing. In the event such discrepancies exist and the Project Manager is not so notified, the Project Manager shall reserve the right to exercise sole arbitration authority. It is mutually agreed that all authorized alterations affecting the requirements and information given on the approved Plans shall be in writing and approved by the Project Manager.
- 2.2.2. The Plans will be supplemented by Shop Drawings as necessary to adequately control the Work or as specified. Shop Drawings are not part of the Contract Documents. Shop Drawings may consist of drawings, diagrams, illustrations, schedules, calculations, and other data prepared by the Contractor, subcontractor, manufacturer, supplier, or distributor, which illustrate how specific portions of the Work shall be fabricated and/or installed in accordance with the Plans and Specifications. Any Work performed prior to the City's approval of Shop Drawings will be at the Contractor's risk and expense.
- 2.2.3. The Project Manager may request additional details and require the Contractor to make changes in the design which are necessary to conform to the provisions and intent of these Specifications without additional cost to the City.
- 2.2.4. Approval of the Shop Drawings by the Project Manager shall not be construed as a complete check and verification but will indicate that general conformance with the design concept and general compliance with the information given in the Contract has been achieved. Any information or action to be taken as set forth in the Shop Drawings is subject to the requirements of the Plans and Specifications. The Contractor shall be responsible for all dimensions and quantities shown on the Shop Drawings. The Project Manager shall be notified in writing and shall take appropriate action for any information in the Shop Drawings that deviates from the requirements of the Contract Documents.
- 2.2.5. Approval by the Project Manager of the Contractor's Shop Drawings shall not relieve the Contractor of its obligation to meet all requirements of the Plans and Specifications and shall not relieve the Contractor of its responsibility for the correctness of the Shop Drawings.

2.2.6. Five (5) sets of Shop Drawings shall be submitted to the Project Manager either in hard copy format or electronic format. No faxed copies will be accepted. After inspection, two sets will be returned to the Contractor; one for the Contractor's use and the other for the fabricator or supplier's use. Shop Drawings being returned will be stamped to indicate the following:

- i) Shop Drawings approved for use in construction will have one of the following statements checked: Approved; No Exception Taken; or Approved as Noted; or
- ii) Shop Drawings to be corrected or redrawn and resubmitted for approval will have one of the following statements checked: Revise as Noted; Resubmit; or Rejected.

If Shop Drawings are returned for correction, corrections shall be made and the corrected drawings shall be resubmitted by the Contractor in the same manner as the first submittal. The time required for approval of each submittal will not exceed four (4) weeks after Shop Drawings are received by the Project Manager.

It is the intent that no more than two submittals will be required. If, however, additional submittals are required by actions of the Contractor, the additional time for Shop Drawing approval will be borne by the Contractor. If additional submittals are required, or if Shop Drawing approval is delayed by actions of the Project Manager, and if the Contractor's controlling operations are delayed or interfered with by reason of the delay in Shop Drawing reviews, an extension of time commensurate with the delay in completion of the Work thus caused will be granted as provided herein.

Specifications for the Shop Drawings:

- i) Electronic Shop Drawings and work drawings are preferred.
- ii) All manually-drafted Shop Drawings shall be 34 inches long and 22 inches wide overall. There shall be a two-inch margin on the left side of the sheet and one-half inch margin on the other three sides. A blank space, six inches by three inches, shall be left near the lower right-hand corner for an approval stamp. Computer drafted 11-inch by 17-inch drawings may be submitted.
 - a. Where design notes or catalogue cuts are required, they may be submitted on 8 1/2 inch by 11-inch sheets in lieu of the size mentioned above.
- ii) There shall be a title block in the lower right-hand corner of each sheet. The title block shall show the City's name, structure number, the location of the structure, and the contents of the sheet.
- iii) The Contract price will include the cost of furnishing all Shop Drawings. Shop Drawings and working drawings submitted to the Project Manager by the Contractor, subcontractor or any lower tier subcontractor pursuant to the Work, may be duplicated by the City and the City may use and disclose in any manner and for any purpose such Shop Drawings and working drawings delivered under this Contract.

2.3. **OPERATING MANUALS AND PARTS LISTS:** The Contractor shall submit four

(4) complete operating manuals and parts lists to the Project Manager for all items of mechanical and electrical equipment incorporated into the Work.

2.4. **AS-BUILT DRAWINGS:** The Contractor shall maintain a set of drawings at the site, with all changes or deviations from the original drawings neatly marked thereon in brightly contrasting color. This shall be a separate set of drawings, not used for construction purposes, which shall be kept up-to-date as the job progresses and shall be made available for inspection by the Project Manager at all times. Upon completion of the Contract, this set of drawings shall be delivered to the Project Manager.

2.5. **CONFORMITY WITH PLANS AND ALLOWABLE DEVIATIONS:** Finished surfaces shall conform with lines, grades, cross sections and dimensions shown on the approved Plans. Any deviation from the approved Plans and working drawings, as may be required by the demands of construction, will in all cases be determined by the Project Manager and authorized in writing.

2.6. **COORDINATION OF SPECIFICATIONS, PLANS AND SPECIAL PROVISIONS:** The Specifications, Plans, Special Provisions, and all supplementary Plans and documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be cooperative to describe and provide for a complete Work. In case of discrepancy, figured dimensions, unless obviously incorrect, shall govern over scaled dimensions. Plans shall govern over Specifications and Special Provisions shall govern over both Plans and Specifications. The Contractor shall not use to its advantage any apparent error or omission in the Plans or Specifications. In the event the Contractor discovers any apparent error or discrepancy, the Contractor shall immediately request the Project Manager's interpretation and decision, and such decision shall be final. In the event contradiction and/or conflicts occur in the Specifications not otherwise covered by Special Provisions, the Specifications deemed by the Project Manager to be most restrictive shall govern.

2.7. **CONSTRUCTION SURVEYING:** The Contractor will furnish and set all construction stakes. The Project Manager will review the stakes. The Contractor shall be held responsible for the proper preservation of all marks and stakes. If, in the opinion of the Project Manager, any marks or stakes have been willfully or carelessly disturbed or destroyed by the Contractor, its employees, or subcontractors, the cost of replacing them will be charged against the Contractor and be deducted from the final payment.

2.8. **RIGHT OF ENTRY:** At all times, the City shall have the right to enter and inspect the Project premises.

2.9. **AUTHORITY AND DUTIES OF INSPECTORS:**

2.9.1. All Work shall be subject to inspection and testing by the City at all reasonable times and at all places prior to acceptance. Inspectors, employed by the City, are authorized to inspect all Work done and all material furnished. Such inspection may extend to all of any part of the Work and to the preparation, fabrication, or manufacture of the materials to be used. The Inspector is not authorized to revoke, alter, or waive any requirements of the Plans and Specifications. The Inspector is

authorized to call to the attention of the Contractor any failure of the Work or materials to conform to the Specifications and Contract Documents.

- 2.9.2. The Inspector shall have the authority to reject materials or suspend the Work until any question at issue can be referred to and decided by the Project Manager. If the Contractor refuses to suspend operations on verbal order, the Inspector shall issue a written order giving the reason for shutting down the Work. Work performed during the absence of the Inspector will not be accepted nor paid for by the City.
- 2.9.3. Inspections by the City or others shall not relieve the Contractor from its obligations to perform the Work in accordance with the requirements of the Contract Documents and to also inspect its own Work.
- 2.9.4. Any plan of action, method of work or construction procedure suggested to the Contractor by the City or City contractors, whether orally or in writing, if adopted or followed by the Contractor in whole or in part, shall be at the sole risk and responsibility of the Contractor.
- 2.9.5. The Inspector shall neither act as foreman or perform other duties for the Contractor nor interfere with the management of the Work by the Contractor. Any advice which the Inspector may give the Contractor shall, in no way, be construed as binding to the Project Manager in any way or releasing the Contractor from fulfilling any of the terms of the Contract.

2.10. **INSPECTION:**

- 2.10.1. Until final payment, all parts of the work may be subject to inspection and testing by the City. The Contractor shall furnish, at its own expense, all reasonable access, assistance, and facilities required by the City for such inspection and testing. The Contractor shall furnish the Project Manager with every reasonable facility for ascertaining whether the Work performed and materials used are in accordance with the requirements and intent of the Specifications and Contract. In the event of night Work, the Contractor shall furnish proper lighting to adequately perform and inspect the Work being performed.
- 2.10.2. Upon request from the Project Manager, the Contractor shall, at any time before acceptance of the Work, remove or uncover such portion of the finished Work as may be directed. After examination, the Contractor may restore said portions of the Work to the standard required by the Specifications. Should the Work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the coverage or making good of the parts removed, may be paid for as Extra Work; but should the Work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed, shall be at the Contractor's expense. Any Work performed or materials used by the Contractor without suitable supervision or inspection by the City shall be ordered removed and replaced at the Contractor's expense.

2.10.3. If the Contractor does not promptly replace rejected material or correct rejected workmanship, the City may (a) by separate Contract or otherwise, replace such material or correct such workmanship and charge the cost thereof to the Contractor; or (b) terminate the Contractor's right to proceed in accordance with this Agreement pursuant to Section 4.10 of the General Conditions. Such inspection and test is for the sole benefit of the City and shall not relieve Contractor of the responsibility of providing quality control measures to assure that the Work strictly complies with the Contract. No inspection or test by the City shall be construed as constituting or implying acceptance. Inspection or test shall neither relieve Contractor of responsibility for damage to or loss of the material prior to acceptance, nor in any way affect the continuing rights of the City after acceptance of the completed Work.

2.10.4. Any Work outside the normal five (5) day, forty (40) hour week will require the Project Manager or Inspector on the job. All inspection so required shall be done at the Contractor's expense and the cost thereof may be deducted from the final payment. Overtime inspection may be conducted by the City at the Contractor's expense at one hundred dollars and 00/100 (\$100.00) per hour. The payment by the Contractor of overtime inspection fees shall not relieve the Contractor from the liquidated damages provisions as specified in Section 4.8 of the General Conditions.

2.11. REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK:

2.11.1. All Work which has been rejected or condemned by the City shall be repaired, or if it cannot be satisfactorily repaired, be removed and replaced at the Contractor's expense. At the Project Manager's discretion, the following unauthorized work shall neither be measured nor paid for by the City, and may need to be removed at the Contractor's sole expense:

- i. Work performed beyond the lines and grades shown on the Plans, or as given, except as herein provided; or
- ii. Work performed without giving timely notice to the Project Manager so the Project Manager may elect to be present to observe the Work in progress; or
- iii. Any Extra Work or unclassified Work performed without prior City written authority and price agreement.

2.11.2. If directed by the City, should the Contractor fail to satisfactorily repair or remove and replace rejected, unauthorized, or condemned Work immediately after receiving formal notice from the Project Manager, the City may, at its sole discretion, recover for such defective Work on the Contractor's Bond or by action in a court having proper jurisdiction over such matters, or the City may employ labor and equipment and satisfactorily repair or remove and replace such Work and charge the cost of the same to the Contractor, which cost will be deducted from any payments due to the Contractor.

2.12. SUPERVISION AND SUPERINTENDENCE:

2.12.1. The Contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The Contractor shall be responsible to see that the completed work complies with the Contract Documents.

- 2.12.2. The Contractor shall designate and keep on any work site at all times during its progress, a competent superintendent who shall not be replaced without prior written notice to the Project Manager. The Contractor shall provide contact information for the superintendent who may be reached twenty-four (24) hours per day. The superintendent will be the Contractor's representative at the site and shall have authority to act on behalf of the Contractor. All communications given to the superintendent shall be as binding as if given to the Contractor. During periods when the Work is suspended, the Contractor shall make appropriate arrangements for any emergency work which may be required.
- 2.12.3. Whenever the superintendent is not present on any particular part of the Work where the Project Manager may desire to inform the Contractor relative to interpretation of the Plans and Specifications or to disapprove or reject materials or Work performed, the Project Manager may so inform the foreman or other worker in charge of the particular part of the Work in reference to which the information is given. Information so given shall be as binding as if given to the superintendent.
- 2.12.4. The Contractor will be supplied with four (4) copies of the Plans, and three (3) copies of the Specifications and Special Provisions. The Contractor shall have available on the work site at all times one copy each of said Plans, Specifications and Special Provisions, exclusive of the set designated for as-built drawings in - Section 2.4 of the General Conditions. Additional copies of Plans, Specifications and Special Provisions can be obtained by the Contractor at the cost of reproduction.

SECTION 3 CONTROL OF MATERIAL

3.1. MATERIAL:

- 3.1.1. Unless otherwise indicated in this Contract, equipment, material and products incorporated in the Work covered by this Contract, shall be new and of the grade specified for the purpose intended. Unless otherwise specifically indicated, reference to equipment, material, product, or patented process by trade names, make or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor may, with permission from the Project Manager, use any equipment, material, article, or process which is equivalent to that named, subject to the requirements of this Section.
- 3.1.2. Within the scope of their authority, the Project Manager shall be the sole judge of the quality and suitability of proposed alternative equipment, material, article or process. The burden of proving the quality and suitability of the alternative shall be upon the Contractor. Information required by the Project Manager in judging an alternative shall be supplied by the Contractor at the Contractor's expense.

3.2. APPROVAL AND ACCEPTANCE OF MATERIALS:

- 3.2.1. Samples of all materials to be tested may be taken by the Project Manager or their authorized representative at the discretion of the Project Manager. Materials may be sampled either prior to shipment or after being received at the work site. All sampling, inspection, and testing shall be done in accordance with the Specifications contained in the Contract Documents.
- 3.2.2. The Contractor shall provide such facilities as the City may require for conducting field tests and for collecting and forwarding samples. The Contractor shall not use or incorporate into the Work any materials represented by the samples until tests have been approved by the City. Any material, which after approval, has for any reason become unfit for use, shall not be incorporated into the Work.
- 3.2.3. Tests or approvals by the Project Manager or others shall not relieve the Contractor from its obligations to perform the Work in accordance with the requirements of the Contract Documents.

3.3. CITED SPECIFICATIONS; SAMPLES AND TESTS:

- 3.3.1. Except as otherwise provided, sampling and testing of all materials, and the laboratory sampling and testing of equipment required under these Specifications, shall be in accordance with the current edition of the American Society for Testing Materials ("ASTM") publication of standards, adopted and in effect on the date of the City's solicitation for bids.
 - 3.3.2. When designated, sampling and testing of materials shall be in accordance with the current edition of the American Standards Association ("ASA") Specifications; the current edition of The American Association of State Highway and Transportation Officials ("AASHTO") publication Standard Specification for Highway Materials and Methods of Sampling and Testing; the current edition of the American Water Works Association Specifications; the current edition of the Federal Specifications or the current edition of MIL Specifications adopted and in effect on the date of City's solicitation for bids.
 - 3.3.3. The testing of all samples and materials shall be made at the expense of the City, when specified herein as by the City, unless the tests reveal nonconformance in which case said costs shall be reimbursed by the Contractor to the City. The Contractor shall furnish the required samples without charge to the City. The Contractor shall give sufficient notification of the placing of orders for materials in order to permit the Project Manager to arrange for appropriate testing.
- 3.4. **STORAGE:** Materials shall be stored to insure the preservation of their quality and fitness for the Work. When necessary, they shall be placed on wooden platforms, or other hard, clean surfaces and not on the ground and shall be placed under cover when directed. Stored materials shall be located to facilitate prompt inspection.

3.5. SUBSTITUTION OF MATERIALS AFTER AWARD OF CONTRACT: Substitution

of equipment and materials of makes and types other than those specified and/or those approved in advance by the Project Manager will be considered for approval only as hereafter provided:

- i. Proposed substitutes shall be equal or superior to items specified or previously approved.
- ii. The Contractor shall submit any requests on its letterhead in duplicate within two (2) weeks after the date of Contract execution. The request for substitutions shall include a complete written list submitted at one time and must be accompanied by a statement outlining reasons for each requested substitution. The request shall include catalog number, technical data, cuts diagrams and such other descriptive data or samples as may be required, and a detailed statement listing all significant details in which each item requested for approval differs from the item specified. Such listing or the failure to list such information shall not relieve the Contractor from providing properly functioning and/or fitting materials, regardless of the approval action taken by the Project Manager. If so requested by the Project Manager, the Contractor shall submit samples of both the specified material or equipment and the proposed substitute. In case of a difference in price, the City shall receive all benefits of the difference for any substitutions, and the Contract amount shall be altered by Change Order to credit the City with any savings so obtained.

3.6. DEFECTIVE MATERIALS: All materials not conforming to the requirements of the Specifications shall be considered defective. Whether in place or not, such material shall be removed immediately from the work site, unless otherwise permitted by the Project Manager. No rejected material, the defects of which have been subsequently corrected, shall be used without prior approval from the Project Manager. Upon failure of the Contractor to comply promptly with any order the Project Manager made under the provisions of this Section, the City shall have authority to remove defective materials and to deduct the cost of removal and replacement with specified materials from any moneys due or to become due to the Contractor, or said costs of removal and replacement may be recovered in any action by the City against the Contractor's Bond.

3.7. PROPERTY RIGHTS IN MATERIALS: The Contractor shall have no property right in materials after they have been attached, affixed or incorporated in the Work or the soil, or after payment has been made by the City to the Contractor for materials delivered to the work site or stored subject to or under the control of the City.

3.8. DAMAGE TO THE WORK AND RESPONSIBILITY FOR MATERIALS:

3.8.1. The Contractor shall be responsible for materials delivered and Work performed until completion and Final Acceptance of the entire construction thereof.

3.8.2. The Contractor shall bear the risk of injury, loss or damage to any and all parts of the Work for whatever cause, whether arising from the execution or from the non-execution of Work. The Contractor shall rebuild, repair or restore Work and materials which have been damaged or destroyed from any causes before completion and acceptance of the Work and shall bear the expense thereof. The Contractor shall

provide security and drainage and erect temporary structures as necessary to protect the Work and materials from damage.

- 3.8.3. The Contractor shall be responsible for materials not delivered to the work site for which any progress payment has been made to the same extent as if the materials were so delivered.

SECTION 4 PERFORMANCE AND PROGRESS

4.1. SUBCONTRACTING OR ASSIGNMENT OF WORK:

- 4.1.1. No contractual relationship will be recognized under the Contract other than the contractual relationship between the City and Contractor.
- 4.1.2. No portion of the Contract shall be subcontracted, assigned or otherwise disposed of except with the written consent of the City and Surety, which consent shall not be unreasonably withheld.
- 4.1.3. Requests for permission to subcontract, assign or otherwise dispose of any portion of the Contract shall be in writing to the Project Manager and shall be accompanied by documents demonstrating the organization which will perform the Work is particularly experienced and equipped for such Work. Consent to subcontract, assign or otherwise dispose of any portion of the Contract shall not be construed to relieve the Contractor of any responsibility for the fulfillment of the Contract.

4.2. **COMMENCEMENT OF WORK:** The Contractor shall begin the Work within the prescribed amount of days set by the City in the written Notice to Proceed. The Contractor shall notify the Project Manager at least forty-eight (48) hours in advance of the time it intends to begin Work. Work shall be completed in the prescribed amount of days set by the City in the Contract Documents, including any Change Orders or amendment. The Contractor shall conduct Work in such a manner and with sufficient materials, equipment, and labor as is considered necessary to ensure its completion within the time limit set forth in the Contract. Should the prosecution of Work for any reason be discontinued by the Contractor, with the consent of the Project Manager, the Contractor shall notify the Project Manager at least forty-eight (48) hours in advance of resuming operations.

4.3. **LIMITATION OF OPERATIONS:** Each item of Work shall be performed to completion without delay and in no instance will the Contractor be permitted to transfer its force from uncompleted Work to new Work without the permission of the Project Manager. The Contractor shall not open up Work to the prejudice of Work already started.

4.4. PROGRESS SCHEDULE:

- 4.4.1. The Contractor shall prepare and submit to the Project Manager for approval five (5) days prior to the Preconstruction Conference, a practicable schedule, showing the order in which the Contractor proposes to carry on the Work, the date on which it will start the several salient features (including procurement of materials and equipment) and the contemplated dates for completing the same. The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of

Work scheduled for completion at any time. The Contractor shall enter on the chart the actual progress at such intervals as directed by the Project Manager and shall immediately deliver three (3) copies thereof. If the Contractor fails to submit a progress schedule within the time herein prescribed, the Project Manager may withhold approval of progress payment estimates until such time as the Contractor submits the required progress schedule.

4.4.2. The Contractor shall perform the Work in accordance with the latest approved progress schedule. If the progress of items along the critical path is delayed, the Contractor shall revise its planning to include additional forces, equipment, shifts or hours as necessary to meet the time or times of completion specified in this Contract. Additional costs resulting therefrom will be borne by the Contractor. The Contractor shall make such changes when progress at any check period does not meet at least one of the following two tests:

- i. The percentage of dollar value of completed Work with respect to the total amount of the Contract is within 10% (ten percent) of the percentage of the Contract time elapsed; or
- ii. The percentage of dollar value of completed Work is within 10% (ten percent) of the dollar value which should have been performed according to the Contractor's network analysis previously approved by the Project Manager.

4.4.3. Failure of the Contractor to comply with the requirements under this Section will be grounds for determination that the Contractor is not performing the Work with such diligence as will ensure completion within the time of completion specified in this Contract. Upon such determination, the City may terminate the Contractor's right to proceed with the Work, or any separate part thereof, in accordance with the provisions contained herein. The City may extend the time periods reflected by Section 4.4.2 (i) or (ii) above, if it does not reasonably reflect upon the Contractor's prosecution of the Work.

4.5. **CHARACTER OF WORKMEN AND EQUIPMENT:**

4.5.1. The Contractor shall employ such superintendents, foremen, and workmen as are careful and competent, and the Project Manager may demand the dismissal of any person employed or subcontracted by the Contractor in, about, or upon the Work who misconduct themselves or act incompetently or negligently in the proper performance of their duties, or neglects or refuses to comply with the directions given. Such person or subcontractor shall not be employed again thereon without the written consent of the Project Manager. Should the Contractor continue to employ, or again employ such person or subcontractor, the Project Manager may withhold all payments which are or may become due, or the Project Manager may suspend the Work until such orders are complied with.

4.5.2. In the employment of labor, preference shall be given, other conditions being equal, to residents of the area wherein the Work is being performed, but no other preference (except as may be required by special labor provisions) or discrimination among citizens of the United States shall be made. No convict labor shall be employed.

4.5.3. The Contractor shall furnish such equipment as is considered necessary for the prosecution of the Work in an acceptable manner and at a satisfactory rate of progress. All equipment, tools, and machinery used for handling materials and executing any part of the Work shall be subject to the approval of the Project Manager and shall be maintained in a satisfactory working condition. Equipment used on any portion of the Work shall be such that no injury to the Work, roadways, adjacent property, or other objects will result from its use. The Contract may be terminated if the Contractor fails to provide adequate equipment for the Work.

4.6. **TEMPORARY SUSPENSION OF WORK:** The City shall have the right to suspend, delay or interrupt the Work wholly or in part for such period as he may determine to be appropriate because of the failure on the part of the Contractor to properly perform the Work in accordance with the Contract, to carry out orders, or to remove defective material or Work. The Contractor shall not suspend the Work without written order given by the Project Manager, and prior to resuming Work shall give the Project Manager forty-eight (48) hours' prior notice to afford opportunity to reestablish supervision.

4.7. **DETERMINATION AND EXTENSION OF CONTRACT TIME FOR COMPLETION:**

4.7.1. The Contractor shall perform fully, entirely, and in a satisfactory and acceptable manner the Work, within the number of days stipulated in the Contract. Time will be assessed against the Contractor beginning with the actual date the Work is started in accordance with the Notice to Proceed. If the Contractor does not begin the Work within the limit as designated in the Notice to Proceed, the days shall start on the first day after the expiration of the limit as stated in the Notice to Proceed.

4.7.2. In adjusting the Contract time for the completion of the Project, all strikes, lockouts, unanticipated delays in transportation or any condition over which the Contractor has no control, and any suspensions ordered by the City for causes not the fault of the Contractor, shall be excluded from the computation of the Contract time for completion of the Work and the City may extend the time for completion in such amount as the conditions justify. In order to secure an extension of time for delays beyond its control, the Contractor, shall within 10 (ten) days from the beginning of any such delay, notify the Project Manager in writing of the causes of delay, where upon the Project Manager shall ascertain the facts and the extent of the delay and extend the time for completing the Work when, in their judgment, the findings of fact justify such an extension, and their finding of fact thereon shall be final and conclusive. No allowances will be made for delays or suspensions of the performance of the Work which are in the control of the Contractor.

4.7.3. If the satisfactory execution and completion of the Contract shall require Work or materials in greater amounts or quantities than those set forth in the Contract, then the Contract time shall automatically be increased in the same proportion as the cost of the additional Work bears to the original Work contracted for.

4.8. **FAILURE TO COMPLETE WORK ON TIME:**

4.8.1. The City and Contractor agree and recognize that time is of the essence for every time period set forth in the Contract Documents and that the City will suffer financial loss if the Work is not substantially complete within the time set forth in the Contract Documents. If the Contractor fails to fully perform and complete the Work in conformity with the provisions and conditions of the Contract within the specified time limit for such performance and completion, or within such further time as, in accordance with the provision of this Contract, shall be fixed or allowed for such performance and completion, the City and Contractor agree that as liquidated damages, and not as a penalty, for the delay in performance, the Contractor shall pay to the City the amount stipulated below for each and every calendar day that expires after the time set forth in the Contract Documents until the same is finally complete and ready for final payment as provided herein.

Original Contract Amount	Amount of Liquidated Damages Per Day
Less than \$100,000	\$300.00
\$100,000 and less than \$500,000	\$600.00
\$500,000 and less than \$1,000,000	\$1,000.00
\$1,000,000 and over	\$1,500.00

4.8.2. The City shall recover inspection charges and damages by deducting the amount thereof out of any moneys which may be due or may become due to the Contractor, and/or by an action at law against the Contractor or its Surety. It is understood and agreed that aside from any other penalty or damage, all costs of the Project Manager and inspection on behalf of the City may be charged to the Contractor and be deducted from any estimate or payment otherwise due and payable.

4.8.3. If the Contractor fails to pay such liquidated damages promptly upon demand therefor, the Surety shall pay such damages. In addition, and at the City's option, the City may withhold all or any part of such liquidated damages from any payment due the Contractor.

4.9. **ADJUSTMENT FOR SUSPENDED WORK:**

4.9.1. In the event the Contractor is ordered by the City, in writing, to suspend Work for some unforeseen cause not provided for in the Contract, and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the job during the period of shutdown. No allowance will be made for lost profits. The period of shutdown shall be computed from the date set out in the written order for Work to cease until the date of the written order for Work to resume. Claims for such compensation shall be filed with the City within 10 (ten) days of the date of written order to resume Work, or such claims will not be considered. The Contractor shall submit with its claim substantiating papers covering the entire

amount shown on the claim. The City shall take the claim under consideration, and may make such investigations as are deemed necessary, and shall be the sole judge as to the equitability of such claim and such decision shall be final.

- 4.9.2. Notwithstanding any provisions of this Contract to the contrary, no provision of this Section shall be construed as entitling the Contractor to compensation for delays due to inclement weather, delays due to failure of the Surety, for suspensions made at the request of the Contractor, or for any other delay provided for in the Contract Documents, Specifications, Special Provisions, Bid Schedule, Contract, Change Order or Field Order.

4.10. **TERMINATION OF CONTRACT FOR DEFAULT:**

- 4.10.1. The occurrence of any one or more of the following shall constitute an "Event of Default" of the Contract, for which the City may, at the City's option, terminate the Contract upon written notice to the Contractor:

- i. The Contractor fails to start the Work on the date given in the Notice to Proceed, or the Contractor in any way abandons the Work;
- ii. The Contractor's progress is insufficient to complete the Work within the specified time;
- iii. The Contractor's willful or deliberate failure or violation to comply with any requirement of the Contract, including the Plans and Specifications and Special Provisions, or execution of Work by the Contractor in bad faith or otherwise not in accordance with its obligations;
- iv. The Contractor fails to maintain any required Bonds, licenses, permits, and/or insurance as required in the Contract;
- v. The Contractor fails to promptly repair, replace or remove any defects in materials or Work or any defects in materials or Work of any other nature, the correction of which has been directed in writing by the Project Manager;
- vi. Substantial evidence of the Contractor's collusion for the purpose of illegally procuring a Contract or perpetrating fraud in the construction of Work;
- vii. The Contractor files a voluntary petition in bankruptcy if a receiver is appointed for the Contractor or any of its property, or the insolvency of the Contractor;
- viii. The Contractor allows any final judgment against it unsatisfied for a period of 10 (ten) days or longer, and makes an assignment for the benefit of creditors;
- ix. The Contractor or any of its officers or employees are convicted, plead nolo contendere, enter into a formal agreement in which they admit guilt, enter a plea of guilty, or otherwise admit culpability to criminal offenses of bribery, kickbacks, collusive bidding, bid-rigging, anti-trust, fraud, undue influence, theft, extortion, or any offense of similar nature, in connection with the Contractor's business;
- x. Other just causes for termination as determined by the City.

- 4.10.2. The City shall provide the Contractor and Surety with written notice of the City's intent to terminate. The Contractor and/or Surety shall have 10 (ten) days from receipt of notice to cure any default or to provide to the City a detailed plan, in writing, of how the Contractor will cure the causes for termination listed within the written notice. If a satisfactory effort has not been made by the Contractor or its Surety to

correct the default within the prescribed period in the notice, or, if in the judgment of the City, any submitted written plan does not ensure satisfactory performance of the Work, the City may declare the Contract terminated and notify the Contractor and its Surety accordingly. Upon receipt of notice from the City that the Contract has been terminated, the Contractor shall immediately discontinue all operations. The City may then proceed with the Work in any lawful manner that it elects until completion.

4.10.3. The City reserves the right to take possession of any machinery, implements, tools, or materials of any description that shall be found upon the Work, to account for said equipment and materials, and to use the same to complete the Project. When the Work is thus finally completed, the total cost of the same will be computed. If the total cost is more than the Contract price, the difference shall be paid to the City either by the Contractor or its Surety. In case of termination, all expenses incident to ascertaining and collecting losses under the Bond, including City project management and legal services, shall be assessed against the Bond.

4.11. **TERMINATION FOR CONVENIENCE OF THE CITY:** This Contract and the performance of the Work hereunder may be terminated at any time, in whole or in part, for convenience. Any such termination shall be effected by delivery to the Contractor of a written notice ("Notice of Termination") specifying the extent to which performance of Work is terminated, the date upon which termination becomes effective, and any necessary actions to be taken by the Contractor to effectuate termination and close-out the Contract. If the Contract is terminated, the Contractor shall be paid on a prorated basis of Work satisfactorily completed, under the Work. The portion of Work satisfactorily completed but not yet accepted by the City shall be determined by the City.

4.12. **COOPERATION WITH OTHER CONTRACTORS:** In connection with the improvements under this Contract, the right is reserved by the City to award any Work not included in the Contract to another contractor for performance during the progress of this Contract, or to perform such Work with the City's forces, and the Contractor shall cooperate and so conduct its operation as to minimize the interference therewith, as directed by the Project Manager.

4.13. **TERMINATION OF CONTRACTOR'S RESPONSIBILITY:** This Contract will be considered complete when all Work and final cleanup has been finished, the Work has been accepted by the City, and all claims for payment of labor, materials, or services of any kind used in connection with the Work have been settled for by the Contractor or its Surety. The Contractor will then be released from further obligation except as set forth in the Bond and for its responsibility for injury to persons or property arising from its duties and obligations under Section 7 of the General Conditions. The Bond executed for performance of this Contract shall be in full effect for a period of one (1) year following acceptance of the Work; except with regard to the representation regarding copyright infringement found in Section 6.4 the Bond shall remain in effect for three (3) years, and except with regard to the representation regarding patent infringement found in Section 6.4 the Bond shall remain in effect for six (6) years. Neither the final payment nor any provision in the Contract Documents shall relieve the Contractor of the responsibility for negligence or faulty materials or workmanship. The Contractor shall warrant its work to be free from faulty materials or

workmanship for the period of two (2) years after Final Acceptance, and upon written notice, the Contractor shall remove any defect due thereto and pay for any damage due to other Work resulting there from which shall appear within the two-year period. Remedied Work shall carry the same warranty as the original Work starting with the date of acceptance of the replacement or repair. Payment to the Contractor will not relieve the Contractor of any obligation under this Contract.

SECTION 5 WARRANTY

5.1. SCOPE OF WARRANTY:

- 5.1.1. The Contractor warrants that the Work and all of its components shall be free from defects and flaws in design, workmanship, and materials; shall strictly conform to the requirements of this Contract; and shall be fit, sufficient and suitable for the purposes expressed in, or reasonably inferred from, this Contract. The warranty herein expressed shall be in addition to any other warranties expressed or implied by law, which are hereby reserved unto the City. In all emergencies the Contractor shall immediately remedy, repair, or replace, without cost to the City and to the entire satisfaction of the City, defects, damages or imperfections due to faulty materials or workmanship appearing in said Work within said period of not less than two (2) years from the date of Final Acceptance. Remedied Work shall carry the same warranty as the original Work starting with the date of acceptance of the replacement or repair. Payment to the Contractor will not relieve the Contractor of any obligation under this Contract.
- 5.1.2. The Contractor, at no additional expense to the City, shall also remedy damage to equipment, the site, or the buildings or the contents thereof which is the result of any failure or defect in the Work, and restore any Work damaged in fulfilling the requirements of the Contract. Should the Contractor fail to remedy any such failure or defect within a reasonable time after receipt of notice thereof, the City will have the right to replace, repair, or otherwise remedy such failure or defect at the Contractor's expense.
- 5.1.3. Subcontractors', manufacturers', and suppliers' warranties and guarantees, expressed or implied, respecting any part of the Work and any material used therein shall be deemed obtained and shall be enforced by the Contractor for the benefit of the City without the necessity of separate transfer or assignment thereof.
- 5.1.4. The rights and remedies of the City provided in this Section are in addition to and do not limit any rights and remedies afforded by the Contract or by law. The Contractor specifically waives all the provisions of Chapter 8 of Article 20 of Title 13, C.R.S. regarding defects in the Work under the Contract.

5.2. CITY'S RIGHT TO CORRECT: If, within five (5) business days after the City gives the Contractor notice of any defect, damage, flaw, unsuitability, nonconformity, or failure to meet warranty subject to correction by the Contractor, or if the Contractor neglects to make, or undertake with due diligence to make the necessary corrections, then the City shall be

entitled to make, either with its own forces or with contract forces, the corrections and to recover from the Contractor all resulting costs, expenses, losses, or damages, including attorneys' fees and administrative expenses.

5.3. **WARRANTY PERIOD:** Except where longer periods of warranty are indicated for certain items, the Contractor warrants Work under the Contract to be free from faulty materials and workmanship for a period of not less than two (2) years from date of Final Acceptance, with one (1) of those years being covered by the Bond, as specified in this Contract. In cases of warranty work, which is not an emergency, all necessary repairs shall be made within a reasonable time not to exceed twenty (20) days after notice of the required repair is received by the Contractor. For those items of warranty work which cannot be completed within said twenty (20)-day period, the Parties shall negotiate a reasonable period of time.

SECTION 6

LEGAL RELATIONSHIP AND RESPONSIBILITY TO THE PUBLIC

6.1. **LAWS TO BE OBSERVED:** The Contractor shall at all times observe and comply with all Federal, State and local laws, codes, ordinances, and regulations, which pertain to and affect the conduct of the Work, and the Contractor and its Surety shall indemnify and save harmless the City and all its officers, agents, employees, or any of their heirs, successors or assigns against any claim, judgment, demand, costs, liability or expenses, including but not limited to attorney's fees and costs of suit arising from or based on the violation of any such law, ordinance, regulations, order, or decree, whether such claim, judgment, demand, costs, liability or expenses arises from actions by the Contractor, its employees, agents or subcontractors. Nothing contained herein shall be deemed to create liability for the Contractor for any design defects not managed by the Contractor.

6.2. **PERMITS AND LICENSES:** The Contractor shall, at its own expense, procure all permits and licenses, pay all charges and fees, and give all notices necessary and incidental to the due and lawful prosecution of the Work. Any costs incurred for these permits must be included in the unit costs.

6.3. PAYMENT OF TAXES:

6.3.1. With the exception of being exempt from City of Littleton Sales and Use taxes, the Contractor shall pay all sales and use taxes required to be paid, shall maintain such records in respect to its Work, which shall be separate and distinct from all other records maintained by the Contractor and shall be available for inspection by the City at any and all reasonable times, and shall furnish the City with such data, as may be necessary to enable the City to obtain any refunds of such taxes which may be available to the City under the laws, ordinances, rules or regulations applicable to such taxes. The Contractor shall require each of its subcontractors to pay all sales and use taxes required and to maintain such records and furnish the Contractor with such data as may be necessary to enable the City to obtain a refund of the taxes paid by such subcontractors.

6.3.2. In accordance with C.R.S. §§ 39-26-114 and 39-26-203, and the related regulation

of the State of Colorado Department of Revenue, the Contractor shall apply to the State of Colorado Department of Revenue and secure prior to commencing Work, an exemption certificate which when issued by the State of Colorado Department of Revenue will enable the Contractor to purchase all materials free of State Sales and Use Taxes and Regional Transportation District ("RTD") Tax, provided that any building permit fee shall be included in any Bid Schedule with respect to the Work. Further, no Littleton sales and/or use tax shall be included in any billing with respect to the Work. This provision shall apply to all contractors, subcontractors and material suppliers. When Littleton sales tax is paid to licensed Littleton vendors for materials, which become part of the Work by a Contractor, the City of Littleton will refund that tax to the Contractor upon receipt of an application from the Contractor at the conclusion of the Contract. Accompanying the application must be the material receipt(s) displaying a description of the item(s) purchased, date of purchase, amount of purchase, tax paid and any other documentation and information which may be required by the City to substantiate the payment and validate a refund.

