THINK LEARN BE MORE TOGETHER

POCATELLO/CHUBBUCK SCHOOL DISTRICT 25

LEARNING TODAY FOR THE POSSIBILITIES OF TOMORROW

Administration Office
3115 Pole Line Road
Pocatello, Idaho

INVITATION TO BID

SPECIFICATIONS FOR

Exhaust System Upgrade

BIDS WITH CONDITIONS WILL NOT BE ACCEPTED

BID OPENING

April 12, 2022
2:00 PM

SCHOOL DISTRICT NO. 25
INVITATION TO BID

Sealed bids will be received by the School District 25 Business Office, Bannock County, Idaho at 3115 Pole Line Road, Pocatello, Idaho, 83201 until **2:00 PM on April 12, 2022** for the following:

2022 Exhaust System Upgrade

A mandatory pre-bid conference and walk-thru to review the projects will be held at Highland High School, north side of the building, 1800 Bench Road, Pocatello, Idaho, on March 31, 2022 at 3:00 PM.

Specifications and additional details, (including bid forms), may be secured at 3115 Pole Line Road, Pocatello, Idaho, 83201 and on the District website at: https://www.sd25.us/Content/bo-bidding

All bids must be on the forms furnished, all blank spaces filled in, and signed with the name and address of the Bidder. No unqualified bids will be read.

Each bid shall be accompanied by a certified check, cashier's check, or a bidder's bond, (executed by a qualified surety company with the power to do business in the State of Idaho) in the sum of not less than five percent (5%) of the total bid, made payable to School District No. 25, Bannock County, Pocatello, Idaho. This surety shall be forfeited by the bidder in the event of failure to enter into a contract. Personal or company checks will not be accepted. Compliance with Idaho Public Works Law is required.

The Board of Trustees reserves the right to reject any or all bids or to waive any informalities, or to accept the bid or bids deemed best for School District No. 25, Bannock County, Pocatello, Idaho.

Renae Johnson, Clerk
School District No. 25

Publish dates:

March 27, 2022
April 3, 2022

IDAHO STATE JOURNAL

INSTRUCTIONS TO BIDDERS

BIDS:

Sealed "BIDS" will be received on or before the time and date set forth under "INVITATION TO BID".

The owner reserves the right to accept or reject any part or all bids.

Bidders submitting a "Bid" on this work will be required to figure and furnish everything as called for by these specifications and the requirements of the "Bid" sheet.

All bids will be in a sealed enveloped addressed to the School District 25 Business Office, Bannock County, Idaho at 3115 Pole Line Road, Pocatello, Idaho, 83201. The following shall be written on the exterior of the envelope:

"BIDS FOR 2022 Exhaust System Upgrade
TO BE OPENED ON **April 12, 2022 AT 2:00 PM**"

Bids not delivered by contractors at time of bid opening must be received in mail no later than 4:00 PM on April 11, 2022, the day before the bid opening.

EXAMINATION OF THE SITE AND DOCUMENTS:

Refer all questions to Brian Glenn, Energy Manager, (208) 233-2604. Contact with other district staff, Board of Trustees, or Administration, will be by written permission only.

A mandatory pre-bid conference and walk-thru to review the projects will be held at Highland High School, north side of the building, 1800 Bench Road, Pocatello, Idaho, on March 31, 2022 at 3:00 PM.

Before submitting a proposal the bidder shall:

1. Carefully examine the specifications.
2. Visit the worksite.
3. Be fully informed of existing conditions and limitations.
4. Include in the bid, sums sufficient to cover all items required by the contract, and shall rely entirely upon his own examinations in making his proposal.

INTERPRETATIONS:

Should a bidder find discrepancies in or omissions from the specifications, or be in doubt as to their meaning, he should at once notify the Owner, who will send written instructions or addenda to all bidders. The owner will not be responsible for oral interpretations. Questions received less than 48 hours before time for bid opening cannot be answered. All addenda issued during the time of bidding will be incorporated in the contract.

BID GUARANTEE:

As a guarantee that, if awarded the contract, the bidder will execute same and furnish bond. Each bid will be accompanied by a Certified check, Cashier's Check, or Bid Bond for not less than five percent (5%) of the base bid payable to the Owner. NO PERSONAL OR COMPANY CHECKS WILL BE ACCEPTED.

OBJECTIONS:

Written objections to specifications or bid procedures must be received by the clerk, secretary, or other authorized official of the District at least one (1) business day before the date and time upon which bids are scheduled to be received, per Idaho Code Section 68-2806(c).

LAWS AND ORDINANCES:

The contractor hereby binds himself to protect and save harmless the owner from all damages arising from the violation of any and all Federal, State, County, City, and all other laws, rules, regulations, in the performance of the terms of the contract.

HOLD HARMLESS AGREEMENTS:

The District expects your work to conform to professional standards. The contractor is expected to hold the District harmless for all damages or claims arising out of the work performed by the contractor. The District will not agree to hold the contractor harmless for damages or claims.

EQUIPMENT:

The contractor shall provide all labor, materials, tools, and equipment, etc. necessary for the complete and substantial execution of everything described in the specifications.

STORAGE OF MATERIALS:

The contractor shall make arrangement and coordinate with the Maintenance Department for storage of materials. Any damages of life or property caused by storage of materials on the above indicated place shall be paid for by the contractor, who shall hold the owner harmless for any damages concerning the same.

SUPERVISION:

The supervision of this work will be done by School District #25 Maintenance Department.

EVIDENCE OF QUALIFICATIONS:

Upon request of the owner, a bidder whose bid is under consideration for award of the contract shall submit, promptly, satisfactory evidence of his financial resources, his experiences, and the organization and equipment he has available for performance of the contract.

EMPLOYMENT OF RESIDENTS OF IDAHO:

In compliance with Idaho Laws, Section 44-1001 and 44-1002 Idaho Code, the contractor must employ ninety-five percent 95% bona fide Idaho residents as employees on any such contracts except where under such contracts fifty (50) or less persons are employed the contractor may employ ten percent (10%) nonresidents, provided however, in all cases such employers must give preference to the employment of bona fide Idaho residents in the performance of such work.

CONTRACTOR'S LICENSE:

In compliance with Idaho Laws, the contractor must be registered with the State of Idaho, and hold the required *Public Works Contractor's License* before obtaining the contract documents and before submitting a bid for this work.

INSURANCE:

All contractors who provide goods or services to the District are required to provide the District with certificates of insurance for General Liability, Auto Liability, Workers Compensation, and Professional Liability if applicable.

The General Liability and/or Professional Liability certificate must name the District as an additional insured under the contractor's policy. Certificates are to be provided to the District prior to any work commencing on District property. This would include the placement of any equipment or materials at the work site

Minimum Insurance Limits

General Liability	$1,000,000 per occurrence $1,000,000 products and completed operations $1,000,000 annual aggregate
Auto Liability	$1,000,000 per occurrence
Worker' Compensation	Statutory
Professional Liability	$1,000,000 per occurrence $1,000,000 annual aggregate

OWNER/CONTRACTOR AGREEMENT:

The Agreement for the work will be written on a District provided Form of Agreement between Owner and Contractor where the basis of payment is a stipulated sum.

PERFORMANCE BOND:

The successful bidder will be required to furnish a 100% performance bond when entering into the contract work, per Idaho Code Section 54-1926, "....conditioned upon the faithful performance of the contract in accordance with the plans, specifications and conditions thereof."

PAYMENT BOND:

The successful bidder will be required to furnish a 100% payment bond when entering into the contract work, per Idaho Code Section 54-1926, "solely for the protection of persons supplying labor or materials, or renting, leasing, or otherwise supplying equipment to the contractor or his subcontractors in the prosecution of the work provided for in such contract."

5% RETAINAGE:

The Owner will retain 5% of the Contractor's earned sum to ensure faithful performance. This 5% will be released to the Contractor upon receipt of approval from State of Idaho.

LIQUIDATED DAMAGES:

Contractor shall be required to pay Owner as liquidated damages the sum of $500 for each day, after the scheduled completion date, that the project is unfinished.

CHANGES IN THE WORK:

All change orders shall be submitted in written form, for District approval, before any additional work is performed.

The owner, without invalidating the contract, may order extra work or make changes by altering, adding to, or deducting from the work; the contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract, except that any claim for extension of the time caused thereby shall be adjusted at the time of ordering such change.

The total allowance for combined overhead and profit for changes shall be included in the total cost to the owner and shall be based on the following schedule:

a) For the Contractor, 10% over cost;
b) For the Sub-Contractor, 15% over cost to be divided 10% for Sub-Contractor and 5% for Contractor; and
c) For any Sub-Subcontractor, 15% over cost to be divided 5% for Contractor, 5% for Sub-Contractor, and 5% for Sub-Subcontractor.

FORM WH5:

Per Idaho Code Section 54-1904A, within thirty (30) days of award of bid, the contractor shall file with the State Tax Commission a form WH-5, Public Works Contract Report.

INSPECTION OF WORK:

The representative of the owner shall at all times have access to the work wherever it is in preparation or progress and the contractor shall provide facilities for such access and for inspection.

WARRANTY:

Manufacturer shall warrant products under normal use and service to be free from defects in materials and workmanship for a period of one year from date of delivery.

Warranty shall cover repair or replacement of such parts determined defective upon inspection. Warranty does not cover any product or part of a product subject to accident, negligence, alteration, abuse or misuse. Warranty does not cover any accessories or parts not supplied by the manufacturer.

Warranty shall not cover any labor expended or materials used to repair any equipment without manufacturer's prior written authorization.

CLEAN UP:

The contractor shall at all times keep the premises free from accumulations of waste material or rubbish caused by his employees or work, and at the completion of the work he shall remove all his rubbish from and about the building and all tools and surplus materials and shall leave his work clean. In case of dispute, the owner shall remove the rubbish and surplus materials and charge the cost to the contractor. At no time shall the School District Dumpsters be used to remove the Contractor's waste, garbage or scraps.

IDAHO EMPLOYER ALCOHOL AND DRUG-FREE WORKPLACE ACT: Include with your bid sheet a contractor's affidavit pursuant to Idaho Code Section 72-1717.

BIDDER CERTIFICATION FORM: All bidders must complete and submit the Bidder Certification Form included with this bid request.

PAYMENT:

Prices must remain firm as quoted by supplier until quantity awarded is received. Application for payment dated on or before the 25th of the month, shall be paid by the 15th of the following month. Application for payment dated after the 25th of the month, shall be paid within 30 days.

Delivery may be accepted any time, however, payment for the 2021-2022 fiscal year cannot be made until after July 1, 2021 when those funds have been released.

BID:

The following universal specifications are being used as a guideline. Alternate bids for equal equipment will be considered upon District approval two weeks prior to the bid due date. Substitutions or major alternations must be indicated upon the proposal sheet at the time of the bid submission. Bids must be based upon conditions at the site and these specifications. Bids shall be submitted in accordance with the requirements shown on the bid form.

BID EVALUATION CRITERIA:

Contractor selection on this project will be evaluated based on the following:

1) Price
2) Contractor reputation for quality of work with current customers or past performance with District 25. (please list all jobs/contracts greater than $50,000 performed in the past two years if contractor has not performed one for the District in past 5 years)
3) Vendor ability to best match the listed criteria as specified.
4) The contract will be awarded to the lowest responsive and responsible bidder or bid/offer most advantageous to the District with price and other factors considered.

DELIVERY AND START OF WORK:

The time frame for the completion of work: June 6, 2022 and be completed by August 5, 2022.

THINK LEARN BE MORE TOGETHER

POCATELLO/CHUBBUCK SCHOOL DISTRICT 25

LEARNING TODAY FOR THE POSSIBILITIES OF TOMORROW

BID PROPOSAL
2022 EXHAUST SYSTEM UPGRADE

Board of Trustees
School District No. 25
3115 Pole Line Road
Pocatello, ID 83201

Date: _____

_____
Company Name

We, the undersigned Bidder agrees, if this bid is accepted, to enter into an agreement with Owner to furnish all labor, materials, tools, and equipment and complete all work called for by these specifications under the supervision of the School Plant Coordinator and Brian Glenn, Energy Manager, for the sum of:

PROJECT	**AMOUNT**
Exhaust System Upgrade at Highland High School, 1800 Bench Road	$ _____

We further acknowledge Addendum(s) Received. No. ____, dated _____.

Work can begin June 6, 2022 and must be completed by August 5, 2022.

The Board of Trustees reserves the right to reject any/or all bids or to waive any informalities, or to accept the bid or bids deemed best for School District No. 25, Bannock County, Pocatello, Idaho.

Respectfully submitted,

- Attached, if applicable, is a listing of subcontractors names and addresses for this project.
- Attached is our Affidavit of Alcohol and Drug-Free Worksite, as pursuant to Idaho Code 72-1717.
- Attached is Bidder Certification Form.

_____
Company Name

_____
Authorized Signature / Date

_____
Address

_____
Title

_____
City, State, Zip

_____
Public Works License Number

_____
Phone / Fax Number

_____
Worker's Comp & Liability Insurance Exp. Date

_____
Email, if applicable

CONTRACTOR'S AFFIDAVIT
CONCERNING ALCOHOL AND DRUG-FREE WORKPLACE

STATE OF _____

COUNTY OF _____

Pursuant to the Idaho Code, Section 72-1717, I, the undersigned, being duly sworn, depose and certify that named contractor is in compliance with the provisions of Idaho Code section 72-1717; that named contractor provides a drug-free workplace program that complies with the provisions of Idaho Code, title 72, chapter 17 and will maintain such program throughout the life of a state construction contract and that named contractor shall subcontract work only to subcontractors meeting the requirements of Idaho Code, section 72-1717(1)(a).

_____ _____

Name Authorized Signature / Date

_____

Company Name

Subscribed and sworn to before me this _____ day of _____, 2022.

Commission expires:

_____

NOTARY PUBLIC, residing at:

_____

THINK LEARN BE MORE TOGETHER

POCATELLO/CHUBBUCK SCHOOL DISTRICT 25

LEARNING TODAY FOR THE POSSIBILITIES OF TOMORROW

BIDDER CERTIFICATION FORM

1. **Debarment and Suspension** – In submitting this bid proposal, we hereby certify that we have not been suspended or in any way excluded from Federal procurement actions by any Federal Agency. We fully understand that if information contrary to this certification subsequently becomes available, such evidence may be grounds for non-award or nullification of a bid contract.

2. **Anti-Collusion** – In submitting this bid proposal, we hereby certify this proposal was developed and prepared without any collusion with any competing bidder or District employee. The content of this proposal has not been disclosed to any competing or potentially competing bidder prior to the proposal due date and time. Furthermore, no action to persuade any person, partnership or corporation to submit or withhold a bid has been made.

3. **Anti-Lobbying** – In submitting this bid proposal, we hereby certify that to the best of our knowledge and belief, no appropriated Federal funds have been paid or will be paid by or on behalf of person associated with this proposal to any person for influencing or attempting to influence and officer or employee of any agency, a member of Congress, an office or employee of Congress or an employee of a member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan or cooperative agreement.

4. **National Sexual Offender Registry** – In submitting this bid proposal, you certify to the District that your company will prohibit any persons in your employ who are registered or required to register under the Idaho Sex Offender Registration Act from participation in company business with the District if such participation would require them to be present on school property. You certify further that you have cross checked such employees against the National Sex Offender Registry found at the following web link: http://www.nsopr.gov/

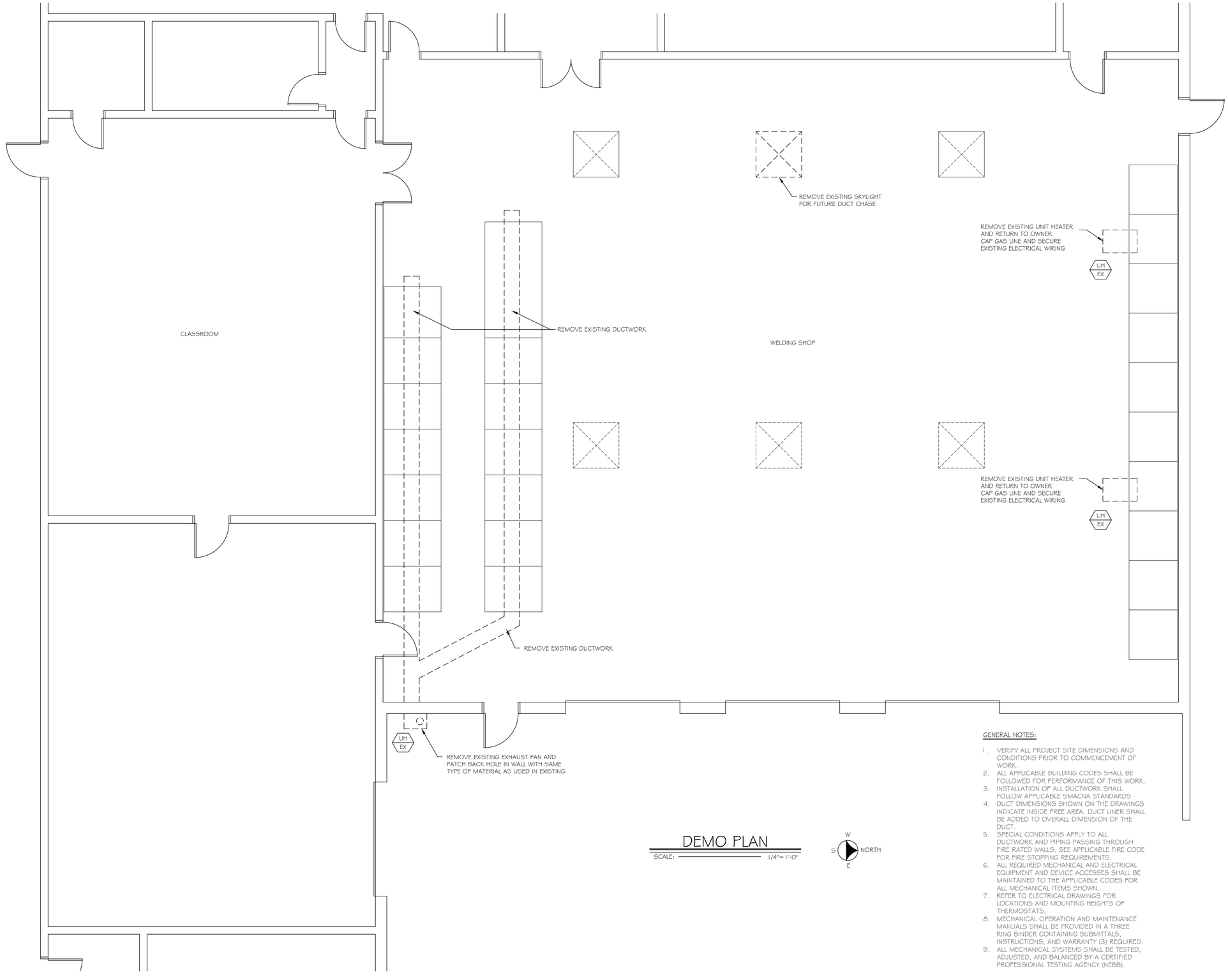
Signed: _____ Date: _____

Name & Title: _____

Company: _____ Phone: _____

Address: _____

City/State/Zip: _____



DEMO PLAN

SCALE: 1/4"= 1'-0"

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GENERAL NOTES:

1. VERIFY ALL PROJECT SITE DIMENSIONS AND CONDITIONS PRIOR TO COMMENCEMENT OF WORK.
2. ALL APPLICABLE BUILDING CODES SHALL BE FOLLOWED FOR PERFORMANCE OF THIS WORK.
3. INSTALLATION OF ALL DUCTWORK SHALL FOLLOW APPLICABLE SMACNA STANDARDS
4. DUCT DIMENSIONS SHOWN ON THE DRAWINGS INDICATE INSIDE FREE AREA. DUCT LINER SHALL BE ADDED TO OVERALL DIMENSION OF THE DUCT.
5. SPECIAL CONDITIONS APPLY TO ALL DUCTWORK AND PIPING PASSING THROUGH FIRE RATED WALLS. SEE APPLICABLE FIRE CODE FOR FIRE STOPPING REQUIREMENTS.
6. ALL REQUIRED MECHANICAL AND ELECTRICAL EQUIPMENT AND DEVICE ACCESSES SHALL BE MAINTAINED TO THE APPLICABLE CODES FOR ALL MECHANICAL ITEMS SHOWN.
7. REFER TO ELECTRICAL DRAWINGS FOR LOCATIONS AND MOUNTING HEIGHTS OF THERMOSTATS.
8. MECHANICAL OPERATION AND MAINTENANCE MANUALS SHALL BE PROVIDED IN A THREE RING BINDER CONTAINING SUBMITTALS, INSTRUCTIONS, AND WARRANTY (3) REQUIRED.
9. ALL MECHANICAL SYSTEMS SHALL BE TESTED, ADJUSTED, AND BALANCED BY A CERTIFIED PROFESSIONAL TESTING AGENCY (NEBB).