- 6.3.3. Contractors who purchase materials that become part of the Work that do not honor the exemption, and thereby who pay sales tax, will not be reimbursed for that tax payment by the City. The Contractor shall bear the risk of any added or increased taxes occurring during the performance of the Work. A change in taxes shall under no circumstances entitle the Contractor to an adjustment under the Contract.

6.4. **PATENTED DEVICES, MATERIALS AND PROCESSES:** If the Contractor is required or desires to use any design, device, material or processes covered by patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the patentee or patent owner. The Contractor shall warrant that the materials, equipment or devices used on or incorporated in the Work shall be delivered free of any rightful claim of any third-party for infringement of any United States patent or copyright. If notified promptly in writing and given authority, information and assistance, the Contractor shall defend, or may settle, at its expense, any suit or proceeding against the City so far as based on a claimed patent or copyright infringement which would result in a breach of this warranty, and the Contractor shall pay all damages and costs awarded therein against the City due to such breach. In case any use of any materials, equipment or devices is in such suit held to constitute an infringement and such use is enjoined, the Contractor shall, at its expense and option, either procure for the City the right to continue using said materials, equipment or devices, or replace same with non-infringing materials, equipment or devices, or modify the same so it becomes non-infringing. The Contractor shall report to the City promptly and in reasonable written detail each notice or claim of patent or copyright infringement based on the performance of this Contract of which the Contractor has knowledge. In the event of any claim or suit against the City as a result of any alleged patent or copyright infringement arising out of the performance of this Contract or out of the use of any supplies furnished or Work or services performed hereunder, the Contractor shall furnish to the City when requested by the City, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the City except where the Contractor has agreed to indemnify the City. This clause shall be included in all subcontracts.

6.5. **SANITARY PROVISIONS:** The Contractor shall provide and maintain in a neat,

sanitary condition such accommodations for the use of its employees as may be necessary to comply with the requirements and regulations of the State Department of Health and the Occupational Safety and Health Administration ("OSHA"). As stated in OSHA Construction Standard 1926.51 C, the Contractor shall supply temporary sanitary facilities as per the following table:

<u>Number of Employees</u>	<u>Minimum Toilet Facilities</u>
20 or less	1 Toilet
21 to 50	1 Toilet and 1 Urinal per 40 workers
51 or more	1 Toilet and 1 Urinal per 50 workers

This requirement to provide sanitary facilities will neither be measured nor paid for separately by the City, but shall be considered incidental to and included in the cost of the Work.

6.6. PUBLIC CONVENIENCE AND SAFETY:

6.6.1. The Contractor shall be solely and completely responsible for conditions of the Work site, including safety of all persons and property during performance of the Work. The Contractor shall fully comply with all applicable Federal, State and local laws, and rules and regulations governing safety of the public and workers. The Contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions on its own responsibility reasonably necessary to protect the life and health of employees on the job and the safety of the public, and to protect property in connection with the performance of the Work. Materials stored on the site shall be so placed and the Work shall, at all times, be so conducted as to cause no greater obstruction to traffic than is considered necessary by the Project Manager.

6.6.2. The Contractor shall not close any road to the public except by the express permission of the City. When the improvement under construction is being used by the traveling public, special attention shall be paid to keeping both the sub-grade and surfacing in such condition that the public can travel in comfort and safety. The Contractor shall cooperate with the Project Manager in the regulation of traffic. If the Contractor constructs temporary bridges or temporary stream crossings, the Contractor's responsibility for accidents shall include the roadway approaches as well as the structures of such crossing.

6.6.3. The right of the Project Manager to conduct construction review or observation of the Contractor's performance will not include review or observation of the adequacy of the Contractor's safety measures in, on, or near the Work site.

6.7. BARRICADES, SIGNS AND HAZARD MARKINGS:

6.7.1. The Contractor shall provide, erect and maintain all necessary barricades, signs, danger signals and lights for the protection of the Work and the safety of the public. All barricades, signs and obstructions erected by the Contractor shall be illuminated at night and all devices for this purpose shall be kept illuminated from sunset to

sunrise.

6.7.2. The Contractor shall be held responsible for all damage to the Work due to failure of barricades, signs, lights and watchman to protect it, and whenever evidence of such damage is found prior to acceptance, the Project Manager may order the damaged portion immediately removed and replaced by the Contractor without cost to the City if, in the opinion of the Project Manager, such action is justified. The Contractor's responsibility for the maintenance of barricades, signs and lights shall not cease until Work has been accepted.

6.8. **USE OF EXPLOSIVES:** When the use of explosives is necessary for the Work, the Contractor shall use the utmost care so as not to endanger life or property, and whenever directed by the Project Manager the number and size of the charges shall be reduced. The Contractor shall notify the proper representatives of any public services corporation, the City, any company, or any individual at least eight (8) hours in advance of any blasting which may damage property on, along, or adjacent to the site. The Contractor shall comply with the requirements of Title 9, Article 7 of the C.R.S., as amended, titled "Explosive Permits". The Contractor shall also be required, at a minimum, to notify the Littleton Fire Department and the Littleton Police Department. All explosives shall be stored in a secure manner and all storage places shall be marked clearly "DANGEROUS EXPLOSIVES," and shall be in care of competent watchmen at all times.

6.9. **PROTECTION AND RESTORATION OF PROPERTY:**

6.9.1. The Contractor shall not enter upon private property for any purpose without first obtaining permission, and shall be responsible for the preservation of all public and private property, sod, trees, fences, monuments, underground structures, etc., on and adjacent to the site(s) and shall use every precaution necessary to prevent damage or injury thereto. The Contractor shall protect carefully, from disturbance or damage, all land monuments and property markers until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed.

6.9.2. The Contractor shall be responsible for all damage or injury to property of any character resulting from any act, omission, neglect or misconduct in his manner, or method of executing said Work, or due to its non-execution of said Work, or at any time due to defective Work or materials, and said responsibility shall not be released until the Work has been completed and accepted by the City.

6.9.3. The Contractor's attention is directed to the importance of protecting all public utilities encountered on all projects. Such utilities may include, but are not limited to, telephone, telegraph and power lines, water lines, sewer lines, gas lines, railroad tracks, and other overhead and underground utilities, cable television lines and facilities. Before any excavation is to begin in the vicinity of water lines, railroad tracks or structures, sewer lines, cable television lines, gas lines or telephone conduits, each utility company concerned must be notified in advance of such excavation, and such excavation shall not be made until an authorized representative of the utility company concerned is on the ground and has designated the location of their

facilities.

6.9.4. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect or misconduct in the execution of the Work, or in consequence of the non-execution thereof on the part of the Contractor, the Contractor shall restore, at its own expense, such property to a condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding, or otherwise restoring, as may be directed; or the Contractor shall make good such damage or injury in an acceptable manner. In case of the failure on the part of the Contractor to restore such property, or to have started action to make good such damage or injury, the City may upon forty-eight (48) hours' notice, proceed to repair, rebuild or otherwise restore such property as may be deemed necessary and the cost thereof will be deducted from any moneys due or which may become due the Contractor under the Contract or prosecuted as a claim against the Contractor's Bond.

6.9.5. The cost of insurance for damages due to Contractor's operation or cost of protecting utilities where required to permit construction under this Contract shall be included in the original Contract prices for the Work.

6.10. **INDEMNIFICATION AND HOLD HARMLESS:** The Contractor and its Surety shall indemnify and save harmless the City, its officers, agents, employees, successors and assigns from all suits, demands, actions, or claims of any nature whatsoever brought or made against the City, its officers, agents, employees, successors or assigns from any injuries or damages sustained by any person, firm or corporation or property or resulting from or arising out of any neglect in safeguarding the Work; or through the use of unacceptable materials in the construction of the improvement; or as a result of any act or omission by the Contractor; or from the use, misuse, storage or handling of explosives; or on account of any claims or amounts recovered for any infringement of patent, trademark or copyright; or from any claims or amounts arising or recovered under Worker's Compensation laws, or any other law, by-law, ordinance, order or decree. Moneys due to the Contractor under and by virtue of the Work, as shall be considered necessary by the City, may be retained, or in case no money is due, the Contractor's Bond shall be held until such suit(s), action(s), or claim(s) for injuries or damages have been settled and satisfactory evidence has been furnished to the City.

6.11. **NO PERSONAL LIABILITY OF THE PROJECT MANAGER:** The Project Manager is an agent of City, and the Project Manager, its agents, heirs, successors and assignees shall have no liability to any third-party as a result of performance of this Contract.

6.12. **NO WAIVER OF LEGAL RIGHTS:** Inspection by the Project Manager or authorized City representatives, payment of money, payment for or acceptance of any Work or any extension of time, or possession taken by the City shall not operate as a waiver of any provision of the Contract, or any power therein provided. A waiver of any breach or term of the Contract shall not be deemed to be a waiver of any other or subsequent breach. The City reserves the right to correct any error that may be discovered in any estimate that may have been paid, and to adjust the same to meet the requirements of the Contract and Specifications. The City reserves the right to claim and recover, by process of law, sums as

may be sufficient to correct any error or make good any deficit in the Work resulting from such error, dishonesty, or collusion discovered in the Work after the final payment has been made.

6.13. **RIGHTS-OF-WAY:** The City shall furnish all lands and rights-of-way required for completion of the Work. In acquiring rights-of-way, the City will proceed as expeditiously as possible, but in the event all rights-of-way or easements are not acquired prior to the beginning of construction, the Contractor shall begin Work on such lands and rights-of-way as have been acquired. No claim for damage will be allowed or shall be made by reason of the City's delay in obtaining lands, easements or rights-of-way. In the event of litigation or other delays in acquiring rights-of-way, the time allowed herein for completion will be extended to compensate for the time actually lost by such delay.

SECTION 7 MEASUREMENT AND PAYMENT

7.1. BONDS.

7.1.1. Contemporaneous with the Contractor's execution of this contract, the Contractor shall provide a Performance Bond and a Labor and Material Payment Bond as security for the faithful performance and payment of all the Contractor's obligations under the Contract Documents. All bonds shall be in the form prescribed by the City, executed by a surety company i) licensed to do business in the State of Colorado; ii) with a general rating of A and a financial size category of Class X or better in Best's Insurance Guide, each in the penal sum of the contract price; and iii) in conformance with C.R.S. §§ 38-26-105 and 106 ("Bonds"). All Bonds signed by an agent or attorney-in-fact shall be accompanied by a certified copy of the signatory's authority to act. The Contractor shall, at all times while providing, performing, or completing the Work including without limitation at all times while correcting any failure to meet warranty pursuant to Section 5 of the General Conditions, maintain and keep in force the Bonds at the Contractor's expense.

7.1.2. If the Surety for any Bond furnished by the Contractor is placed in a receivership or declared bankrupt, or its rights to do business in Colorado are terminated, or it ceases to meet the requirements specified herein, the Contractor shall within five (5) days thereafter substitute another Bond and Surety, both of which shall be acceptable to the City.

7.2. **MEASUREMENT OF WORK PERFORMED:** The determination of the amount of Work acceptably completed under the terms of the Contract, or as directed by the Project Manager in writing, will be made by the Project Manager based on measurements taken by them or their authorized representatives. These measurements will be taken according to the United States standard measure. All surface and linear measurements will be taken horizontally unless otherwise shown on Plans or otherwise specified. Structures shall be measured to the neat lines as shown on the Plans, or as directed in writing by the Project Manager.

7.3. SCOPE OF PAYMENT:

7.3.1. The Contractor shall accept the compensation, as herein provided, in full payment for furnishing all materials, equipment, labor, tools, and incidentals necessary to complete the Work and for performing all Work contemplated and embraced under the Contract; for loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the completion of the Work until the final acceptance by the City; for all risks of every description connected with the completion of the Work; for all expenses incurred in consequence of the suspension or discontinuance of the Work as herein specified; for any infringement of patent, trademark, or copyright; and for completing the Work according to the Plans and Specifications. Neither the payment of any partial payment nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective Work or material. No moneys payable under the Contract or any part thereof, except the partial payment for the first month period, shall become due and payable until the Contractor satisfies to the City that it has fully settled or paid for all materials and equipment used in or upon the Work and labor done in connection therewith. The City, if it so elects, may pay any or all such bills, wholly or in part, and deduct the amount or amounts so paid from any monthly or final partial payment excepting the first estimate.

7.4. **PAYMENT FOR INCREASED OR DECREASED QUANTITIES:** When alterations in the Plans or quantities of Work are ordered and performed without a written Change Order or amendment, the Contractor shall accept payment in full at the Contract unit price for the actual quantities of Work done, and only upon the City's review and approval of said Work. No allowance will be made for lost profits. Increased or decreased Work without a written Change Order will be paid for as stipulated herein.

7.5. PAYMENT FOR OMITTED ITEMS:

7.5.1. For any item omitted from the Work, the City will pay the Contractor a fair and equitable amount for costs incurred directly related to such item prior to the date of the City's order to omit the item, subject to Section 1.4 of the General Conditions. No allowance will be made for lost profits in reimbursements to the Contractor for omitted items of Work. Acceptable materials ordered by the Contractor or delivered to the Work site prior to the date of cancellation, alteration, or suspension of the Work by order of the Project Manager will be paid for at the actual cost to the Contractor and shall thereupon become the property of the City.

7.5.2. The Contractor shall immediately submit certified statements covering all money expended in preparation for any omitted item, and shall be reimbursed for any money expended in preparation for Work on any omitted item when such preparation has no value to the remaining items of the Contract, or for a proportionate amount based on the total Contract price over which such preparation would ordinarily be distributed when other items are included in such preparation.

7.6. EXTRA AND FORCE ACCOUNT WORK:

- 7.6.1. Extra Work, for which no price is provided in the Bid Schedule, shall be covered by Change Order to be signed by both Parties before such Work is commenced. Extra Work will be paid for either at a lump sum, or unit prices agreed upon, or on a Force Account basis, subject to Section 1.5 of the General Conditions. For all labor, teams, and foremen in direct charge of the specific operations accomplished on a Force Account basis, the Contractor shall receive the current local rate of wage, to be agreed upon before starting the Work, to which shall be added 15% (fifteen percent) of the sum thereof to cover cost of supervision, the rental of small tools and ordinary equipment, additional Bond, Unemployment Insurance, all overhead and any other costs not specifically stated. In addition, the Contractor shall be paid a sum equal to the Worker's Compensation insurance premium, the actual costs of Social Security taxes computed on the base rate for the class of Work involved for the actual amount of the payroll, and the public liability and property damage insurance premium; provided, however, that nothing in this Section will change the legal status of the relationship between the Parties to this Agreement. For all materials furnished and used by the Contractor on a Force Account basis, the Contractor shall receive the actual cost of such materials, including transportation charges as shown by original receipted bills, to which shall be added 15% (fifteen percent) of said actual cost.
- 7.6.2. For machine power tools or equipment, including fuel and lubricant, used on Force Account Work, payment for the same will be made on a rental basis at the rate agreed upon between the Contractor and the Project Manager, to which rate no percentage shall be added.
- 7.6.3. The compensation as herein provided shall be received by the Contractor as payment for Extra Work done on a Force Account basis and subject to any conditions or limitations as specified in Section 1.5 of the General Conditions. The Contractor shall make no claim for Force Account Work, unless performed on written order and in accordance therewith. The Contractor's representative and the Inspector shall compare records of Extra Work done on a Force Account basis at the end of each day. Copies of these records shall be made upon suitable forms provided for this purpose and signed by both the Inspector and the Contractor's representative, one copy being forwarded to the Project Manager and one copy to the Contractor.
- 7.6.4. All claims for Extra Work done on a Force Account basis shall be submitted each month to the Project Manager by the Contractor upon certified statements, or upon forms furnished by the City. Work performed prior to a written order by the Project Manager will not be paid for.

7.7. PARTIAL PAYMENTS:

- 7.7.1. Partial progress payments shall be made by the City to the Contractor for the percentage of the Work completed, subject to inspection and approval by the Project Manager. The City shall determine when work has been completed, and progress payments shall not constitute a waiver of the City's right to require fulfillment of all terms of the Contract Documents and the delivery of all Work contemplated herein, complete and satisfactory to the City.

- 7.7.2. Once per month as the Work progresses, the Project Manager will make an estimate of the value of the Work performed and materials completed and in-place or delivered to the Work site in accordance with the Contract. Upon the Project Manager's request, the Contractor shall furnish a detailed estimate of the total Contract price showing the amount included therein for each category of Work, to provide a basis for determining the amount of progress payments. The market value of materials and equipment delivered to the Work site but not yet incorporated in the Work may, at the discretion of the City, be included with a progress payment. However, payment by the City for such materials and equipment shall not relieve the Contractor of the responsibility for the care of such materials and equipment; the City shall not be deemed to have assumed ownership of the materials or equipment until incorporated into the completed and accepted Work. Such increases to progress payments, if authorized, are intended only to reduce the cost of doing business with the City.
- 7.7.3. In accordance with C.R.S. § 24-91-103, where the Contract price exceeds one hundred fifty thousand dollars (\$150,000.00), partial payments shall be authorized at the end of each calendar month, or as soon thereafter as practicable, to the Contractor upon satisfactory performance of the Contract. The City shall, from the total of the Contract estimate so ascertained, deduct an amount equivalent to five (5) percent of the whole, to be retained by the City until acceptance of the entire Contract and the balance of the sum equivalent to 95% (ninety-five percent) of the whole, shall be certified to by the Project Manager for payment.
- 7.7.4. The City shall retain from all progress payments an amount equal to all statutory claims filed against the Contractor pursuant to C.R.S. § 38-26-107. No partial payments except final payment will be made for a sum less than one thousand dollars (\$1,000.00). The estimates will be approximate only, and all partial or monthly estimates and payments shall be subject to correction in the estimate and payment rendered following discovery of an error in any previous estimates or payments. Should any defective Work or material be discovered, or should a reasonable doubt arise as to the integrity of any part of the Work completed previous to the final acceptance and payment, the costs shall be deducted from the first payment rendered after the discovery of such Work an amount equal in value to the defective or questioned Work, and this Work will not be included in a subsequent estimate or payment until the defects have been remedied or the causes for doubt removed.
- 7.8. **PUNCH LIST AND FINAL ACCEPTANCE.** The Work shall be finally accepted when, and only when, the whole and all parts thereof shall have been completed to the satisfaction of City in full compliance with, and as required by or pursuant to, this Contract. Upon receipt of the Contractor's Written Notice of Completion, the City shall make a review of the Work and notify the Contractor in writing of all Punch List Work, if any, to be completed or corrected. Following the Contractor's completion or correction of all Punch List Work, the City shall review the Work and prepare and deliver to the Contractor either a written notice of additional Punch List Work to be completed or corrected or a written notice of Final Acceptance of the Work.

7.9. **ACCEPTANCE AND FINAL PAYMENT:**

7.9.1. Two (2) weeks after acceptance of the Work including final cleanup, the City shall initiate the acceptance and final payment procedures. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. Upon completion of the acceptance and final payment procedures, the Work will be considered accepted, the Contract considered complete, and, upon compliance with the provisions of State law, the final payment shall be executed and submitted to the Contractor.

7.9.2. The acceptance by the Contractor of the last payment as aforesaid shall operate as and shall be a release of the City from all claims for liability arising from the performance of the Work under the Contract, excepting any claims that may arise during the warranty period.

7.10. **LIENS.**

7.10.1. *Title.* Nothing in this Contract shall be construed as vesting in the Contractor any right of property in any equipment, materials, supplies, and other items provided under this Contract after they have been installed in, incorporated into, attached to, or affixed to, the Work or Work site. All such equipment, materials, supplies, and other items shall, upon being so installed, incorporated, attached or affixed, become the property of the City, but such title shall not release the Contractor from its duty to insure and protect the Work in accordance with the requirements of this Contract.

7.10.2. *Waivers of Lien.* The Contractor shall, from time to time at the City's request and in any event prior to final payment, furnish to the City such receipts, releases, affidavits, certificates, and other evidence as may be necessary to establish, to the reasonable satisfaction of the City, that no lien against the work or the public funds held by the City exists in favor of any person whatsoever for or by reason of any equipment, material, supplies, or other item furnished, labor performed, or other thing done in connection with the Work or this Contract ("Lien"), and that no right to file any Lien exists in favor of any person whatsoever.

7.10.3. *Removal of Liens.* If at any time any notice of any Lien is filed, the Contractor shall, promptly and without charge, discharge, remove, or otherwise dispose of such Lien. Until such discharge, removal, or disposition, the City shall have the right to retain from any money payable hereunder an amount that the City, in its sole judgment, deems necessary to satisfy such Lien and to pay the costs and expenses, including attorneys' fees and administrative expenses, of any actions brought in connection therewith or by reason thereof.

7.10.4. *Protection of City Only.* This Section shall not operate to relieve the Contractor's Surety or Sureties from any of their obligations under the Bonds, nor shall it be deemed to vest any right, interest, or entitlement in any subcontractor or supplier. The City's retention of funds pursuant to this Section shall be deemed solely for the protection of its own interests pending removal of such Liens by the Contractor, and the City shall have no obligation to apply such funds to such removal but may, nevertheless, do so where the City's interests would thereby be served.

7.11. DEDUCTIONS.

7.11.1. *City's Right To Withhold.* Notwithstanding any other provision of this Contract and without prejudice to any of the City's other rights or remedies, the City shall have the right at any time, to deduct and withhold from any progress or final payment that may be or become due under this Contract, such amount as may reasonably appear necessary to compensate the City for any actual or prospective loss due to:

- i. Work that is defective, damaged, flawed, unsuitable, nonconforming, or incomplete;
- ii. Claims or liens filed or reasonable evidence indicating probable filing of claims or liens from third-parties, regardless of merit;
- iii. Failure of the Contractor to make payments properly and promptly to subcontractors for material or labor;
- iv. Failure of the Contractor to complete any portion of the Work in compliance with an approved schedule;
- v. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract value;
- vi. Failure of the Contractor to submit on a timely basis, any documentation required by the Contract Documents, including without limitation, monthly reports, schedules, or request for approval of subcontractors;
- vii. Unauthorized Work or deviations by the Contractor from the Contract Documents;
- viii. Damage to the City or to another contractor;
- ix. State or local sales, use, or excise taxes from which the City is exempt;
- x. Any other failure of the Contractor to perform any of its obligations under this contract; or
- xi. The cost to the City, including attorneys' fees and administrative costs, of correcting any of the aforesaid matters or exercising any one or more of the City's remedies set forth within the Contract Documents.

7.11.2. *Release and Use of Withheld Funds.* The City shall be entitled to retain any and all amounts withheld pursuant to Section 7.11.1 above until the Contractor has either performed the obligations in question or furnished security for such performance satisfactory to the City. The City shall be entitled to apply any money withheld or any other money due to the Contractor under this Contract to reimburse itself for any and all costs, expenses, losses, damages, liabilities, suits, judgments, awards, attorneys' fees and administrative expenses incurred, suffered, or sustained by the City and chargeable to Contractor under this Contract.

7.11.3. *Waiver under C.R.S. § 38-26-107.* Execution of the Contract Documents by the Contractor shall constitute waiver by the Contractor to claim any right of payment of interest upon any such retained funds, or to claim any right of payment of interest upon funds withheld under the provisions of C.R.S. § 38-26-107.

SECTION 8

DISPUTES AND REMEDIES

8.1. DISPUTE RESOLUTION PROCEDURE.

8.1.1. *Notice of Disputes and Objections.* If the Contractor disputes or objects to any requirement, direction, instruction, interpretation, determination, or decision of the City, the Contractor may notify the City in writing of the issue and of the amount of any equitable adjustment to the Contract price or Contract time to which the Contractor claims it will be entitled as a result thereof; provided, however, that the Contractor shall, nevertheless, proceed without delay to perform the Work as required, directed, instructed, interpreted, determined, or decided by the City, without regard to such dispute or objection. Unless the Contractor so notifies the City within two (2) business days after receipt of such requirement, direction, instruction, interpretation, determination, or decision, the Contractor shall be conclusively deemed to have waived all such disputes or objections and all claims based thereon.

8.1.2. *Negotiation of Disputes and Objections.* To avoid and settle without litigation any such dispute or objection, the City and the Contractor agree to engage in good faith negotiations. Within 10 (ten) business days after the City's receipt of the Contractor's written notice of dispute or objection, a conference between the City and the Contractor shall be held to resolve the dispute. Within 10 (ten) business days after the end of the conference, the City shall render its final decision in writing to the Contractor. If the Contractor objects to the City's final decision, then it shall, within 10 (ten) business days give the City notice thereof and, in such notice, shall state its final demand for settlement of the dispute. Unless the Contractor so notifies the City, the Contractor shall be conclusively deemed to have agreed to and accepted the City's final decision and to have waived all claims based on such final decision.

8.2. **DISPUTED CLAIMS FOR EXTRA WORK:** In case the Contractor deems extra compensation is due for Work or material not covered in the Contract Documents, or not ordered by the Project Manager as Extra Work, the Contractor shall notify the Project Manager in writing of its intention to make claim for such extra compensation before beginning Work on which the Contractor bases the claim, and shall afford the Project Manager every facility for keeping actual cost of the Work. Failure on the part of the Contractor to give such notification or to afford the Project Manager proper facilities for keeping strict account of actual cost shall constitute a waiver of the claim for such extra compensation. The filing of such notice by the Contractor and the keeping of costs by the Project Manager shall not in any way be construed to prove the validity of the claim. When the Work has been completed, the Contractor shall, within 10 (ten) days, file its claim for extra compensation with the Project Manager, who will review for consideration.

8.3. **CONTRACTOR'S REMEDIES.** If the City fails or refuses to satisfy a final demand made by the Contractor pursuant to Section 8.2 above, or to otherwise resolve the dispute which is the subject of such demand to the satisfaction of the Contractor, within 10 (ten) days following receipt of such demand, the Contractor shall be entitled to pursue such remedies, not inconsistent with the provisions of this Contract, as it may have in law or equity.

8.4. **CITY'S REMEDIES.** If it should appear at any time prior to final payment that an Event of Default, and has failed to cure any such Event of Default, as defined within Section 4.10 of the General Conditions, the City shall have the right, at its election and without prejudice to any other remedies provided by law or equity, to pursue any one or more of the following remedies:

- i. The City may require the Contractor, within such reasonable time as may be fixed by the City, to complete or correct all or any part of the Work that is defective, damaged, flawed, unsuitable, nonconforming, or incomplete; to remove from the Work site any such work; to accelerate all or any part of the Work; and to take any or all other action necessary to bring the Contractor and the Work into strict compliance with this Contract.
- ii. The City may perform or have performed all work necessary for the accomplishment of the results stated in (i) above and withhold or recover from the Contractor all the cost and expense, including attorneys' fees and administrative costs, incurred by the City in connection therewith.
- iii. The City may accept the defective, damaged, flawed, unsuitable, nonconforming, incomplete, or dilatory Work or part thereof and make an equitable reduction in the Contract price.
- iv. The City may terminate this Contract without liability for further payment of amounts due or to become due under this Contract, pursuant to Section 4.10 of the General Conditions.
 - i. Upon any termination of this Contract or of the Contractor's rights under this Contract in accordance with Sections 4.10 or 4.11 of the General Conditions, and at the City's option exercised in writing, any or all subcontracts and supplier contracts of the Contractor shall be deemed to be assigned to the City without any further action being required, but the City shall not thereby assume any obligation for payments due under such subcontracts and supplier contracts for any Work provided or performed prior to such assignment.
- v. The City may withhold from any progress or final payment, whether or not previously approved, or may recover from the Contractor any and all costs including attorneys' fees and administrative expenses, incurred by the City as the result of any Event of Default or as a result of actions taken by the City in response to any Event of Default.
- vi. The City may recover any damages suffered by the City.

8.5. **CITY'S SPECIAL REMEDY FOR DELAY.** If the Work is not completed by the Contractor in full compliance with and as required by or pursuant to this Contract, within the time as such time may be extended by Change Order, then the City may invoke its remedies under Section 8.4 of the General Conditions or may, in the exercise of its sole and absolute discretion, permit the Contractor to complete the Work but charge to the Contractor and deduct from any progress or final payments, whether or not previously approved, administrative expenses and costs for each day completion of the Work is delayed beyond

the completion date, computed as set forth in Section 4.8 of the General Conditions, as well as any additional damages caused by such delay.

8.6. **ATTORNEY FEES:** In the event there is any dispute between the the Contractor or the Surety and the City, its officers, agents or employees, and the City, its officers, agents or employees prevail, the City, its officers, agents or employees shall be granted all of its costs, including but not limited to attorney's fees, court costs and expert witness fees.

SECTION 9 OTHER PROVISIONS

- 9.1. Wherever a number of days is specified in this Contract it shall mean calendar days unless otherwise specified.
- 9.2. When a delay on any aspect of the Work occurs, the Contractor, to the maximum extent possible, shall utilize its resources elsewhere in the Work. If the Contractor, after complying the maximum extent possible by the reassignment of its labor force, equipment and materials, alleges to have suffered damages due to delay, and the delay is caused in whole or in part by acts or omissions within the control of the City or persons acting on its behalf, then such a claim shall be treated as a Change Order request and shall be processed in accordance with the Change Order, audit and inspection requirements specified in the General Provisions or it shall be deemed forever waived. Nothing herein contained shall be interpreted so as to allow the Contractor to recover delay damages from the City for delays caused by acts of God, the acts or omissions of the Contractor, its subcontractors, employees or agents, or persons over which the City has no control.
- 9.3. Work performed by the Contractor under this Contract shall conform to reasonable and normal professional standards and the Contractor shall conduct itself at all times in a manner consistent with industry standards.
- 9.4. No reports, graphics or other material produced specifically for the City under this Contract shall be the subject of an application for copyright or trademark by or on behalf of the Contractor.
- 9.5. No assignment of any claim or proceeds under this Contract shall be binding upon the City unless it shall be first notified thereof in writing.

DEFINITIONS

Whenever the following terms or pronouns are used in the Specifications and Contract Documents, the intent and meaning shall be as follows:

AWWA: American Water Works Association.

CHANGE ORDER: A written modification of the Contract, issued after award to the Contractor, authorizing an addition, deletion, or revision to the Work within the general scope of the Contract or authorizing an adjustment in the Contract price or time mutually agreed upon between the City and the Contractor.

CDOT: Colorado Department of Transportation.

CONTRACT OR CONTRACT DOCUMENTS: The written agreement executed between the City and the Contractor covering the performance of the Work and the furnishing of labor and materials, by which the Contractor is bound to perform the Work and furnish the labor and materials and by which the City is obligated to compensate at a mutually established and accepted rate or price.

CONTRACTOR: The individual, partnership, firm, or corporation executing the Contract, acting directly or through lawful agents or employees, primarily liable for the acceptable performance of the Work for which contracted, and for the payment of all legal debts pertaining to the Work.

DRAWINGS: The Plans, profiles, typical cross-sections, general cross-sections, elevations, schedules, and details which show locations, character, dimensions, and details of the Work.

DISTRICT: A legally constituted group of individuals who have joined together in order to facilitate construction of utility systems within the limits of their property. The district shall be represented by its authorized Board of Directors.

PROJECT MANAGER: The duly authorized representative of the City, acting directly or through an assistant or representative.

EQUIPMENT: All machinery, together with the necessary supplies for upkeep and maintenance, and all tools and apparatus necessary for the proper construction and acceptable completion of the Work.

EXTRA WORK: Work not provided for in the Contract as awarded but found to be essential to the satisfactory completion of the Contract, within its intended scope.

FIELD ORDER: A written order effecting minor change in the Work not involving an adjustment in the Contract price or an extension of the Contract time, issued by the Project Manager to the Contractor during construction.

FINAL ACCEPTANCE: An acknowledgment made by the City that all Work has been completed.

FORCE ACCOUNT: A method of payment, other than lump sum or unit price, for Work ordered by a Change Order.

INSPECTOR: An authorized representative of the City assigned to make all necessary inspection of the Work performed or being performed, or of the materials furnished or being furnished by the Contractor.

LABORATORY: The official testing laboratories of the City or such other laboratories as may be designated by the Project Manager.

NOTICE TO PROCEED: A written notice to the Contractor of the date on which it is to begin Work.

PAYMENT BOND: The approved form of security furnished by the Contractor and its Surety as a guarantee that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the Work, as provided by law.

PERFORMANCE BOND: The approved form of security furnished by the Contractor and its Surety as a guarantee of good faith and ability of the Contractor to execute the Work in accordance with the terms of the Plans, Specifications, and Contract. In lieu of a separate Performance Bond, a combination Performance, Labor and Material Payment Bond may be supplied by the Contractor.

PERFORMANCE, LABOR AND MATERIAL PAYMENT BOND: Security furnished by the Contractor and its Surety as a guarantee that the Contractor will pay in full all bills and accounts for materials and labor used in the Work and that it will execute the Work in accordance with the Contract.

PLANS: The official Plans, working drawings, or supplemental drawings or exact reproductions thereof, approved by the Project Manager which show the locations, character, dimensions, and details of the Work to be done and which are to be considered as part of the Contract, supplementary to the Specifications.

PROGRESS SCHEDULE: A construction schedule prepared by the Contractor in a bar-chart, critical path or other format acceptable to the Project Manager which includes the start and completion dates of all salient features of the Work.

SHOP DRAWINGS: All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a subcontractor, manufacturer, supplier, or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.

SPECIAL PROVISIONS: The specific clauses setting forth conditions or requirements particular to the Work, covering work or materials involved in the bid and estimate, which are not thoroughly or satisfactorily stipulated in the General Provisions or Specifications.

SPECIFICATIONS: The directions, provisions, and requirements contained herein, supplemented by Special Provisions, pertaining to the method and manner of performing the Work, or to the quantities or the qualities of materials to be furnished under the Contract. Also includes Technical Specifications, part of the Contract Documents consisting of technical written descriptions for materials, equipment, construction systems, standards and workmanship.

STRUCTURES: Bridges, culverts, sewers, catch basins, retaining walls, manholes, headwalls, buildings, valve vaults and other features which may be encountered in the Work and not otherwise classified herein.

SUBCONTRACTOR: An individual, firm or corporation having a direct contract with the Contractor or the Contractor's subcontractor(s) for the performance of a part of the Work.

SUBSTANTIAL COMPLETION: The Work (or a specified part thereof) has progressed to the point where, in the opinion of the Project Manager, it is sufficiently complete in accordance with the Contract, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. For the purposes of final acceptance of the Work, Substantial Completion shall include cleanup of the Work site and all work areas.

SUPPLIER: Any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design.

SURETY: The corporate body or individuals who are bound by the Performance Bond; Payment Bond; or Performance, Labor and Material Payment Bond, with and for the Contractor who is responsible for the entire and satisfactory fulfillment of the Contract and for the payment of all debts incurred in fulfilling the Contract.

UNIT PRICE WORK: Work to be paid for on the basis of unit prices.

Exhibit D
Construction Contract Forms

Bond No. 101550046

PERFORMANCE, LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that Tryg Group, LLC (Contractor), as Principal (the "Principal") and Merchants National Bonding, Inc., a corporation organized under the laws of the State of Iowa, and authorized to transact business in the State of Colorado, as "Surety," jointly and severally, including their heirs, personal representatives, successors and assigns, are held and firmly bound unto the City of Littleton as Obligee, hereinafter called Owner, for the use and benefit of claimants as herein below defined, in the amount of Two Million Five Hundred Eighty-Four Thousand, Three Hundred Seventy-Five Dollars and 00/100 (\$2,584,375.00), for the payment and interest as provided by law for the performance of the Contract between the Principal and the Owner, dated _____, 2025, for the Museum Mechanical Replacement project in accordance with drawings and specifications; which the Contract is made a part hereof, and is hereinafter referred to as the Contract, and incorporated by this reference.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal, at all times, shall promptly and faithfully perform said Contract, and shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, any authorized modifications thereof during the original term of the Contract, any extensions thereof that may be granted by the Owner, and during the term of any guarantee or warranty required under the Contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense when the Owner may incur in making good any default, then the Principal and Surety shall have no obligation under this Bond, otherwise it shall remain in full force and effect for a period of one (1) year following execution of the Contract. Upon expiration, this Bond shall be extended by a continuation certificate for an additional one (1) year, and extended thereafter until the warranty period has expired in accordance with the terms of the Contract.

The Surety, for value received, agrees that no extension of time, change in, addition to, or other alteration or modification of the terms of the Contract or work to be performed there under or any other forbearance on the part of either the Owner or the Principal to the other shall in any way release or impact the Surety's liability or obligation on this Bond, and the Surety hereby waives notice of any extension of time, change in, addition to, or other alteration or forbearance.

Whenever the Owner terminates the Contract in accordance with the terms thereof, the Surety shall, within fifteen (15) calendar days after written notice of such termination, notify the Owner in writing of its election to complete the Contract in accordance with its terms and conditions, or notify the Owner that the Surety elects not to complete the Contract. If the Surety fails to provide the written notice within the fifteen (15) calendar day period, then it will have deemed to have not elected to complete the Contract. Should the Surety elect to complete the Contract, then it shall, within fifteen (15) additional calendar days, following written notice of such election, obtain a bid or bids for submission to Owner for completing the Contract in accordance with its terms and conditions. The Surety shall arrange for a contract between bidder and Owner, and make

available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs, attorneys fees of the Owner and damages for which the Surety shall be liable hereunder, the amount set forth in the first paragraph hereof. In the event of termination, the Surety may not engage the Principal to complete the Contract, without prior written consent of the Owner, which consent may be withheld in the Owner's sole discretion. If the Surety elects to complete the Contract, then it shall be entitled to receive the balance of the Contract price, less i) any amounts paid by the Owner to the Principal; ii) costs incurred by the Owner in correcting the defective work; iii) any additional legal, design professional or other costs incurred by the Owner resulting from Principal's default; and iv) any liquidated damages caused by the delayed performance or nonperformance of the Principal. Any progress payments, less retainage, due but not paid at the date of termination shall be paid to the Surety so long as the Surety has agreed to indemnify the Owner for the amount thereof and no other claims have been made to such funds by subcontractors or suppliers in accordance with the Contract or any applicable law. In the event that the Surety elects not to complete the Contract, the Owner may then have work completed by such means and in such manner, as it may deem advisable. The Surety, in such event, shall at all times make available, as work progresses under the Contract between the Owner and new contractor, sufficient funds to pay the cost of completion of the Contract pursuant to the its terms together with the other amounts set forth above, but in no event shall the Surety be responsible for the payment of any sums to the Owner until the Owner has paid in full its total obligation under the terms of the original Contract, plus Change Orders or amendments less deductions and claims chargeable by law or by the Contract, if any, and less the retainage which will be disbursed as provided by the Contract and any applicable law.

Any proceeding, whether legal or equitable, under this Bond, except for claims for payment of labor and material, or copyright or patent infringement, must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

Further, the above named Principal and Surety hereby jointly and severally agree with the Owner that the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such Contract ("claimant"), and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, repairs or machinery, equipment and tools, consumed or used in connection with the construction of such work, whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

The above-named Principal and Surety hereby jointly and severally agree with the Owner that every claimant, who has not been paid in full at any time up to and including the time of final settlement for the work contracted to be done, file with the Owner, a verified statement of the amount due and unpaid in accordance with Section 38-26-107, C.R.S. Provided, further, that no final settlement between the Owner and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. The Owner shall not be liable for the payment of any costs, attorney fees, or other expenses of any such legal remedies a claimant may have against the Principal or Surety.

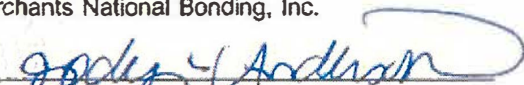
SIGNED this 28th day of October 2025.

In the presence of:

Tryg Group, LLC


(Contractor / Principal)

Merchants National Bonding, Inc.


(Surety) Jody L. Anderson, Attorney-in-Fact

(Accompany this Bond with Attorney in-fact's authority from the Surety to execute the Bond, certified to include the date of the Bond.)

APPROVED FOR THE OWNER:

BRENT SODERLIN
DIRECTOR OF PUBLIC WORKS AND UTILITIES

MERCHANTS

BONDING COMPANYTM

POWER OF ATTORNEY

Know All Persons By These Presents, that MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., both being corporations of the State of Iowa, and MERCHANTS NATIONAL INDEMNITY COMPANY, an assumed name of Merchants National Bonding, Inc., (herein collectively called the "Companies") do hereby make, constitute and appoint, individually,

Andrew J Waterbury; Brad Moody; Elizabeth Ostblom; Evan E Moody; Jody L Anderson; Karen A Feggestad; Regina R Hrovat

their true and lawful Attorney(s)-in-Fact, to sign its name as surety(ies) and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

This Power-of-Attorney is granted and is signed and sealed by facsimile under and by authority of the By-Laws adopted by the Board of Directors of the Companies.

"The President, Secretary, Treasurer, or any Assistant Treasurer or any Assistant Secretary or any Vice President shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof."

"The signature of any authorized officer and the seal of the Company may be affixed by facsimile or electronic transmission to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed."

In connection with obligations in favor of the Florida Department of Transportation only, it is agreed that the power and authority hereby given to the Attorney-in-Fact includes any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts required by the State of Florida Department of Transportation. It is fully understood that consenting to the State of Florida Department of Transportation making payment of the final estimate to the Contractor and/or its assignee, shall not relieve this surety company of any of its obligations under its bond.

In connection with obligations in favor of the Kentucky Department of Highways only, it is agreed that the power and authority hereby given to the Attorney-in-Fact cannot be modified or revoked unless prior written personal notice of such intent has been given to the Commissioner - Department of Highways of the Commonwealth of Kentucky at least thirty (30) days prior to the modification or revocation.

In Witness Whereof, the Companies have caused this instrument to be signed and sealed this 2nd day of June, 2025.



MERCHANTS BONDING COMPANY (MUTUAL)
MERCHANTS NATIONAL BONDING, INC.
MERCHANTS NATIONAL INDEMNITY COMPANY

By

Larry Taylor

President

STATE OF IOWA
COUNTY OF DALLAS ss.

On this 2nd day of June, 2025, before me appeared Larry Taylor, to me personally known, who being by me duly sworn did say that he is President of MERCHANTS BONDING COMPANY (MUTUAL), MERCHANTS NATIONAL BONDING, INC., and MERCHANTS NATIONAL INDEMNITY COMPANY; and that the seals affixed to the foregoing instrument are the Corporate Seals of the Companies; and that the said instrument was signed and sealed in behalf of the Companies by authority of their respective Boards of Directors.



(Expiration of notary's commission
does not invalidate this instrument)

[Signature]

Notary Public

I, Elisabeth Sandersfeld, Secretary of MERCHANTS BONDING COMPANY (MUTUAL), MERCHANTS NATIONAL BONDING, INC., and MERCHANTS NATIONAL INDEMNITY COMPANY do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said Companies, which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Companies on this day of



Ata B. S.

Secretary

POA 0018 (5/25)



MOODY
INSURANCE AGENCY

October 27, 2025

City of Littleton
2255 W. Berry Avenue
Littleton, CO 80120

RE: TRYG Group LLC

Project Name:	Mechanical Replacement for Museum – RFP 19-2025
Contract Amount:	\$2,584,375.00
Bond No:	101550046

The performance and payment bonds covering the above captioned project were executed by this agency, through Merchants National Bonding, Inc. on October 27, 2025.

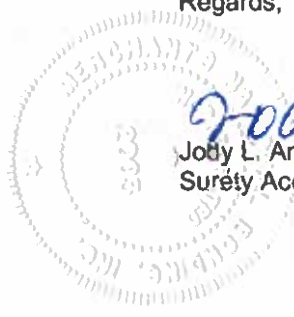
We hereby authorize the City of Littleton to date all bonds and powers of attorney to coincide with the date of the contract.

If you should have additional questions or concerns, please do not hesitate to give me a call at 303-824-6651.

Regards,



Jody L. Anderson,
Surety Account Manager



NOTICE TO PROCEED
[Project Name and Number]

Date: _____

TO: **[Type Contractor Name]**
[Type Contractor Address]

You are hereby authorized to proceed on this date, **[Date]** with the work covered in the contract documents titled **[Project Name and Number]**. Work must commence within **[Number of Days in which construction must commence]** days of acceptance of this Notice to Proceed.

OWNER, CITY OF LITTLETON

By: _____ Title: _____

CONTRACTOR ACCEPTANCE OF NOTICE TO PROCEED

By: _____
this _____ day of _____, 20____.
Title: _____

CONTRACTOR'S RECEIPT FOR FINAL PAYMENT

[Project Name and Number]

Date: _____

TO: [Type Contractor Name]
[Type Contractor Address]

The undersigned has accepted the City of Littleton's Check No. _____ dated _____, 20____ in the amount of _____ Dollars (\$_____), as final payment of all sums due for work done under the Contract Documents titled **[Project Name and Number]**, as amended, and as complete performance by the Contractor of all obligations to be performed by it pursuant thereto. The Contractor acknowledges and agree that no future claims for additional payments shall be made.

CONTRACTOR

By: _____ Title: _____

FINAL ACCEPTANCE AND WARRANTY INITIATION

[Project Name and Number]

Date: _____

TO: [Type Contractor Name]
[Type Contractor Address]

You are hereby notified that on the ____ day _____, 20____, the City of Littleton has accepted the construction work completed by _____, for the construction work covered under the contracts documents titled **[Project Name and Number]**.

You are also notified that the warranty terms and conditions as set forth in the contract documents are initiated as of the date of this acceptance.

Final payment receipt form is attached within the contract documents for your convenience. Should this form not be returned within ten (10) calendar days, properly signed and approved, it will be assumed that lack of such performance constitutes informal giving of a receipt and satisfaction by the contractor for final settlement of all amounts due.

CITY OF LITTLETON

By: _____ Title: _____

NOTICE OF END OF BASIC WARRANTY PERIOD

[Project Name and Number]

Date: _____

TO: _____

You are hereby notified that on the ____ day of _____, 20____, the City of Littleton has ended the basic warranty period for the construction work completed by _____ for the construction work covered under the contract documents titled **[Project Name and Number]**. The basic warranty two (2) years from the date of Final Acceptance and warranty initiation.

You are also notified that the contract provisions concerning additional warranties on remedied work; patented devices, materials, and processes which may have been used in this construction; or other expressed warranties are not relinquished by the owner as a result of the issuance of this notice.

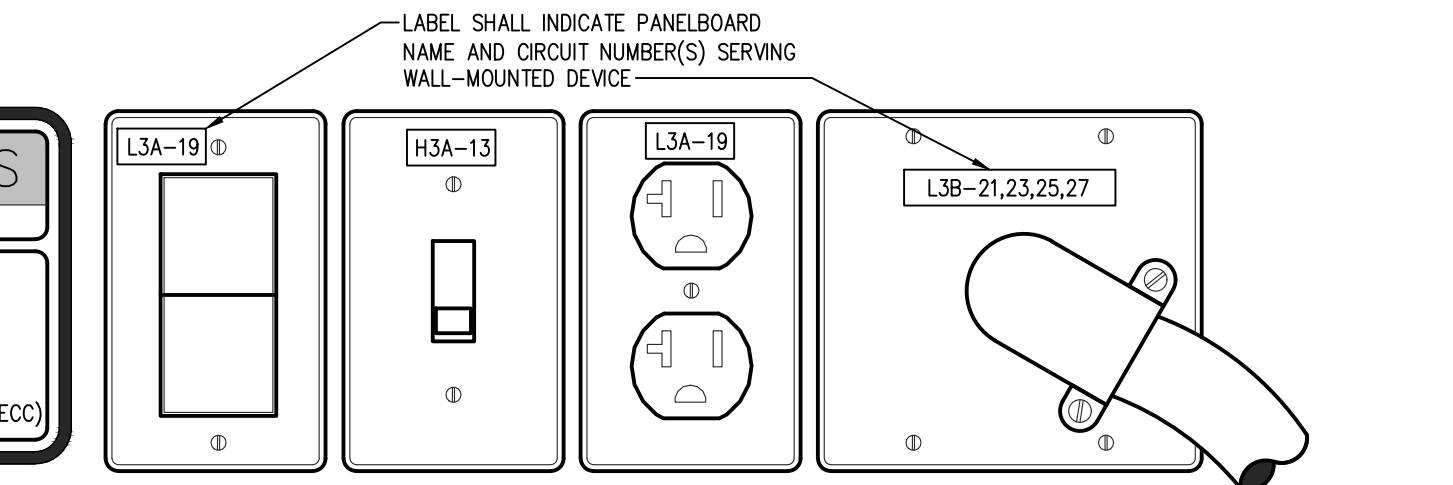
CITY OF LITTLETON

By: _____
Title: _____

Exhibit E
Drawings and Specifications

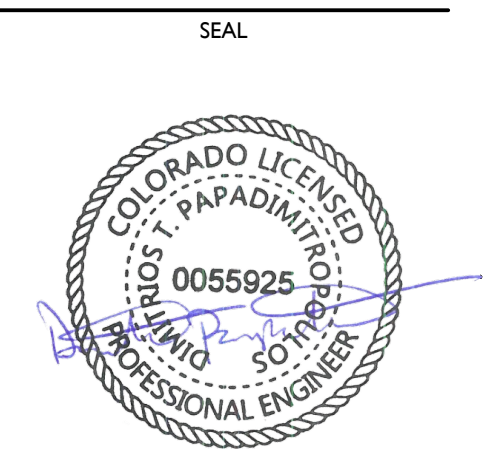
ELECTRICAL LEGEND			
NOT ALL SYMBOLS SHOWN ARE NECESSARILY USED ON THESE DRAWINGS			
GENERAL		LIGHTING	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	ELECTRICAL DETAIL NOTE TAG		SHADING INDICATES CONNECTION TO EMERGENCY CIRCUIT OR 90-MINUTES SELF-CONTAINED BATTERY PACK
	FEEDER TAG		DIRECT/INDIRECT OR LENSED HIGH EFFICIENCY LIGHT FIXTURE
	RELOCATE EQUIPMENT, DEVICE ARROW		RECESSED 2'x4' AND 2'x2' LIGHT FIXTURE
	HEAVY LINEWEIGHT ITEMS INDICATE NEW WORK TO BE DONE		RECESSED 1'x4' LIGHT FIXTURE
	LIGHT LINEWEIGHT ITEMS INDICATE EXISTING TO REMAIN		SURFACE MOUNTED 1'x4' LIGHT FIXTURE
	DASHED LINEWEIGHT ITEMS INDICATE EXISTING TO BE REMOVED		STRIP LIGHT FIXTURE
	NEW OR RELOCATED CIRCUIT RUN		DOWNLIGHT
	CIRCUIT RUN, EXISTING TO REMAIN		DIRECTIONAL WALL WASHER/ADJUSTABLE DOWNLIGHT
	CIRCUIT RUN, EXISTING TO BE REMOVED		WALL SCONCE
	UNDER FLOOR CIRCUIT RUN		TRACK LIGHT
	UNDERGROUND CIRCUIT RUN		EXIT SIGN WITH FACING AND DIRECTIONAL ARROWS
	CONDUIT CAP		EMERGENCY LIGHT UNIT
	HOME RUN TO PANEL, NUMBER OF ARROWS INDICATES NUMBER OF CIRCUITS		REMOTE EMERGENCY LIGHT HEAD
SWITCHING		ONE-LINE	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SNAP SWITCH - SUBSCRIPT LETTER, IF SHOWN, INDICATES CONTROL OF FIXTURES MARKED WITH SAME SUBSCRIPT LETTER		FAULT CURRENT POINT VALUE REFERENCE
	TWO-POLE SWITCH		GROUNDING CONNECTION
	THREE-WAY SWITCH		SERVICE WEATHERHEAD
	FOUR-WAY SWITCH		METER
	DIMMER SWITCH		SURGE PROTECTION DEVICE
	KEY SWITCH		GENERATOR
	SWITCH WITH PILOT LIGHT ("ON" WHEN THE SWITCH IS "OFF")		TRANSFORMER
	LOW VOLTAGE SWITCH		PAD-MOUNTED TRANSFORMER
	RAISE/LOWER WALL SWITCH		ELECTRICAL PANEL
	THERMAL OVERLOAD SWITCH		AUTOMATIC TRANSFER SWITCH
	GANGED SWITCHES		CIRCUIT BREAKER
	OCCUPANCY SENSOR FOR LIGHTING CONTROLS		FUSED DISCONNECT SWITCH
ABBREVIATIONS		COMMUNICATION	
ACCR	DESCRIPTION	SYMBOL	DESCRIPTION
AB	ABOVE COUNTERTOP		COMBINATION PHONE/DATA OUTLET
AFCI	ARC-FAULT CIRCUIT INTERRUPTER		DATA OUTLET
AUX	EQUIPMENT EQUIPPED WITH THE AUXILIARY CONTACTS		TELEPHONE OUTLET
BC	BLANK COVER		TELEPHONE BOARD
C	CONTROLLED DEVICE		GROUND BAR
(E), E	EXISTING		TV OUTLET
EPO	EMERGENCY POWER OFF		
GFI, GFCI	GROUND FAULT PROTECTION FOR PERSONNEL		
GFP, GFPE	GROUND FAULT PROTECTION OF EQUIPMENT		
HP	HORSEPOWER		
L	LOOKABLE PER NEC 110.25		
(N), N	NEW		
NIC	NATIONAL ELECTRICAL CODE NOT IN CONTRACT		
(R), R	RELOCATED		
(TY)	TYPICAL		
UF	UNDER FLOOR		
UG	UNDER GROUND		
USB	WIRING DEVICE WITH USB OUTLET(S)		
WP	WEATHERPROOF (NEMA 3R RATING OR WEATHERPROOF WHILE IN USE)		
ADA DEVICES		SECURITY	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	DOOR SIGNAL PUSH BUTTON AND BELL		CARD READER
	DOOR SIGNAL DISCONNECT SWITCH		SECURITY CAMERA
	HEARING IMPAIRED VISUAL DEVICE TIED TO THE DOOR SIGNAL AND PHONE		
	DOOR SIGNAL LOW VOLTAGE TRANSFORMER		

PROJECT DESIGN CODES	
YEAR	CODE
2020	NATIONAL ELECTRICAL CODE (NEC, NFPA70)
2021	INTERNATIONAL BUILDING CODE (IBC)
2021	INTERNATIONAL FIRE CODE (IFC)
2021	INTERNATIONAL ENERGY CONSERVATION CODE (IECC)



ELECTRICAL GENERAL NOTES			
CONTRACTOR SHALL COMPLY WITH NOTES AS APPLICABLE TO PROJECT. NOTES ON INDIVIDUAL DRAWINGS TAKE PRECEDENCE.			
1.	BEFORE SUBMITTING THE BID ELECTRICAL CONTRACTOR SHALL VISIT AND EXAMINE THE PREMISES, AND/OR JOB SITE, SO AS TO ASCERTAIN THE EXISTING CONDITIONS IN WHICH HE WILL BE REQUIRED TO OPERATE IN PERFORMING HIS PART OF THE CONTRACT TO ANTICIPATE ANY POSSIBLE SPACE RESTRICTIONS OR CONSTRAINTS THAT COULD AFFECT TIMELY COMPLETION OF THE ELECTRICAL WORK IN ACCORDANCE WITH THE INTENT OF THE SPECIFICATIONS AND DRAWINGS. THE ELECTRICAL CONTRACTOR SHALL REPORT TO THE ARCHITECT OR GENERAL CONTRACTOR ANY CONDITIONS THAT MIGHT PREVENT THE SPECIFIED ELECTRICAL WORK FROM BEING PERFORMED IN THE MANNER INTENDED. NO CONSIDERATION OR ALLOWANCE WILL BE GRANTED TO THE ELECTRICAL CONTRACTOR FOR FAILURE TO VISIT THE PROJECT SITE, OR FOR ANY ALLEGED MISUNDERSTANDING OF THE MATERIALS TO BE FURNISHED OR WORK TO BE DONE.	29.	CONDUIT JOINTS SHALL BE CUT SQUARE AND REAMED SMOOTH. BENDS OR OFFSETS SHALL BE MADE WITH AN APPROVED BENDER OR HOKEY, OR HUB-TYPE CONDUIT FITTINGS. BENDS SHALL BE MADE SO THAT THE CONDUIT IS NOT DAMAGED AND ITS INTERNAL DIAMETER IS NOT EFFECTIVELY REDUCED. THERE SHALL NOT BE MORE THAN THE EQUIVALENT OF FOUR QUARTER BENDS (360° TOTAL) BETWEEN PULL POINTS.
2.	THE ELECTRICAL CONTRACTOR SHALL EXAMINE THE DRAWINGS OF ALL TRADES WHOSE WORK RELATES TO OR IS DEPENDENT ON ELECTRICAL WORK TO BECOME FULLY INFORMED OF THE EXTENT AND CHARACTER OF THEIR SPECIFIED WORK AND BE ABLE TO COORDINATE IT WHILE AVOIDING POSSIBLE INTERFERENCE WITH THE ELECTRICAL WORK.	30.	CONCEALED CONDUIT SYSTEMS SHALL BE RUN IN A DIRECT LINE WITH LONG SWEEP BENDS AND OFFSETS. EXPOSED CONDUIT RUNS SHALL BE PARALLEL TO AND AT RIGHT ANGLES TO BUILDING LINES.
3.	IT IS THE INTENTION OF THESE SPECIFICATIONS AND DRAWINGS TO CALL FOR FINISHED WORK, TESTED AND READY FOR OPERATION. WHEREVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN, "FURNISH AND INSTALL COMPLETE AND READY FOR USE." "REPLACE" SHALL MEAN, "TO PUT NEW IN PLACE OF EXISTING."	31.	ALL ROOF PENETRATIONS SHALL BE SEALED WATER TIGHT, PROVIDE FLASHING AND COUNTER FLASHING AS REQUIRED. COORDINATE ROOFING WORK WITH THE GENERAL CONTRACTOR.
4.	THE ARCHITECTURAL SPECIFICATIONS, GENERAL AND SPECIAL CONDITIONS FOR THE WORK OF THIS PROJECT, BASE BUILDING DRAWINGS AND SPECIFICATIONS, SHALL BE EXAMINED BY ELECTRICAL CONTRACTOR BEFORE SUBMITTING A BID.	32.	CONTRACTOR SHALL NOTIFY ENGINEER 48 HOURS PRIOR TO SUBSTANTIAL COMPLETION OF CONSTRUCTION OR INSTALLATION OF CEILING TILE, TO SCHEDULE A FINAL PUNCH LIST WALK THROUGH.
5.	WITH SUBMISSION OF THE BID, THE ELECTRICAL CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE ARCHITECT/ENGINEER OF ANY NECESSARY ITEMS OR WORK THAT HAVE BEEN OMITTED FROM THE DRAWINGS OR SPECIFICATIONS. IN THE ABSENCE OF SUCH WRITTEN NOTICE IT IS MUTUALLY AGREED THAT THE ELECTRICAL CONTRACTOR HAS INCLUDED THE COST OF ALL REQUIRED ITEMS IN HIS BID, AND THAT THE ELECTRICAL CONTRACTOR WILL BE RESPONSIBLE FOR THE APPROVED SATISFACTORY FUNCTIONING OF THE ENTIRE SYSTEM WITHOUT EXTRA COMPENSATION.	33.	THE CONTRACTOR SHALL PREPARE AN OPERATING AND MAINTENANCE MANUAL COVERING ALL SYSTEMS AND EQUIPMENT INSTALLED UNDER THIS DIVISION. SUBMIT AN OUTLINE OF A PREVENTATIVE MAINTENANCE PROGRAM FOR EACH SYSTEM.
6.	THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE AND SATISFACTORY ELECTRICAL INSTALLATION IN ACCORDANCE WITH THE TRUE INTENT OF THE DRAWINGS AND SPECIFICATIONS. HE SHALL PROVIDE, WITHOUT EXTRA CHARGE, ALL INCIDENTAL ITEMS REQUIRED, AS A PART OF THIS ELECTRICAL INSTALLATION. THE INSTALLATION SHALL BE SO MADE THAT ALL WORK PERFORMED UNDER THIS CONTRACT SHALL REMAIN EXPOSED TO VIEW UNTIL APPROVED BY THE INSPECTION AUTHORITY.	34.	WARRANTIES:
7.	SECURE AND PAY FOR ALL PERMITS, TAXES, ROYALTIES, LICENSES, AND INSPECTIONS IN ASSOCIATION WITH THE WORK SPECIFIED UNDER ELECTRICAL DIVISION AND INDICATED ON THE DRAWINGS. FILE ALL NECESSARY PLANS, PREPARE ALL DOCUMENTS, AND OBTAIN ALL NECESSARY APPROVALS REQUIRED BY ALL GOVERNMENTAL DEPARTMENTS HAVING JURISDICTION. ALL WORK PERFORMED UNDER THIS CONTRACT SHALL REMAIN EXPOSED TO VIEW UNTIL APPROVED BY THE INSPECTION AUTHORITY.	A.	PROVIDE COMPLETE WARRANTY INFORMATION FOR EACH ITEM, WHICH SHALL INCLUDE NAME OF PROJECT, DATE OF EQUIPMENT, DATE OF BEGINNING OF WARRANTY OR BOND, DURATION OF WARRANTY OR BOND, AND NAMES, ADDRESSES, AND TELEPHONE NUMBERS OF MANUFACTURING/SERVICING PERSONNEL, AS WELL AS PROCEDURES FOR FILING A CLAIM AND OBTAINING WARRANTY SERVICES.
8.	ALL WORK SHALL COMPLY WITH NATIONAL ELECTRICAL CODE, NATIONAL FIRE PROTECTION ASSOCIATION CODES (NFPA), INTERNATIONAL CODE COUNCIL (ICC) CODES, INCLUDING ENERGY CONSERVATION CODE (IECC), AND ALL APPLICABLE LOCAL, STATE, MUNICIPAL, AND CITY CODES, ORDINANCES AND REGULATIONS.	B.	THE CONTRACTOR SHALL OBTAIN ALL MATERIALS, WORKMANSHIP AND THE SUCCESSFUL OPERATION OF ALL EQUIPMENT AND APPARATUS INSTALLED FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE ENTIRE WORK AS IDENTIFIED IN THE GENERAL CONDITIONS.
9.	BEFORE STARTING WORK, ELECTRICAL CONTRACTOR SHALL PREPARE AND SUBMIT TO THE ARCHITECT/ENGINEER SHOP DRAWINGS, BROCHURES, INSTALLATION INSTRUCTIONS, AND DESCRIPTIVE EQUIPMENT DATA RELATED TO SPECIFIED EQUIPMENT, WIRING DEVICES, AND ACCESSORIES FOR APPROVAL. THESE DOCUMENTS SHALL BE IN ELECTRONIC (PDF) FORMAT. ALL SUBMITTALS MUST BE CLEAR AND CONCISE. PARTIAL, PROGRESS, "PIECEMEAL," OR CATALOGUES WILL NOT BE REVIEWED AND WILL BE RETURNED AS INCOMPLETE. (NO EXCEPTIONS, ALLOW A MINIMUM OF SEVEN (7) WORKING DAYS FOR ENGINEERS REVIEW) THE CONTRACTOR SHALL IDENTIFY ANY "LONG LEAD TIME" ITEMS WHICH MAY IMPACT THE OVERALL PROJECT SCHEDULE. ALL BIDS SHALL INCLUDE COSTS ASSOCIATED WITH THE PURCHASE AND DELIVERY OF EQUIPMENT TO MEET THE PROJECT SCHEDULE. NO EQUIPMENT SHALL BE ORDERED, PURCHASED, OR INSTALLED PRIOR TO THE APPROVAL OF SHOP DRAWINGS, BROCHURES, INSTALLATION INSTRUCTIONS, AND SCHEDULES. APPROVAL BY THE ARCHITECT/ENGINEER IS INTENDED TO ESTABLISH CONFORMANCE WITH THE PROJECT DESIGN CONCEPT AND THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS.	DEMOLITION:	
10.	THE NAMING OF THE MANUFACTURER OR BRAND WITH CATALOG NUMBER OR OTHER PRODUCT IDENTIFICATION WITHOUT THE WORDS "OR EQUAL" IN THE SPECIFICATIONS OR NOTES SHALL INDICATE THAT IT IS THE ONLY PRODUCT APPROVED FOR PURCHASE. IF THE WORDS "OR EQUAL" ARE USED, THEY SHALL BE INTERPRETED AS ESTABLISHING A QUALITY OR PERFORMANCE STANDARD FOR THE MATERIAL OR PRODUCT TO BE PURCHASED. THIS SHALL INDICATE THAT THE ELECTRICAL CONTRACTOR IS NOT RESTRICTED TO THE USE OF THE NAMED AND IDENTIFIED PRODUCT IF A SUBSTITUTE APPROVED BY THE ARCHITECT/ENGINEER IS AVAILABLE; HOWEVER, WHERE A SUBSTITUTE IS REQUESTED, IT WILL BE PERMITTED ONLY WITH THE WRITTEN APPROVAL OF THE ARCHITECT/ENGINEER. NO SUBSTITUTE MATERIAL OR GROUNDING CONNECTION SHALL BE ORDERED, FABRICATED, SHIPPED, OR PROCESSED IN ANY MANNER PRIOR TO THE APPROVAL OF THE ARCHITECT/ENGINEER. THE ELECTRICAL CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR ADDITIONAL EXPENSES, AS REQUIRED, MAKING CHANGES FROM THE ORIGINAL MATERIAL OR PRODUCT SPECIFIED.	A.	DURING THE DEMOLITION PHASE OF THIS CONTRACT, IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO VERIFY DEMOLITION SCOPE AND ITEMS WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS. EXISTING CONDUIT, ELECTRICAL EQUIPMENT, AND RELATED ITEMS SHALL BE CAREFULLY REMOVED EITHER AS SHOWN ON THE DEMOLITION DRAWINGS AS BEING REMOVED, OR AS REQUIRED FOR THE WORK UNDER THIS CONTRACT. THESE ITEMS SHALL BE TAGGED, PROTECTED FROM DAMAGE, AND STORED AS DIRECTED BY THE BUILDING MANAGEMENT/OWNER, ARCHITECT OR ENGINEER.
11.	THE TERM "AS REQUIRED" REFERS TO COMPONENTS THAT MAY BE REQUIRED TO COMPLETE THE NOTED SYSTEM INDICATED IN THE PROJECT DOCUMENTS.	B.	EXISTING LIGHT FIXTURES IN WORK AREA, NOTED ON DRAWINGS TO BE RE-USED SHALL BE THOROUGHLY CLEANED AND/OR REFURNISHED TO MATCH NEW.
12.	THE TERM "VERIFY" REFERS TO A CONDITION WHICH MUST BE CONFIRMED PRIOR TO PROCEEDING WITH THE ORDERING OF MATERIAL OR THE FABRICATION AND INSTALLATION OF A COMPONENT.	C.	CONTRACTOR SHALL REMOVE SWITCHES, DATA/TELEPHONE OUTLETS, AND ELECTRICAL OUTLETS SCHEDULED FOR DEMOLITION. ALL UNUSED POWER WIRING SHALL BE REMOVED BACK TO JUNCTION BOX IN CEILING SPACE, OR TO THE ELECTRICAL PANEL FEEDING THE CIRCUIT. THE SPARE CIRCUIT BREAKER SHALL BE SWITCHED TO THE "OFF" POSITION, AND NOTED ON PANEL DIRECTORY AS SPARE WITH THE JUNCTION BOX LOCATION IF APPLICABLE.
13.	ABBREVIATIONS THROUGHOUT THE DOCUMENTS COMPLY WITH DOCUMENT ABBREVIATION LIST ON LEGEND OR ARE THOSE IN COMMON USE. ENGINEER WILL DEFINE THE INTENT OF ANY IN QUESTION.	D.	ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR RINGING OUT ALL CIRCUITS WHICH ARE, OR MAY BE, AFFECTED BY THIS PROJECT TO ENSURE CIRCUIT CONTINUITY, AND TO PREVENT OVERLOADING ANY SINGLE CIRCUIT. CONTRACTOR SHALL ENSURE THAT ORIGINAL DESIGN BETWEEN PROJECT AREA AND EXISTING TENANT SPACES REMAIN INTACT PER ORIGINAL DESIGN INTENT. CORRECT ANY MISLABELED J-BOX COVERS WITH ACCURATE PANEL BRANCH CIRCUIT IDENTIFICATION. REFER TO DETAIL NOTES ON PLANS THAT APPLY TO WORK TO BE PERFORMED UNDER THIS CONTRACT. CIRCUIT BREAKERS FOR ALL UNUSED CIRCUITS SHALL BE TURNED TO THE "OFF" POSITION AND LABELED AS SPARE ON REVISED PANEL DIRECTORIES.
14.	THE DRAWINGS ARE DIAGRAMMATIC IN CHARACTER. LOCATIONS SHOWN FOR ELECTRICAL EQUIPMENT, DEVICES, CIRCUITS, ETC., ARE APPROXIMATE. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE WORK WITH THE ARCHITECTURAL, PLUMBING, HVAC, AND OTHER TRADE DRAWINGS FOR THE EXACT DIMENSIONS, CLEARANCES, AND ROUGH-IN-LOCATIONS. THE ELECTRICAL CONTRACTOR SHALL COOPERATE WITH THE OTHER TRADES IF FIELD ADJUSTMENTS ARE REQUIRED TO ACCOMMODATE THE WORK OF OTHERS.	E.	PROVIDE NEW JUNCTION BOXES, NEW CONDUIT AND WIRING AS REQUIRED TO REPAIR, REROUTE AND RECONNECT CONDUCTORS THAT ARE DAMAGED, DISTURBED OR OTHERWISE ADVERSELY AFFECTED BY THE DEMOLITION AND REMODEL WORK.
15.	DRAWINGS SHALL NOT BE SCALED FOR ROUGH-IN MEASUREMENTS OR USED AS SHOP DRAWINGS. WHERE DIMENSIONS ARE SHOWN ON PLANS OR DETAILS, THESE DIMENSIONS ARE TO BE FIELD-VERIFIED BY THE ELECTRICAL CONTRACTOR AGAINST EXISTING FIELD CONDITIONS, INSTALLATION REQUIREMENTS OF OTHER TRADES, AND THE MANUFACTURER'S SUBMITTALS FOR EQUIPMENT TO BE INSTALLED. SHOULD ANY CONFLICTS ARISE WHICH CANNOT BE EASILY RESOLVED IN THE FIELD WITHOUT CHANGING THE DESIGN INTENT, THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.	F.	THE LOCATIONS OF EXISTING LIGHTING FIXTURES, POWER DEVICES AND WIRING, ETC., SHOWN ON THE DRAWINGS HAVE BEEN TAKEN FROM EXISTING DRAWINGS AND ARE, THEREFORE, ONLY AS ACCURATE AS THAT INFORMATION. ALL EXISTING CONDITIONS SHALL BE VERIFIED AT THE FIELD WITH NECESSARY ADJUSTMENT BEING MADE TO THE DRAWING INFORMATION.
16.	RECORD DOCUMENTS		
A.	THE ELECTRICAL CONTRACTOR SHALL MAINTAIN ACCURATE RECORDS OF ALL DEVIATIONS IN WORK AS INSTALLED FROM WORK SPECIFIED ON THE DRAWINGS OR IN THE SPECIFICATIONS, AND IDENTIFY ORIGIN OF CHANGE.		
B.	KEEP A COMPLETE SET OF RECORD DOCUMENT PRINTS IN CUSTODY DURING ENTIRE PERIOD OF CONSTRUCTION AT THE CONSTRUCTION SITE. ON COMPLETION OF THE PROJECT, TWO COMPLETE SETS OF MARKED-UP PRINTS SHOWING THESE DEVIATIONS SHALL BE DELIVERED TO GENERAL CONTRACTOR AND ARCHITECT/ENGINEER. THIS CONTRACT WILL NOT BE CONSIDERED COMPLETED UNTIL THESE RECORD DRAWINGS HAVE BEEN RECEIVED AND REVIEWED BY THE ENGINEER.		
17.	WHILE ALL WORK IS IN PROGRESS, EXCEPT FOR SHORT DESIGNATED INTERVALS DURING WHICH CONNECTIONS ARE TO BE MADE, CONTINUITY OF SERVICE TO ALL EXISTING SYSTEMS SERVING OCCUPIED SPACES SHALL BE MAINTAINED. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH OWNER AT ALL TIMES FOR ALL NEW-TO-EXISTING CONNECTIONS, SYSTEM SHUTDOWNS, AND RESTART-UP.		
18.	ANY WORK WHICH WILL AFFECT THE BUILDING OCCUPANTS, INCLUDING, BUT NOT LIMITED TO, WORK WHICH GENERATES EXCESSIVE NOISE, DUST, SMOKE, OR INCONVENIENCE TO BUILDING OCCUPANTS, SHALL BE PERFORMED AFTER BUSINESS HOURS, UNLESS PRIOR APPROVAL HAS BEEN OBTAINED FROM THE BUILDING MANAGER OR OWNER.		
19.	ELECTRICAL ITEMS AFFECTED BY REMODEL WORK ARE SHOWN ON DRAWINGS ALONG WITH EXISTING ELECTRICAL INSTALLATION. EXISTING ELECTRICAL INSTALLATION SHOWN IS NOT NECESSARILY ALL-INCLUSIVE. RETAIN CIRCUIT CONTINUITY FOR EXISTING ELECTRICAL EQUIPMENT, FIXTURES, AND DEVICES THAT ARE TO REMAIN. SUCH EQUIPMENT SHALL BE RECONNECTED TO EXISTING CIRCUITS OR CONNECTED TO NEW CIRCUIT(S) AS INDICATED ON DRAWINGS. ENSURE ALL ELECTRICAL DEVICES IN WORK AREA ARE FULLY FUNCTIONAL. FOR DEVICES OR JUNCTION BOXES LOCATED IN WALLS, THAT MUST REMAIN IN PLACE FOR CIRCUIT CONTINUITY, PROVIDE BLANK COVER PLATES TO MATCH WALL PLATES STYLE IN THE AREA OF WORK. FOR OTHER UNUSED JUNCTION BOXES, REMOVE WIRING AND PROVIDE BLANK COVER PLATE, OR COORDINATE WITH GENERAL CONTRACTOR FOR PATCHING OF WALL TO MATCH ADJACENT SURFACE AS DIRECTED BY ARCHITECT.		
20.	REPORT ANY EXISTING DAMAGED EQUIPMENT OR SYSTEMS TO THE OWNER PRIOR TO BEGINNING THE PROJECT.		
21.	BEFORE ANY EQUIPMENT IS INSTALLED, DETERMINE THAT SAID EQUIPMENT WILL PROPERLY FIT WITHIN THE SPACE ALLOCATED. INSTALL ALL EQUIPMENT AND MATERIALS IN SUCH A MANNER AS TO PROVIDE REQUIRED ACCESS FOR SERVICING AND MAINTENANCE. ALLOW AMPLE SPACE FOR REMOVAL OF ALL PARTS THAT REQUIRE REPLACEMENT OR SERVICING.		
22.	SUFFICIENT ACCESS AND WORKING SPACE SHALL BE PROVIDED AND MAINTAINED ABOUT ALL ELECTRICAL EQUIPMENT TO PERMIT READY AND SAFE OPERATION AND MAINTENANCE OF SUCH EQUIPMENT PER NEC ARTICLE 110 REQUIREMENTS.		
23.	ALL MATERIALS AND EQUIPMENT SHALL BE NEW, UNDATED, BEAR THE UL LABEL WHERE APPLICABLE, AND BE AS SPECIFIED FOR USE IN EACH SPECIFIC LOCATION. ANY INCIDENTAL ACCESSORIES NECESSARY TO COMPLETE THE WORK IN ALL RESPECTS AND MAKE IT READY FOR OPERATION, EVEN IF NOT SPECIFICALLY SPECIFIED, SHALL BE FURNISHED, DELIVERED, AND INSTALLED BY THE ELECTRICAL CONTRACTOR WITHOUT ADDITIONAL EXPENSE TO THE CLIENT.		
24.	NOT ALL DETAILS OF SYSTEMS ARE SHOWN ON DRAWINGS, NOR ARE THEY SPECIFIED HEREIN. ELECTRICAL SYSTEMS SHALL BE SUCH AS TO LEGALLY PASS ALL INSPECTIONS BY THE LOCAL INSPECTION DEPARTMENT, STATE AND FEDERAL AUTHORITIES HAVING JURISDICTION.		
25.	MINOR DETAILS NOT USUALLY SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER INSTALLATION AND OPERATION OF A SYSTEM OR EQUIPMENT, SHALL BE INCLUDED IN THE ELECTRICAL CONTRACTOR'S ESTIMATE, AS IF SPECIFIED OR SHOWN HEREIN.		
26.	ALL NEW, RELOCATED AND EXISTING MATERIALS, IN CEILING PLenums NOT ENCLOSED IN CONDUIT, SHALL BE CLASS 1 RATED, NOT EXCEEDING RATING OF 25 FLAME SPREAD AND 50 SMOKE DEVELOPED. REMOVE AND REPLACE ALL EXISTING MATERIALS IN WORK AREA NOT IN COMPLIANCE.		
27.	COORDINATE THE INSTALLATION OF ELECTRICAL MATERIALS AND EQUIPMENT ABOVE AND BELOW CEILING WITH SUSPENSION SYSTEM, MECHANICAL EQUIPMENT, AND OTHER BUILDING COMPONENTS. ALL COMPONENTS SHALL BE LOCATED AS CLOSE TO STRUCTURE AS POSSIBLE. COORDINATE CEILING CAVITY SPACE CAREFULLY WITH ALL TRADES.		
28.	THE CONDUIT SYSTEM AND ELECTRICAL ENCLOSURES, NEW AND EXISTING, SHALL BE SECURELY BONDED TOGETHER AND SUPPORTED PER NEC REQUIREMENTS.		