Gate City
ENGINEERING SERVICES
340 E. CLARK ST.
POCATELLO,ID 83204
208.221.9506

REGISTERED PROFESSIONAL ENGINEER
6159
STATE OF IDAHO
RON D. RICE

ORIGINAL DRAWING SIGNED BY: RON D. RICE
DATE ORIGINAL SIGNED: -
ORIGINAL ON FILE AT
122 SOUTH MAIN, POCATELLO, IDAHO 83204

Highland High School
Welding Shop Exhaust System
Pocatello, Idaho

REVISIONS

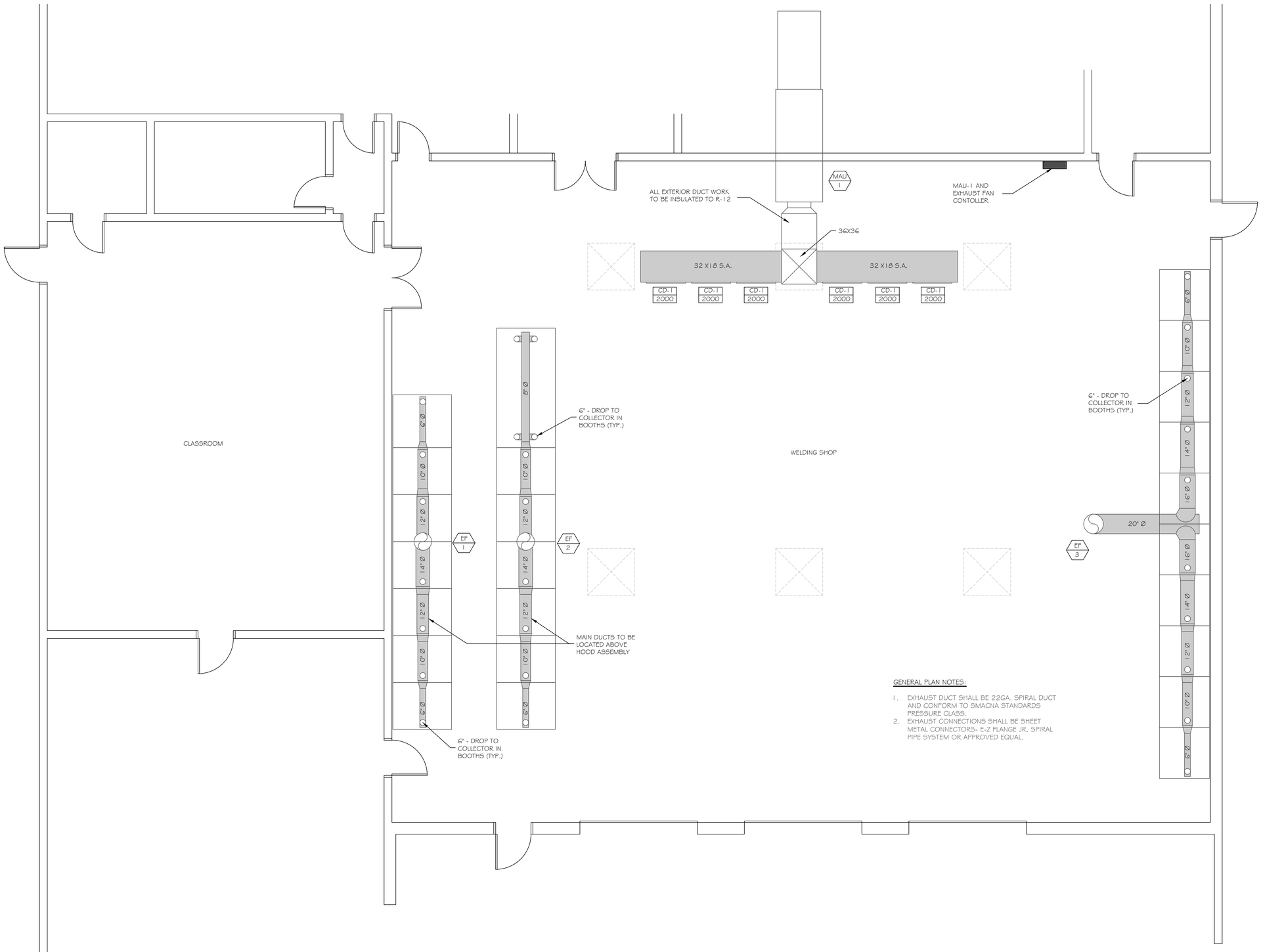
REV	DATE	DESCRIPTION

PROJECT No.: 2193
DATE: 3/10/2022
SCALE: As Shown
ENGINEER: RON RICE
DWG. BY: S.R.

DEMO PLAN

M1.0

SHEET: 1



GENERAL PLAN NOTES:

1. EXHAUST DUCT SHALL BE 22GA. SPIRAL DUCT AND CONFORM TO SMACNA STANDARDS PRESSURE CLASS.
2. EXHAUST CONNECTIONS SHALL BE SHEET METAL CONNECTORS- E-Z FLANGE JR. SPIRAL PIPE SYSTEM OR APPROVED EQUAL.

HVAC FLOOR PLAN

SCALE: 1/4"= 1'-0"

W S NORTH E

Gate City
ENGINEERING SERVICES
340 E. CLARK ST.
POCATELLO,ID 83204
208.221.9506

REGISTERED PROFESSIONAL ENGINEER 6159 STATE OF IDAHO RON D. RICE

ORIGINAL DRAWING SIGNED BY: RON D. RICE
DATE ORIGINAL SIGNED: -
ORIGINAL ON FILE AT
122 SOUTH MAIN, POCATELLO, IDAHO 83204

Highland High School
Welding Shop Exhaust System
Pocatello, Idaho

REVISIONS

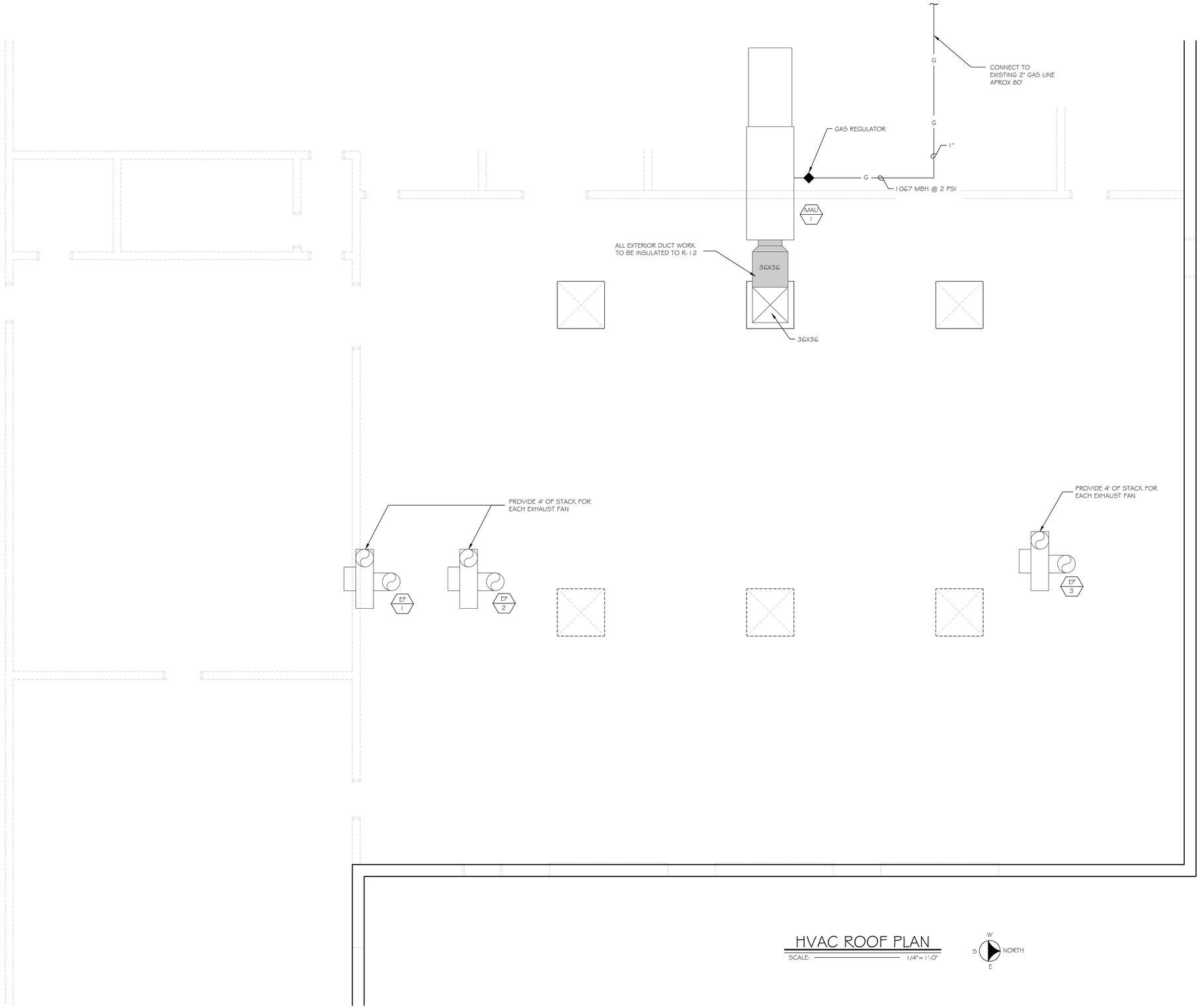
REV	DATE	DESCRIPTION

PROJECT No.: 2193
DATE: 3/10/2022
SCALE: As Shown
ENGINEER: RON RICE
DWG. BY: S.R.

HVAC FLOOR PLAN

M2.0

SHEET: 2



HVAC ROOF PLAN

SCALE: 1/4"= 1'-0"

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Gate City
ENGINEERING SERVICES
340 E. CLARK ST.
POCATELLO,ID 83204
208.221.9506

REGISTERED PROFESSIONAL ENGINEER
6159
STATE OF IDAHO
RON D. RICE

ORIGINAL DRAWING SIGNED BY: RON D. RICE
DATE ORIGINAL SIGNED: -
ORIGINAL ON FILE AT
122 SOUTH MAIN, POCATELLO, IDAHO 83204

Highland High School
Welding shop Exhaust System
Pocatello, Idaho

REVISIONS

REV	DATE	DESCRIPTION

PROJECT No.: 2193
DATE: 3/10/2022
SCALE: As Shown
ENGINEER: RON RICE
DWG. BY: S.R.

HVAC ROOF PLAN

M3.0

SHEET: 3

HVAC EQUIPMENT SCHEDULE

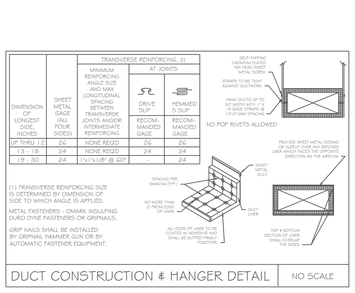
MARK	DESCRIPTION	MANUF. & MODEL NUMBER	SUPPLY FAN CFM	SUPPLY FAN ESP	SUPPLY FAN HP	VOLTAGE	MOP/ M.C.A.	HEATING INPUT	HEATING OUTPUT	LENGTH	HEIGHT	WIDTH	WEIGHT (LBS)	ACCESSORIES
MAU 1	DIRECT GAS FIRED MAKE-UP AIR UNIT	ECON-AIR EA4-D-1000-30D	12000	.5	10	460/3/60	25 / 16.7	10667	9813	195"	52"	48"	1581	CURB ASSEMBLY, MOTORIZED INLET DAMPER, DISCONNECT, CONTROL PANEL

DIFFUSER, GRILLE, & REGISTER SCHEDULE

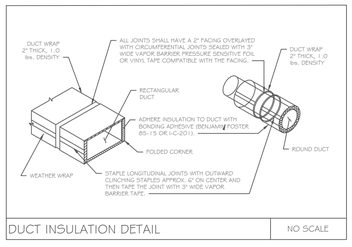
SYMBOL	DESCRIPTION	NECK SIZE	FACE SIZE	MATERIAL	PATTERN	INSTALLATION	NOTES
CD-1	BEVELED EDGE	40 X 14	42 X 16	ALUMINUM	DOUBLE DEFLECTION	DUCT	KRUEGER 5880H

EXHAUST FAN SCHEDULE

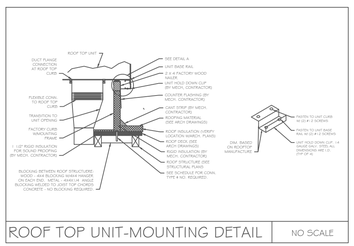
SYMBOL	TYPE	C.F.M.	S.P.	H.P.	CHAR.	R.P.M.	CONTROL	MANUFACTURE / MODEL	ROTATION	DISCHARGE	ACCESSORIES
EF 1	UTILITY SET	4200	4"	5	460/3/60	1881	FROM MAU-1 CONTROLLER	CAR-MON CMB-30	CW-UB	UP BLAST	FAN INLET / DISCHARGE FLEX CONNECTIONS, WEATHER COVER, VIBRATION RAILS, DRAIN, BACK-DRAFT DAMPER
EF 2	UTILITY SET	4200	4"	5	460/3/60	1881	FROM MAU-1 CONTROLLER	CAR-MON CMB-30	CW-UB	UP BLAST	
EF 3	UTILITY SET	6000	4"	7.5	460/3/60	1790	FROM MAU-1 CONTROLLER	CAR-MON CMB-32	CW-UB	UP BLAST	



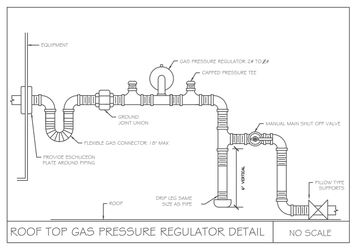
DUCT CONSTRUCTION & HANGER DETAIL | NO SCALE



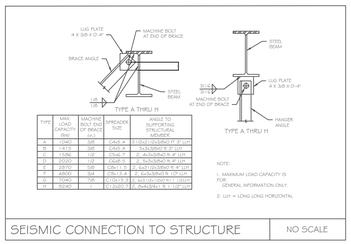
DUCT INSULATION DETAIL | NO SCALE



ROOF TOP UNIT-MOUNTING DETAIL | NO SCALE



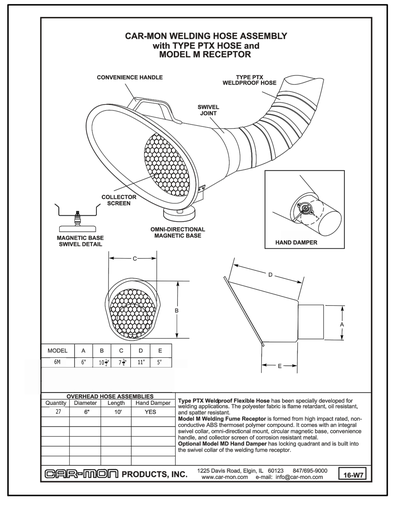
ROOF TOP GAS PRESSURE REGULATOR DETAIL | NO SCALE



TYPE	MAX. LOAD CAPACITY (lbs)	MACHINE BOLT AT END OF BRACE (in.)	SPREADER SIZE	ANGLE TO ATTACH TO STEEL STRUCTURAL MEMBER
A	1,040	3/8	C4X5.4	3-1/2x3-1/2x5/16 3" LG
B	1,415	3/8	C4X5.4	3-1/2x3-1/2x5/16 3" LG
C	1,760	1/2	C6X8.7	3" x 3x3x5/16 3" LG
D	2,020	1/2	C6X8.7	3" x 3x3x5/16 3" LG
E	2,600	5/8	C8X11.5	4" x 4x3x5/16 3" LG
F	3,800	5/8	C8X11.5	4" x 4x3x5/16 3" LG
G	10,460	7/8	C10X15.3	6" x 4x3-1/2x5/16 3" LG
H	10,460	1	C12X20.7	6" x 4x3-1/2x5/16 3" LG

NOTE:
1. MAXIMUM LOAD CAPACITY IS FOR GENERAL INFORMATION ONLY.
2. LLH = LONG LONG HORIZONTAL

SEISMIC CONNECTION TO STRUCTURE | NO SCALE



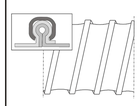
MODEL	A	B	C	D	E
6M	6"	10"	7"	11"	5"

OVERHEAD HOSE ASSEMBLIES			
Quantity	Diameter	Length	Hand Damper
27	6"	10'	YES

Type PTX Weldproof Flexible Hose has been specially developed for welding applications. The polyester fabric is flame retardant, oil resistant, and spatter resistant.
Model M Welding Fume Receptor is formed from high impact rated, non-conductive ABS thermoset polymer compound. It comes with an integral swivel collar, omni-directional mount, circular magnetic base, convenience handle, and collector screen of corrosion resistant metal.
Optional Model MD Hand Damper has locking quadrant and is built into the swivel collar of the welding fume receptor.

CAR-MON PRODUCTS, INC. 1225 Davis Road, Elgin, IL 60123 847/695-9000 www.car-mon.com e-mail: info@car-mon.com 16-W7

CAR-MON TYPE PTX HOSE



MATERIAL
Hose wall constructed of neoprene-coated polyester fabric. External helix made of galvanized steel

APPLICATIONS
- Transfer of hot or cold air
- Air conditioning and ventilation
- Exhaust fumes
- Welding fumes
- Extraction of corrosive media

PROPERTIES
- Good temperature resistance
- Flame resistant, passed UL 94-VO
- Good chemical resistance
- Highly flexible, extreme compressibility, small bend radius
- External helix protects against abrasion

Temperature Range	-30° to +325°F. Intermittent to +400°F
Diameter Range	Standard 3" through 16" (Special order through 36")
Standard Length	25'
Standard Color	Black

QUANTITY: 24 - 6" X 10' PTX HOSES

TECHNICAL DATA

Size ID Inches	Approx. Weight (Lbs./Ft.)	Bending Radius (Inches)*	Positive (in. w.c.)	Negative (in. w.c.)
6	.50	3.00	88	18

*Referring to the inner side of the elbow of hose.
The above mentioned data refers to an average and ambient temperature of 68°F. Subject to technical changes and color variations.

CAR-MON PRODUCTS, INC. 1225 Davis Road, Elgin, IL 60123 Phone (847) 695-9000
Web Site: www.car-mon.com e-mail: info@car-mon.com

Gate City
ENGINEERING SERVICES
340 E. CLARK ST.
POCATELLO,ID 83204
208.221.9506

REGISTERED PROFESSIONAL ENGINEER 6159 STATE OF IDAHO RON D. RICE

ORIGINAL DRAWING SIGNED BY: RON D. RICE
DATE ORIGINAL SIGNED: -
ORIGINAL ON FILE AT
122 SOUTH MAIN, POCATELLO, IDAHO 83204

Highland High School
Welding Shop Exhaust System
Pocatello, Idaho

REVISIONS

REV.	DATE	DESCRIPTION

PROJECT No.: 2193
DATE: 3/10/2022
SCALE: As Shown
ENGINEER: RON RICE
DWG. BY: S.R.

SCHEDULES DETAILS

M4.0

SHEET: 4

2022 Exhaust System Upgrade
Highland HS Welding Shop
Pocatello, Idaho

MECHANICAL SPECIFICATIONS

TABLE OF CONTENTS

2022 Exhaust System Upgrade
Highland HS Welding Shop
Pocatello, Idaho

SECTION 23 06 00

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.1 Description:

A. Description: This section describes specific requirements, products, and methods of execution which are typical throughout the mechanical work of this project. Additional requirements for the specific systems will be found in the sections specifying those systems, and supersede these requirements.

1.2 Project Conditions:

A. Obtain approval from A/E prior to cutting any structural members of furring elements.

B. Coordinate with structural and architectural work to determine acceptable locations for sleeves and supports which are required but may not be specifically show on the plans. Schedule installation of sleeves and special supports in manner timely to the work of other crafts. Provide offsets necessary for proper coordination with other work and reroute systems appropriately.