ARCHITECT FOR REVIEW AND DISPOSITION. PRIOR TO CORE DRILLING THROUGH FLOORS, VERIFY CLEARANCE OF BEAMS, DUCTWORK, ETC., IN CEILING SPACE BELOW, AND X-RAY FOR CONDUIT AND/OR REBAR IN SLAB. COORDINATE WITH BUILDING MANAGEMENT/OWNER TO INFORM TENANT BEFORE SCHEDULING OF CORE DRILLING AND TO ADVISE CONCERNING PROTECTION FOR ANY SENSITIVE EQUIPMENT PRIOR TO COMMENCEMENT OF WORK. ALL X-RAYS AND CORE DRILLS MUST BE SCHEDULED FOR AFTER HOURS UNLESS BUILDING MANAGEMENT/OWNER AUTHORIZES OTHERWISE.	
54.	RACEWAYS SHALL BE PROVIDED WITH EXPANSION FITTINGS WHERE NECESSARY TO COMPENSATE FOR THERMAL EXPANSION AND CONTRACTION, AND TO ALLOW FOR MINOR MOVEMENT OF THE STRUCTURAL ELEMENTS OF THE BUILDING. EXPANSION FITTINGS FOR METAL RACEWAYS SHALL BE MADE ELECTRICALLY CONTINUOUS BY EQUIPMENT BONDING JUMPERS OR OTHER MEANS.
55.	PROVIDE TYPEWRITTEN, UPDATED PANELBOARD DOOR DIRECTORIES FOR ALL AFFECTED PANELS, REFLECTING ACCURATE BRANCH CIRCUIT DESTINATIONS. CLEARLY MARK JUNCTION BOXES IN CEILING SPACE WITH PANEL DESIGNATIONS AND CIRCUIT NUMBERS. PROVIDE NEW ENGRAVED PLASTIC LABELS TO REPLACE ANY DAMAGED, MISLABELED, TEMPORARY OR OTHERWISE ILLEGIBLE EXISTING IDENTIFICATION LABELS FOR DISTRIBUTION EQUIPMENT AFFECTED BY THIS CONTRACT. ATTACH THESE LABELS PERMANENTLY TO EQUIPMENT WITH RIVETS OR SCREWS. SELF-ADHESIVE TAPE IS NOT ACCEPTABLE. LABEL OUTLET AND SWITCH COVER PLATES WITH PANEL DESIGNATION AND CIRCUIT NUMBERS.
56.	REQUIREMENTS FOR MECHANICAL EQUIPMENT ELECTRICAL CONNECTIONS:
A.	ELECTRICAL CONTRACTOR SHALL OBTAIN A COPY OF THE MECHANICAL AND PLUMBING EQUIPMENT SUBMITTALS TO COMPARE AGAINST CURRENT MECHANICAL EQUIPMENT SCHEDULE. REPORT ANY DISCREPANCIES TO ELECTRICAL ENGINEER FOR VERIFICATION OF THE EQUIPMENT SELECTION, AND REQUIRED REVISION OF THE DRAWINGS OR SCHEDULES.
B.	ELECTRICAL CONTRACTOR SHALL REVIEW MECHANICAL AND PLUMBING DRAWINGS, SCHEDULES AND SUBMITTALS FOR VERIFICATION OF THE EQUIPMENT USED, WIRING AND ADDITIONAL INSTALLATION REQUIREMENTS. WHEN REQUESTING DELIVERY TO JOB SITE, ELECTRICAL CONTRACTOR SHALL VERIFY THIS DATA WITH EQUIPMENT NAMEPLATES OR MANUALS. IF SIGNIFICANT DISCREPANCIES OCCUR, CONTACT ELECTRICAL ENGINEER FOR REVISION OF THE CONSTRUCTION DOCUMENTS.
C.	PROVIDE SAFETY DISCONNECT SWITCHES FOR ALL MECHANICAL EQUIPMENT UNLESS PROVIDED BY MECHANICAL CONTRACTOR AS SPECIFICALLY DIRECTED ON MECHANICAL DRAWING OR SPECIFICATION REQUIREMENTS.
D.	ELECTRICAL WIRING IN CONNECTION WITH THE AUTOMATIC TEMPERATURE CONTROL SYSTEM, WHERE SHOWN ON THE ELECTRICAL DIVISION DRAWINGS, SHALL BE PERFORMED BY THE ELECTRICAL CONTRACTOR. ALL OTHER WIRING, INCLUDING 120V REQUIRED FOR PROPER OPERATION OF THE AUTOMATIC TEMPERATURE CONTROL SYSTEM, SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR.
57.	PROVIDE FIRE STOPPING MATERIAL AND SYSTEMS, AS LISTED IN THE UL FIRE RESISTANCE DIRECTORY, EQUAL TO THE FIRE RESISTANCE RATING OF THE RESPECTIVE WALL OR FLOOR ASSEMBLY FOR ALL PENETRATIONS OF CONDUIT, SLEEVES, WIRING, CABLES AND OTHER ELECTRICAL ITEMS THROUGH FIRE-RATED CORRIDOR WALLS, FIRE RESISTIVE WALLS, FIRE RESISTIVE SHAFTS, AND FLOOR PENETRATIONS.
58.	TELECOMMUNICATIONS
A.	REFER TO TELECOMMUNICATIONS DRAWINGS, AND COORDINATE WITH TELECOMMUNICATIONS CONTRACTOR FOR EXACT LOCATION, REQUIREMENTS, SPECIFICATION AND ROUTING FOR ALL CONDUITS, RACEWAYS, JUNCTION BOXES AND FLOOR PENETRATIONS PRIOR TO ROUGH-IN.
B.	AT TELEPHONE AND DATA SERVICE POINT FOR EACH MODULAR FURNITURE GROUPING, THE ELECTRICAL CONTRACTOR SHALL PROVIDE MINIMUM 4-11/16"x4-11/16"x2-1/2" STEEL JUNCTION BOX WITH TWO 1" CONDUITS (OR AS OTHERWISE SPECIFIED BY TELECOMMUNICATIONS CONTRACTOR) WITH PULL WIRE. THE BOX SHALL BE INSTALLED IN THE CEILING SPACE. CABLEING SHALL BE PROVIDED BY OTHERS. COORDINATE ALL WORK WITH TELECOMMUNICATIONS CONTRACTOR PRIOR TO ROUGH-IN.
C.	ALL TELECOMMUNICATIONS CABLEING SHALL BE INSTALLED BY TENANT'S VENDOR.
D.	CLIENT'S TELECOMMUNICATIONS CONTRACTOR SHALL REMOVE ALL ABANDONED AND UNUSED TELECOMMUNICATIONS CABLEING, CONDUIT, JUNCTION BOXES, AND ASSOCIATED WIRING LOCATED IN THE CEILING SPACE BACK TO POINT OF ORIGIN. THE GENERAL CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE CONTRACTOR FOR THE REMOVAL OF THE PHONE/DATA CABLEING. BEFORE DISCONNECTING AND REMOVING ANY EQUIPMENT, DEVICES OR CABLEING, THE APPROPRIATE CONTRACTOR SHALL COORDINATE WITH CLIENT AND ARCHITECT TO ENSURE THAT EQUIPMENT IS SCHEDULED TO BE REMOVED. IF REQUESTED, THE ELECTRICAL CONTRACTOR COULD BE CONTRACTED FOR THIS SCOPE.
E.	ELECTRICAL CONTRACTOR SHALL VERIFY QUANTITY AND TYPE OF DATA/PHONE/AUDIO/VIDEO PORTS TO BE INSTALLED IN EACH ROOM. PROVIDE ONE (1) SET OF DATA/PHONE/AUDIO/VIDEO PORTS TO TELECOMMUNICATIONS CONTRACTOR PRIOR TO ORDERING OF SUB-PLATES AND REQUIRED ACCESSORIES.
F.	ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL GROUND BAR IN THE PHONE/DATA ROOM. PROVIDE #6 AWG COPPER CONDUCTOR FROM BUILDING GROUNDING ELECTRODE CONDUCTOR TO GROUND BAR. COORDINATE EXACT BAR LOCATION AND ADDITIONAL REQUIREMENTS WITH TELECOMMUNICATIONS CONTRACTOR.
59.	FIRE ALARM
A.	GENERAL CONTRACTOR SHALL SOLICIT BIDS FROM BUILDING OWNER'S DESIGNATED FIRE ALARM CONTRACTOR FOR CONSTRUCTION AND INSTALLATION OF AN APPROVED FIRE ALARM SYSTEM AND DEVICES WHICH SHALL COMPLY WITH ALL APPLICABLE CODES AND ALL REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION. (GENERAL CONTRACTOR SHALL VERIFY WITH BUILDING MANAGEMENT/OWNER CONCERNING DESIGNATED FIRE ALARM CONTRACTOR.)
B.	REQUIRED MODIFICATIONS TO EXISTING FIRE ALARM SYSTEM SHALL BE PROVIDED ON A DESIGN/BUILD BASIS BY FIRE ALARM CONTRACTOR. PRIOR TO BIDDING, FIRE ALARM CONTRACTOR SHALL FIELD VERIFY EXISTING FIRE ALARM SYSTEMS CAPABILITY AND FIRE ALARM DEVICE LOCATIONS IN THIS SCOPE OF WORK. IF REQUIRED BY LOCAL JURISDICTION, FIRE ALARM SYSTEM SHALL BE UPGRADED TO MEET CURRENT CODES. FIRE ALARM CONTRACTOR SHALL PREPARE AND SUBMIT ALL SHOP DRAWINGS AND EQUIPMENT BROCHURES TO AUTHORITIES HAVING JURISDICTION, SUCH AS FIRE DEPARTMENT, BUILDING DEPARTMENT, ETC., AS REQUIRED, FOR REVIEW AND APPROVAL. CONTRACTOR SHALL ALSO PROVIDE THE ENGINEER WITH ONE (1) SET OF DRAWINGS, CALCULATIONS AND EQUIPMENT SUBMITTALS FOR HIS REVIEW AND RECORD.
C.	IF REQUIRED, RELOCATE EXISTING SMOKE DETECTORS, REMOTE INDICATOR LIGHTS, FIRE ALARM HORNS, STROBES, SPEAKERS, ETC., BASED ON REMODELED AREA MODIFICATION, AND RECONNECT TO EXISTING SYSTEM AS REQUIRED. NEW FIRE ALARM DEVICES SHALL BE OF THE SAME MANUFACTURER AS THE EXISTING DEVICES AND SHALL BE COMPATIBLE WITH EXISTING FIRE ALARM SYSTEM. PROVIDE ADDITIONAL CONDUCTORS, 2W's, 1W's, AND OTHER EQUIPMENT NECESSARY IN ORDER TO EXPAND SYSTEM AS REQUIRED. PROVIDE SYNCHRONIZING MODULES FOR STROBES. IF REQUIRED, REPLACE EXISTING FIRE ALARM DEVICES, THAT ARE NOT CURRENTLY BUILDING STANDARD OR COMPATIBLE, WITH NEW BUILDING STANDARD FIRE ALARM DEVICES. PRIOR TO PURCHASING FIRE ALARM DEVICES, PROVIDE OUT SHEETS, SHOP DRAWINGS, AND SEQUENCE OF OPERATION TO BUILDING MANAGEMENT AND FIRE PREVENTION BUREAU FOR THEIR APPROVAL, AND TO ENGINEER FOR HIS REVIEW.
D.	PROVIDE NEW BUILDING STANDARD FIRE ALARM STROBES, ADA HIGH INTENSITY, COMPATIBLE WITH EXISTING OR NEW FIRE ALARM SYSTEM AS REQUIRED. MODIFY EXISTING FIRE ALARM CHIME AND CONDUCTORS AND FIRE ALARM PANELS PER MANUFACTURER'S REQUIREMENTS. MOUNT STROBES +80" A.F.F OR 6" BELOW THE CEILING, WHICHEVER IS LOWER. REPLACE EXISTING STROBE LIGHTS WITH NEW BUILDING STANDARD STROBE LIGHTS, AND ENSURE ALL STROBE LIGHTS ARE SYNCHRONIZED.
E.	FIRE ALARM CONTRACTOR SHALL FURNISH DUCT DETECTORS (120V OR 24V), WITH REMOTE INDICATING LIGHT AND TEST SWITCH, FOR ALL MECHANICAL AIR-MOVING SYSTEMS WHERE REQUIRED BY CODE OR LOCAL AUTHORITIES. DETECTORS SHALL BE OF THE SAME MANUFACTURER AS EXISTING OR NEW FIRE ALARM SYSTEM. MECHANICAL CONTRACTOR SHALL INSTALL DETECTORS IN THE MECHANICAL DUCTWORK, AS REQUIRED BY CODE, TO FACILITATE MOTOR SHUTDOWN UPON DETECTION OF SMOKE. ELECTRICAL CONTRACTOR SHALL HARWARE DETECTOR TO THE FAN MOTOR (THROUGH A POWER-INTER interrupting RELAY) FOR SHUTDOWN UPON DETECTION OF SMOKE; AND IF REQUIRED BY CODE, THE FIRE ALARM CONTRACTOR SHALL CONNECT TO FIRE ALARM SYSTEM AS TROUBLE ALARM. COORDINATE ALL REQUIREMENTS AND SPECIFICATIONS WITH BUILDING ENGINEER OR BUILDING FIRE ALARM AUTHORITY. SUBMIT DRAWINGS AND EQUIPMENT OUT SHEETS FOR ENGINEER'S REVIEW AND FIRE DEPARTMENT APPROVAL.
F.	FIRE/SMOKE DAMPERS SHALL BE ACTIVATED PER INTERNATIONAL MECHANICAL CODE SECTION 607.3.3.3. ACTIVATION SHALL BE PROVIDED BY FIRE ALARM CONTRACTOR.
G.	IF A PRE-ACTION DRY PIPE SPRINKLER SYSTEM IS REQUIRED FOR THIS PROJECT, THE PRE-ACTION FIRE ALARM SYSTEM CONTROL PANEL SHALL BE ANNUNCIATED ON THE BUILDING MAIN FIRE ALARM CONTROL PANEL (FACP) IN THE FIRE COMMAND CENTER (FCC).
H.	IF THE PROJECT REQUIRES A UPS SYSTEM AND COMPUTER ROOM AIR CONDITIONING (CRAC) UNITS, THE UPS SYSTEM AND CRAC UNITS SHALL BE CONNECTED TO THE BUILDING FIRE ALARM SYSTEM AND TO THE PRE-ACTION FIRE ALARM CONTROL PANEL. THE UPS SYSTEM, CRAC UNITS, AND FIRE/SMOKE DAMPERS SERVING THE COMPUTER ROOM SHALL BE SHUT DOWN UPON ACTIVATION OF FIRE ALARM SYSTEM. PROVIDE INTERFACE WIRING AS REQUIRED. PROVIDE WIRING FROM CRAC UNIT TO MOISTURE SENSORS OR SITE MONITORING SYSTEM IF IT IS PROVIDED UNDER MECHANICAL CONTROL AND ALARM SECTION. THE CRAC UNITS SHALL SHUT DOWN AND ALARM UPON DUCT DETECTOR ACTIVATION AS PART OF UL SYSTEM. COORDINATE ALL OF THE ABOVE WITH APPROPRIATE UPS, PDU AND CRAC UNIT MANUFACTURERS.
60.	SECURITY
A.	ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT LOCATIONS AND REQUIREMENTS FOR J-BOX ROUGH-INS, CONDUIT RUNS WITH PULL WIRE, REQUIRED PENETRATIONS, AND POWER REQUIREMENTS FOR SECURITY SYSTEM CONTRACTOR PRIOR TO ROUGH-IN. THE SECURITY SYSTEM CONTRACTOR SHALL ALSO COORDINATE WORK WITH FIRE ALARM CONTRACTOR FOR COORDINATION OF THE INTERCONNECTION OF THE SECURITY SYSTEM WITH FIRE ALARM SYSTEM AS REQUIRED PER LOCAL CODES AND FIRE DEPARTMENT REGULATIONS.
61.	AUDIO-VISUAL EQUIPMENT
A.	ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT LOCATIONS AND REQUIREMENTS FOR J-BOX ROUGH-INS, CONDUIT RUNS WITH PULL WIRE, REQUIRED PENETRATIONS, AND POWER REQUIREMENTS FOR AUDIO-VISUAL EQUIPMENT WITH AUDIO-VISUAL CONTRACTOR PRIOR TO ROUGH-IN.



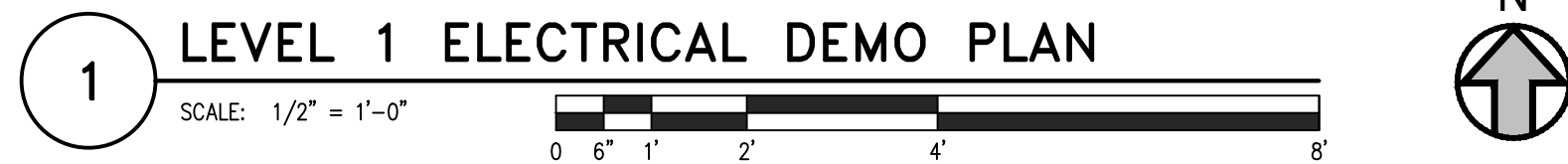
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NO.	REVISION/ISSUE	DATE
	PERMIT ISSUE	12.02.2024

MDP JOB #: 23047.01	
DESCRIPTION:	
LEGEND AND NOTES	
DRAWN BY:	CHECKED BY:
JB/BR	DPI/ER
DATE:	SCALE:
12.02.24	AS NOTED
SHEET:	

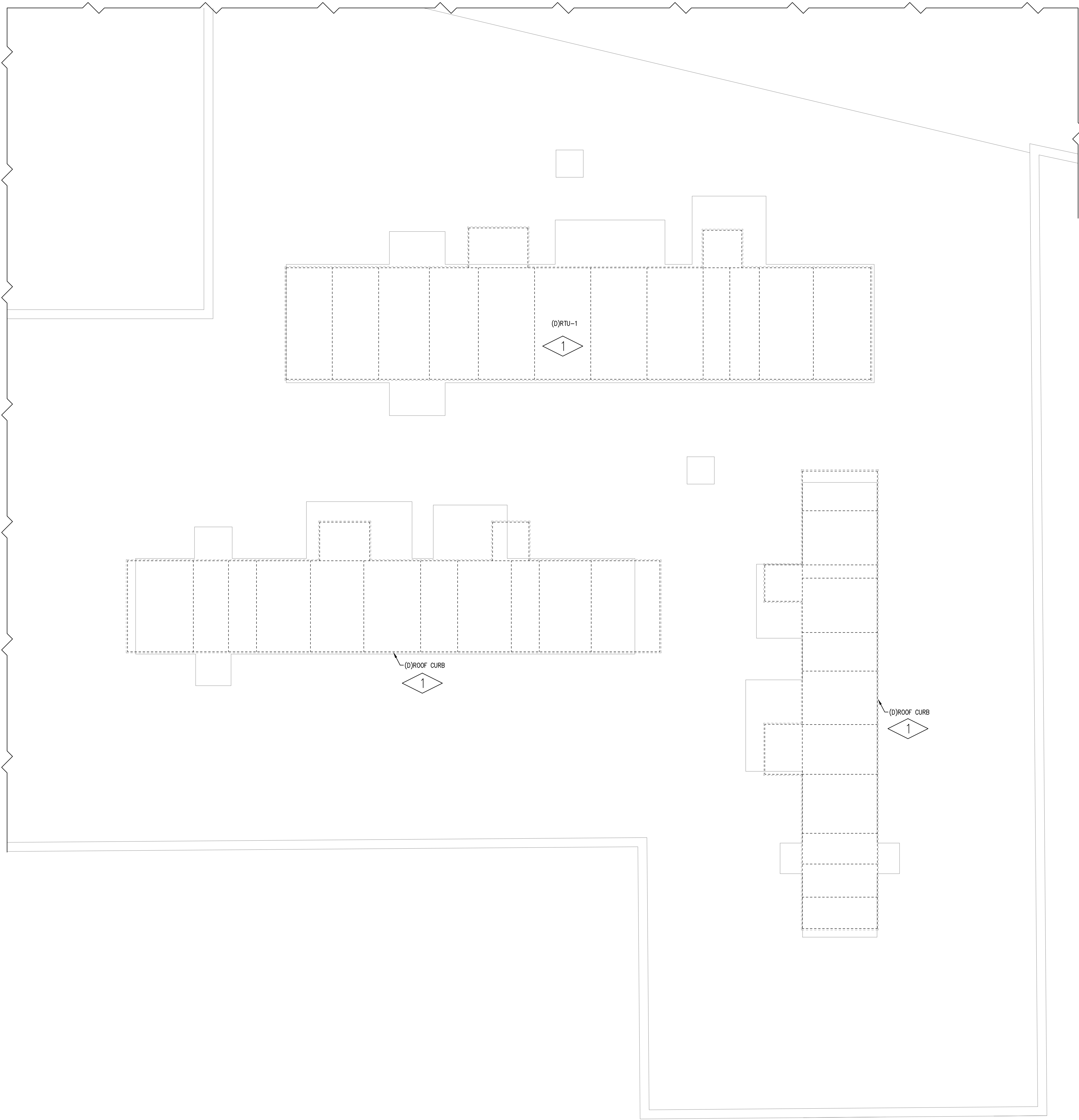


1. DURING THE DEMOLITION PHASE OF THIS CONTRACT, IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO VERIFY DEMOLITION SCOPE AND ITEMS WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS.
2. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR RINGING OUT ALL CIRCUITS WHICH ARE OR MAY BE AFFECTED BY THIS PROJECT TO ENSURE CIRCUIT CONTINUITY AND TO PREVENT OVERLOADING OF THE CIRCUIT. CONTRACTOR SHALL ENSURE THAT CIRCUITS SHARED BETWEEN PROJECT AREA AND EXISTING TENANT SPACES REMAIN INTACT PER ORIGINAL DESIGN INTENT. CORRECT ANY MISLABELED J-BOX COVERS WITH ACCURATE PANEL/BRANCH CIRCUIT IDENTIFICATION. REFER TO DETAIL NOTES ON PLANS THAT APPLY TO WORK TO BE PERFORMED UNDER THIS CONTRACT. CIRCUIT BREAKERS FOR ALL UNUSED CIRCUITS SHALL BE TURNED TO THE "OFF" POSITION AND LABELED AS SHOWN ON THE PROVIDED PANEL IDENTIFICATION SHEET.
3. PROVIDE NEW JUNCTION BOXES, NEW CONDUIT AND WIRING AS REQUIRED TO REPAIR, REROUTE AND RECONNECT CONDUITS THAT ARE DAMAGED, DISTURBED OR OTHERWISE ADVERSELY AFFECTED BY THE DEMOLITION AND REMODEL WORK..
4. ELECTRICAL CONTRACTOR SHALL COORDINATE ADDITIONAL WORK REQUIRED FOR DEMOLITION SCOPE OF THIS PROJECT WITH MECHANICAL AND PLUMBING CONTRACTORS. COORDINATE IF ANY EQUIPMENT WILL BE REMOVED OR RELOCATED, DISCONNECT EQUIPMENT AND REMOVE ASSOCIATED RACEWAY AND WIRING BACK TO THE MAIN ELECTRICAL PANEL. REPAIR OR REPLACE ANY EXISTING RACEWAY OR BRANCH CIRCUIT(S) TO NEW EQUIPMENT LOCATION AND RECONNECT EQUIPMENT AS EXISTING. RETAIN CIRCUIT(S) FOR REMAINING EQUIPMENT IF REQUIRED.

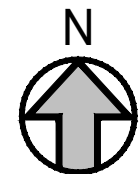


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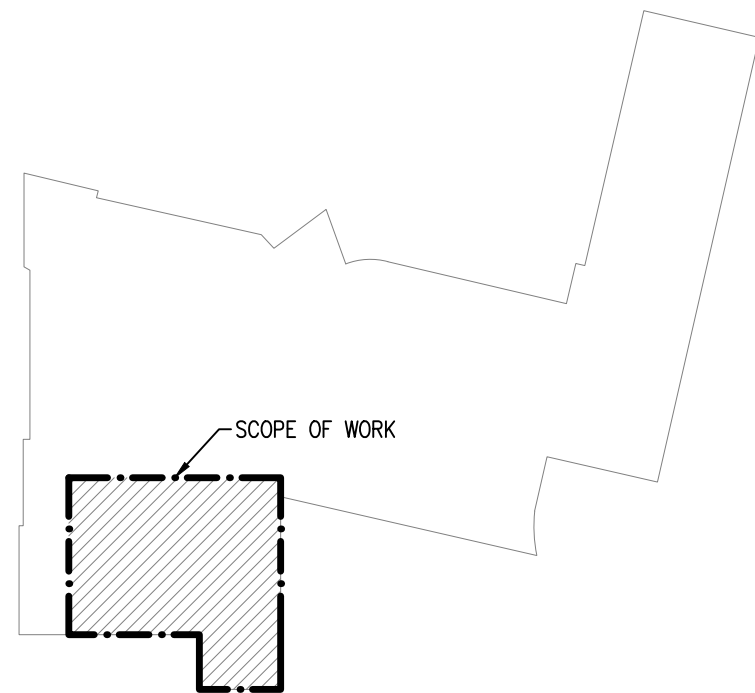


1 ROOF ELECTRICAL DEMO PLAN
SCALE: 1/4" = 1'-0"



ELECTRICAL DEMO DETAIL NOTES

- EXISTING ROOF TOP UNITS TO BE DEMOLISHED ALONG WITH ALL ASSOCIATED ELECTRICAL EQUIPMENT. ELECTRICAL CONTRACTOR SHALL TERMINATE EXISTING BRANCH CIRCUITS SUPPLYING EXISTING ROOF TOP UNIT IN READILY ACCESSIBLE LOCATION FOR RECONNECTION TO NEW CHILLER.



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December 02, 2024

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ROOF ELECTRICAL DEMO PLAN

DRAWN BY: JB/BR	CHECKED BY: DPIER
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December 02, 2024

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LEVEL 1 ELECTRICAL PLAN

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12.02.24	AS NOTED

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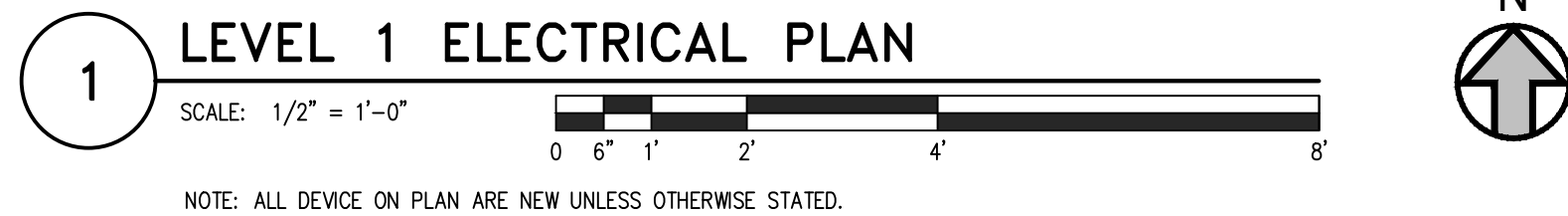
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POWER NOTES

- THESE NOTES APPLY TO ALL POWER AND ELECTRICAL PLANS INCLUDED IN THIS SET OF DRAWINGS.
- UP-TO-DATE AS-BUILT ELECTRICAL PLANS ARE NOT AVAILABLE FOR THIS PROJECT AREA. INFORMATION FOR THE EXISTING CIRCUITRY IS BASED ON EXISTING PANEL DIRECTORIES, AVAILABLE DRAWINGS, FIELD SURVEY OBSERVATIONS, AND ASSUMPTIONS. IF SIGNIFICANT DISCREPANCIES ARE FOUND THAT CAN NOT BE EASILY RESOLVED, CONTACT THE ARCHITECT OR ENGINEER.
- CIRCUIT NUMBERS SHOWN ON THE PLAN MAY NOT REFLECT ACTUAL CIRCUIT NUMBERS AS A RESULT OF UNDOCUMENTED MODIFICATIONS MADE BY PREVIOUS TENANT IMPROVEMENT PROJECTS. CIRCUIT NUMBERS SHOWN INDICATE THE QUANTITY OF AND LOAD FOR CIRCUITS REQUIRED FOR THIS PROJECT.
- PULL CONDUCTORS OF ABANDONED BRANCH CIRCUITS AND REUSE AVAILABLE CIRCUITS FOR THE SCOPE OF THIS PROJECT. THE ELECTRICAL CONTRACTOR SHALL FIELD VERIFY AND TRACE CIRCUITS AS NECESSARY TO PROVIDE AN ACCURATE PANEL SCHEDULE FOR AFFECTED PANELS. INCLUDE COSTS ASSOCIATED WITH THIS SCOPE IN THE BID.
- EXISTING POWER AND COMMUNICATIONS OUTLETS ARE TO REMAIN WHERE SHOWN ON THE PLAN IN A LIGHT SOLID LINE WEIGHT UNLESS OTHERWISE NOTED. RETAIN CIRCUIT CONTINUITY FOR THESE DEVICES AS REQUIRED.
- PROVIDE CIRCUIT CONTINUITY FOR ALL DEVICES AFFECTED BY REMODEL WORK THAT ARE TO REMAIN. WHERE THE EXISTING RECEPTACLES IN THE EXTERIOR PERIMETER WALL CONFLICT WITH NEW WALL PARTITIONS, REMOVE THE DEVICE AND REWORK THE CIRCUIT FOR CONTINUITY AS REQUIRED.
- THE ELECTRICAL CONTRACTOR SHALL VERIFY THAT ALL EXISTING AND RELOCATED OUTLETS IN THE AREA OF WORK ARE FUNCTIONING. IF REQUIRED, REPLACE THE DEVICE WITH A NEW ONE.
- EXISTING POWER AND COMMUNICATIONS OUTLETS ARE TO REMAIN WHERE SHOWN ON THE PLAN AS UNLESS OTHERWISE NOTED. NEW WALL-MOUNTED POWER, DATA, AND COMMUNICATIONS OUTLETS SHALL BE MOUNTED 18" A.F.F. (FROM THE FLOOR TO THE CENTERLINE OF THE BOX, U.N.O.) TO COMPLY WITH ADA REQUIREMENTS.
- RECEPTACLE OUTLETS AND SWITCHES SHALL BE LABELED WITH DESIGNATED PANEL AND CIRCUIT NUMBER ON OR INSIDE THE COVER PLATE. JUNCTION BOXES IN CEILING SPACE AND DISCONNECTS SHALL HAVE CIRCUIT NUMBERS MARKED ON THE COVER. COORDINATE THE REQUIREMENTS WITH THE CLIENT.
- ALL 125-VOLT THROUGH 250-VOLT RECEPTACLES SUPPLIED BY SINGLE-PHASE BRANCH CIRCUITS RATED 150V OR LESS TO GROUND, 50 AMPERES OR LESS, AND ALL RECEPTACLES SUPPLIED BY THREE-PHASE BRANCH CIRCUITS RATED 150 VOLTS OR LESS TO GROUND, 100 AMPERES OR LESS, INSTALLED IN BATHROOMS, KITCHEN/FOOD PREPARATION AREAS, OUTDOORS, WITHIN SIX FEET OF THE OUTSIDE EDGE OF THE SINK, INDOOR DAMP AND WET LOCATIONS, LAUNDRY AREAS, GARAGES, SERVICE BAYS, AND SIMILAR AREAS WHERE ELECTRICAL HAND TOOLS OR PORTABLE LIGHTING EQUIPMENT ARE TO BE USED SHALL HAVE GROUND-FAULT CIRCUIT-INTERRUPTER PROTECTION FOR PERSONNEL PER NATIONAL ELECTRICAL CODE (NEC) ARTICLE 210.8. INSTALL THE GROUND-FAULT CIRCUIT INTERRUPTER IN A READILY ACCESSIBLE LOCATION.
- WHEN THE RECEPTACLE IS MARKED AS "GFI," GFCI PROTECTION NEEDS TO BE PROVIDED. PROVIDE A GFCI-TYPE CIRCUIT BREAKER, RECEPTACLE, OR STAND-ALONE DEVICE. WHEN MULTIPLE RECEPTACLES ARE SHOWN AS "GFI" AND CONNECTED TO THE SAME CIRCUIT NOT PROTECTED BY A GFCI-TYPE CIRCUIT BREAKER, THE FIRST RECEPTACLE IN THE BRANCH CIRCUIT NEEDS TO BE GFCI-TYPE WITH ALL OTHER RECEPTACLES CONNECTED TO THE LOAD SIDE OF THIS RECEPTACLE.
- WHEN A SPECIFIED GFCI-TYPE CIRCUIT BREAKER IS NOT AVAILABLE FROM THE SELECTED MANUFACTURER, IT IS ACCEPTABLE TO USE STAND-ALONE DEVICES PROVIDING PERSONNEL OR EQUIPMENT GFCI PROTECTION AS INDICATED ON DRAWINGS.
- EACH MULTIWIRE BRANCH CIRCUIT SHALL BE PROVIDED WITH A MEANS THAT WILL SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS AT THE POINT WHERE THE BRANCH CIRCUIT ORIGINATES. DISCONNECTION CAN BE ACCOMPLISHED THROUGH IDENTIFIED HANDLE TIES USED WITH SINGLE-POLE CIRCUIT BREAKERS OR MULTI-POLE DEVICES. THE BRANCH CIRCUIT SERVING EMERGENCY POWER CIRCUITS SHALL NOT BE PART OF A MULTIWIRE BRANCH CIRCUIT.
- THE UNGROUNDED AND GROUNDED CONDUCTORS OF EACH MULTIWIRE BRANCH CIRCUIT SHALL BE GROUPED BY WIRE TIES OR SIMILAR MEANS IN AT LEAST ONE LOCATION WITHIN THE PANELBOARD OR OTHER POINT OF ORIGIN.
- OUTLET BOXES INSTALLED ON THE EDGES OF METAL STUDS ARE REQUIRED TO BE SECURED IN PLACE BY THE ADDITIONAL USE OF BOX-BACK SUPPORTS PER NEC ARTICLE 314.23.
- BEFORE ANY CORE DRILLING OF CONCRETE FLOORS OR WALLS, THE CONTRACTOR SHALL X-RAY. COORDINATE SCHEDULE WITH GENERAL CONTRACTOR.
- A 125-VOLT, SINGLE PHASE, 15- OR 20-AMPERE-RATED RECEPTACLE OUTLET SHALL BE INSTALLED AT AN ACCESSIBLE LOCATION WITHIN 25 FEET OF THE HEATING, AIR-CONDITIONING, AND REFRIGERATION EQUIPMENT PER NEC ARTICLE 210.6.3. THIS OUTLET SHALL BE LOCATED ON THE SAME LEVEL AS THE EQUIPMENT. IT SHALL NOT BE CONNECTED TO THE LOAD SIDE OF THE EQUIPMENT BRANCH-CIRCUIT DISCONNECT MEANS. THE GFCI PROTECTION SHALL BE PROVIDED FOR THIS RECEPTACLE PER NEC ARTICLE 210.8(E).
- AN INDIVIDUAL DISCONNECTING MEANS SHALL BE PROVIDED IN SIGHT FROM THE LOCATION FOR EACH MOTOR OR THE DRIVEN MACHINERY IN ACCORDANCE WITH NEC ARTICLE 430.
- THE MECHANICAL CONTRACTOR SHALL FURNISH STARTERS FOR ALL THREE-PHASE MECHANICAL EQUIPMENT (EXCEPT FOR STARTERS THAT ARE SHOWN TO BE PROVIDED IN MOTOR CONTROL CENTERS). STARTERS SHALL HAVE OVERLOAD PROTECTION WITH MANUAL RESET AND SHALL BE NEMA-RATED. STARTERS SHALL BE INSTALLED BY AN ELECTRICAL CONTRACTOR EXCEPT WHEN SUPPLIED AS AN INTEGRAL PART OF MECHANICAL EQUIPMENT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE SAFETY DISCONNECT SWITCHES FOR ALL MECHANICAL EQUIPMENT WHERE NOT SPECIFICALLY INDICATED ON MECHANICAL PLANS TO BE PROVIDED BY THE MECHANICAL CONTRACTOR.
- IF RACEWAYS ARE INSTALLED EXPOSED TO DIRECT SUNLIGHT ON OR ABOVE ROOFTOPS, CORRECTIONS NEED TO BE PROVIDED FOR CONDUCTOR SIZES BASED ON TEMPERATURE ADJUSTMENTS. THE ADJUSTMENTS SHOWN IN NEC TABLE 310.15(B)(3)(C) SHALL BE ADDED TO THE OUTDOOR TEMPERATURE TO DETERMINE THE APPLICABLE AMBIENT TEMPERATURE FOR APPLICATION OF THE CORRECTION FACTORS IN TABLE 310.15(B)(2)(A) OR TABLE 310.15(B)(2)(B).
- OUTDOOR ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN SUITABLE ENCLOSURES. IT SHALL BE PROTECTED FROM ACCIDENTAL CONTACT BY UNAUTHORIZED PERSONNEL, OR BY VEHICULAR TRAFFIC, OR BY ACCIDENTAL SPILLAGE OR LEAKAGE FROM PIPING SYSTEMS, NO ARCHITECTURAL APPURTENANCE, PIPING, DUCTS, OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION MAY BE LOCATED IN THE WORKING SPACE REQUIRED BY NEC ARTICLE 110.26.

NOTE TO ELECTRICAL CONTRACTOR

FOR HEATING, AIR-CONDITIONING, AND REFRIGERATION EQUIPMENT SHALL BE PROVIDED A 125-VOLT, 15- OR 20-AMPERE RATED RECEPTACLE OUTLET, INSTALLED AT AN ACCESSIBLE LOCATION FOR THE SERVING OF HEATING, AIR-CONDITIONING, AND REFRIGERATION EQUIPMENT. THE RECEPTACLE SHALL BE LOCATED ON THE SAME LEVEL AND WITHIN 25 FEET OF THE EQUIPMENT, AND NOT BE CONNECTED TO THE LOAD SIDE OF THE EQUIPMENT DISCONNECT MEANS. THE RECEPTACLE OUTLET SHALL BE WEATHERPROOF, GFI PROTECTED IF INSTALLED OUTDOOR OR IN THE WET LOCATION. PROVIDE OUTLET IF ONE NOT AVAILABLE AND CONNECT TO THE NEAREST 20A, 120V, 1-PH BRANCH CIRCUIT CURRENTLY SUPPLYING OTHER SERVICE/CONVENIENCE RECEPTACLES IN THE AREA, ENSURE THE LOAD ON CIRCUIT DOES NOT EXCEED 16A.



MECHANICAL EQUIPMENT SCHEDULE

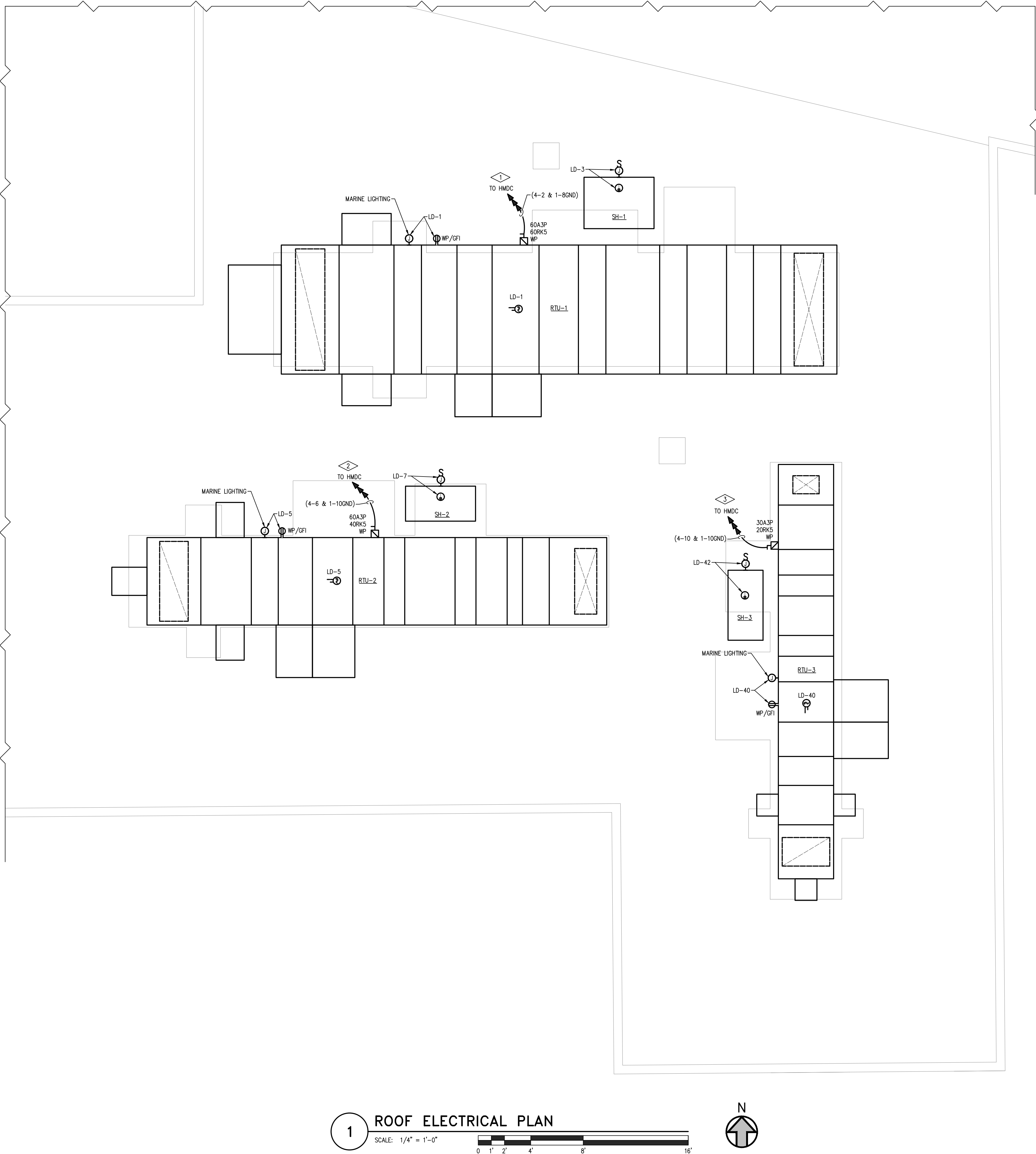
KEY	DESCRIPTION	MOTOR, HP	LOAD, A	VA	VOLTS	PH	OCPD SIZE	BRANCH CIRCUIT CONDUCTORS	SPECIFIC NOTES
B-1	GAS BOILER	-	16.0	1920.0	120	1	20	(2-12 & 1-12GND)	1
B-2	GAS BOILER	-	16.0	1920.0	120	1	20	(2-12 & 1-12GND)	1
P-1	PUMP	3	11.0	3963.0	208	3	20	(4-12 & 1-12GND)	
P-2	PUMP	3	11.0	3963.0	208	3	20	(4-12 & 1-12GND)	
P-3	PUMP	10	14	11639.0	480	3	20	(4-12 & 1-12GND)	
P-4	PUMP	10	14	11639.0	480	3	20	(4-12 & 1-12GND)	
RTU-1	ROOF TOP UNIT	-	60	49883.0	480	3	60	(4-4 & 1-8GND)	
RTU-2	ROOF TOP UNIT	-	30	24942.0	480	3	40	(4-8 & 1-10GND)	
RTU-3	ROOF TOP UNIT	-	16	13302.0	480	3	20	(4-12 & 1-12GND)	
SH-1	STEAM HUMIDIFIER	-	3.33	400.0	120	1	20	(2-12 & 1-12GND)	2
SH-2	STEAM HUMIDIFIER	-	2.167	260.0	120	1	20	(2-12 & 1-12GND)	2
SH-3	STEAM HUMIDIFIER	-	1.5	180.0	120	1	20	(2-12 & 1-12GND)	2
WSS-1	WATER SOFTENER SYSTEM	-	3.5	420.0	120	1	20	(2-12 & 1-12GND)	

GENERAL NOTES

- ELECTRICAL CONTRACTOR SHALL OBTAIN A COPY OF THE MECHANICAL AND PLUMBING EQUIPMENT SUBMITTALS TO COMPARE AGAINST CURRENT MECHANICAL EQUIPMENT SCHEDULE. REPORT ANY DISCREPANCIES TO ELECTRICAL ENGINEER FOR VERIFICATION OF THE EQUIPMENT SELECTION AND REQUIRED REVISION OF THE DRAWINGS OR SCHEDULES.
 - FIELD VERIFY EQUIPMENT NAMEPLATES AND MANUALS AGAINST PARAMETERS SHOWN ON THIS SCHEDULE. IF SIGNIFICANT DISCREPANCIES OCCUR, CONTACT ELECTRICAL ENGINEER FOR REQUIRED REVISION OF THE DRAWINGS.
 - COORDINATE EXACT EQUIPMENT LOCATIONS AND ADDITIONAL INSTALLATION REQUIREMENTS WITH MECHANICAL/PLUMBING CONTRACTOR PRIOR TO ROUGH-IN.
 - SAFETY DISCONNECT SWITCHES UTILIZING 480V 3-PHASE CONFIGURATION SHALL BE HEAVY DUTY WITH CLASS RK5 FUSES AND FUSE REJECTION KITS INSTALLED.
 - STARTERS FOR EQUIPMENT WITH THREE-PHASE MOTORS PROVIDED BY MECHANICAL/PLUMBING CONTRACTOR.
 - CONTROL PANEL SHORT CIRCUIT RATING SHALL BE INDICATED ON THE FACTORY INSTALLED LABEL AND SHALL BE ADEQUATE FOR THESE INSTALLATION CONDITIONS.
- SPECIFIC NOTES:
- PROVIDE SMART TOUCH OPERATING CONTROL WITH LCD DISPLAY. EACH PAIR OF BOILER TO BE INTERLOCKED AND SEQUENCED FROM A SINGLE CONTROLLER.
 - INTERLOCK WITH ASSOCIATED RTU.

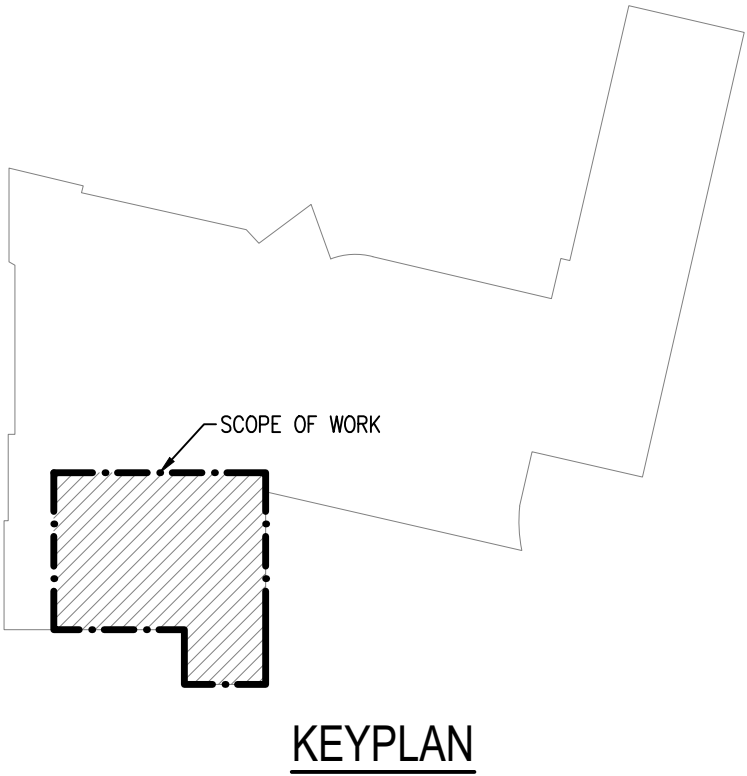


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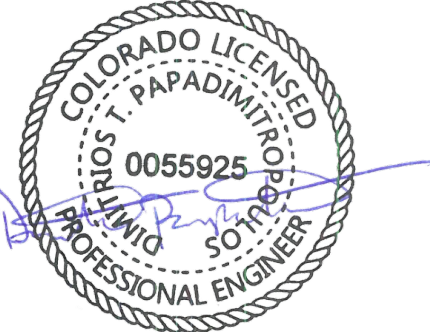
ELECTRICAL DETAIL NOTES

- EXISTING RTU-1, IS SCHEDULED FOR REPLACEMENT WITH NEW ROOF TOP UNIT. ELECTRICAL CAPACITY OF NEW ROOF TOP UNIT IS LESS THAN EXISTING UNIT. PROVIDE AND INSTALL A NEW FUSED DISCONNECT AS SHOWN ON PLAN. ELECTRICAL CONTRACTOR SHALL REPLACE EXISTING BRANCH CIRCUITS FROM MAIN DISTRIBUTION PANEL "HMD" FEEDING EXISTING CHILLER WITH NEW. SEE ONE-LINE AND FEEDER SCHEDULE ON E3.0 FOR MORE DETAIL. COORDINATE EXACT LOCATION AND ANY ADDITIONAL INFORMATION WITH MECHANICAL CONTRACTOR AND BUILDING CHIEF ENGINEER.
- EXISTING RTU-2, IS SCHEDULED FOR REPLACEMENT WITH NEW ROOF TOP UNIT. ELECTRICAL CAPACITY OF NEW ROOF TOP UNIT IS LESS THAN EXISTING UNIT. PROVIDE AND INSTALL A NEW FUSED DISCONNECT AS SHOWN ON PLAN. ELECTRICAL CONTRACTOR SHALL REPLACE EXISTING BRANCH CIRCUITS FROM MAIN DISTRIBUTION PANEL "HMD" FEEDING EXISTING CHILLER WITH NEW. SEE ONE-LINE AND FEEDER SCHEDULE ON E3.0 FOR MORE DETAIL. COORDINATE EXACT LOCATION AND ANY ADDITIONAL INFORMATION WITH MECHANICAL CONTRACTOR AND BUILDING CHIEF ENGINEER.
- EXISTING RTU-3, IS SCHEDULED FOR REPLACEMENT WITH NEW ROOF TOP UNIT. ELECTRICAL CAPACITY OF NEW ROOF TOP UNIT IS LESS THAN EXISTING UNIT. PROVIDE AND INSTALL A NEW FUSED DISCONNECT AS SHOWN ON PLAN. ELECTRICAL CONTRACTOR SHALL REPLACE EXISTING BRANCH CIRCUITS FROM MAIN DISTRIBUTION PANEL "HMD" FEEDING EXISTING CHILLER WITH NEW. SEE ONE-LINE AND FEEDER SCHEDULE ON E3.0 FOR MORE DETAIL. COORDINATE EXACT LOCATION AND ANY ADDITIONAL INFORMATION WITH MECHANICAL CONTRACTOR AND BUILDING CHIEF ENGINEER.



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NO.	REVISION/ISSUE	DATE
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MDP JOB #: 23047.01

DESCRIPTION:
ROOF ELECTRICAL PLAN

DRAWN BY: JB/BR	CHECKED BY: DPIER
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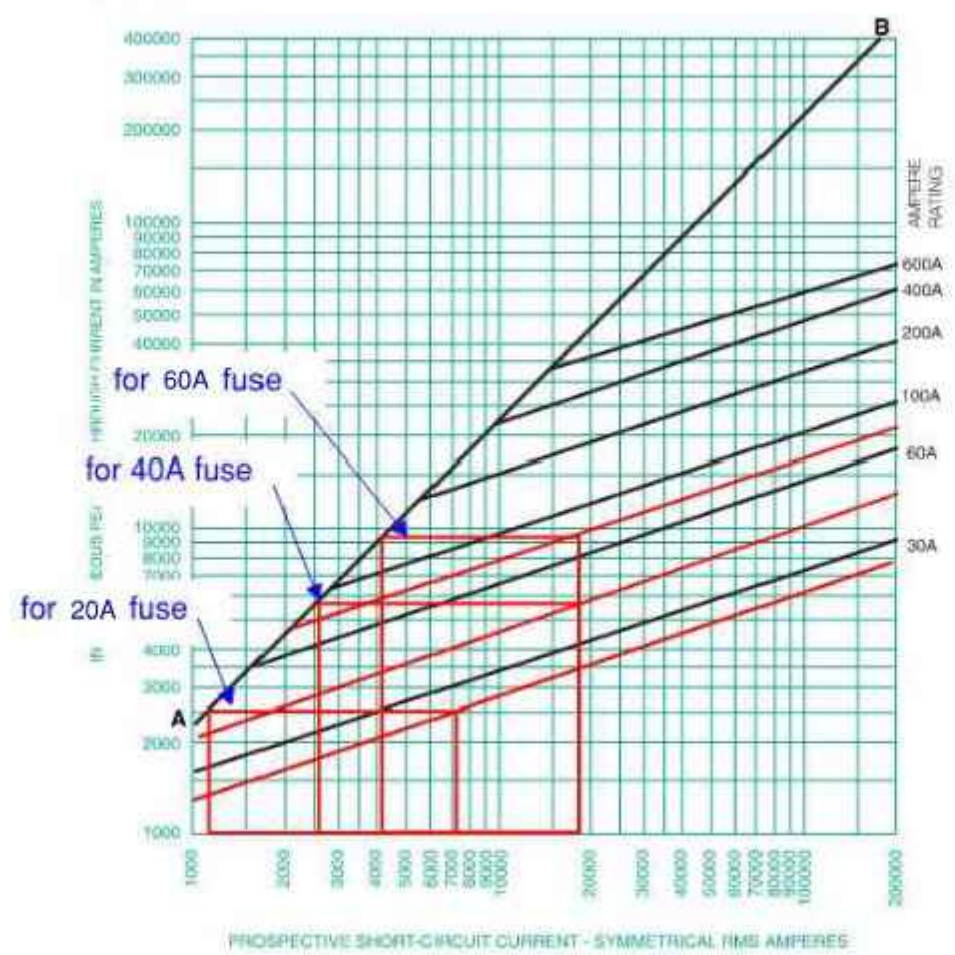
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Fusetron Class RK5 Dual-Element Time-Delay Fuses FRN-R



FRN-R - RMS Let-Through Currents (kA)

Prospect. Short C.C.	Fuse Size					
	30 kA	60 kA	100 kA	200 kA	400 kA	600 kA
5,000	1	2	3	5	5	5
10,000	2	3	4	7	10	10
15,000	2	3	5	8	11	15
20,000	2	4	5	8	12	16
25,000	2	4	6	9	13	17
30,000	2	4	6	10	14	18
35,000	2	4	6	10	15	19
40,000	2	5	7	11	15	20
50,000	3	5	7	11	17	21
60,000	3	5	8	12	18	22
70,000	3	6	8	13	19	23
80,000	3	6	8	13	19	24
90,000	3	6	9	14	20	25
100,000	3	6	9	14	21	26
150,000	4	7	10	16	24	29
200,000	4	8	11	18	26	32

FEEDER SCHEDULE

#	# OF SETS	CONDUCTORS	GROUND CONDUCTOR	CONDUIT SIZE
800.4	3	4-300KCMIL CU	1-1/0 CU	2-1/2"
800.4SA	3	4-400KCMIL AL	1-4/0 AL	3"
400.3	1	3-500KCMIL CU	1-3 CU	3-1/2"
400.4SA	2	4-250KCMIL AL	1-1/0 AL	2-1/2"
200.4	1	4-3/0 CU	1-6 CU	2"
100.4	1	4-2 CU	1-8 CU	1-1/4"
70.4	1	4-4 CU	1-8 CU	1-1/4"
60.4	1	4-6 CU	1-10 CU	1"
40.4	1	4-6 CU	1-10 CU	1"
30.4	1	4-10 CU	1-10 CU	1/2"
25.4	1	4-10 CU	1-10 CU	1/2"

LEGEND: TYPICAL LABEL FORMAT IS AAAABC, WHERE:
AAA-REFERS TO CONDUCTORS CURRENT RATING
B-NUMBER OF CURRENT CARRYING CONDUCTORS
C-OPTIONS: N-SERVICE ENTRANCE; S-TRANSFORMER SECONDARY CONDUCTORS; T-TAP RULE PER NEC ARTICLE 250.122(G) FOR EQUIPMENT GROUNDING CONDUCTOR SIZING AND NEC ARTICLE 240.21(B)(1) AND (2) FOR THE TAP CONDUCTORS LENGTH.

Fault Current Calculations

Calculation Date: 2023-08-04

Point	Fault Location	Conductors Length, feet	Conductors size	# conductors per phase	Cu (1) Al (2)	Raceway Magnetic (1) Nonmagn. (2)	Voltage	Phase	"C" Value	Previous fault value	Available Fault Current Value
A	At Utility Transformer Secondary Winding										33,900
B	At HMDC	20	500	4	2	2	480	3	21390	33,900	32,958
C	At 300KVA Transformer Primary	15	500	1	1	1	480	3	22185	32,958	30,505
E	At LMDC	100	300	3	1	1	208	3	18176	19,908	15,266
F	At Panel LD	55	"3/0"	1	1	1	208	3	12843	15,266	9,885
G	At RTU-1	75	"1/0"	1	1	1	480	3	8924	32,958	16,483
H	At RTU-2	75	"1/0"	1	1	1	480	3	8924	32,958	16,483
I	At RTU-3	75	6	1	1	1	480	3	2425	32,958	7,045

Point	Fault Location	Size, kVA	Primary voltage, V	Secondary Voltage, V	%Z	Transformer full load amperes, A	Phase	Previous fault value	Available Fault Current Value
D	Secondary of the Transformer	300.0	480	208	3	833	3	30,505	19,908

DETAIL NOTES

- EXISTING ROOF TOP UNIT ON ROOF LEVEL IS BEING REPLACED WITH NEW. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING BRANCH CIRCUIT FEEDING EXISTING ROOF TOP UNIT TO NEW ROOF TOP UNIT. COORDINATE EXACT LOCATION AND ANY ADDITIONAL INFORMATION WITH MECHANICAL CONTRACTOR.
- ELECTRICAL CONTRACTOR SHALL REPLACE EXISTING 150/3 CIRCUIT BREAKER WITH NEW 100/3 CIRCUIT BREAKER SERVING RTU-1. ALL EXISTING BRANCH CIRCUIT CONDUCTORS AND CONDUIT ARE TO BE TRACED BACK TO SOURCE, REMOVED, AND REPLACED WITH NEW. SEE FEEDER SCHEDULE FOR NEW BRANCH CIRCUIT CONDUCTOR SIZING.
- ELECTRICAL CONTRACTOR SHALL REPLACE EXISTING 150/3 CIRCUIT BREAKER WITH NEW 60/3 CIRCUIT BREAKER SERVING RTU-2. ALL EXISTING BRANCH CIRCUIT CONDUCTORS AND CONDUIT ARE TO BE TRACED BACK TO SOURCE, REMOVED, AND REPLACED WITH NEW. SEE FEEDER SCHEDULE FOR NEW BRANCH CIRCUIT CONDUCTOR SIZING.
- ELECTRICAL CONTRACTOR SHALL REPLACE EXISTING 60/3 CIRCUIT BREAKER WITH NEW 30/3 CIRCUIT BREAKER SERVING RTU-3. ALL EXISTING BRANCH CIRCUIT CONDUCTORS AND CONDUIT ARE TO BE TRACED BACK TO SOURCE, REMOVED, AND REPLACED WITH NEW. SEE FEEDER SCHEDULE FOR NEW BRANCH CIRCUIT CONDUCTOR SIZING.

NOTE TO BUILDING DEPARTMENT

- NEW ROOF TOP UNITS ARE OF LESSER CAPACITY AS THE EXISTING ROOF TOP UNITS BEING DEMOLISHED. OVERALL LOAD FOR MAIN DISTRIBUTION BOARD HMDC IS NOT INCREASED.

Panel: HB											
Location: Electrical Rm 131				Status: Existing		Voltage: 480/277		Bus Rating: 250		Fed from: HMDC	
Feeder OCPD: 100				Mounting: Surface		Phase: 3		Main 3-pole CB Size, A: MLO		Wire: 4	
Tr-r Size, Kva:				Feed: Bottom		Note: Siemens P2		AIC Rating: 14,000			
CB #	CB Note	Code	Description	Load, VA	CB Size	Phase	Load, VA	Description	Code	CB #	CB Note
1		1	Lighting - Corridor	1000	20	1	A	3 20 6720	Pump - P-3	3	2
3		1	Lighting - Admin Hall and Bathroom	1125	20	1	B	/			4
5		1	Lighting - 3-way Prep and Admin Wing	755	20	1	C	/			6
7		1	Lighting - Outside	1250	20	1	A	3 20 6720	Pump - P-4	3	8
9		1	Lighting	955	20	1	B	/			10
11		4	Heat tape - CH-1	800	20	1	C	/			12
13		6	Existing Load	1275	20	1	A	3 20 6318	Pump - P-5	3	14
15		1	Lighting - Exterior	1325	20	1	B	/			16
17			Spare		20	1	C	/			18
19			Spare		20	1	A	3 20 6318	Pump - P-6	3	20
21			Spare		20	1	B	/			22
23			Spare		20	1	C	/			24
25		3	Air Compressor	9650	20	3	A	3 20 6318	Pump - P-7	3	26
27					/		B	/			28
29					/		C	/			30
31		6	Dust Collector	6525	20	3	A	3 20 6318	Pump - P-8	3	32
33					/		B	/			34
35					/		C	/			36
37			Space		-	A	3 15	5000	Unit Heater - BUH-1	4	38
39			Space		-	B	/				40
41			Space		-	C	/				42
Code				Load, VA	Demand	Load Summary per Phase					
1 * Lighting				6410	125%	Connected		Demand			
2 * Receptacles - First 10,000					100%	23487 VA		24854 VA		19766 VA	
Receptacles - Other 10,000					50%	23367 VA		25023 VA		16316 VA	
3 * Motor				39712	100%	21517 VA		22510 VA		15720 VA	
Largest Motor				9650	125%						
4 * Electrical Heating				5800	100%	Panel Connected Load:		68372 VA			
5 * Kitchen Equipment					100%	Panel Demand Load:		72387 VA			
6 * Other				7800	100%						
7 * Heating HVAC					100%	Panel Demand Load:		87.07 Am ps			
8 * Cooling HVAC					100%						
9 Sub Panel					100%						
10 * Redundant					0%						

CB Notes Legend: N - New, GFI - GFCI, AFI - AFCI, GFP - Equipment rated GFCI, L - Lockable (NEC110.25). Sample: "N,GFI" - means new GFCI circuit breaker.

* Revised Load

Panel: LD											
Location: Hall 140 Fed from: LMDC Feeder OCPD: 200 Tr-r Size, Kva:				Status: Existing Mounting: Surface Feed: Bottom		Voltage: 208/120 Phase: 3 Wire: 4 Note: Siemens P1		Bus Rating: 250 Main 3-pole CB Size, A: MLO AIC Rating: 22,000			
CB #	CB Note	Code	Description	Load, VA	CB Size	Phase	Load, VA	Description	Code	CB Note	#
1	N	6	RTU-1 - Marine Lighting/Duct Detector	760	20	1	A	2 25 2746	P-1	3	N 2
3	N	6	SH-1	500	20	1	B	/			N 4
5	N	6	RTU-1 - Marine Lighting/Duct Detector	760	20	1	C	-			N 6
7		6	SH-2	360	20	1	A	2 25 2746	P-2	3	N 8
9		6	Existing Load	1255	20	1	B	/			N 10
11		3	BF-6	1200	20	1	C	-			N 12
13		4	UH-1B, UH-1A - Mech Rm	1100	20	1	A	1 20 1920	B-1	6	14
15		6	B-3 Burners	7800	30	3	B	1 20 1920	B-2	6	16
17			/	/	C	1	20 200	GW-H1		6	18
19			/	/	A	1	20 900	Refrigerator - Shop Rm		5	20
21		6	B-3 Burner Controls	500	20	1	B	1 20 1200	CRP-1 - Crawl Space	6	22
23		6	Radiant and CRP-1 Controls	500	20	1	C	1 20 540	Recept's - Crawl Space	2	24
25		6	Existing Load	1000	20	1	A	1 20 1500	P-3 - Crawl Space	3	26
27		2	Recept's - Mech Rm	540	20	1	B	1 20 1500	SP-1 - Crawl Space	3	28
29		6	Existing Load	3500	30	2	C	1 20 420	WSS-1	3	N 30
31			/	/	A	1	20 300	CH-1 Controls		6	32
33		6	Existing Load	5000	30	2	B	1 20 500	Duct Detectors	6	34
35			/	/	C	2	50 8550	Existing Load		6	36
37		2	Recept - Welding	180	20	1	A	/			38
39		2	Recept - Welding	180	20	1	B	1 20 760	RTU-3 - Marine Lighting/Duct Detector		N 40
41		6	Security Cameras	675	20	1	C	1 20 280	SH-3		N 42
Code				Load, VA	Demand	Load Summary per Phase					
1 * Lighting					125%	Connected		Demand			
2 * Receptacles - First 10,000				1440	100%	19391 VA		Phase A →		19766 VA	
Receptacles - Other 10,000					50%	15941 VA		← Phase B →		16316 VA	
3 * Motor				7366	100%	15420 VA		← Phase C →		15720 VA	
Largest Motor				2746	125%						
4 * Electrical Heating				1100	100%	Panel Connected Load:				50752 VA	
5 * Kitchen Equipment				900	100%	Panel Demand Load:				51439 VA	
6 * Other				37200	100%						
7 * Heating HVAC					100%	Panel Demand Load:				142.78 Amps	
8 * Cooling HVAC					100%						
9 Sub Panel					100%						
10 * Redundant					0%						



MECHANICAL GENERAL NOTES

CONTRACTOR SHALL COMPLY WITH NOTES AS APPLICABLE TO PROJECT. NOTES ON INDIVIDUAL DRAWINGS TAKE PRECEDENCE.

A. GENERAL:

- REFER TO BASE BUILDING SPECIFICATIONS, BASE BUILDING DRAWINGS, GENERAL CONDITIONS AND DIVISION 1 FOR SUPPLEMENTAL REQUIREMENTS.
- WHILE ALL WORK IS IN PROGRESS, EXCEPT FOR SHORT DESIGNATED INTERVALS DURING WHICH CONNECTIONS ARE TO BE MADE, CONTINUITY OF SERVICE TO ALL EXISTING SYSTEMS SERVING OCCUPIED SPACES, SHALL BE MAINTAINED. PROVIDE TEMPORARY PIPING SERVICES WHERE REQUIRED TO MAINTAIN EXISTING AREAS OPERABLE.
- ANY WORK WHICH WILL AFFECT THE BUILDING OCCUPANTS, INCLUDING, BUT NOT LIMITED TO, WORK WHICH GENERATES EXCESSIVE NOISE, DUST, SMOKE, OR INTERFERENCE TO BUILDING OCCUPANTS, SHALL BE PERFORMED AFTER BUSINESS HOURS, UNLESS PRIOR APPROVAL HAS BEEN OBTAINED FROM THE BUILDING MANAGER.
- THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH OWNER AT ALL TIMES FOR ALL NEW-TO-EXISTING CONNECTIONS, SYSTEM SHUTDOWNS, RESTART-UP, AND FLUSHING AND FILLING OF BOTH NEW AND EXISTING AFFECTED SYSTEMS.
- THE CONTRACTOR SHALL VISIT AND EXAMINE THE PREMISES AND/OR JOB SITE SO AS TO ASCERTAIN, PRIOR TO BIDDING, THE EXISTING CONDITIONS IN WHICH HE WILL BE OBLIGED TO OPERATE IN PERFORMING HIS PART OF THE CONTRACT. NO EXTRAS WILL BE ALLOWED DUE TO LACK OF KNOWLEDGE OF THESE CONDITIONS.
- REPORT ANY EXISTING DAMAGED EQUIPMENT OR SYSTEMS TO THE OWNER PRIOR TO ANY WORK.
- INSTALL ALL EQUIPMENT AND MATERIALS IN SUCH A MANNER AS TO PROVIDE REQUIRED ACCESS FOR SERVICING AND MAINTENANCE, ALLOW AMPLE SPACE FOR REMOVAL OF ALL PARTS THAT REQUIRE REPLACEMENT OR SERVICING.
- FURNISH WINGED STEEL ACCESS DOORS WITH CONCEALED LATCH, WHETHER SHOWN ON DRAWINGS OR NOT, WERE REQUIRED FOR ACCESS TO ALL CONCEALED VALVES, SHOCK ABSORBERS, MOTORS, FANS, BALANCING COCKS, AND OTHER OPERATING DEVICES REQUIRING ADJUSTMENT OR SERVICING. ACCESS DOORS IN FIRE-RATED WALLS AND CEILINGS SHALL HAVE EQUIVALENT U.L. LABEL AND FIRE RATING.
- IT IS THE INTENTION OF THESE SPECIFICATIONS AND DRAWINGS TO CALL FOR FINISHED WORK, TESTED AND READY FOR OPERATION. WHEREVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN "FURNISH AND INSTALL COMPLETE AND READY FOR USE."
- SECURE AND PAY FOR ALL PERMITS, TAP FEES, TAXES, ROYALTIES, LICENSES, AND INSPECTIONS IN CONNECTION WITH THE WORK SPECIFIED UNDER THIS DIVISION.
- ALL WORK SHALL COMPLY WITH ALL APPLICABLE CODES AND REGULATIONS.
- DRAWINGS ARE DIAGRAMMATIC IN CHARACTER AND DO NOT NECESSARILY INDICATE EVERY REQUIRED OFFSET, VALVE, FITTING, ETC.
- DRAWINGS SHALL NOT BE SCALED FOR ROUGH-IN MEASUREMENTS OR USED AS SHOP DRAWINGS. ALL DIMENSIONS SHALL BE VERIFIED IN FIELD.
- ALL NEW, RELOCATED AND EXISTING MATERIALS, IN CEILING PLENUMS SHALL BE CLASS 1 RATED, NOT EXCEEDING 3" OR 75 FLAME SPREAD AND 0" RATING OF SMOKE DEVELOPED. REMOVE AND REPLACE ALL EXISTING MATERIALS NOT IN COMPLIANCE.
- BEFORE ANY EQUIPMENT IS ORDERED AND/OR INSTALLED, DETERMINE THAT SAID EQUIPMENT WILL PROPERLY FIT WITHIN THE SPACE ALLOCATED. THAT REQUIRED PIPING GRADES CAN BE MAINTAINED; AND THAT DUCTWORK CAN BE RUN AS INTENDED.
- COORDINATE THE INSTALLATION OF MECHANICAL MATERIALS AND EQUIPMENT ABOVE AND BELOW CEILINGS, LIGHT FIXTURES, AND OTHER BUILDING COMPONENTS. ALL COMPONENTS SHALL BE LOCATED AS TIGHT TO STRUCTURE AS POSSIBLE. COORDINATE CEILING CAVITY SPACE CAREFULLY WITH ALL TRADES.
- ALL ROOF AND EXTERIOR PENETRATIONS SHALL BE SEALED WATER TIGHT. PROVIDE FLASHING AND COUNTER FLASHING AS REQUIRED. COORDINATE ROOFING WORK WITH THE GENERAL CONTRACTOR.
- CONTRACTOR SHALL NOTIFY ENGINEER 48 HOURS PRIOR TO SUBSTANTIAL COMPLETION OF CONSTRUCTION OR INSTALLATION OF CEILING TILE, TO SCHEDULE A FINAL PUNCH LIST WALKTHROUGH.
- ALL MATERIALS AND EQUIPMENT SHALL BE NEW, FREE OF DEFECTS, AND INSTALLED IN ACCORDANCE WITH MANUFACTURER'S CURRENT PUBLISHED RECOMMENDATIONS.
- CONTRACTOR SHALL PREPARE AND SUBMIT TO THE ARCHITECT/ENGINEER IN ELECTRONIC (PDF) FORMAT, ALL SHOP DRAWINGS AND DESCRIPTIVE EQUIPMENT DATA/SUBMITTALS REQUIRED FOR THE PROJECT. SUBMITTALS AND SUBMITTAL SCHEDULES SHALL BE PREPARED AND SIGNED BY A QUALIFIED DESIGN PROFESSIONAL. THE CONTRACTOR SHALL IDENTIFY ANY "LONG LEAD TIME" ITEMS, WHICH MAY IMPACT THE OVERALL PROJECT SCHEDULE. ALL BIDS SHALL INCLUDE COSTS ASSOCIATED WITH THE PURCHASE AND DELIVERY OF EQUIPMENT TO MEET THE PROJECT SCHEDULE. ALL SUBMITTALS SHALL BE CLEAR AND CONCISE. PARTIAL, PROGRESS, "PIECEMEAL," OR CATALOGUES WILL NOT BE REVIEWED AND WILL BE RETURNED AS INCOMPLETE - NO EXCEPTIONS. ALLOW A MINIMUM OF 10 WORKING DAYS FOR ARCHITECT/ENGINEER'S REVIEW.
- REVIEW OF THE EQUIPMENT SUBMITTALS IS CONTINGENT ON WHETHER THE PHYSICAL DIMENSIONS OF THE SUBMITTED EQUIPMENT WILL FIT INTO ALLOTTED SPACES WITH CLEARANCE FOR INSTALLATION AND MAINTENANCE. CONTRACTOR SHALL VERIFY PRIOR TO ORDERING AND INSTALLATION.
- QUIET OPERATION AND VIBRATION: MECHANICAL EQUIPMENT PROVIDED UNDER THIS CONTRACT SHALL OPERATE UNDER ALL LOAD CONDITIONS WITHOUT NOISE OR VIBRATION, WHICH IS OBJECTABLE IN THE OPINION OF THE ENGINEER.
- KEEP A COMPLETE SET OF RECORD DOCUMENT PRINTS IN CUSTODY DURING ENTIRE PERIOD OF CONSTRUCTION AT THE CONSTRUCTION SITE. AT THE COMPLETION OF THE PROJECT, TURN THESE DRAWINGS OVER TO THE GENERAL CONTRACTOR FOR HIS SUBMISSION TO THE ARCHITECT.
- THE CONTRACTOR FOR THIS WORK SHALL EXAMINE THE DRAWINGS AND SPECIFICATIONS FOR OTHER PARTS OF THE WORK, AND HEADROOM OR SPACE CONDITIONS APPEAR INADEQUATE OR IF ANY DISCREPANCIES OCCUR BETWEEN THE PLANS FOR HIS WORK AND THE PLANS FOR THE WORK OF OTHERS, HE SHALL REPORT SUCH DISCREPANCIES TO THE ARCHITECT/ENGINEER AND SHALL OBTAIN WRITTEN INSTRUCTIONS FOR ANY CHANGES NECESSARY TO ACCOMMODATE HIS WORK WITH THE WORK OF OTHERS. ANY CHANGES IN THE WORK COVERED BY THIS SPECIFICATION MADE NECESSARY BY THE FAILURE OR NEGLECT OF THE CONTRACTOR TO REPORT SUCH DISCREPANCIES SHALL BE MADE BY AND AT THE EXPENSE OF THIS CONTRACTOR.
- EQUIPMENT SCHEDULES ESTABLISH A QUALITY AND DESIGN STANDARD. SUBSTITUTIONS MUST BE EQUIVALENT IN PERFORMANCE, MATERIAL, SPACE, AND CONFIGURATION REQUIREMENTS. THE PROJECT ENGINEER OR ARCHITECT'S DECISION WILL BE FINAL AND MAY BE BASED ON BOTH CERTIFIED TEST DATA AND SUBJECTIVE REASONING.
- THE MANUFACTURER'S MATERIAL OR EQUIPMENT LISTED IN THE SCHEDULE OR IDENTIFIED BY NAME ON THE DRAWINGS ARE THE TYPES TO BE PROVIDED FOR THE ESTABLISHMENT OF SIZE, CAPACITY, GRADE AND QUALITY. IF ALTERNATES ARE USED IN LIEU OF THE SCHEDULED NAMES, THE COST OF ANY CHANGES IN CONSTRUCTION REQUIRED BY THEIR USE SHALL BE BORNE BY CONTRACTOR.
- OPERATING AND MAINTENANCE DATA: THE CONTRACTOR SHALL PREPARE AN OPERATING AND MAINTENANCE MANUAL COVERING ALL SYSTEMS AND EQUIPMENT INSTALLED UNDER THIS DIVISION. SUBMIT AN OUTLINE OF A PREVENTATIVE MAINTENANCE PROGRAM FOR EACH SYSTEM. CONTRACTOR SHALL PROPERLY LUBRICATE ALL MECHANICAL PIECES OF EQUIPMENT, WHICH HE HAS PROVIDED BEFORE TURNING THE BUILDING OVER TO THE OWNER.
- DEMOLITION:
 - DURING THE DEMOLITION PHASE REMOVE EXISTING EQUIPMENT, PIPING, DUCTWORK AND RELATED ITEMS, EITHER AS SHOWN ON THE DEMOLITION DRAWINGS AS BEING REMOVED, OR AS REQUIRED FOR THE WORK.
 - PROPERLY CAP AND SEAL ALL DUCTWORK AND PIPING NOT USED.
 - EXISTING THERMOSTATS, DIFFUSERS, DUCTWORK, ETC., NOTED ON DRAWINGS TO BE RE-USED SHALL BE THOROUGHLY CLEANED AND/OR REFINISHED TO MATCH NEW.
 - THE LOCATION OF EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., SHOWN ON THE DRAWINGS HAS BEEN TAKEN FROM EXISTING DRAWINGS AND IS, THEREFORE, ONLY AS ACCURATE AS THAT INFORMATION.
- WARRANTIES:
 - PROVIDE COMPLETE WARRANTY INFORMATION FOR EACH ITEM, INCLUDING, NAME OF PRODUCT OR EQUIPMENT; DATE OF BEGINNING OF WARRANTY OR BOND; DURATION OF WARRANTY OR BOND; AND NAMES, ADDRESSES AND TELEPHONE NUMBERS OF MANUFACTURING/SERVICING PERSONNEL, AS WELL AS, PROCEDURES FOR FILING A CLAIM AND OBTAINING WARRANTY SERVICES.
 - THE CONTRACTOR SHALL WARRANT ALL MATERIALS, WORKMANSHIP AND THE SUCCESSFUL OPERATION OF ALL EQUIPMENT AS INSTALLED IN THE GENERAL CONDITIONS, OR DIV. 1.
- ANY FILTERS USED DURING CONSTRUCTION SHALL BE REPLACED WITH NEW FILTERS DURING FINAL CLEANUP.