C. Replace any spray applied fire-proofing damaged by installation of mechanical if present in construction.

1.3 Dimension and Fit:

A. Fabricate materials accurately from measurements take at the project site, not from the drawings.

B. Do not spring or bend pipe to fit conditions or make up joints.

1.4 Serviceability of Products:

A. Furnish all products to provide the proper orientation of serviceable components to access space provided.

B. Coordinate installation of piping, ductwork, equipment, system components, and other products to allow proper service of all items requiring periodic maintenance or replacement.

C. Replace or relocate all products incorrectly ordered or installed to provide proper serviceability.

D. Provide code required access, power and lighting, and platforms as required.

1.5 Accessibility:

A. Provide access doors in ceilings, walls, floors, ducts, etc., for access to traps, valves, dampers, automatic devices, and all serviceable or operable equipment in concealed areas.

1.6 Routing:

A. Route all pipelines and ductwork parallel with building lines and as high as possible except where underground or shown otherwise on the building plans.

B. Route piping and ducts to clear all doors, windows, and other openings, and to avoid all other pipes and ducts, light fixtures, and similar products.

C. Conceal all pipes and ducts where routed through finished areas, unless authorized by Architect/Engineer or otherwise indicated on plans.

D. Priority: In general, medium pressure ducts (over 3.0 inches W.G.), graded pipes, and electrical raceways have priority of routing. Route other work elsewhere, over or under, as necessary. Order of priority does not reduce requirement for all trades to fully coordinate work.

1.7 Seismic Protection:

A. Description
   1. Included but not limited to:
      a. The requirements for seismic protection measures to be applied to mechanical equipment and systems specified herein are in addition to any other items called for in other sections of these specifications. Mechanical equipment shall include all ductwork, piping, and equipment specified in Division 23.
   2. Exclusion
      a. Floor mounted equipment weighing less than 400 lb, furniture or temporary or movable equipment.

B. Quality Assurance
   1. Reference Standards
      a. All ductwork and piping shall be provided with seismic restraints in accordance with Seismic Hazard Level (SHL) B of the Seismic Restraint Manual: Guidelines for Mechanical Systems dated 1991 and Addenda, as published by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) and in accordance with the International Building Code.
   2. Design Criteria
      a. This facility is located in seismic zone 3.
      b. The occupancy category is special occupancy structure.
      c. The importance factor is 1.0.

1.8 Access Panels:

A. Furnish minimum 18 x 18 inch panels for ceilings and for access to equipment in soffits and shafts, and minimum 12 x 12 inch panels for walls unless indicated otherwise. Access panel shall be lockable.

B. Furnish where indicated and where required to access temperature control dampers, valves, fire dampers, trap primers, shock arresters, and other appurtenances requiring operation, service, or maintenance. Review locations with the Owner's Representative prior to installation.

1.9 Pipe Sleeves:

A. Interior Wall Sleeves: 12 gauge galvanized steel, flush with wall on both sides.

B. Interior Floor Sleeves: 12 gauge galvanized steel and extend two inches above finish floor.

C. Exterior Wall Sleeves: Cast iron, flush with wall on both sides.

D. On Grade Floor Sleeves: Same as exterior wall sleeves.

1.10 Floor, Wall and Ceiling Escutcheon Plates:

A. Furnish split type plates as follows:
   1. Floor Plates: Cast brass, chrome plated
   2. Wall and Ceiling Plates: Spun aluminum

1.11 Piping Markers:

A. Acceptable Manufacturers: W.H. Brady, Seton

B. Pipes shall be labeled with all-vinyl, self-sticking labels or letter. For pipe covering sizes up to and including 1 ¼-inch outside diameter, select labels with ½-inch letters. For sizes from 1 ½-inch through 2-inch outside diameter, ¾-inch letters; for sizes from 2 1/2-inch through 6 inch outside diameter, 1 ¼-inch letters. The pipe markers shall be identified and color coded as follows. Install directional arrow adjacent to pipe marker indicating direction of flow. Arrows shall be same sizes and color as identification labels.

Service	Pipe Marker	Background Color
Heating Hot Water	Glycol Heating Supply	Yellow
	Glycol Heating Return	Yellow
Chilled Water	Chilled Water Supply	Green
	Chilled Water Return	Green
Storm Drain Water	Storm Drain	Green
Cold Water	Domestic Cold Water	Green
Hot Water	Domestic Hot Water Supply	Yellow
	Domestic Hot Water Recirc	Yellow
Sanitary Waste	Sanitary Waste	Green
Vent	Vent	Green
Fuel Gas	Natural Gas	Yellow

1.12 Mechanical Supporting Devices:

A. General
   1. Securely fasten all mechanical work to the structure to prevent hazard to human life and limb, and to prevent damage to products of construction under all conditions of operation.

B. Foundation and Supports
   1. Mount all equipment, plenums, piping and ductwork on foundations or suspend from primary building structure with additional structural members as required to provide secure and safe permanent installation. Design additional structural members for load imposed. Provide vibration isolation between equipment and supporting structure.
   2. Provide concrete foundations, including housekeeping pads for all mechanical equipment located on cast-in-place concrete structures. Coordinate final sizes and locations.
   3. Provide fabricated steel supports, frames, bases, and support or appurtenances for proper installation for all equipment.

4. Where Superstrut framing channel product series numbers are the only numbers listed, equal products by Uni-Strut or 0 – Strut with equivalent finish may be used.

C. Pipe Supports: Standard components, selected in accordance with MSS SP69, that satisfy the criteria of MSS SP-58, and framing channels and clamps.
   1. Single Pipes: Install hangers for cold piping outside the insulation using high density (6 lb. per cubic foot) insulation and 18 gal. galvanized sheet metal shield or saddle. Provide copper plated hangers for copper pipe.
   2. Trapeze Hangers: Where pipes are clustered, parallel, and in the same plane, they may be supported by trapeze hangers. Provide rods and framing channel sized to suit load imposed.
   3. Provide inserts for poured concrete and drop-in expansion anchors for pre-cast slabs.
   4. Manufacturers: Grinnell, C & P, Michigan, Super Strut

D. Inserts: Provide all inserts required for installation of piping. In poured concrete provide wrought steel or malleable iron adjustable type. Where expansion bolts are necessary to secure piping or equipment, use drop-in type anchors, to be inserted by drilling concrete. Power driven inserts not permitted for supporting piping to ceiling.

1.13 Seismic Protection:

A. Materials
   1. Materials and equipment shall conform to the respective specifications and other requirements specified below.
      a. Square-head bolts and heavy hexagon nuts, ANSI B18.2.1 and BI 8.2.2 and ASTM A 307 or A 576.
      b. Bolts underground, ASTM A 325.
      c. Sway brace shall conform to applicable requirements of MSS SP-58 and SP-69. Material used for members listed in Table shall be structural steel conforming with ASTM A36.
      d. Flexible Couplings: Flexible couplings shall have same pressure ratings as adjoining pipe
      e. Flexible ball joints conforming to the following requirements may be employed on aboveground piping. Joints shall have cast or wrought steel casing and ball parts capable of 360 degrees rotating plus not less than 15 degrees angular movement. Joints shall be certified to be suitable for the service intended by the manufacturer, based on not less than 2 years satisfactory operation in a similar application.
      f. Flexible couplings and joints of the mechanical joint type may be used for aboveground or underground piping.
      g. Mechanical couplings for steel or cast-iron pipe shall be of the sleeve type and shall provide a tight flexible joint under all reasonable conditions, slight settling or shifting of the ground, minor variations in trench gradients, and traffic vibrations. Where permitted in other sections of these specifications, joints utilizing split-half couplings with grooved or shouldered pipe ends may be used.
      h. Sleeve-type couplings shall be sued for joining plain-end pipe sections. The coupling shall consist of one steel middle rim, two steel followers, two gaskets, and necessary steel bolts and nuts to compress the gaskets. Underground bolts shall be high-strength type as specified.

1.14 Disconnect Switches:

A. All mechanical equipment requiring disconnect switches and over current protection shall be supplied per manufacturer recommendations and meet the National Electrical Code.

1.15 Equipment Efficiency:

Efficiency of Mechanical equipment and electric motors supplied with mechanical equipment: Meet or exceed the requirements of the International Energy Conservation Code.

1.16 Access Panels

Install in accordance with manufacturer's recommendations, coordinated with architectural features.

1.17 Pipe Sleeves:

A. Interior Floor and Wall Sleeves: Large enough in diameter to provide ¼ inch clearance around pipe or insulation. Pipe penetrations through mechanical room and fan room floors shall be made watertight.

B. Penetrations through Rated Floors and Walls: Caulk with fire barrier sealing system approved by authority having jurisdiction and Owner's insurance underwriter, with rating equal to floor or wall penetrated.

C. Exterior Wall Sleeves: Large enough to allow for caulking and made watertight. Caulking shall be from outside. Secure sleeves against displacement.

D. On-Grade floor Sleeves: Same as exterior wall sleeves, caulked from inside.

E. Layout: Layout work in advance of pouring of slabs or construction of wall and furnish and set inserts and sleeves necessary to complete the work.

F. Coordination: Cutting and patching required as a result of lack of coordination of this operation shall be at no additional cost.

1.18 Floor, Wall and Ceiling Escutcheon Plates:

A. Install on piping passing though finished walls, floors, ceilings, partitions and plaster furring. Escutcheon plates shall completely cover opening around pipe.

B. Secure wall and ceiling plates to pipe or structure.

C. Plates shall not penetrate insulation vapor barriers.

D Plates not required in unfinished spaces.

1.19 Piping Markers:

A. Install in accordance with ANSI A13.1 or the following, whichever is more stringent, apply labels or letters after completion of pipe cleaning, insulation, painting, or other similar work, as follows.
   1. Every 20 feet along continuous exposed lines.
   2. Every 10 feet along continuous concealed lines.
   3. Adjacent to each valve and stub-out for future.
   4. Where pipe passes through a wall, into and out of concealed spaces.
   5. On each riser.
   6. On each leg of a "T".

7. Locate conspicuously where visible.

B. Further apply labels or letters to lower quarters of the pipe on horizontal runs except where view is not obstructed on the upper quarters and pipe is normally viewed from above.

1.20 Mechanical Piping and Supporting Devices:

A. General: Fabricate and install piping and tubing in accordance with ASME B31.9 or the Idaho State Plumbing Code as applicable, the drawings, and this specification.
   1. Install all piping systems in accordance with manufacturer's recommendations. Provide pipe racks, pipe stands, trapeze hangers, etc., as required.
   2. Provide adjustable hangers complete with inserts, adjusters, bolts, nuts, swivels, all-thread rods, etc., except where specified otherwise, for all pipes.
   3. Do not use wire or perforated metal to support piping.
   4. Except as otherwise indicated for exposed continuous pipe, runs, install hangers and supports of same type and style as installed for adjacent similar piping.