- EXISTING EQUIPMENT, CHECK, VERIFY AND MAKE OPERABLE ALL EXISTING EQUIPMENT THAT IS REFER TO BE REUSED, PROVIDE SERVICE ON ALL ROOF TOP HVAC UNITS, Z-BOXES, FAN COILS, AIR CONDITIONING UNITS, ETC., AS REQUIRED TO BRING THEM TO PROPER OPERATING CONDITION. CLEAN COILS AND ENCLOSURE, LUBRICATE, CHECK MOTORS AND REPLACE FILTERS.
- RESPONSIBILITY OF CONTRACTOR: THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE AND SATISFACTORY INSTALLATION OF THE WORK IN ACCORDANCE WITH THE TRUE INTENT OF THE DRAWINGS AND SPECIFICATIONS. HE SHALL PROVIDE, WITHOUT EXTRA CHARGE, ALL INCIDENTAL ITEMS REQUIRED, AS A PART OF HIS WORK. THE INSTALLATION SHALL BE SO MADE THAT ITS SEVERAL COMPONENT PARTS WILL FUNCTION TOGETHER AS A WORKABLE SYSTEM AND SHALL BE LEFT WITH ALL PARTS ADJUSTED AND IN WORKING ORDER.

B. MECHANICAL/ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT:

- CONTRACTOR SHALL REVIEW ELECTRICAL POWER REQUIREMENTS FOR MECHANICAL EQUIPMENT THAT ARE SCHEDULED ON THE ELECTRICAL DRAWINGS AND VERIFY THAT THEY MATCH PRIOR TO ORDERING EQUIPMENT. DO NOT PURCHASE MOTORS OR ELECTRICAL EQUIPMENT UNTIL POWER CHARACTERISTICS AVAILABLE AT BUILDING SITE LOCATION HAVE BEEN CONFIRMED BY CONTRACTOR.
- PROVIDE SAFETY DISCONNECT SWITCHES FOR ALL MECHANICAL EQUIPMENT, UNLESS SPECIFICALLY SHOWN ON THE ELECTRICAL DIVISION.
- FURNISH COMBINATION TYPE FULL NEMA RATED STARTERS WITH FUSED DISCONNECT SWITCH FOR ALL 3-PHASE MOTORS PROVIDED.
- ELECTRICAL WIRING IN CONNECTION WITH THE AUTOMATIC TEMPERATURE CONTROL SYSTEM, INCLUDING INTERLOCK WIRING, WHERE SHOWN ON THE ELECTRICAL DIVISION DRAWINGS, SHALL BE PERFORMED BY THE ELECTRICAL CONTRACTOR. ALL OTHER WIRING, INCLUDING 120V REQUIRED FOR PROPER OPERATION OF THE AUTOMATIC TEMPERATURE CONTROL SYSTEM, SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR.

C. MECHANICAL, PLUMBING AND FIRE PROTECTION SYSTEMS FIRESTOPPING:

- CONTRACTOR SHALL PROVIDE FIRESTOP SYSTEM FOR ALL THROUGH PENETRATIONS OF PIPING, DUCTWORK AND OTHER MECHANICAL ITEMS THROUGH FIRE-RATED CORRIDOR WALLS, FIRE RESISTIVE WALLS, FIRE RESISTIVE SHAFTS AND FLOOR PENETRATIONS NOT WITHIN THE CAVITY OF A WALL. FIRESTOP SYSTEM SHALL BE LISTED/INSTALLED/TESTED IN ACCORDANCE WITH ASTM E814 OR UL 1479. THE SYSTEM SHALL HAVE AN F RATING/1 R RATING OF NOT LESS THAN 1 HR AND NOT LESS THAN THE REQUIRED RATING OF THE PENETRATING ASSEMBLY. CONTRACTOR SHALL ALSO REFERENCE AND COMPLY WITH 2018 IBC SECTION 714.4.1.2.

D. PIPING APPLICATION:

- ALL PIPING SHALL CONFORM TO APPLICABLE NATIONAL AND LOCAL CODES.
- DOMESTIC HOT AND COLD WATER: ABOVE GRADE, INSIDE BUILDING; TYPE "L" HARD DRAWN COPPER TUBE, 95-5 TIN-ANTIMONY SOLDERED JOINTS. BELOW GRADE, INSIDE AND OUTSIDE BUILDING: INACCESSIBLE LOCATIONS, BELOW GRADE OR LARGER THAN 2"; SCHEDULE 40 BLACK STEEL PIPE WITH SEAMLESS STEEL BUTT-WELD FITTINGS AND WELDED JOINTS. FOR BELOW GRADE GAS PIPING, PROVIDE PIPING WITH MACHINE-APPLIED COATING AND WRAPPING IN ACCORDANCE WITH LOCAL CODE AND UTILITY COMPANY REQUIREMENTS. PROVIDE CATHODIC PROTECTION.
- SANITARY DRAINAGE, STORM DRAINAGE AND VENTS - INSIDE BUILDING: ABOVE GRADE: CSPI 301 CAST IRON, NO-HUB TYPE, WITH NEOPRENE GASKETS AND 300 SERIES STAINLESS STEEL CLAMPS; BELOW GRADE: ASTM A-74 SERVICE WEIGHT CAST IRON, HUB-AND-SPOOT TYPE ONLY, WITH NEOPRENE COMPRESSION GASKETS, BEYOND 5 FEET OUTSIDE BUILDING, UNLESS SPECIFIED BY CIVIL, ASTM D-3034 SDR-35 PVC SEWER PIPE.
- NATURAL GAS PIPING: ABOVE GRADE, EXPOSED LOCATIONS: 2" AND SMALLER: SCHEDULE 40 BLACK STEEL PIPE, BEVELED ENDS, WITH 150 PSI MALLEABLE IRON FITTINGS AND THREADED JOINTS. INACCESSIBLE LOCATIONS, BELOW GRADE OR LARGER THAN 2"; SCHEDULE 40 BLACK STEEL PIPE WITH SEAMLESS STEEL BUTT-WELD FITTINGS AND WELDED JOINTS. FOR BELOW GRADE GAS PIPING, PROVIDE PIPING WITH MACHINE-APPLIED COATING AND WRAPPING IN ACCORDANCE WITH LOCAL CODE AND UTILITY COMPANY REQUIREMENTS. PROVIDE CATHODIC PROTECTION.
- FOR GAS PIPING INSTALLED ON ROOF SHALL BE SUPPORTED AT A MINIMUM OF EVERY 6 FEET, WITH 6" MINIMUM CLEARANCE FROM ROOF, EXCEPT WHERE GOVERNED BY MORE STRINGENT LOCAL CODES OR SPECIFICATIONS.
- EXPOSED GAS PIPING SHALL BE LABELED WITH GAS PRESSURE AND PAINTED TO PREVENT CORROSION.
- PROVIDE FULL-SIZED SHUT-OFF VALVE, PRESSURE REGULATOR (VENTED TO OUTSIDE) AND 6" DRIP LEG FOR CONNECTIONS TO GAS-FIRED EQUIPMENT.
- SPACE HEATING WATER, CHILLED WATER, AND CONDENSER WATER PIPING: 2"-1/2" AND SMALLER: TYPE L COPPER TUBE, ASTM B-88, WITH WROUGHT COPPER FITTINGS PER ANSI B16.22, BRAZED OR LEAD-FREE SOLDERED. 3" AND LARGER: SCHEDULE 40 BLACK STEEL WITH FLANGED OR WELDED JOINTS.
- EQUIPMENT DRAINS, CONDENSATE DRAINS AND OVERFLOWS: TYPE "M" OR "DWV" COPPER.
- REFRIGERANT PIPING (FIELD INSTALLED): TYPE "K" HARD-DRAWN COPPER TUBING WITH WROUGHT COPPER SILVER SOLDERED FITTINGS AND COUPLINGS; OR TYPE "L" COPPER, REFRIGERANT GRADE, COLOR CODED AND MARKED "ACR" WITH BRAZED JOINTS. SOFT-ANNEALED COPPER TUBING MAY BE USED IN SIZES UP TO 1-3/8" AND, WHEN USED, SHALL BE ENCLOSED IN IRON OR STEEL PIPING OR IN CONDUIT, MOLDING OR RACEWAY WHICH WILL PROTECT SAID TUBING AGAINST DAMAGE.

E. PIPING INSTALLATION:

- GENERAL: INSTALL PIPES AND PIPE FITTINGS IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES, WHICH WILL ACHIEVE PERMANENTLY LEAK-PROOF PIPING SYSTEMS, CAPABLE OF PERFORMING GRADE, COLOR CODED AND MARKED "ACR" WITH BRAZED JOINTS. SOFT-ANNEALED COPPER TUBING MAY BE USED IN SIZES UP TO 1-3/8" AND, WHEN USED, SHALL BE ENCLOSED IN IRON OR STEEL PIPING OR IN CONDUIT, MOLDING OR RACEWAY WHICH WILL PROTECT SAID TUBING AGAINST DAMAGE.
- SANITARY WASTE AND VENT; ROOF DRAIN; AND STORM DRAIN PIPING:
 - VERIFY ALL INVERT ELEVATIONS OF EXISTING WASTE AND STORM DRAIN PIPING PRIOR TO ANY NEW WORK.
 - INSTALL PLUMBING DRAINAGE PIPING WITH MINIMUM 1/4" PER FOOT (2%) DOWNWARD SLOPE IN DIRECTION OF DRAIN FOR PIPING 3" AND SMALLER. INSTALL 4" AND LARGER PIPING WITH MINIMUM 1/8" PER FOOT (1%) DOWNWARD SLOPE, UNLESS OTHERWISE INDICATED ON DRAWINGS AND WHEN APPROVED BY ADMINISTRATIVE AUTHORITIES.
 - GRADE VENT PIPING FOR PROPER VENTILATION (MINIMUM 1/8" PER FOOT) AND TO ALLOW PIPING TO FREE ITSELF QUICKLY OF CONDENSATION OF WATER.
- CONTRACTOR SHALL FIELD VERIFY ALL PIPING AND PLUMBING LOCATIONS AND INVERTS PRIOR TO TRENCING OR INSTALLATION OF NEW PIPING. ALLOW FOR COST OF X-RAYING FLOOR FOR LOCATING BURIED PIPING AND PRIOR TO MAKING FLOOR PENETRATIONS.
- INSTALL HANGERS AND GUIDES AS NECESSARY FOR PIPING SYSTEMS, WHICH ARE SELF-SUPPORTING AND NOT DEPENDENT UPON CONNECTION TO EQUIPMENT. ALL PIPING SHALL BE ADEQUATELY SUPPORTED FROM THE BUILDING STRUCTURE WITH ADJUSTABLE HANGERS TO MAINTAIN UNIFORM GRADING, WHERE REQUIRED AND TO PREVENT SAGGING AND POCKETING.
- ALLOW FLEXIBILITY IN THE CONSTRUCTION OF THE PIPING SYSTEM IN ORDER TO PREVENT EXCESSIVE STRESSES IN MATERIALS AND JOINTS DUE TO THERMAL EXPANSION OR EQUIPMENT VIBRATION. PROVIDE SUFFICIENT SWING JOINTS, ANCHORS, EXPANSION LOOPS, EXPANSION JOINTS, AND/OR OTHER DEVICES AS NECESSARY, AND INSTALL SO AS TO PERMIT FREE EXPANSION AND CONTRACTION WITHOUT CAUSING UNDUE STRESSES.
- PROVIDE SHUTOFF VALVES AND UNIONS OR FLANGES TO ISOLATE EACH ITEM OF EQUIPMENT.
- PROVIDE DIELECTRIC UNIONS AT ALL JUNCTIONS OF DISSIMILAR METALS.
- PROVIDE SHEET METAL SHIELDS FOR PIPING 2" AND SMALLER (EXCEPT WHERE REQUIRED TO BE CLAMPED) AND CALCIUM SILICATE THERMAL INSERT WITH SHEET METAL SHIELDS FOR PIPING LARGER THAN 2" AND FOR ALL SIZES OF INSULATED PIPING REQUIRED TO BE CLAMPED.
- PROVIDE ELECTROLYSIS ISOLATORS AT ALL HANGERS AND SUPPORTS FOR DOMESTIC WATER, CONDENSER WATER, AND OTHER WATER LINES WHICH ARE NOT INSULATED.
- TEST ALL PIPING SYSTEMS. CORRECT LEAKS BY REMAINING JOINTS. GIVE A MINIMUM OF TWENTY-FOUR (24) HOURS NOTICE TO ENGINEER OF DATES WHEN ACCEPTANCE TEST WILL BE CONDUCTED.

- ALL PIPING SHALL BE CLEANED AND FLUSHED PRIOR TO SERVICE.

- NEW DOMESTIC WATER SUPPLY AND DISTRIBUTION SYSTEMS SHALL BE PURGED AND STERILIZED BEFORE ACCEPTANCE FOR OPERATION, IN ACCORDANCE WITH IPC 2015 SECTION 610.

F. MECHANICAL IDENTIFICATION:

- LABEL ALL DUCT ACCESS DOORS, PIPING, EQUIPMENT AND THERMOSTATS. PIPING AND EQUIPMENT SHALL BE IDENTIFIED WITH LETTERS 2" HIGH AND 6" FLOW ARROWS.

G. VIBRATION CONTROL:

- ALL MECHANICAL EQUIPMENT, PIPING AND DUCTWORK AS NOTED OR IN THE SPECIFICATION, SHALL BE MOUNTED ON VIBRATION ISOLATORS TO PREVENT THE TRANSMISSION OF VIBRATION AND MECHANICALLY TRANSMITTED SOUND TO THE BUILDING STRUCTURE. VIBRATION ISOLATORS SHALL BE SELECTED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND THE WEIGHT DISTRIBUTION, SO AS TO PRODUCE REASONABLY UNIFORM DEFLECTION.

H. WATER DISTRIBUTION SYSTEM:

- ALL EQUIPMENT AND FIXTURES, WHICH ARE CONNECTED TO A POTABLE WATER SUPPLY, SHALL BE INSTALLED IN SUCH A MANNER AS TO ELIMINATE THE POSSIBILITY OF ANY PHYSICAL OR POTENTIAL CROSS-CONNECTION. VACUUM BREAKERS SHALL BE PROVIDED FOR ALL SUBMERGED/ENCLOSED OUTLETS AND INSTALLED A MINIMUM OF 6" ABOVE OVERFLOW RIM.
- INSTALL BACKFLOW PREVENTERS ON PLUMBING LINES WHERE CONTAMINATION OF DOMESTIC WATER MAY OCCUR.
- INSTALL PRESSURE REDUCING VALVES TO LIMIT MAXIMUM PRESSURE AT PLUMBING FIXTURES TO 65 PSIG.
- INSTALL WATER HAMMER ARRESTERS IN DOMESTIC WATER PIPING SYSTEM AT EACH SET OF FLUSH VALVES AND IN OTHER LOCATIONS WHERE HYDROSTATIC SHOCK PRESSURES COULD OCCUR.

I. PLUMBING FIXTURES:

- WHERE FIXTURES ARE SPECIFIED AS HANDICAPPED-ACCESSIBLE, IT SHALL BE THE SOLE RESPONSIBILITY OF ALL MANUFACTURERS AND/OR SUPPLIERS TO PROVIDE PLUMBING FIXTURES AND RELATED TRIM, WHICH MEET OR EXCEED THE ADA REQUIREMENTS. COORDINATE WITH ARCHITECTURAL DRAWINGS.
- FIXTURE MOUNTING HEIGHT AND ROUGH-IN DIMENSIONS SHALL BE AS INDICATED ON THE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.
- INSTALL DRAIN FLASHING COLLAR OR FLANGE, SO THAT NO LEAKAGE OCCURS BETWEEN DRAIN AND ADJOINING FLOORING. MAINTAIN INTEGRITY OF WATERPROOF MEMBRANES, WHERE PENETRATED.
- PROVIDE ISOLATION VALVES AT ALL PLUMBING FIXTURES.

J. METAL DUCTWORK:

- NEW RECTANGULAR DUCTWORK SHALL BE GALVANIZED SHEET METAL, INTERNALLY LINED WITH MINIMUM 1-1/2" THICK, 2 LB/QU.FT. DENSITY FIBERGLASS DUCT LINER, WITH MINIMUM NRC (NOISE REDUCTION COEFFICIENT) OF 0.70, MINIMUM INSULATION VALUE SHALL BE R-6. LINER SHALL BE U.L. APPROVED, MADE FROM FLAME ATTENUATED GLASS FIBER BONDED WITH A THERMOSETTING RESIN WITH ACRYLIC SMOOTH SURFACE TREATMENT AND FACTORY APPLIED EOE COATING.
- ALL DUCT DIMENSIONS ARE INSIDE CLEAR DIMENSIONS IN INCHES.
- USE MINIMUM 26 GA. WHERE DUCTS ARE WITHIN CORRIDORS.
- SMACNA STANDARDS: COMPLY WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE" FOR FABRICATION AND INSTALLATION OF METAL DUCTWORK. COMPLY WITH SMACNA "HVAC AIR DUCT LEAKAGE TEST MANUAL" FOR TESTING OF DUCT SYSTEMS.
- ALL RECTANGULAR DUCTWORK WITH 45 DEG. ELBOWS OR GREATER SHALL HAVE DOUBLE WALL TURNING VANES OR LONG RADIUS ELBOWS. PROVIDE LONG RADIUS ELBOWS FOR ROUND DUCTWORK.
- SEAL ALL DUCTWORK WITH NON-HARDENING, NON-MIGRATING MASTIC OR LIQUID ELASTIC SEALANT, IN TYPE APPLICABLE FOR FABRICATION/INSTALLATION DETAIL, AS COMPOUNDED AND RECOMMENDED BY MANUFACTURER, SPECIFICALLY FOR SEALING JOINTS AND SEAMS IN DUCTWORK.

- PROVIDE DUCT HANGERS IN ACCORDANCE WITH SMACNA HVAC DUCT MANUALS.

K. COMBINATION FIRE/SMOKE DAMPERS:

- PROVIDE AND INSTALL U.L. LABELED, CLASS II (FOR VELOCITIES UP TO 1,500 FPM) OR CLASS I (FOR VELOCITIES ABOVE 1500 FPM), MOTOR-DRIVEN COMBINATION FIRE/SMOKE DAMPERS AT ALL FIRE RATED WALLS, FULL DUCT SIZE, WITH TYPE 304 STAINLESS STEEL SIDE SEALS, COMBINATION SILICONE/CALVANIZED STEEL EDGE SEALS, BRONZE OLITE OR STAINLESS STEEL SLEEVE BEARINGS, AIRFOIL SHAPED GALVANIZED STEEL PARALLEL ACTING BLADES ALONG WITH OUT-OF-AIRSTREAM IN-JAMB LINGAGE WITH STAINLESS STEEL PIVOTS AND FACTORY SLEEVE, RED ENAMEL FINISH, CAULKED AND ATTACHED TO DAMPER IN ACCORDANCE WITH U.L. FIRE DAMPER REQUIREMENTS.
- FIRE/SMOKE DAMPERS SHALL BE ACTIVATED PER 2018 IMC SECTION 607.3.3.2. ACTIVATION SHALL BE COORDINATED BY GENERAL CONTRACTOR.

L. AIR OUTLETS AND INLETS:

- CEILING COMPATIBILITY: PROVIDE DIFFUSERS WITH BORDER STYLES THAT ARE COMPATIBLE WITH ADJACENT CEILING SYSTEMS, AND THAT ARE SPECIFICALLY MANUFACTURED TO FIT INTO CEILING MODULE WITH ACCURATE FIT AND ADEQUATE SUPPORT. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR TYPES OF CEILING SYSTEMS, WHICH WILL CONTAIN EACH TYPE OF CEILING AIR DIFFUSER.

M. CONTROLS:

- TEMPERATURE CONTROLS CONTRACTOR SHALL PROVIDE A COMPLETE NEW/MODIFIED CONTROL SYSTEM USING NEW CONTROL DEVICES AS REQUIRED OR TO REPLACEABLE EXISTING DEVICES FOR THE MECHANICAL SYSTEMS TO OPERATE AS REQUIRED. THE CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING A PROPOSAL.

- THE EXISTING TEMPERATURE CONTROL SYSTEM CONTROL DEVICES, DAMPERS, OPERATORS, WIRING, CONDUIT, AIR PIPING, VALVES, ETC. NOT BEING MODIFIED, AND WHICH ARE NO LONGER UTILIZED, SHALL BE REMOVED, AND NOT ABANDONED IN PLACE.

- CHECK AND MAKE OPERABLE ALL WIRING AND PNEUMATIC CONTROL TUBING FOR ALL THE SYSTEMS ASSOCIATED WITH THE PROJECT AREA.

- THE CONTROL CONTRACTOR WILL BE RESPONSIBLE FOR ALL INSTALLATION, PROGRAMMING, COMMISSIONING, TESTING AND PERFORMANCE VERIFICATION.
- THE CONTROLS CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING ALL DEVICES REQUIRED FOR A COMPLETE OPERATING CONTROL SYSTEM.

- PROVIDE 120V WIRING AS REQUIRED FOR THE TEMPERATURE CONTROL SYSTEMS, UNLESS SPECIFICALLY INDICATED ON ELECTRICAL DRAWINGS.

N. PIPING INSULATION:

- ALL NEW AND EXISTING PIPING SHALL BE INSULATED WITH FIBERGLASS PIPING INSULATION: "K" FACTOR SHALL BE MAXIMUM OF 0.24 AT 75° F MEAN TEMPERATURE. INSULATION SHALL HAVE JACKET WITH TENSILE STRENGTH OF 35 LBS/IN AND FACTORY APPLIED VAPOR BARRIER JACKET WITH PERMEABILITY OF 0.02 PERM WITH ADHESIVE SELF-SEALING LAP JOINT. SEE TABLE ON THIS SHEET FOR MINIMUM INSULATION THICKNESSES REQUIRED.

O. EXISTING INSULATION REPAIR:

- REPAIR DAMAGED SECTIONS OF EXISTING MECHANICAL INSULATION, BOTH PREVIOUSLY DAMAGED OR DAMAGED DURING THIS CONSTRUCTION PERIOD. USE INSULATION OF SAME THICKNESS AS EXISTING INSULATION; INSTALL NEW JACKET LAPPING AND SEAL OVER EXISTING.

TESTING, ADJUSTING AND BALANCING:

A. GENERAL:

- THE CONTRACTOR SHALL TEST, ADJUST AND BALANCE ALL AIR SIDE SYSTEMS AND EQUIPMENT, SUPPLY/RETURN AIR SYSTEMS, AIR TERMINALS, DIFFUSERS AND GRILLES, GENERAL EXHAUST/SUPPLY FANS, AIR HANDLING UNITS, TERMINAL UNITS, ETC. AND ALL HYDRONIC SYSTEMS AND EQUIPMENT; AND HEATING/CHILLED/CONDENSER WATER SYSTEMS, COILS, PUMPS, ETC.

B. QUALIFICATIONS OF CONTRACTOR:

- THE MECHANICAL CONTRACTOR SHALL PROCURE THE SERVICES OF AN INDEPENDENT TESTING AND BALANCING AGENCY (NOT ENGAGED IN ENGINEERING DESIGN AND IS NOT A DIVISION OF A MECHANICAL CONTRACTING ENTITY), SPECIALIZING IN THE TESTING, ADJUSTING AND BALANCING OF ENVIRONMENTAL SYSTEMS TO PERFORM THE ABOVE-MENTIONED WORK. WORK SHALL BE PERFORMED BY QUALIFIED TECHNICIANS, WHO ARE CURRENTLY CERTIFIED BY THE TESTING, ADJUSTING AND BALANCING BUREAU (TABB), THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), OR THE ASSOCIATED AIR BALANCE COUNCIL (AABC).

C. APPROVAL OF CONTRACTOR:

- THE FOLLOWING FIRMS ARE ACCEPTABLE TO PERFORM THE WORK:

COMPLETE MECHANICAL BALANCING, INC.	(303) 948-5429
DENVER TEST AND BALANCE, INC.	(303) 883-6535
TAB SERVICES, INC.	(303) 649-1213
JPG ENGINEERING, INC	(303) 688-9044

- ANY TESTING AND BALANCING FIRM OTHER THAN THE ACCEPTABLE FIRMS LISTED ABOVE, DESIRING TO OFFER THEIR SERVICES FOR THIS WORK, SHALL SUBMIT THEIR QUALIFICATIONS TO THE ENGINEER NOT LESS THAN SEVEN (7) WORKING DAYS PRIOR TO THE BID DATE.

D. TESTING PROCEDURES:

- TESTING AND BALANCING SHALL NOT BEGIN UNTIL THE SYSTEM HAS BEEN COMPLETED AND IS IN FULL WORKING ORDER.
- BEFORE ANY HYDRONIC, DOMESTIC WATER OR APPLICABLE SYSTEM BALANCING WORK IS DONE, THE SYSTEMS SHALL BE CHECKED FOR PLUGGED STRAINERS, PROPER PUMP ROTATION, CONTROL VALVE INSTALLATION AND OPERATION, AIR LOCKS, SYSTEM STATIC PRESSURE, FLOW METER, AND CHECK VALVE INSTALLATION. ALL THROTTLING DEVICES AND CONTROL VALVES SHALL BE OPEN AT THIS TIME.

E. GENERAL SYSTEM AND EQUIPMENT PROCEDURES:

- BALANCE ALL AIR AND WATER FLOWS AT TERMINALS TO WITHIN +10% TO -5% OF DESIGN FLOW QUANTITIES. NOTIFY CONTRACTOR/ENGINEER IN WRITING OF CONDITIONS DETRIMENTAL TO THE PROPER COMPLETION OF THE TEST AND BALANCE WORK.
- MINIMUM COOLING CFM FOR VAV TERMINALS SHALL BE SET AT 10% OF MAXIMUM DESIGN.
- RECORD PRIMARY AND AMBIENT AIR, DRY BULB AND WET BULB TEMPERATURES AT THE TIME OF TESTING.
- CHECK AND CALIBRATE ALL THERMOSTATS AND TEMPERATURE SENSORS; REPORT TO THE GENERAL CONTRACTOR ANY MALFUNCTIONING THERMOSTAT AND SENSORS; AND REPAIR OR REPLACE AS REQUIRED. THERMOSTATS OR SENSORS SHALL BE SET FOR:
HEATING MODE-SET AND LOCK AT 72 DEGREES F +/- 2 DEGREES F.
COOLING MODE-SET AND LOCK AT 75 DEGREES F +/- 2 DEGREES F.

F. TEST AND BALANCE REQUIREMENTS:

- HYDRONIC SYSTEMS: HEATING/CHILLED AND CONDENSER WATER SYSTEMS; THE SYSTEM SHALL BE BALANCED PROPORTIONALLY USING THE FLOW METERS. ON COMPLETION OF THE BALANCE, THE FOLLOWING INFORMATION SHALL BE RECORDED IN THE REPORT: FLOW METER SIZE AND BRAND; REQUIRED FLOW RATE AND PRESSURE DROP; VALVE SETTINGS ON METERS WITH A READABLE SCALE; AND FLOW RATE IN BOTH FULL COIL FLOW AND FULL BYPASS MODES.

- EQUIPMENT: PROVIDE FACTORY START-UP AND REPORT FOR ALL NEW AND EXISTING HVAC UNITS, AUX, AIR CONDITIONING SYSTEMS, ETC. REPORT SHALL INCLUDE NAMEPLATE DATA, DESIGN DATA, MEASURED MOTOR AMP DRAW, VOLTAGE, DISCHARGE AND SUCTION STATIC PRESSURE AND TEMPERATURE, MEASURE ADJUST AND REPORT AIRFLOWS, SET VFD SPEEDS OF VARIABLE-SPEED FAN SYSTEM, CHECK AND VERIFY ACTIVATION OF ELECTRIC AND GAS FIRED EQUIPMENT.

G. REPORT OF WORK:

- THE TESTING AND BALANCING CONTRACTOR SHALL SUBMIT TWO (2) BOUND COPIES AND ONE (1) ELECTRONIC FILE OF THE FINAL TESTING AND BALANCING REPORT AT LEAST FIFTEEN (15) CALENDAR DAYS PRIOR TO THE DATE FOR WHICH THE MECHANICAL CONTRACTOR REQUESTS FINAL INSPECTION.
- A COMPLETE REDUCED SET OF MECHANICAL CONTRACT DRAWINGS (SHOWING EACH SYSTEM) SHALL BE INCLUDED IN THE REPORT, WITH ALL EQUIPMENT, FLOW MEASURING DEVICES, TERMINALS, CLEARLY MARKED AND ALL EQUIPMENT DESIGNATED. THE TEST AND BALANCE CONTRACTOR CAN OBTAIN DRAWING FILES FROM THE ENGINEER FOR DEVELOPMENT OF THESE DRAWINGS.
- THE REPORT SHALL INCLUDE A LIST OF ALL EQUIPMENT USED IN THE TESTING AND BALANCING WORK.
- THIS PROJECT WILL NOT BE CONSIDERED SUBSTANTIALLY COMPLETE UNTIL A SATISFACTORY REPORT IS RECEIVED. THE TESTING AND BALANCING CONTRACTOR SHALL RESPOND TO AND CORRECT ALL DEFICIENCIES WITHIN SEVEN (7) DAYS OF RECEIVING THE ENGINEER'S WRITTEN REVIEW OF THE BALANCING REPORT. FAILURE TO COMPLY WILL RESULT IN HOLDING RETAINAGE OF THE FINAL PAYMENT UNTIL ALL ITEMS HAVE BEEN CORRECTED TO THE SATISFACTION OF THE ENGINEER.

H. GUARANTEE OF WORK:

- THE TESTING AND BALANCING CONTRACTOR SHALL GUARANTEE THE ACCURACY OF THE TESTING AND BALANCING FOR A PERIOD OF 90 DAYS FROM THE DATE OF FINAL ACCEPTANCE OF THE TEST AND BALANCE REPORT. DURING THIS PERIOD, THE TESTING AND BALANCING CONTRACTOR SHALL MAKE PERSONNEL AVAILABLE, AT NO COST TO THE OWNER, TO CORRECT DEFICIENCIES THAT MAY BECOME APPARENT IN THE SYSTEM BALANCE.