B. Foundations and Supports:
   1. Provide where shown on drawing, or as specified, and per manufacturer's installation instructions.

C. Pipe Supports:
   1. Suspended Piping: support piping at each change in direction. Support piping on either side of control valves, pumps, at equipment connections, and wall penetrations so that piping is independently supported.
   2. Piping shall be independently supported form pipe hangers and shall not be laid through trusses, or supported from other piping or ductwork.
   3. Riser piping shall be supported at the top and bottom of the riser with intermediate supports as required. Riser piping shall not depend on a friction clamp for load bearing support.

D. Vertical Piping:
   1. Pipe supports shall hold a piping away from wall unless otherwise approved.
   2. Riser clamps to be directly under fitting (mechanical couplings not included) or welded to pipe.
   3. Risers to be supported at each floor penetration.
   4. Provide structural steel supports at the base of pipe risers. Size supports to carry all forces exerted by piping system when systems are in operation.

E. Horizontal Piping:
   1. Support within two feet at each change in direction.
   2. For cast iron no-hub piping and fitting assemblies less than 5'-0" long, provide hangers at each pipe end and fittings.

F. Building Attachments:
   1. Fastening or attaching to deck structure is prohibited. Support all piping from primary structural members, beams, joists, or provide intermediate supporting members between joists or beams.
   2. Provide all additional structural steel angles, channels, or other intermediate members required to support piping where structures do not occur as required for proper support.
   3. Arrange supports to prevent eccentric loading of joists and joist girders. Locate supports at joist panel points.

1.21 Cleaning and Adjusting:

A. General: Thoroughly clean Mechanical and plumbing equipment, fixtures, piping and ductwork of stampings and markings (except those required by codes), iron cuttings and other refuse. Clean plenums and equipment casings of debris and small particles of rubbish and dust before installing and making final duct connections. Provide temporary filters for all equipment with filters, replace with new filters after construction activities in building are complete.

B. Painted Surfaces: Clean scratched or marred factory finished and painted surfaces of rust or other foreign matter and paint with matching color industrial enamel or manufacturer supplied touch up paint.

C. Adjusting: After mechanical equipment has had minimum of thirty days of operation, lubricate and grease all equipment. Re-tighten belts to proper tension. Adjust fans, valves, control valves and other miscellaneous equipment requiring adjustment to setting indicated or directed.

D. Additional requirements are specified under specific sections of this Division.

1.22 Painting:

A. Equipment Room and Finished Areas:
   1. Grilles, Diffusers, and Registers: Paint sheet metal and visible ductwork behind grilles, diffusers, and registers flat black.

B. Refer to Architectural Specification Section and individual Sections of Division 23 for supplemental and additional painting requirements.

C. Finish exterior mechanical equipment, materials, devices, and construction with finish type and color as selected by Architect, submit color palette for approval.

D. Finish interior mechanical equipment, materials, devices and construction with finish type and color as selected by Architect, submit color palette for approval.

PART 2 – PRODUCTS (not used)
PART 3 – EXECUTION (not used)

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:
   1. Certified TAB reports.
   2. Documentation of work performed per ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
   3. Documentation of work performed per ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

B. TAB Firm Qualifications: **NEBB** certified.

C. TAB Report Forms: Standard TAB contractor's forms approved by Architect.

D. Perform TAB after distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine the approved submittals for HVAC systems and equipment.

C. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

D. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

E. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

F. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

G. Examine automatic temperature system components to verify the following:
   1. Dampers, valves, and other controlled devices are operated by the intended controller.
   2. Dampers and valves are in the position indicated by the controller.

3. Integrity of dampers and valves for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.
5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
6. Sensors are located to sense only the intended conditions.
7. Sequence of operation for control modes is according to the Contract Documents.
8. Controller set points are set at indicated values.
9. Interlocked systems are operating.
10. Changeover from heating to cooling mode occurs according to indicated values.

H. Report deficiencies discovered before and during performance of test and balance procedures.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in **NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems** and in this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish.

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in **inch-pound (IP)** units.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare schematic diagrams of systems' "as-built" duct layouts.

B. For variable-air-volume systems, develop a plan to simulate diversity.

C. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

D. Verify that motor starters are equipped with properly sized thermal protection.

E. Check for airflow blockages.

F. Check condensate drains for proper connections and functioning.

G. Check for proper sealing of air-handling unit components.

H. Check for proper sealing of air duct system.

3.4 TOLERANCES

A. Set HVAC system airflow and water flow rates within the following tolerances:
   1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus **10** percent.
   2. Air Outlets and Inlets: Plus or minus **10** percent.

END OF SECTION

2022 Exhaust System Upgrade
Highland HS Welding Shop
Pocatello, Idaho
SECTION 23 07 20

MECHANICAL INSULATION

PART 1 – GENERAL

1.1 Description: This section describes ductwork insulation, both internal and external.

PART 2 – PRODUCTS

2.1 Duct Insulation, external:

A. Acceptable Manufactures:
   1. Where Manville/Schuller in the only manufacturer indicated, equivalent products by Owens-Corning may be furnished.

B. External Insulation: Glass fiber blanket, ¾ lb./cu. ft. with vapor barrier jacket. Schuller "Microlite" with "FSK" jacket.

C. Insulation thermal conductivity shall be a minimum of k = 0.24.

D. Vapor barrier is required on the exterior of the insulation to protect it from condensation.

E. The vapor barrier shall be continuous with all joints sealed and having a perm rating 0.5 perm.

2.2 Duct Insulation, Internal:

A. Acceptable Manufacturers: Where Schuller is the only manufacturer indicated, equivalent approved products by Owens-Corning may furnished no exceptions.

B. Rectangular Duct Internal Liner: Mat-faced density 1-1/2 lb./cu. ft. minimum, antimicrobial acoustical duct blanket, Schuller "Linacousitc" duct liner.

C. Round Duct Internal Liner: Schuller Spiracoustic and Spriacoustic Plus round duct liner with anti-microbial airstream coating. Minimum thermal conductivity of k = 0.24.

D. Adhesive: Benjamin Foster 85-20, Tuff-Bond or equivalent.

E. Weld or Stick Pins: Duro Dyne with NC-I nylon stop clips, Grip-Nail, Gemco, Tuff-Bond or equivalent.

F. Sealant: Schuller Super Seal or equal: All joints shall be sealed so that condensation within the insulation will not occur.

2.3 Pressure Sensitive Tape:

A. Acceptable Manufacturers" Where Nashua tapes are indicated, equivalent products by other insulation manufacturers specified in this section are acceptable.

B. Duct Insulation
   1. External insulation: Nashua type FSK

PART 3 – EXECUTION

3.1 Duct Insulation:

A. Ducts shall be insulated with the minimum thermal resistances as follows unless more stringent levels are listed herein, applicable codes, or noted on drawings.
   1. Supply, return, exhaust and pressure relief ducts within conditioned space, R-3.3. Exhaust and relief ducts outside conditioned space, R 3.3.
   2. Supply and return ducts in concrete or in ground, R-5.3.
   3. Supply or return ducts outside conditioned space, R-7.

   The applied locations are:
   1. Supply and return ductwork outside the building: Internally lined.
   2. Supply and return ductwork inside the building: Internally lined unless noted otherwise on drawing.
      a. Round supply and return duct 18 inches in diameter and smaller may be externally insulated, unless noted otherwise.
   3. Restroom exhaust ductwork: Externally insulated, completely.
   4. Ductwork at exhaust fans: Externally insulated, completely.
   5. Pressure relief ductwork: External from backdraft damper to outside air intake vent, completely.
   6. Equipment Outside Air and Exhaust Duct from Unit to Louver: Internally lined.
   7. Combustion air inlet duct externally insulated, completely.

B. Installation, External Duct Insulation:
   1. General requirements: Install in accordance with manufacturer's recommendations.
   2. Additional procedures: External insulation with joints and seams shall be lapped 3 inches minimum and stapled 3 inches on center. Seal vapor barrier jacket where insulation types or joints meet with 3-inch wide pressure sensitive tape.
   3. Vapor barrier: Seal insulation to maintain vapor barrier.
   4. Lined ductwork: External insulation not required where ductwork is internally lined except where noted or specified.

C. Installation, Internal Duct Liner
   1. General requirements: Apply liner in accordance with manufacturer's recommendations and with SMACNA "Duct liner Application Standard."
   2. Additional procedures: Apply internal insulation to flat sheet with continuous coverage of adhesive. Use adhesive on all butt edges. Install weld or stick pins and clips 15 inches on center and no more than 2 inches maximum from any cut or exposed edge.
   3. Dimensions: Duct dimensions on drawings are net clear inside dimensions with duct liner installed. Install liner in compliance with NFPA 90A.
   4. Seal all cut edges with colored sealant, clear sealant is prohibited.

3.2 Field Quality Control:

A. Field Tests: Testing of systems shall have been completed and systems approved prior to applying insulation.

B. Existing Systems:
   1. Repair existing insulation damaged during installation of work.
   2. Make neat connections where new and existing insulation meet.
   3. Where existing piping, ductwork or equipment is removed, cover existing surfaces neatly to match existing.

C. Accessibility: Provide removable insulation sections to cover parts of equipment which must be opened periodically for maintenance; including metal vessel covers, fasteners, valves, flanges, frames, and accessories. Do not insulate boiler manholes, handholes, cleanouts, ASME stamp, and manufacturer's nameplates. Provide neatly beveled edge at interruptions of insulation.

END OF SECTION

SECTION 231123

NATURAL GAS PIPING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Minimum Operating-Pressure Ratings:

1. Piping and Valves: 100 psig (690 kPa) minimum unless otherwise indicated.
2. Service Regulators: 100 psig (690 kPa) minimum unless otherwise indicated.

B. Natural-Gas System Pressure within Building: One distribution pressure. 0.5 psig (3.45 kPa).

2.2 PIPES, TUBES, AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.

1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
4. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.

B. Corrugated, Stainless-Steel Tubing: Comply with ANSI/IAS LC 1; include flame-retardant PE coating, copper-alloy threaded ends, and striker plates.
1. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D2513, SDR 11 and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.

2.3 SPECIALTIES

A. Appliance Flexible Connectors:

1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
4. Corrugated stainless-steel tubing with polymer coating.

B. Service Meters: Comply with gas company requirements.

2.4 VALVES

A. General Requirements for Metallic Manual Gas Shutoff Valves: Comply with ASME B16.33.

1. CWP Rating: 125 psig (860 kPa).

B. One-Piece, Bronze Ball Valve with Bronze Trim: MSS SP-110.

1. Body: Bronze, complying with ASTM B 584.
2. Ball: Chrome-plated brass.
3. Stem: Bronze; blowout proof.
4. Seats: Reinforced TFE; blowout proof.
5. Packing: Separate packnut with adjustable stem packing threaded ends.
6. CWP Rating: 600 psig (4140 kPa).
7. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

C. Bronze Plug Valves: MSS SP-78.

1. Body: Bronze, complying with ASTM B 584.
2. Plug: Bronze.
3. Operator: Square head or lug type with tamperproof feature where indicated.
4. Pressure Class: 125 psig (862 kPa).
5. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
6. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

2.5 PRESSURE REGULATORS

A. General Requirements: Single stage, steel jacketed, and corrosion resistant. Include elevation compensator.

B. Service-Pressure Regulators: ANSI Z21.80; 100-psig- (690-kPa-) maximum inlet pressure. Factory- or field-installed, stainless-steel screen in vent opening if not connected to vent piping.

PART 3 - EXECUTION

3.1 OUTDOOR PIPING INSTALLATION

A. Comply with requirements in Section 230500 "Common Work Results for HVAC" for basic piping installation requirements.

B. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Comply with requirements in Section 230500 "Common Work Results for HVAC" for wall penetration systems.

C. Install service meters to comply with gas company requirements.

3.2 INDOOR PIPING INSTALLATION

A. Comply with requirements in Section 230500 "Common Work Results for HVAC" for basic piping installation requirements.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install gas stops for shutoff to appliances with low-pressure gas supply.

D. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.

E. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

F. Connect branch piping from top or side of horizontal piping.

G. Install unions in pipes NPS 2 (DN 50) and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.

H. Do not use natural-gas piping as grounding electrode.

3.3 PIPING JOINT CONSTRUCTION

A. Threaded Joints: Thread pipe with tapered pipe threads complying with ASME B1.20.1.

B. Joints in Steel Piping with Protective Coating: Apply joint cover kits to pipe after joining to cover, seal, and protect joints.

3.4 VALVE INSTALLATION

A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.

B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

3.5 OUTDOOR PIPING SCHEDULE

A. Aboveground natural-gas piping shall be the following:

1. Steel pipe with malleable-iron fittings and threaded joints.

3.6 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG (3.45 kPa)

A. Aboveground, branch piping NPS 1 (DN 25) and smaller shall be one of the following:

1. Corrugated stainless-steel tubing with mechanical fittings having socket or threaded ends to match adjacent piping.
2. Steel pipe with malleable-iron fittings and threaded joints.

B. Aboveground, distribution piping shall be[one of] the following:

1. Steel pipe with malleable-iron fittings and threaded joints.

3.7 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Valves for pipe sizes NPS 2 (DN 50) and smaller shall be one of the following:

1. One-piece, bronze ball valve with bronze trim.

B. Valves for pipe sizes NPS 2-1/2 (DN 65) and larger shall be one of the following:

1. Two-piece, full-port, bronze ball valves with bronze trim.
2. Bronze plug valve.

C. Valves in branch piping for single appliance shall be one of the following:

1. One-piece, bronze ball valve with bronze trim.

END OF SECTION

SECTION 23 30 10

AIR HANDLING AND DISTRIBUTION

PART 1 – GENERAL

1.1 DESCRIPTION:

A. This section describes specific requirements, products, and methods of execution relating to the project air handling and distribution, exhaust system. Provide all HVAC systems as specified, fully functional and complete in every detail.

1.2 SUBMITTALS :

A. Manufacturer's technical product data for all equipment and components, highlighted to show applicable features, including all size, capacity data, electrical characteristics and a control diagram showing all components and a written sequence of operation. Submit fan performance curves clearly showing specified operating point with TSP, power, RPM, and efficiency indicated.

B. Submit assembly-type drawings showing unit dimensions, weight loadings, required clearances and field connection details.

C. Air diffuser and grilles: Product data showing dimensions, details of construction, and performance data, including air volumes, outlet velocity, pressure drop, throw, and noise level throughout variable flow volume range.

PART 2 – PRODUCTS

2.1 DUCTWORK:

A. Ductwork Systems:
   1. Ductwork Construction: Galvanized steel sheets in accordance with SMACNA HVAC Duct Construction Standards, Metal and Flexible. Sheet steel shall be ASTM A653 with G-90 galvanized coating.
      a. Applicable duct construction pressure classification is 2.0 inches water gage for supply and return ductwork, 2.0 for exhaust ductwork.
      b. Exposed Ductwork: 20 gauge minimum, round shall be spiral seam. Do not dent, scratch, warp or allow deflection in ductwork. Install duct work neat, square and true. All cut edges shall be square and true. No visible gaps or cracks are allowed. Hangers shall be equally spaced, all thread rod type. Fasteners shall be installed in uniform neatly spaced columns and rows. Touch-up scratches and cut edges with ZRC.
      c. Ductwork Seal Class designation is A for all ductwork: seal all transverse joints, longitudinal seams, and duct wall penetrations.
      d. Provide tapered transitions at all changes in duct size and at connections to fans and other equipment.
      e. Turning Vanes: In all 90 degree turns in ducts provide single thickness turning vanes or 1-1/2 radius elbows.
      f. Duct passing through exit corridors shall be 26 gage, minimum.
      g. Ducts passing through roof shall have weatherproof leak-tight penetrations properly flashed and sealed.
      h. Duct shall be round or rectangular as required or shown, no exceptions. Duct dimensions shown are net clear inside dimensions.

2. Flexible Duct
    a. Do not use flexible duct unless specifically called for on the plans.
    b. At diffuser connections and return outlets where shown flex duct shall not be exposed.
        1) Provide duct listed as UL-181 Class I air duct and constructed in compliance with NFPA 90A, R-value of 5.5 minimum, with inner liner and durable tear and puncture resistant outer liner.
        2) Maximum length 6'. Install with not more than 90 degree full radius bend.
        3) Make joints with stainless steel quick lock pivoting head metal screw clamps or drawband.
        4) Clamps-Tridon LS Series, Duct Tape Nashua 357, Drawbands Panduit PLT-H, or equal.
        5) All elbows shall be rigid metal duct.
    c. Provide bell mouth spin-in fitting with damper at all take-offs Flexmaster Series 3000S, or equal.
    d. Manufacturer: Valuflex UPC #090 or approved equal.

2.2 DUCT ACCESSORIES:

A. Dampers
1. Not all volume dampers are shown on the drawings.
2. Provide air volume dampers at each duct branch for supply, return, and exhaust ductwork and in the duct leading to each supply, return, and exhaust openings to adjust the system to produce the design air quantities, and as required.
3. Provide opposed blade dampers in grilles or diffusers if insufficient clearance exists between terminal device and duct for installation of volume damper in branch duct.
4. Relocate dampers in ductwork and provide elbows, extensions, and other ductwork construction as required to eliminate noise.
5. Volume Dampers.
    a. Damper Quadrants: indicating dial regulator and sealed end bearings. Provide remote operators at hard ceilings and other areas as required, Vent Fabrics or approved equal.
    b. Damper fabrication:
        1) Minimum gage and duct construction shall be in accordance with SMACNA standards.
        2) Airfoil damper blade shall be aligned with handle and index pointer.
        3) All operators accessible and lockable.
        4) Maximize distance from branch dampers to diffusers. Locate damper a minimum of 3 feet from diffusers.
        5) All damper shafts shall have sealed bearings.

B. Access Panels and Doors
1. System Access Panels.
    a. Sheet-metal doors reinforced, cross-bracketed, or otherwise.
    b. Seal doors airtight with felt edged gaskets.
    c. Secure with hinges and sash locks.
    d. Ruskin ADC or equal.
    e. Entire assembly UL rated as required.

C. Flexible fabric ductwork and equipment connections: 30 oz. Ventfabrics Ventglas or Duro-Dyne Durolon neoprene coated fire retardant glass fabric.

D. Duct Sealer: Oil resistant elastomer containing approximately 50% solids by weight in blended ketone solvent. Container label shall show name of material, date of manufacture, shelf-life, curing time, mixing and application instructions. RCD Corporation non-flammable water based air duct sealant or equal.

E. Zinc Rich Coating: Southern Coatings Inc. “Galvicon”, ZRC products Co. “ZRC”, or equal. Touch up damaged surfaces on galvanized surfaces with zinc-rich coating.

F. Fasteners: ASTM A-307, Grade A or B with ASTM A 563 heavy nuts, UNC threads, cadmium plating or electro-galvanizing finish.

2.3 GRILLES, REGISTERS AND DIFFUSERS

A. Provide grilles, registers, and diffusers of the types, sizes and manufacturer in this specification called for on plans and in schedule on drawings.

B. Provide diffusers of the size, style, and manufacturer called out on drawings
   1. Diffuser shall be tested in accordance with ASHRAE Standard 70-1991.
   2. Diffusers shall be constructed of steel, unless noted otherwise. Cone type diffusers shall be of multiple single-piece cone construction with the back cone including an integrally drawn inlet (welded-in inlets and corner joints are not acceptable). Modular core type diffusers shall consist of fixed louver directional modules, which can be easily repositioned in the field without tools for 1, 2, 3, or 4-way discharge.
   3. Diffuser finish shall be white, baked on, with a pencil hardness of HB to H. The paint must pass a 100-hour ASTM D117 Corrosive Environment Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 250- hour ASTM-870 Water Immersion Test. The paint must pass the ASTM D-2794 Reverse Impact Cracking Test with an applied force of 50 inch pounds.

C. Provide round, square or rectangular diffusers complete with equalizing grid. Install grids orientated to square diffuser face.

D. Equip diffusers with panels of the proper size to match the suspended ceiling layout or with the proper frame for surface mounting. Fully correlate diffuser and grille style, dimension, and fit with ceiling.

E. Manufacturers: Price, Titus or Krueger, or approved equal.

2.4 FILTERS:

A. Disposable Filters.
   1. Capacities and sizes as required or provided with equipment. UL Class II.
   2. Filters: Pleated non-woven cotton fabric type with frame and support grid. 25 to 30 percent efficient per ASHRAE 52-76. FARR 30-30 or approved equal.
   3. MERV-8 minimum.