PIPING INSULATION TABLE

PIPING SYSTEM TYPE	MINIMUM INSULATION THICKNESS (IN.) FOR PIPE SIZES	
	UP TO 1"	1-1/2" - 8"

DOMESTIC COLD WATER AND CONDENSATE DRAINS.	0.5	1.0
DOMESTIC HOT WATER PIPING (CIRCULATING AND NON-CIRCULATING).	1.0	1.5
SANITARY WASTE PIPING EXPOSED TO OUTDOOR AMBIENT TEMPERATURES.	N/A	2.0
HVAC CHILLED WATER SUPPLY AND RETURN.	1.0	1.0
HVAC SPACE HEATING WATER SUPPLY AND RETURN.	1.5	2.0
REFRIGERANT SUCTION LINES.	1.0	1.0
REFRIGERANT HOT GAS LINES.	1.0	1.5

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SEAL



December 02, 2024

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LITTLETON MUSEUM RETROFIT
6028 S GALLUP ST, LITTLETON, CO 80120

NO.	REVISION/ISSUE	DATE
	PERMIT ISSUE	12.02.2024

MDP JOB #: 23047.01

DESCRIPTION:

MECHANICAL GENERAL NOTES

DRAWN BY:	CHECKED BY:
JB/BR	DP/ER
DATE:	SCALE:
12.02.24	AS NOTED

SHEET:

M0.0

Drawing: J:\6028 S Gallup St\23047.01 - Littleton Museum Retrofit\01 Drawings\2024\11-18 - Permit Update\MO.1 - Legend And Site Plan.dwg Plotted by: Joseph Barnard On: Monday, December 2, 2024 5:07:00 PM



(E) ROOF HATCH
GENERAL LOCATION
OF MECHANICAL
ROOM IN BUILDING

(E) RTU-1
(E) RTU-2
(E) RTU-3



1 SITE PLAN
SCALE: NO SCALE

APPLICABLE CODES

2021 ICC
2021 INTERNATIONAL FIRE CODE
2021 IFGC
2020 NEC

MECHANICAL LEGEND

NOT ALL SYMBOLS SHOWN ARE NECESSARILY USED ON THESE DRAWINGS

HVAC DUCTWORK, AIR DEVICES AND SYMBOLS

SYMBOL		DESCRIPTION
		DOUBLE-LINE AND SINGLE LINE RECTANGULAR DUCT. FIRST NUMBER INDICATES WIDTH IN INCHES, SECOND NUMBER INDICATES DEPTH IN INCHES
		DOUBLE-LINE AND SINGLE LINE ROUND DUCT. NUMBER INDICATES DIAMETER IN INCHES.
		ACOUSTICAL LINED RECTANGULAR DUCT SIZES GIVEN INDICATE CLEAR INSIDE DIMENSIONS IN INCHES.
		DOUBLE LINE AND SINGLE LINE CHANGE IN ELEVATION.
		DOUBLE-LINE AND SINGLE LINE EXISTING DUCTWORK TO REMAIN
		DOUBLE-LINE AND SINGLE LINE EXISTING DUCTWORK WHICH SHALL BE REMOVED OR RELOCATED AND REUSED WHERE POSSIBLE.
		FLEXIBLE DUCT
		DOUBLE-LINE AND SINGLE LINE DUCT TRANSITION
		DOUBLE-LINE AND SINGLE LINE RECTANGULAR DUCT ELBOW WITH TURNING VANES
		SINGLE LINE DUCT WITH RADIUS ELBOW
		DOUBLE-LINE AND SINGLE LINE CONICAL TAP
		DOUBLE-LINE AND SINGLE LINE DUCT WITH SPIN-IN FITTING AND VOLUME DAMPER
UP	DOWN	
		RECTANGULAR DUCT SECTION, SUPPLY
		RECTANGULAR DUCT SECTION, RETURN
		RECTANGULAR DUCT SECTION, EXHAUST
		ROUND VERTICAL DUCT
		MANUAL VOLUME DAMPER
		BACKDRAFT DAMPER
		FIRE DAMPER (WITH ACCESS PANEL)
		FIRE/SMOKE DAMPER (WITH ACCESS PANEL)
		DOUBLE LINE AND SINGLE LINE DUCT ENDCAP

	TEMPERATURE SENSOR
	HUMIDISTAT
	CO SENSOR
	CO2 SENSOR
	ACCESS PANEL (AP)
	VARIABLE FREQUENCY MOTOR DRIVE (VFD)
	UNDERCUT DOOR BY MEASUREMENT INDICATED
	AIRFLOW SUPPLY
	AIRFLOW RETURN OR EXHAUST

PLUMBING SPECIALTIES

SYMBOL	DESCRIPTION
	FLOOR DRAIN (FD)
	FLOOR SINK (FS) (ROUND OR SQUARE)
	FLOOR CLEANOUT (FCO)
	WALL CLEANOUT (WCO)
	BACKFLOW PREVENTER (BFP)

ABBREVIATIONS

ABBR.	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
BOD	BOTTOM OF DUCT
BTUH	BRITISH THERMAL UNITS PER HOUR
CFM	CUBIC FEET/PER MINUTE
DB	DRY BULB TEMPERATURE
DIA	DIAMETER
DN	DOWN
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EFF	EFFICIENCY
ELEV	ELEVATION
EW	ENTERING WATER TEMPERATURE
(E)	EXISTING
FLR	FLOOR
FFM	FEET PER MINUTE
GFPM	GALLONS PER MINUTE
MAX	MAXIMUM
MFR	MANUFACTURER
MIN	MINIMUM
(N)	NEW
N/A	NOT APPLICABLE
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OA	OUTSIDE AIR
RA	RETURN AIR
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VIR	VENT THROUGH ROOF
W/O	WITHOUT

PIPE SYMBOLS

SYMBOL	DESCRIPTION
	INDICATION OF PITCH GOING UP OR DOWN
	DIRECTION OF FLOW

HVAC PIPING

LINE TYPE	DESCRIPTION
	NEW PIPING (LINE TYPE VARIES PER SYSTEM)
	EXISTING PIPING (LINE TYPE VARIES PER SYSTEM)
	PIPE TO BE REMOVED
	HATCH INDICATING DEMOLITION WORK
	CONDENSER WATER SUPPLY
	CONDENSER WATER RETURN
	CHILLED WATER SUPPLY
	CHILLED WATER RETURN
	HEATING WATER SUPPLY
	HEATING WATER RETURN

PLUMBING PIPING

LINE TYPE	DESCRIPTION
	DOMESTIC COLD WATER (CW)
	DOMESTIC HOT WATER (HW)
	DOMESTIC HOT WATER CIRCULATING (HWC)
	NATURAL FUEL GAS
	SANITARY WASTE (ABOVE FLOOR/GRADE)
	SANITARY WASTE (BELOW FLOOR/GRADE)
	GREASE WASTE (ABOVE FLOOR/GRADE)
	GREASE WASTE (BELOW FLOOR/GRADE)
	STORM DRAIN (ABOVE FLOOR/GRADE)
	STORM DRAIN (BELOW FLOOR/GRADE)
	DRAIN (ABOVE FLOOR/GRADE)
	DRAIN (BELOW FLOOR/GRADE)
	SANITARY VENT

GENERAL / MISCELLANEOUS

SYMBOL	DESCRIPTION
	POINT OF CONNECTION TO EXISTING SYSTEM (POC)
	DETAIL NUMBER OR PLUMBING RISER NUMBER
	SHEET NUMBER WHERE DETAIL FOR RISER IS SHOWN
	SECTION POINT OF VIEW
	SECTION DESIGNATION
	SECTION NUMBER WHERE SECTION IS SHOWN
	BOLD LINES INDICATE NEW OR RELOCATED EQUIPMENT. NEW EQUIPMENT MAY BE NOTED (N). RELOCATED EQUIPMENT MAY BE NOTED (R).
	LIGHT LINES INDICATED EXISTING EQUIPMENT TO REMAIN. EXISTING EQUIPMENT MAY BE NOTED (E).
	DASHED LINES INDICATE EXISTING EQUIPMENT TO BE REMOVED OR RELOCATED AND REUSED WHERE POSSIBLE.

SPRINKLERS

SYMBOL	DESCRIPTION
	EXISTING SPRINKLER HEAD SHOWN FOR REFERENCE ONLY

VALVES AND SPECIALTIES

SYMBOL	DESCRIPTION
	BALL VALVE
	BUTTERFLY VALVE
	HOSE END VALVE
	PRESSURE REDUCING VALVE
	CHECK VALVE
	GAUGE COCK VALVE
	GAS COCK OR PLUG VALVE
	VENTURI METER
	PRESSURE RELIEF VALVE
	STRAINER
	STRAINER WITH BLOW-OFF
	BALANCING COCK
	COMBINATION BALANCING COCK/ FLOW MEASURING DEVICE
	FLEXIBLE PIPE CONNECTOR
	AIR VENT - AUTOMATIC
	AIR VENT - MANUAL
	METER
	PRESSURE/TEMPERATURE TEST POINT
	PRESSURE GAUGE
	PRESSURE GAUGE AND COCK
	THERMOMETER AND THERMOWELL
	OPEN FUNNEL DRAIN

PIPE FITTINGS

LINE TYPE	DESCRIPTION
	VERTICAL PIPE (UP OR DOWN)
	PIPING CAP OR PLUG
	PIPING ELBOW UP
	PIPING ELBOW DOWN
	PIPING REDUCER, CONCENTRIC (FLAT ON TOP)
	PIPING REDUCER, ECCENTRIC (FLAT ON BOTTOM)
	PIPING ELBOW DOWN TO TEE
	PIPING ELBOW UP TO TEE
	PIPING TEE UP
	PIPING TEE DOWN
	UNION, SCREWED
	UNION, FLANGED

SEAL



December 02, 2024

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NO.	REVISION/ISSUE	DATE
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MDP JOB #: 23047.01

DESCRIPTION:

LEGEND AND SITE PLAN

DRAWN BY:	CHECKED BY:
JB/BR	DPIER
DATE:	SCALE:
12.02.24	AS NOTED
SHEET:	

M0.1



ROOF MOUNTED AIR HANDLING UNIT SCHEDULE																																										
TAG	MANUF.	MODEL NO.	NOM. TONS	SERVICE/ LOCATION	SUPPLY FAN SECTION					RETURN FAN SECTION					WATER COIL DATA											FILTER			VIBRATION ISOLATION	UNIT TOTAL ELEC. SERVICE				OPERAT. WEIGHT (LBS)	SPECIFIC NOTES							
					CFM	E.S.P. (IN. W.C. @ ALT.)	T.S.P. (IN. W.C. @ ALT.)	WHEEL DIA. (IN.)	FAN QTY.	RPM	H.P. (PER FAN)	ELECTRICAL VOLTS/PH/Hz	CFM	E.S.P. (IN. W.C. @ ALT.)	WHEEL DIA. (IN.)	FAN QTY.	RPM	H.P. (PER FAN)	ELECTRICAL VOLTS/PH/Hz	SERVICE	MAX. FACE VEL. (FPM)	COIL CFM	MAX. AIR P.D. IN W.C. @ S.L.	ENT. AIR TEMP DB/WB (°F)	LVG. AIR TEMP DB/WB (°F)	EWT/LWT (°F)	MBH TOTAL/SENS.	GPM		% P.G. SOLUTION	MAX. WATER P.D. FT. W.C.	ROWS	FINS PER FOOT			TYPE	MAX VEL. FPM	INITIAL P.D. IN W.C. @ S.L.	VOLTS/PH/Hz	FLA	MCA	MOCP
RTU-1	TRANE	PSCA034	49	ROOF	19,200	1.5	4.42	17.7	5	2,306	6	480/3/60	19,200	1.25	22	3	1,386	6	480/3/60	HEATING COOLING	589 573	19,200 19,200	0.177 0.86	-10/- 89/61	80/- 55/48.9	180/150 43/55	1,541.88 589.17	110.6 110.03	40 40	4.97 11.74	2 8	121 145	PLEATED MERV 8	360	0.595	SPRING	480/3/60	49.61	51.15	60	15,000	
RTU-2	TRANE	CSAA021	24	ROOF	11,735	2.5	5.54	12.2	5	3,963	4	480/3/60	11,735	1.0	17.7	2	2,136	6	480/3/60	HEATING COOLING	592 592	11,735 11,735	0.096 0.405	49/- 82/59	80/- 55/49.2	180/150 43/55	324.6 286.03	23.28 53.42	40 40	1.37 6.39	1 6	114 96	PLEATED MERV 8	352	0.592	SPRING	480/3/60	34.83	36.37	40	8,100	
RTU-3	TRANE	CSAA010	12	ROOF	3,700	1.0	3.23	17.7	1	2,034	6	480/3/60	3,700	0.75	17.7	1	1,460	6	480/3/60	HEATING COOLING	403 403	3,700 3,700	0.069 0.307	37/- 84/59	80/- 52/47.2	180/150 43/55	141.96 106.8	10.18 19.94	40 40	0.40 1.92	1 6	141 126	PLEATED MERV 8	266	0.536	SPRING	480/3/60	13.58	15.12	20	5,600	
GENERAL NOTES																																										
1. SUBMITTALS – INDICATE CAPACITIES, ASSEMBLY, UNIT DIMENSIONS, WEIGHT LOADING, REQUIRED CLEARANCES, CONSTRUCTION DETAILS, FIELD CONNECTION DETAILS, COOLING AND HEATING CAPACITIES, ELECTRICAL CHARACTERISTICS AND CONNECTION REQUIREMENTS. SUBMIT SOUND DATA BY OCTAVE BAND.																																										
2. BASIS OF DESIGN TRANE.																																										
3. GENERAL – INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION & MAINTENANCE INSTRUCTIONS. AIR HANDLING UNITS SHALL BE UL LISTED; ALL UNITS SHALL BE FIELD LABELED WITH UNIT NUMBER AND AREA SERVED. COORDINATE UNIT LOCATION WITH STRUCTURAL ENGINEER; MAINTAIN ALL REQUIRED SERVICE AND AIR CIRCULATION CLEARANCES; COMPLY WITH MANUFACTURER'S REQUIREMENTS; CAPACITIES LISTED ON SCHEDULE ARE AT JOB SITE ALTITUDE; STARTUP MUST BE DONE BY FACTORY TRAINED PERSONNEL.																																										
4. INSTALL UNIT WITH ADEQUATE CLEARANCE FOR COIL PULL, FILTER REPLACEMENT AND TO FULLY OPEN ACCESS DOORS. PROVIDE ALL REQUIRED ACCESS DOORS. PROVIDE A MINIMUM OF 3 FEET CLEARANCE IN FRONT OF DISCONNECT SWITCHES AND CONTROL PANELS AS REQUIRED BY NEC.																																										
5. WARRANTY – THE MANUFACTURER SHALL PROVIDE 12 MONTH PARTS AND LABOR WARRANTY, WITH AN ADDITIONAL EXTENDED 48 MONTH PARTS ONLY WARRANTY ON THE COMPRESSOR.																																										
6. UNIT TO UTILIZE EXISTING ROOF CURB AS MUCH AS POSSIBLE. PROVIDE ADAPTATIONS TO CURB FOR NEW RTU FOOTPRINT.																																										
7. OUTDOOR ROOFTOP UNIT– CABINET CONSTRUCTION–WELDED, TUBULAR STEEL AND CHANNEL FRAMEWORK; PANELS AND ACCESS DOORS SHALL BE DOUBLE WALL, FULL SOLID LINERS, 18 GAUGE EXTERIOR BAKED POWDER COAT; 20 GAUGE INNER GALVANIZED STEEL, MIN. 2-INCH THICK; THERMAL BROKE ASSEMBLY; FOAM INSULATION, MIN. R-13. SERVICE DOORS SHALL BE PROVIDED ON BOTH SIDES OF EACH SECTION.																																										
8. SUPPLY / RETURN FANS– FAN ASSEMBLIES INCLUDING FAN, MOTOR AND SHEAVES SHALL BE STATICALLY AND DYNAMICALLY BALANCED AT THE FACTORY WITH INTERNAL ISOLATION. MOTORS SHALL BE PREMIUM EFFICIENCY; UNIT MOUNTED VARIABLE FREQUENCY DRIVE WITH DISCONNECT PER FAN.																																										
9. ELECTRICAL – UNIT WIRING SHALL COMPLY WITH NEC AND UL STANDARDS. PROVIDE MARINE LIGHT IN EACH SECTION MOUNTED AND WIRED TO A JUNCTION BOX; PROVIDE FIELD SUPPLIED 115V POWER AND GFI RECEPTACLE; SINGLE FUSED DISCONNECT SWITCH SHALL BE PROVIDED; FACTORY MOUNTED FIRE STAT, FREEZE STAT AND SMOKE DETECTORS IN THE SUPPLY AND RETURN AIR OPENINGS.																																										
10. WATER COOLING AND HEATING COILS – HEADERS SHALL CONSIST OF SEAMLESS COPPER TUBING WITH FINS OF ALUMINUM PLATE CONSTRUCTION. COIL TUBES SHALL BE 5/8 INCH DIAMETER SEAMLESS COPPER BRAZED AT JOINTS.																																										
11. PROVIDE ACCESS TO COILS FOR SERVICE AND CLEANING. – PROVIDE STAINLESS STEEL, POSITIVELY SLOPED DRAIN PAN WITH THE COOLING COIL WITH 3" CONDENSATE P-TRAP.																																										
12. MIXING BOX SECTION SHALL BE PROVIDED WITH OUTSIDE AND RETURN AIR DAMPERS. 0 TO 100% ECONOMIZER SECTION WITH OUTSIDE AIR, RETURN AIR AND EXHAUST DAMPER(S), WITH OUTSIDE AIR HOOD WITH BIRD SCREEN AND MOISTURE ELIMINATOR, AND WITH OUTSIDE AIRFLOW MONITORING STATION.																																										
13. DAMPERS – MODULATING TYPE – LEAKAGE RATE SHALL BE LESS THAN 0.2% AT 2 INCHES STATIC PRESSURE DIFFERENTIAL TESTED IN ACCORDANCE WITH AMCA STANDARD 500.																																										
14. BLENDER / AIR MIXER SECTION TO PROVIDE PROPER AIR MIXING AND DISTRIBUTION OF THE OUTSIDE AND RETURN AIRSTREAMS.																																										
15. SOUND ATTENUATOR SECTION(S) SHALL BE PROVIDED BY THE AIR HANDLING UNIT MANUFACTURER AS AN INTEGRAL SECTION OF THE UNIT TO ATTENUATE FAN NOISE AT THE SOURCE. PROVIDE ACOUSTIC PERFORMANCE AND AIR PRESSURE DROP AS SCHEDULED.																																										
16. EACH UNIT SHALL BE EQUIPPED WITH A COMPLETE MICROPROCESSOR BASED CONTROL SYSTEM. THE UNIT CONTROL SYSTEM SHALL INCLUDE ALL REQUIRED TEMPERATURE AND PRESSURE SENSORS, INPUT/OUTPUT BOARDS, MAIN MICROPROCESSOR AND OPERATOR INTERFACE.																																										
17. SUPPLY AIR FAN TO BE CONTROLLED BY DUCT STATIC PRESSURE. RETURN / EXHAUST FAN TO BE CONTROLLED VIA DIRECT BUILDING STATIC PRESSURE.																																										
18. THE MICROPROCESSOR SHALL HAVE A BUILT-IN PROGRAMMABLE TIME SCHEDULE AND HOLIDAY SCHEDULE. EACH UNIT SHALL ALSO HAVE THE ABILITY TO ACCEPT A TIME SCHEDULE VIA BAS NETWORK COMMUNICATIONS.																																										
19. OPEN COMMUNICATIONS PROTOCOL – THE UNIT CONTROL SYSTEM SHALL HAVE THE ABILITY TO COMMUNICATE TO AN INDEPENDENT BUILDING MANAGEMENT SYSTEM (BMS).																																										
20. PROVIDE AIRFLOW MONITORING STATION ON OUTSIDE AIR.																																										
21. VFD SHALL BE BE CAPABLE OF ACCEPTING INPUT/OUTPUT SPEED AND STATUS SIGNALS FROM FIRE ALARM SYSTEM. APPROVAL OF VFD SUBMITTAL BY FIRE ALARM CONTRACTOR IS REQUIRED PRIOR TO PURCHASE OF VFD.																																										

BOILER SCHEDULE																							
TAG	MANUF.	MODEL	LOCATION	BOILER TYPE	INPUT (MBH)	OUTPUT (MBH) @ ALT.	AHRJ THERMAL EFF. (%)	TURN DOWN	FUEL TYPE	MIN/MAX GAS INLET PRESSURE (IN W.G.)	DESIGN FLOW (GPM)	EWT/LWT (°F)	MAX. WATER P.D. FT. W.G.	% PG SOLUTION	MAX. PRESSURE RATING	COMBUSTION AIR INLET SIZE (IN)	FLUE VENT OUTLET SIZE (IN)	ASME RATED	UNIT ELECTRICAL SERVICE		VIBRATION ISOLATION	OPERATIONAL WEIGHT (LBS)	SPECIFIC NOTES
																			VOLTS/PH/HZ	MOCP			
B-1	AERCO	BMK 2000	MECHANICAL ROOM	CONDENSING	2,000	1,636	94.6	20:1	NATURAL GAS	4"-14"	131	155/180	6.93	40	160	12	12	YES	120/1/60	20	NONE	1,700	
B-2	AERCO	BMK 2000	MECHANICAL ROOM	CONDENSING	2,000	1,636	94.6	20:1	NATURAL GAS	4"-14"	131	155/180	6.93	40	160	12	12	YES	120/1/60	20	NONE	1,700	
GENERAL NOTES 1. PROVIDE MANUFACTURER VENTLESS GAS TRAIN OR GAS PRESSURE REGULATOR AND VENT TO OUTSIDE PER MANUFACTURERS RECOMMENDATIONS. 2. PROVIDE CONDENSATE NEUTRALIZATION KIT FOR EACH BOILER. 3. BOILER AND PUMP TO BE WIRED ON SEPARATE CIRCUITS, REFER TO ELECTRICAL PLANS. DUAL POINT OF CONNECTION. PROVIDE FUSED DISCONNECT. 4. LOW WATER FLOW SAFETY CONTROLLER. 5. PROVIDE OUTDOOR AIR SENSOR CONNECTED TO BOILER CONTROLLER. 6. PROVIDE SMART TOUCH OPERATING CONTROL WITH LCD DISPLAY. EACH PAIR OF BOILERS TO BE INTERLOCKED AND SEQUENCED FROM A SINGLE CONTROLLER. 7. PROVIDE AND INSTALL FLUE VENT PER MANUFACTURER'S INSTRUCTIONS, UTILIZE PVC PIPE MATERIAL RECOMMENDED BY MANUFACTURER AND RATED FOR CATEGORY IV APPLIANCES. 8. FLUE DESIGNS AND SIZING BY MANUFACTURER. SUBMIT FLUE STACK PRESSURE CALCULATIONS IN HIGH AND LOW FIRING RANGE. PROVIDE MOTORIZED FLUE DAMPER IF REQUIRED. 9. PROVIDE ADJUSTABLE HIGH LIMIT CONTROL WITH MANUAL RESET. 10. PROVIDE SUPPLY TEMPERATURE AND OUTSIDE AIR TEMPERATURE SENSORS FOR BOILER CONTROL. 11. PROVIDE FACTORY INSTALLED ASME RELIEF VALVES SET TO 75 PSI. 12. PIPE FLUE DRAINS TO NEAREST FLOOR DRAIN. 13. REQUIRED APPROVALS: CSD1, FM, GE, AND SCAQMD. 14. 10 YEAR HEAT EXCHANGER WARRANTY.																							

HVAC PUMP SCHEDULE																				
TAG	MANUF.	MODEL NO.	SERVICE	LOCATION	PUMP TYPE	FLOW (GPM)	HEAD (FEET)	EFF. (%)	SUCTION DIAMETER (IN)	DISCHARGE DIAMETER (IN)	IMPELLER DIAMETER (IN)	NPSHR (FT)	PUMP RPM	DESIGN PRESSURE (PSIG)	% PG SOLUTION	MOTOR DATA		VIBRATION ISOLATION	OPERATIONAL WEIGHT (LBS)	SPECIFIC NOTES
																H.P.	VOLTS/PH/Hz			
P-1	TACO	VR SERIES – VR30H	BOILER PUMP	MECHANICAL ROOM	INLINE	140	30	63%	3	3	–	–	4,100	175	40	2	208/1/60	SPRING ISOLATORS	100	INTERLOCK WITH B-1
P-2	TACO	VR SERIES – VR30H	BOILER PUMP	MECHANICAL ROOM	INLINE	140	30	63%	3	3	–	–	4,100	175	40	2	208/1/60	SPRING ISOLATORS	100	INTERLOCK WITH B-2
P-3	GRUNDFOS	NBS 025–095–4P	HEATING WATER SYSTEM	MECHANICAL ROOM	END SUCTION	355	70	78.6%	3	3	9.5	12.91	1,770	175	40	10	480/3/60	SPRING ISOLATION BASE	450	1,2,3
P-4	GRUNDFOS	NBS 025–095–4P	HEATING WATER SYSTEM	MECHANICAL ROOM	END SUCTION	355	70	78.6%	3	3	9.5	12.91	1,770	175	40	10	480/3/60	SPRING ISOLATION BASE	450	1,2,3
SPECIFIC NOTES					GENERAL NOTES															
1. PROVIDE WITH VARIABLE FREQUENCY DRIVE.					1. PREMIUM EFFICIENCY MOTOR.															
2. PROVIDE WITH SUCTION DIFFUSER AND STARTUP STRAINER.																				
3. BASE MOUNTED ON CONCRETE INERTIA BASE.																				

UNIT HEATER SCHEDULE (ELECTRIC)														
TAG	MANUF.	MODEL NO.	TYPE	AREA SERVED	CONFIG.	CFM	ELECTRIC COIL			UNIT TOTAL ELECTRICAL SERVICE			OPERATIONAL WEIGHT (LBS)	SPECIFIC NOTES
							HEATING CAPACITY (KW)	EAT/LAT (°)	HEATING STAGES	VOLTS/PH/HZ	FLA	MOCP		
EHU-1	TRANE	UHEC-0530ACA	UNIT HEATER	MECHANICAL ROOM	WALL MOUNT	400	5.0	32/80	1	480/3/60	6.1	15	30	
GENERAL NOTES														
1. UNIT-MOUNTED THERMOSTAT.														
2. PROVIDE WITH INTEGRAL DISCONNECT.														
3. WALL MOUNTED PER MANUFACTURER'S SPECIFICATIONS														

STEAM HUMIDIFIER														
TAG	MANUF.	MODEL NO.	SERVICE/ LOCATION	CAPACITY (LBS/HR)	DESIGN AIRFLOW (CFM)	MAX. OUTLET PRESSURE (IN W.C.)	HEATER QTY.	INPUT (MBH)	GAS INLET SIZE (IN)	UNIT TOTAL ELECT. SERVICE			OPERAT. WEIGHT (LBS)	SPECIFIC NOTES
										POWER (WATTS)	VOLTS/PH/Hz			
SH-1	CAREL	UG300X1105	ROOF	660	19,200	8	2	737.0	1-1/4	400	120/1/60	870		
SH-2	CAREL	UG150X1105	ROOF	330	11,735	8	2	368.5	1	260	120/1/60	620		
SH-3	CAREL	UG045X1105	ROOF	100	3,700	8	2	118.7	1	180	120/1/60	620		
SPECIFIC NOTES 1. INTERLOCK WITH ASSOCIATED RTU. 2. PROVIDE WITH INSULATED ROOF CURB. 3. PROVIDE WITH DUCT TEMP SENSOR.														

MISCELLANEOUS EQUIPMENT SCHEDULE	
TAG	DESCRIPTION
AS-1	AIR SEPARATOR: B&G ROLAIRTRUL R-5F, 5" FLANGED CONNECTION, 500 GPM CAPACITY, 125 PSI WORKING PRESSURE
EI-2	HYDRONIC HEATING WATER: ASME VERTICAL FLOOR MOUNTED EXPANSION TANK, AMTROL MODEL AX-144V, 77 GALLON, 24"ø X 52", 240°F TEMP RATING, 175 PSIG PRESSURE RATING.
WSS-1	WATER SOFTENING SYSTEM: WATER CONTROL CORPORATION MODEL EFT-48-MR, TWO(2) FIBERGLASS RESIN TANKS (10" DIAM. X 55" TALL), ONE(1) POLYETHYLENE BRINE TANK (18" DIAM. X 33" TALL). MINIMUM 12 GPM (7 PSI PRESSURE LOSS) AND MAXIMUM 22 GPM (25 PSI PRESSURE LOSS). MINIMUM 96,000 GRAINS OF SOFTENING PER GENERATION, 13 LBS SALT DOSAGE PER CUBIC FOOT OF RESIN. 115V/1PH/60HZ, 3.5 FLA.



1800 GLENARM PLACE, SUITE 800
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SEAL



December 02, 2024

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LITTLETON MUSEUM RETROFIT
6028 S GALLUP ST, LITTLETON, CO 80120

NO.	REVISION/ISSUE	DATE
	PERMIT ISSUE	12.02.2024

MDP JOB #: 23047.01

DESCRIPTION:

MECHANICAL SCHEDULES

DRAWN BY:	CHECKED BY:
JB/BR	DPI/ER
DATE:	SCALE:
12.02.24	AS NOTED
SHEET:	

M0.2



Job Name: Littleton Historical Museum AHU and Boiler Plant R

PSCA
Quantity: 1
Tag: RTU-1 REV

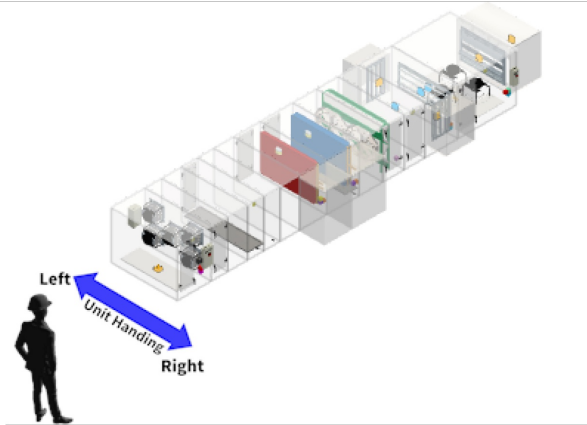
Trane Performance Climate Changer Air Handler

Unit Overview - RTU-1 REV						
Application	Unit Size	External Dimensions			Weight	
		Height	Width	Length	Installed	Rigging
Outdoor unit	34	74.7 in	100.0 in	512.879 in	13694 lb	12196 lb
Quantity of Shipping Sections		Largest Ship Split		Length	Heaviest Ship Split	Elevation
		Height	Width			
6 piece(s)		74.7 in	100.0 in	106.2 in	3910 lb	5300.00 ft
Supply Fan						
Airflow	19200 cfm	Total Static Pressure	4.416 in H2O	Airflow	19200 cfm	Total Static Pressure
						1.553 in H2O

Note: Height includes air handler sloped roof panel and standing seam.

Construction Features

Panel	2 in. foam injected R-13 w therm break
Panel Material	All unit inner panels - galvanized
Integral Base Frame	7.25 in. integral base frame
Paint	Slate gray
Short Circuit Current Rating	5 kA
Agency Approval	UL listed unit
Roof Curb Type	Standard roof curb



Unit Electrical

Circuit	Voltage/Phase/Frequency	FLA	MCA	Max Fuse Size
Circuit number 1 SPP (Field provided unit disconnect)	460/3/60	49.61 A	51.15	60.00
Circuit number 2 Receptacle	115/1/60	8.00 A	10.00	15.00

Unit Controls

Factory Controls Package	Variable volume
Controller Type	Symbio
Controller mounting	Unit mounted
Controller location	Left
Factory programmed	Yes

Warranty

Warranty section	Extd. warranty
Labor - 1st year	1st year labor warranty

RTU-1 DETAIL

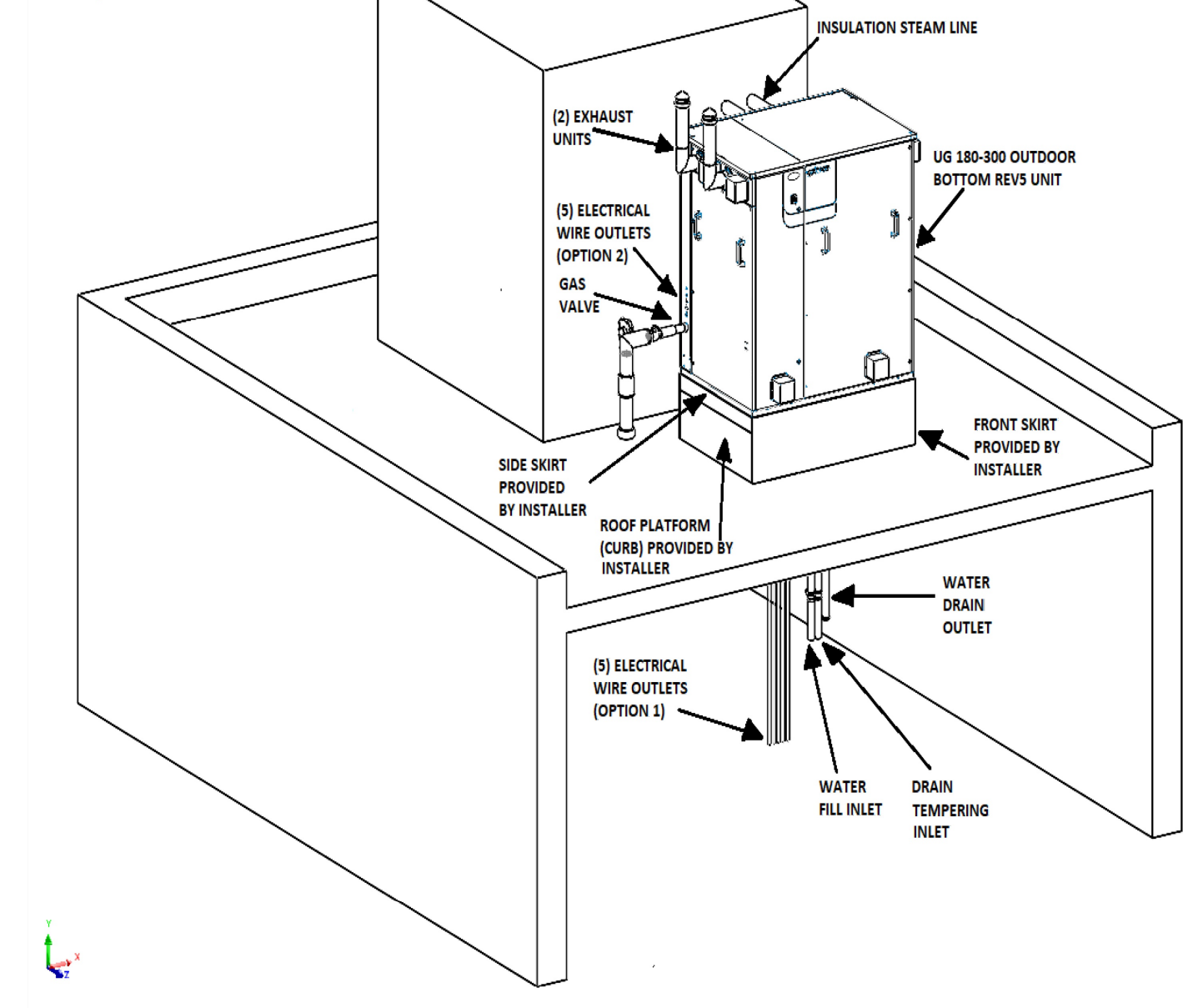
SCALE: NO SCALE

Submittal Data

Positioning

TYPICAL OUTDOOR INSTALLATION

NOTE: Water lines must be insulated and heat-traced by installer.



The Gastem outdoor units (cod. UG***X1105) are IAS No.12-94 (par. 2.20) certified for outdoor installation; Air recirculation for cooling for the electronic parts are included.
Heater(s) for freeze protection are included: UGKH1151KW @ 115V.
All installations must conform with local building codes or, in the absence of local codes, to the National Fuel Gas Code ANSI Z223.1 in the United States or CSA B149. Installation codes in Canada. Carel cannot accept responsibility for incorrect installation or code violations.

SH-1, SH-2 & SH-3 INSTALLATION DETAIL

SCALE: NO SCALE



Job Name: Littleton Historical Museum AHU and Boiler Plant R

CSAA
Quantity: 1
Tag: RTU-2 REV

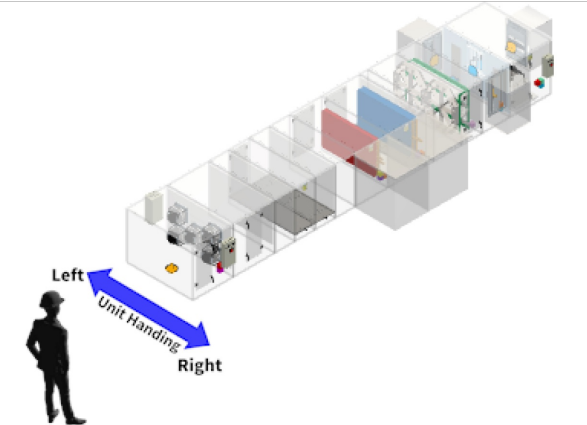
Trane Performance Climate Changer Air Handler

Unit Overview - RTU-2 REV						
Application	Unit Size	External Dimensions			Weight	
		Height	Width	Length	Installed	Rigging
Outdoor unit	CSAA021	59.0 in	80.0 in	434.641 in	7386 lb	6371 lb
Quantity of Shipping Sections		Largest Ship Split		Length	Heaviest Ship Split	Elevation
		Height	Width			
2 piece(s)		59.0 in	80.0 in	350.9 in	5199 lb	5300.00 ft
Supply Fan						
Airflow	11735 cfm	Total Static Pressure	5.538 in H2O	Airflow	11735 cfm	Total Static Pressure
						1.817 in H2O

Note: Height includes air handler sloped roof panel and standing seam.

Construction Features

Panel	2in. foam injected R-13 with thermal break
Panel Material	All unit inner panels - galvanized
Integral Base Frame	6in. integral base frame
Paint	Slate gray
Short Circuit Current Rating	5 kA
Agency Approval	UL listed unit
Roof Curb Type	Standard roof curb



Unit Electrical

Circuit	Voltage/Phase/Frequency	FLA	MCA	Max Fuse Size
Circuit number 1 SPP (Field provided unit disconnect)	460/3/60	34.83 A	36.37	40.00
Circuit number 2 Receptacle	115/1/60	8.00 A	10.00	15.00

Unit Controls

Factory Controls Package	Variable volume
Controller Type	Symbio
Controller mounting	Unit mounted
Controller location	Left
Factory programmed	Yes

Warranty

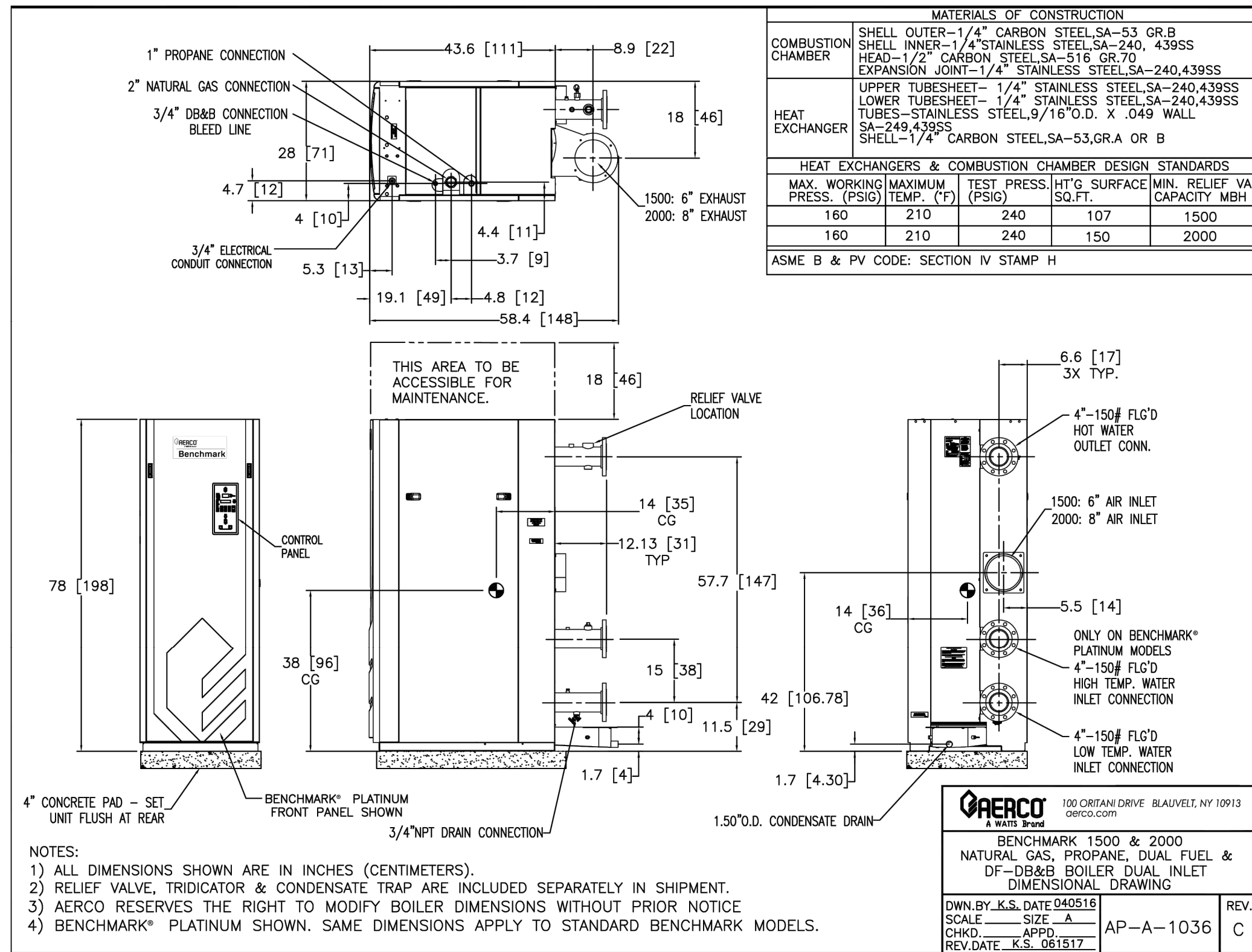
Warranty section	Extd. warranty
Labor - 1st year	1st year labor warranty

Pipe cabinet section

Pipe Cabinet	Front Door	Back Door	Side Door	Weight
Pipe Cabinet 1	One front door	One back door	One side door	368.5 lb

RTU-2 DETAIL

SCALE: NO SCALE



NOTES:
1) ALL DIMENSIONS SHOWN ARE IN INCHES (CENTIMETERS).
2) RELIEF VALVE, TRIDICATOR & CONDENSATE TRAP ARE INCLUDED SEPARATELY IN SHIPMENT.
3) AERCO RESERVES THE RIGHT TO MODIFY BOILER DIMENSIONS WITHOUT PRIOR NOTICE
4) BENCHMARK* PLATINUM SHOWN. SAME DIMENSIONS APPLY TO STANDARD BENCHMARK MODELS.

B-1 & B-2 DIMENSIONAL DETAIL

SCALE: NO SCALE



Job Name: Littleton Historical Museum AHU and Boiler Plant R

CSAA
Quantity: 1
Tag: RTU-3 REV

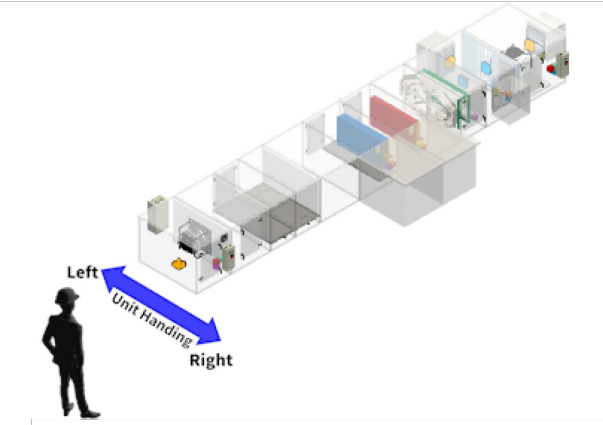
Trane Performance Climate Changer Air Handler

Unit Overview - RTU-3 REV						
Application	Unit Size	External Dimensions			Weight	
		Height	Width	Length	Installed	Rigging
Outdoor unit	CSAA010	43.6 in	61.5 in	395.550 in	5082 lb	4268 lb
Quantity of Shipping Sections		Largest Ship Split		Length	Heaviest Ship Split	Elevation
		Height	Width			
2 piece(s)		43.6 in	61.5 in	345.8 in	3783 lb	5300.00 ft
Supply Fan						
Airflow	3700 cfm	Total Static Pressure	3.235 in H2O	Airflow	3700 cfm	Total Static Pressure
						1.098 in H2O

Note: Height includes air handler sloped roof panel and standing seam.

Construction Features

Panel	2in. foam injected R-13 with thermal break
Panel Material	All unit inner panels - galvanized
Integral Base Frame	6in. integral base frame
Paint	Slate gray
Short Circuit Current Rating	5 kA
Agency Approval	UL listed unit
Roof Curb Type	Standard roof curb



Unit Electrical

Circuit	Voltage/Phase/Frequency	FLA	MCA	Max Fuse Size
Circuit number 1 SPP (Field provided unit disconnect)	460/3/60	13.58 A	15.12	20.00
Circuit number 2 Receptacle	115/1/60	8.00 A	10.00	15.00

Unit Controls

Factory Controls Package	Variable volume
Controller Type	Symbio
Controller mounting	Unit mounted
Controller location	Left
Factory programmed	Yes

Warranty

Warranty section	Extd. warranty
Labor - 1st year	1st year labor warranty

Pipe cabinet section

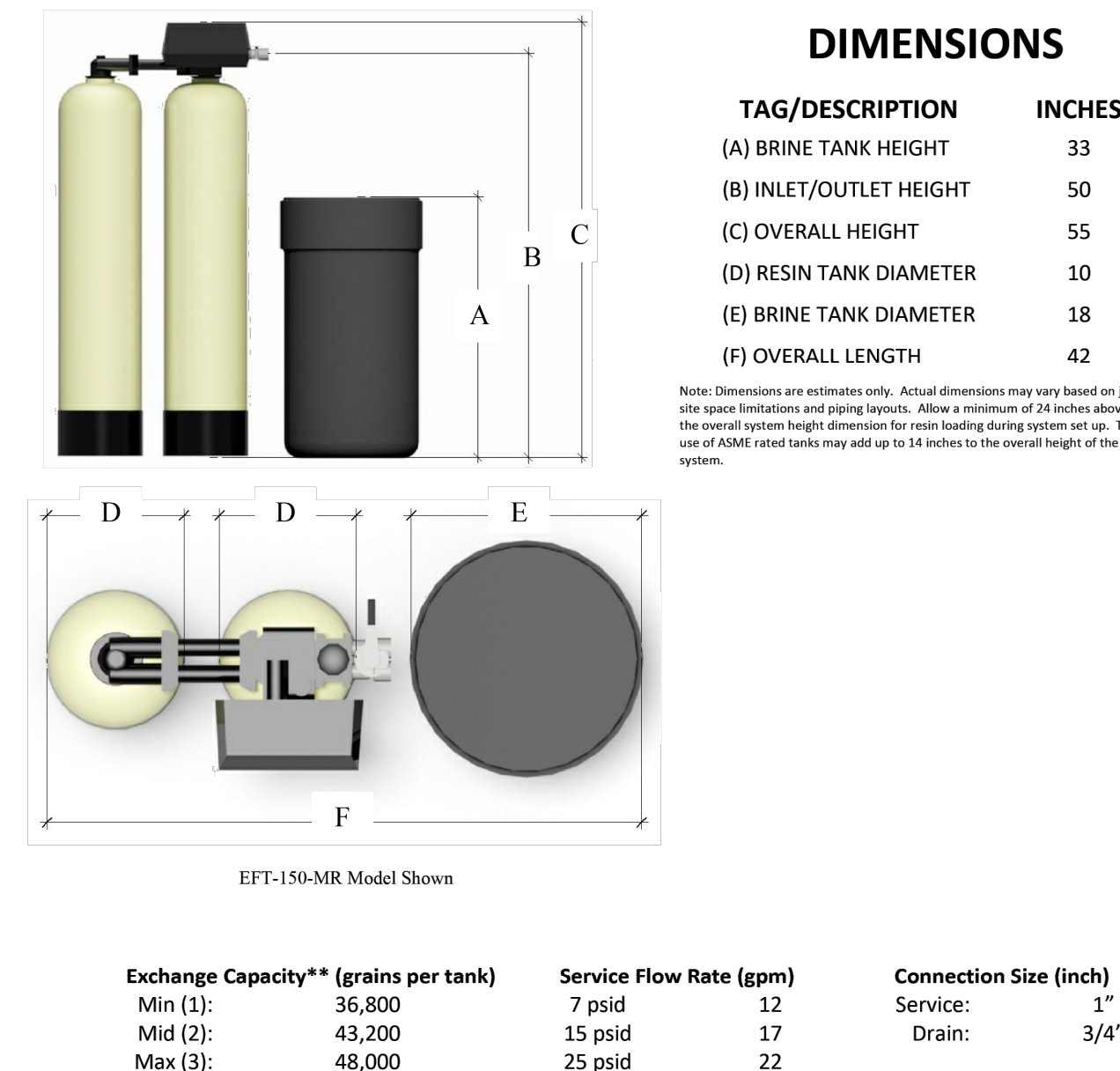
Pipe Cabinet	Front Door	Back Door	Side Door	Weight
Pipe Cabinet 1	One front door	One back door	Two side doors	288.2 lb

RTU-3 DETAIL

SCALE: NO SCALE



SYSTEM SPECIFICATIONS



Exchange Capacity** (grains per tank)	Service Flow Rate (gpm)	Connection Size (inch)
Min (1): 36,800	7 psid	1"
Mid (2): 43,200	15 psid	3/4"
Max (3): 48,000	25 psid	

Backwash Rate (gpm): 1.7	Regeneration Time (mins): 88
System Dry Weight (lbs): 275	Brine Tank Salt Capacity (lbs): 225
Resin Volume Per Tank (cuft): 1.6	Dynamic Inlet Pressure Range (psi): 20 - 125
Feed Water Temperature Range (°F): 34 - 110	Brine Tank Size (inches): 18W x 33H
Resin Tank Size (inches): 10W x 54H	Number of System Regenerations*: 7

Notes
*Total system regenerations before mandatory brine tank fill is required. (based on brine tank salt capacity)
**If the number of system regenerations is less than 4, WCC recommends incorporating multiple brine tanks or bulk salt storage system into the system design.
**Based on Salt Setting: (1) 7 lbs / cu ft. (2) 10 lbs / cu ft. (3) 13 lbs / cu ft.

Water Control Corporation
7150 143rd Ave NW, Anoka, MN 55303
Toll Free: 1-866-405-1366, Local: (763) 427-9638, Fax: (763) 427-5665
www.watercontrolinc.com

WATER SOFTENING SYSTEM (WSS-1) DETAIL

SCALE: NO SCALE



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SEAL



December 02, 2024

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LITTLETON MUSEUM RETROFIT
6028 S GALLUP ST, LITTLETON, CO 80120

NO.	REVISION/ISSUE	DATE
	PERMIT ISSUE	12.02.2024

MDP JOB #: 23047.01

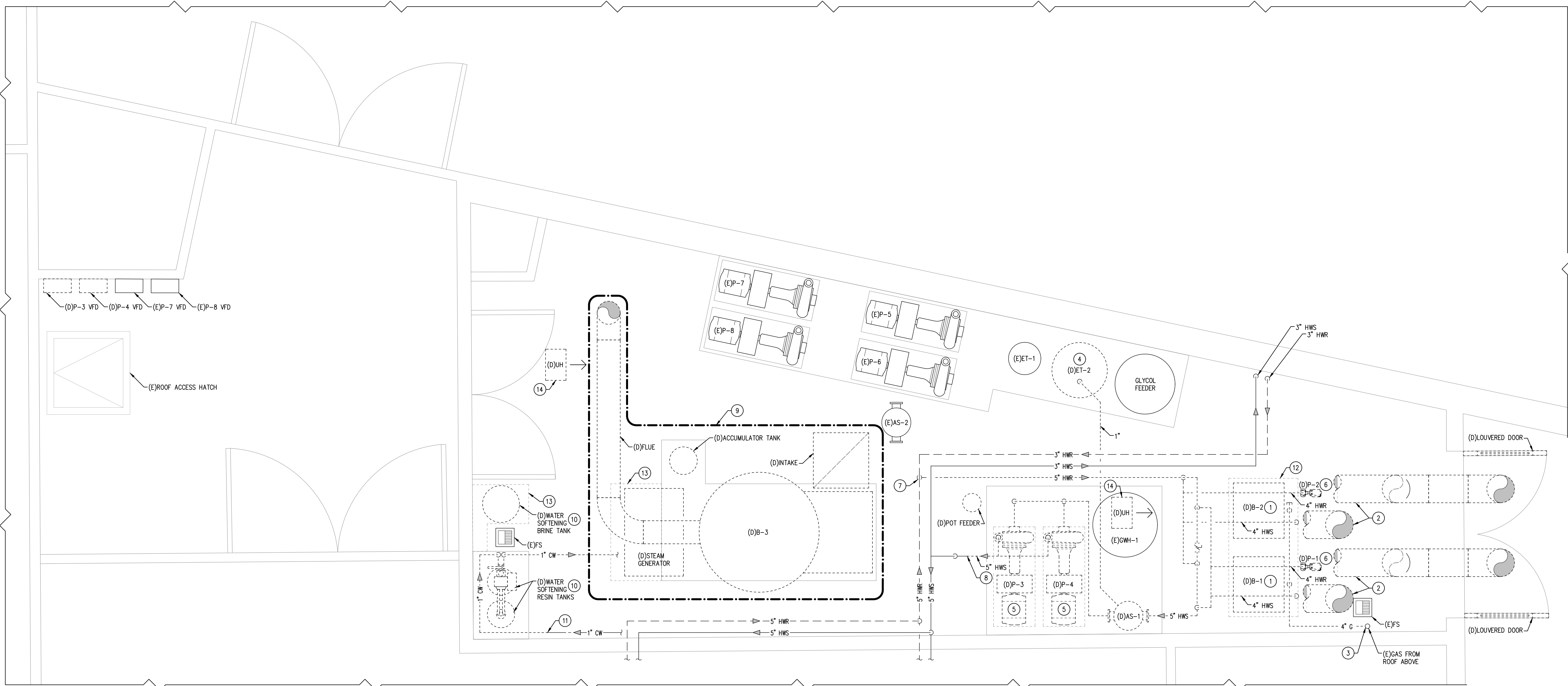
DESCRIPTION:

MECHANICAL DETAILS

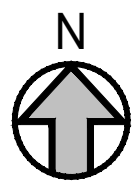
DRAWN BY:	CHECKED BY:
JB/BR	DP/ER
DATE:	SCALE:
12.02.24	AS NOTED
SHEET:	

M0.3

Drawing: 1\6028 S Gallup St\3047.01 - Littleton Museum Retrofit\01 Drawings\2024\11-18 - Permit Update\M1.1 - Level 1 Mechanical Demo Plan.dwg Plotted by: Joseph Barnard On: Monday, December 2, 2024 5:07:54 PM



1 LEVEL 1 MECHANICAL DEMOLITION PLAN
SCALE: 1/2" = 1'-0"
0 6" 1' 2' 4' 8'

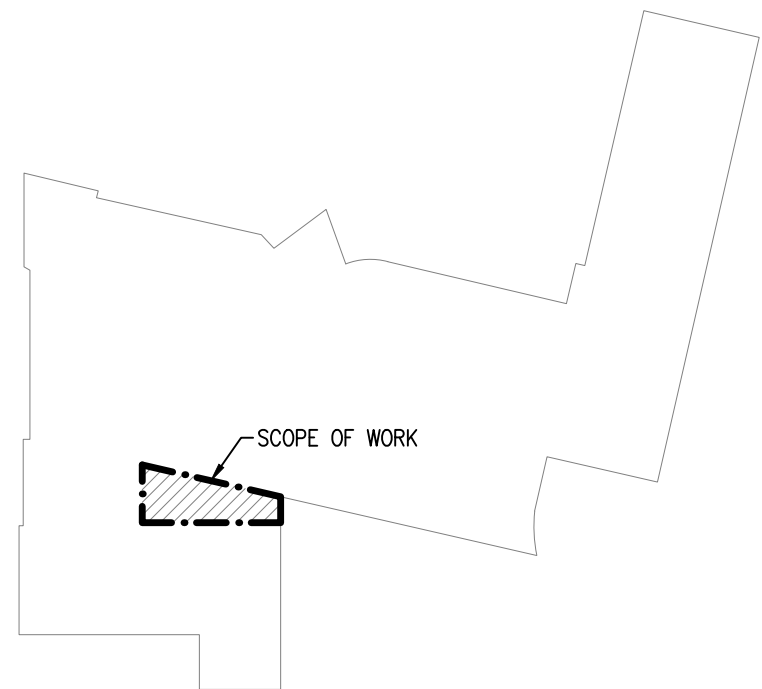


GENERAL NOTES

- NOT ALL EXISTING EQUIPMENT, PIPING AND ACCESSORIES SHOWN ON PLAN. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND EXACT LOCATIONS PRIOR TO COMMENCING WORK.
- ALL PIPING AND ASSOCIATED ACCESSORIES TO REMAIN, UNLESS OTHERWISE NOTED.
- ALL DEMOLISHED/ABANDONED/UNUSED PIPING, VALVES, HANGERS, ACCESSORIES, ETC. SHALL BE REMOVED FROM SITE AND DISPOSED OF PROPERLY.
- CONTRACTOR IS RESPONSIBLE FOR ENSURING CONTINUITY OF PIPING SYSTEMS AFTER DEMOLITION.

MECHANICAL DEMOLITION NOTES

- DEMOLISH BOILER AND ASSOCIATED HWS/HWR/GAS PIPING INCLUDING ALL PIPING ACCESSORIES.
- DEMOLISH EXISTING FLUE AND VENT DUCTS FROM DEMOLISHED BOILER THROUGH STRUCTURE. UTILIZE EXISTING PENETRATIONS FOR NEW BOILER FLUE AND VENT CONNECTIONS.
- DEMOLISH EXISTING GAS PIPING FROM BOILER TO POINT INDICATED AND TEMPORARILY CAP/SEAL AIRTIGHT. REFER TO NEW MECHANICAL PLAN FOR RECONNECTION.
- DEMOLISH EXISTING EXPANSION TANK AND ASSOCIATED PIPING INCLUDING ALL PIPING ACCESSORIES.
- DEMOLISH HEATING WATER PUMP AND ASSOCIATED HWS PIPING INCLUDING ALL PIPING ACCESSORIES.
- DEMOLISH BOILER PUMP AND ASSOCIATED HWR PIPING INCLUDING ALL PIPING ACCESSORIES.
- DEMOLISH EXISTING HWR PIPING SERVING BOILERS AND PUMPS BACK TO POINT INDICATED AND TEMPORARILY CAP/SEAL WATER TIGHT. REFER TO NEW MECHANICAL PLAN FOR RECONNECTION.
- DEMOLISH EXISTING HWS PIPING SERVING BOILERS AND PUMPS BACK TO POINT INDICATED AND TEMPORARILY CAP/SEAL WATER TIGHT. REFER TO NEW MECHANICAL PLAN FOR RECONNECTION.
- DEMOLISH STEAM BOILER AND ALL ASSOCIATED EQUIPMENT/ACCESSORIES. DEMOLISH ALL ABANDONED STEAM PIPING ASSOCIATED WITH DEMOLISHED SYSTEM. DEMOLISH ALL DOMESTIC WATER PIPING SERVING THE SYSTEM BACK TO MAINS AND CAP/SEAL WATER TIGHT. DEMOLISH GAS PIPING FROM STEAM BOILER BACK TO MAIN AND CAP/SEAL AIRTIGHT. DEMOLISH STEAM BOILER COMBUSTION AIR INTAKE AND FLUE UP THROUGH ROOF AND CAP/SEAL ROOF PENETRATION WATER TIGHT.
- DEMOLISH WATER SOFTENING SYSTEM WITH ASSOCIATED PIPING AND ACCESSORIES.
- DEMOLISH EXISTING CW PIPING SERVING DEMOLISHED WATER SOFTENING SYSTEM BACK TO POINT INDICATED AND TEMPORARILY CAP/SEAL WATER TIGHT. REFER TO NEW MECHANICAL PLAN FOR RECONNECTION.
- DEMOLISH FULL CONCRETE PAD BELOW DEMOLISHED BOILERS.
- DEMOLISH SECTION OF CONCRETE PAD TO EXTENTS SHOWN TO ACCOMMODATE FOOTPRINT OF NEW EQUIPMENT TO BE INSTALLED.
- DEMOLISH HOT WATER UNIT HEATER AND ASSOCIATED PIPING INCLUDING ALL PIPING ACCESSORIES.



KEYPLAN



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MDP JOB #: 23047.01

DESCRIPTION:

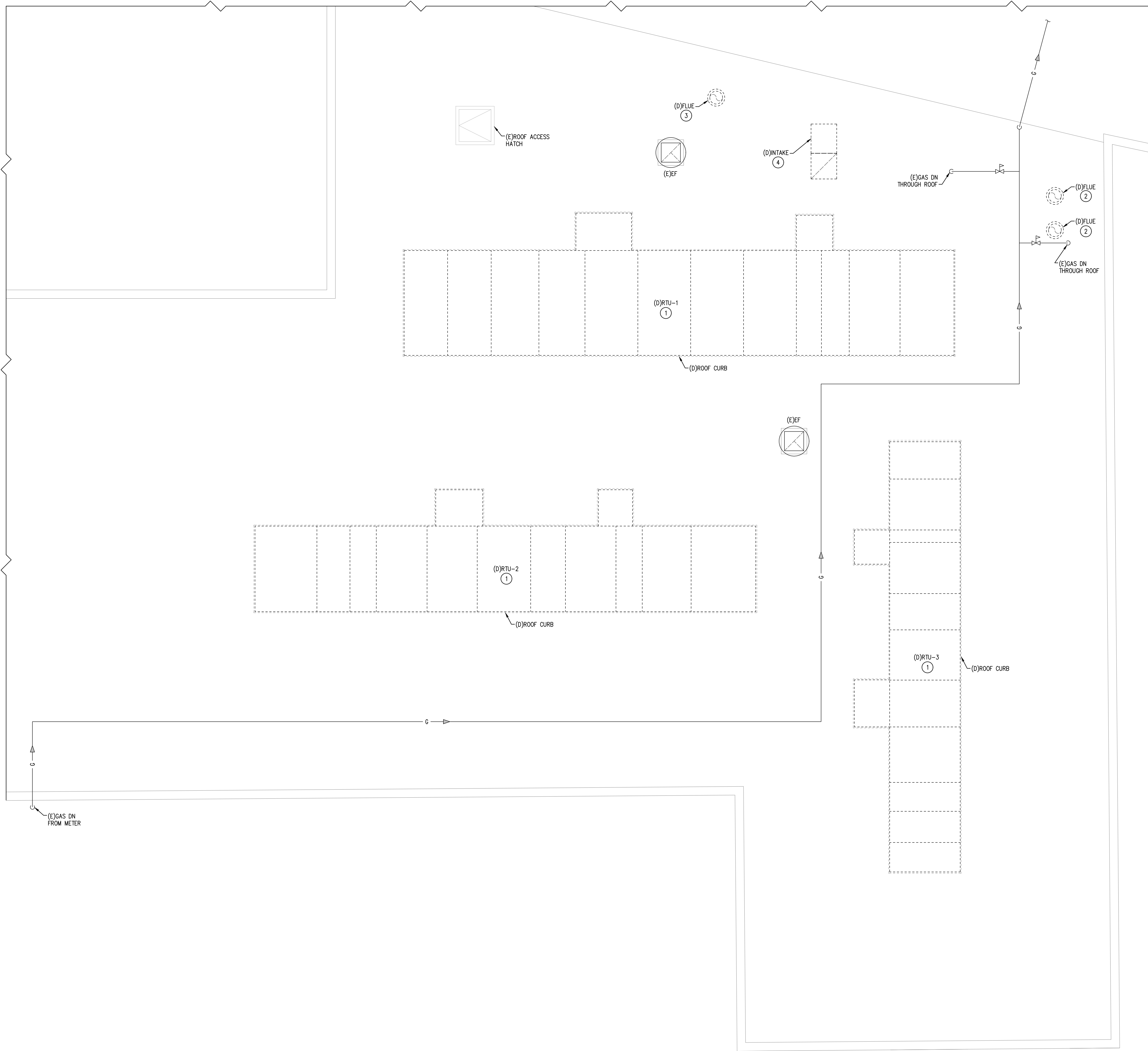
**LEVEL 1 MECHANICAL
DEMOLITION PLAN**

DRAWN BY:	CHECKED BY:
JB/BR	DPIER
DATE:	SCALE:
12.02.24	AS NOTED

SHEET:

MI.1

Drawing: J:\6028 S Gallup St\23047.01 - Littleton Museum Retrofit\01 Drawings\2024\11-18 - Permit Update\M1.2 - Roof Mechanical Demo Plan.dwg Plotted by: Joseph Barnard On: Monday, December 2, 2024 5:08:01 PM



1 ROOF MECHANICAL DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

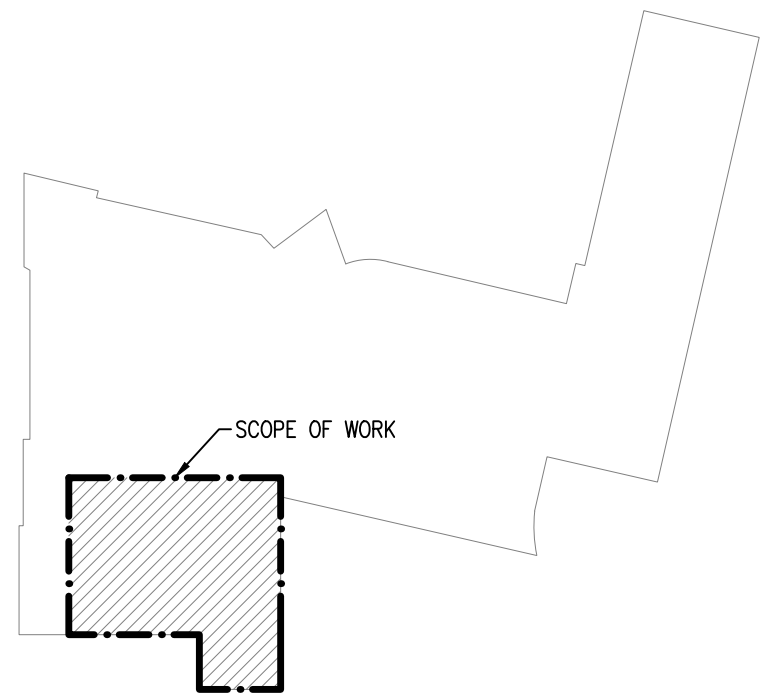


GENERAL NOTES

1. NOT ALL EXISTING EQUIPMENT, PIPING AND ACCESSORIES SHOWN ON PLAN. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND EXACT LOCATIONS PRIOR TO COMMENCING WORK.
2. ALL PIPING AND ASSOCIATED ACCESSORIES TO REMAIN, UNLESS OTHERWISE NOTED.
3. ALL DEMOLISHED/ABANDONED/UNUSED PIPING, VALVES, HANGERS, ACCESSORIES, ETC. SHALL BE REMOVED FROM SITE AND DISPOSED OF PROPERLY.
4. CONTRACTOR IS RESPONSIBLE FOR ENSURING CONTINUITY OF PIPING SYSTEMS AFTER DEMOLITION.
5. ALL ROOF REPAIR TO BE DONE WITH VERISCO ROOFING SYSTEMS.

MECHANICAL DEMOLITION NOTES

1. DEMOLISH EXISTING RTU FROM ROOF CURB. DEMOLISH ASSOCIATED ROOF CURB AS REQUIRED TO ACCOMMODATE NEW RTU FOOTPRINT. DEMOLISH STEAM PIPING FROM RTU BACK TO BELOW ROOF AND CAP/SEAL ROOF PENETRATION WATER TIGHT. DEMOLISH CHILLED WATER AND HEATING WATER PIPING BACK FROM RTU AND TEMPORARILY CAP/SEAL WATER TIGHT 12" BELOW ROOF. FIELD VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK.
2. DEMOLISH EXISTING FLUE DUCTS FROM DEMOLISHED BOILER THROUGH ROOF STRUCTURE AND TEMPORARILY CAP/SEAL ROOF PENETRATION WATER TIGHT. UTILIZE EXISTING PENETRATIONS FOR NEW BOILER FLUE CONNECTIONS.
3. DEMOLISH STEAM BOILER FLUE ON ROOF AND CAP/SEAL ROOF PENETRATION WATER TIGHT.
4. DEMOLISH STEAM BOILER COMBUSTION AIR INTAKE ON ROOF AND CAP/SEAL ROOF PENETRATION WATER TIGHT.

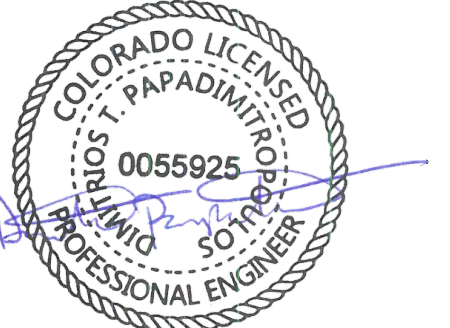


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DESCRIPTION:

ROOF MECHANICAL
DEMOLITION PLAN

DRAWN BY: JB/BR	CHECKED BY: DPIER
DATE: 12.02.24	SCALE: AS NOTED
SHEET:	

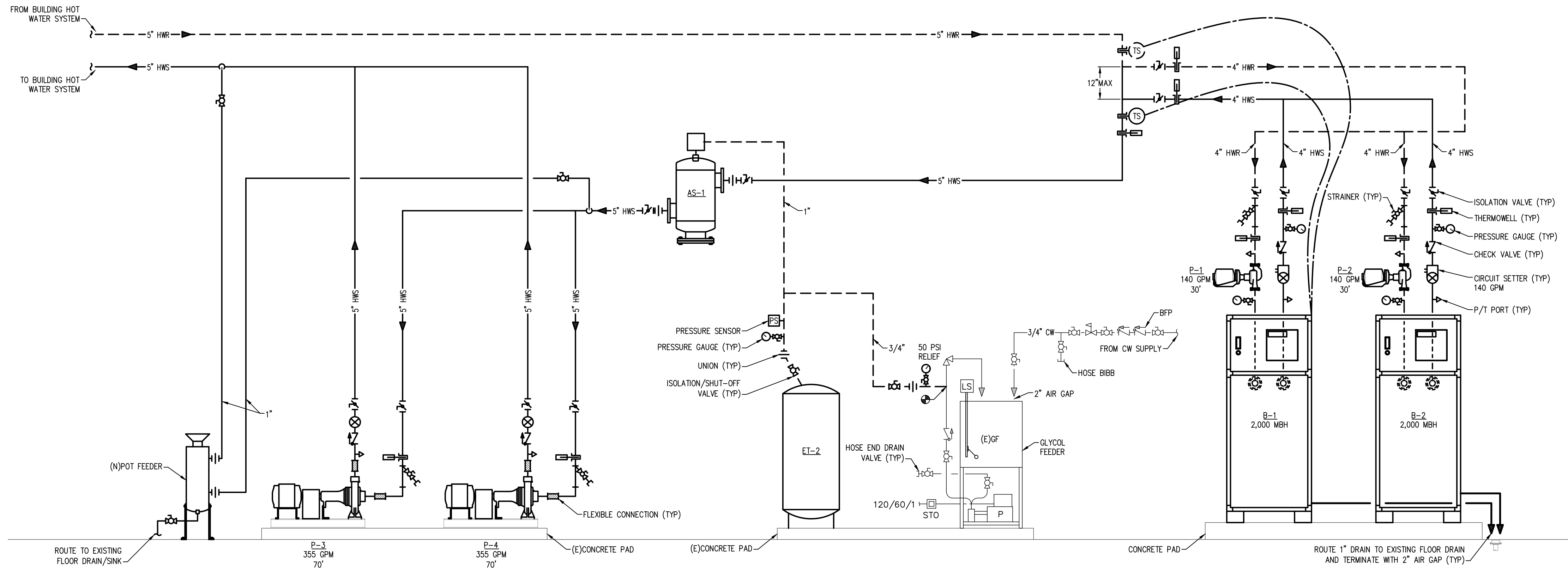
MI.2



1. INSTALL NEW BOILER ON EXISTING/NEW CONCRETE HOUSEKEEPING PAD. PROVIDE PIPING CONNECTIONS AND ASSOCIATED PIPE ACCESSORIES PER PIPING DIAGRAM 1/M3.1. CONCRETE PAD TO BE EXTENDED TO FIT NEW FOOTPRINT OF BOILERS.
2. EXTEND EXISTING CONCRETE PAD TO EXTENTS SHOWN TO ACCOMMODATE NEW FOOTPRINT OF BOILERS.
3. PROVIDE BOILER PUMP IN VERTICAL OF HEATING WATER RETURN RISER.
4. PROVIDE NEW 8" VENT FROM BOILER UP THROUGH ROOF AND TERMINATE ABOVE ROOF WITH APPROVED MANUFACTURER TERMINATION. REUSE EXISTING ROOF PENETRATION FROM DEMOLISHED STEAM BOILER INTAKE OPENING IN GENERAL LOCATION IF POSSIBLE OTHERWISE PROVIDE NEW PENETRATION THROUGH ROOF.
5. PROVIDE NEW 8" Ø FLUE FROM BOILER UP THROUGH ROOF AND TERMINATE ABOVE ROOF WITH APPROVED MANUFACTURER TERMINATION. REUSE EXISTING ROOF PENETRATION FROM DEMOLISHED STEAM BOILER FLUE OPENING IN GENERAL LOCATION IF POSSIBLE OTHERWISE PROVIDE NEW PENETRATION THROUGH ROOF.
6. PROVIDE 4"Ø PIPING CONNECTION FROM EXISTING GAS PIPING STUB TO NEW BOILERS. EXTEND 2"Ø FROM 4"Ø PIPING DOWN TO EACH BOILER. PROVIDE 6"Ø DIRT LEG, GAS COCK, AND PRV RYTOR FOR BOILER CONNECTION. PROVIDE REDUCER AS NECESSARY TO BOILER.
7. INSTALL NEW WATER SOFTENING SYSTEM ON EXISTING/NEW CONCRETE HOUSEKEEPING PAD. PROVIDE PIPING CONNECTIONS AND ACCESSORIES AS REQUIRED PER MANUFACTURER SPECIFICATIONS. PROVIDE 3/4" Ø DRAIN CONNECTION FROM SYSTEM TO NEARBY FLOOR SINK; I.W. CONNECTION.
8. EXTEND EXISTING CONCRETE PAD AS NEEDED TO ACCOMMODATE FOOTPRINT OF WATER SOFTENING SYSTEM.
9. PROVIDE 1"Ø PIPING CONNECTION FROM EXISTING CW PIPING STUB TO NEW WATER SOFTENING SYSTEM.
10. PROVIDE 1"Ø PIPING MAIN FROM NEW WATER SOFTENING SYSTEM TO NEW STEAM HUMIDIFIER ON ROOF. EXTEND 3/4"Ø PIPING FROM NEW 1"Ø PIPING UP TO EACH STEAM HUMIDIFIER. REFER TO MECHANICAL PLAN 1/M2.2 FOR CONTINUATION OF CW PIPE AND ROUTING TO STEAM HUMIDIFIERS.
11. PROVIDE NEW INSULATED DOOR; COORDINATE DOOR SPECIFICATIONS AND FINISH WITH BUILDING OWNER/ENGINEER.
12. PROVIDE NEW VARIABLE FREQUENCY DRIVE MOUNTED ON WALL BEHIND ASSOCIATED PUMP.



Drawing: J:\6028 S Gallup St\23047.01 - Littleton Museum Retrofit\01 Drawings\2024-11-18 - Permit Update\M3.1 - Piping Diagram.dwg Printed by: Joseph Barnard On: Monday, December 2, 2024 5:08:22 PM



1 PIPING DIAGRAM
SCALE: NO SCALE



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DESCRIPTION:

MECHANICAL PIPING
DIAGRAM

DRAWN BY:	CHECKED BY:
JB/BR	DPIER
DATE:	SCALE:
12.02.24	AS NOTED
SHEET:	

M3.1

Exhibit F Special Conditions

[*none*]