2.5 MAKE-UP AIR UNIT

A. Description: Rooftop mount unit.
B. Quality Assurance:
   1. Unit shall be designed in accordance with UL Standards.
   2. Unit shall be HVI tested and certified.
C. 3. Front air discharge.
D. Manufacturer: Econ-air, Greenheck, Captive Aire or approved equal.

E. Unit Cabinet
1. Unit cabinet shall be constructed of galvanized steel coated with a pre-painted baked enamel finish.

F. Blowers:
1. Blower shall be belt drive.

G. See reference drawings for basis of design unit type.

2.6 UTILITY EXHAUST FANS

A. Hazardous fume exhaust fan shall be licensed to bear the AMCA seal for certified performance in accordance with AMCA Standard 210. The fan shall be single inlet, single width, Arrangement 10 and shall have a backward inclined fan wheel with single thickness flat blades welded to both the shroud and back plate. The fan wheel shall be statically and dynamically balanced before assembly. Any required balance weights shall be welded to the outside of the shroud or back plate; no weights are to be installed in the blade air stream. All surfaces of the centrifugal fan shall be painted completely with an acid resistant polyester powder coating.

B. The bearings shall be of the pillow block type with cast steel frame and shall be bolted to the structural bearing supports. The fan shaft shall be fabricated of ground and polished cold drawn steel with machined centers and key slots for both the fan wheel and the drive sheave. It shall be given a rust inhibitive asphaltic coating after assembly. The V-belt drive shall be adjustable. The variable pitch sheave shall be factory set at the appropriate position to provide the specified capacity in the approximate midpoint of the adjustment range. All fans shall be provided with a belt guard enclosing both sheaves and V-belts. The belt guard shall have a tachometer hole. All drives shall be rated for no less than 150% of motor load.

C. The scroll and side sheets of the fan housing shall be fabricated of cold rolled steel of 12-gauge minimum thickness. The scroll and side sheets shall be joined through continuous welding. Spot welded or standing seam construction is not acceptable. The fan housing shall have a minimum of 8 attachment studs with flange locking nuts. Any bolts, self-tapping screws or fasteners that protrude into the housing interior are not acceptable. The fan base shall be fabricated of cold rolled steel of 12-gauge minimum thickness. The bearing supports within the base shall be fabricated of cold rolled steel angles having a minimum 3/16” thickness and they shall be welded to the sides of the base. All seams in the individual components shall be continuous welded. The motor base shall be fabricated of cold rolled steel of 12-gauge minimum thickness. Its position shall be adjustable through the use of bolts that travel in slots in the sides of the fan base. A non-hardening, high elasticity caulking shall be applied during assembly between the mating surfaces of the inlet cone and the fan housing and of the fan housing and the fan base.

TEST REQUIREMENTS:

A. The assembled fan shall be test run before shipment with “total frequency” vibration measured at each bearing in both the vertical and horizontal planes. Any fan having an average reading of over 3 mils deflection is not acceptable.

2.7 FLEXIBLE HOSE -PTX

A. The flexible hose shall be manufactured using a flame retardant, oil resistant, polyester fabric with spatter resistant characteristics, and clinched with an external galvanized steel helix. No adhesives may be used in the construction.

2.8 FUME RECEPTOR -6M

A. The welding fume receptor shall be formed from high impact rated ABS thermoset polymer compound with high heat resistance capabilities, in an elliptical, low resistance air entry design with flanged perimeter. It shall be complete with integral swivel collar, circular omnidirectional magnetic base, hand damper, convenience handle, and collector screen of corrosion resistant material.

B. The omnidirectional magnetic base shall allow easy positioning of the receptor near the welding point and shall hold the receptor firmly in place on the worktable or weldment. Hose assembly shall be factory assembled to maintain the integrity of the assembly. Field assembly is not acceptable.

PART 3 – EXECUTION

3.1 AIR DISTRIBUTION EQUIPMENT

A. Arrange fans to be cleanable and so that wheel, bearings, shaft and drive are removable

B. Provide plug type clean out doors or split fan housing. Gasket joints and bolt airtight.

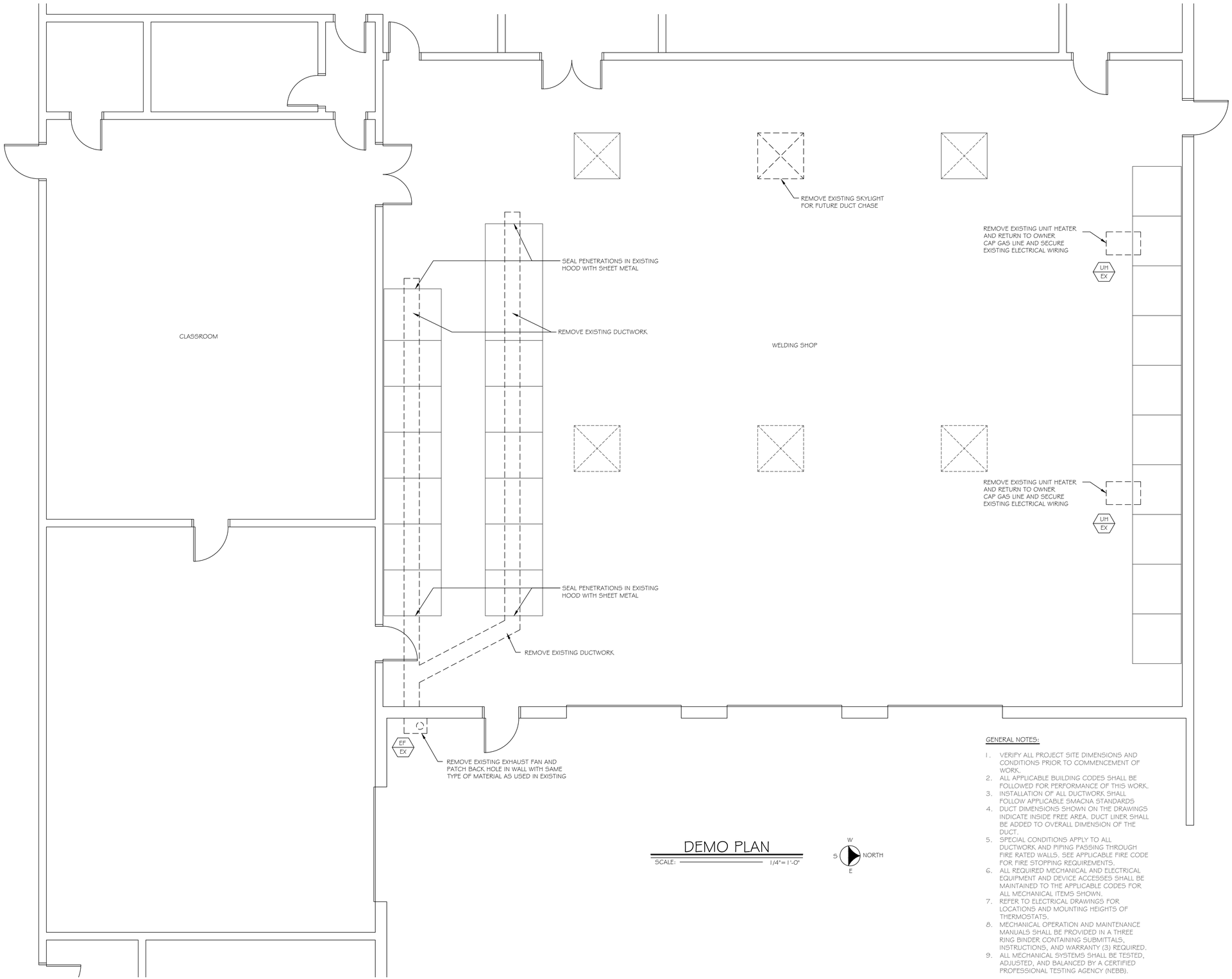
C. Provide vibration isolation for all fans and equipment.

D. Assemble fans at factory, and test with permanent motor for proper operation, alignment, and balance.

E. Provide accessory roof curbs and/or roof caps as recommended by the manufacturer.

F. Install all equipment and accessories per manufacturer’s instructions and recommendations.

END OF DIVISION



DEMO PLAN

SCALE: 1/4"= 1'-0"

W S NORTH E

GENERAL NOTES:

1. VERIFY ALL PROJECT SITE DIMENSIONS AND CONDITIONS PRIOR TO COMMENCEMENT OF WORK.
2. ALL APPLICABLE BUILDING CODES SHALL BE FOLLOWED FOR PERFORMANCE OF THIS WORK.
3. INSTALLATION OF ALL DUCTWORK SHALL FOLLOW APPLICABLE SMACNA STANDARDS
4. DUCT DIMENSIONS SHOWN ON THE DRAWINGS INDICATE INSIDE FREE AREA. DUCT LINER SHALL BE ADDED TO OVERALL DIMENSION OF THE DUCT.
5. SPECIAL CONDITIONS APPLY TO ALL DUCTWORK AND PIPING PASSING THROUGH FIRE RATED WALLS. SEE APPLICABLE FIRE CODE FOR FIRE STOPPING REQUIREMENTS.
6. ALL REQUIRED MECHANICAL AND ELECTRICAL EQUIPMENT AND DEVICE ACCESSES SHALL BE MAINTAINED TO THE APPLICABLE CODES FOR ALL MECHANICAL ITEMS SHOWN.
7. REFER TO ELECTRICAL DRAWINGS FOR LOCATIONS AND MOUNTING HEIGHTS OF THERMOSTATS.
8. MECHANICAL OPERATION AND MAINTENANCE MANUALS SHALL BE PROVIDED IN A THREE RING BINDER CONTAINING SUBMITTALS, INSTRUCTIONS, AND WARRANTY (3) REQUIRED.
9. ALL MECHANICAL SYSTEMS SHALL BE TESTED, ADJUSTED, AND BALANCED BY A CERTIFIED PROFESSIONAL TESTING AGENCY (NEBB).

Gate City
ENGINEERING SERVICES
340 E. CLARK ST.
POCATELLO,ID 83204
208.221.9506

REGISTERED PROFESSIONAL ENGINEER 6159 STATE OF IDAHO RON D. RICE

ORIGINAL DRAWING SIGNED BY: RON D. RICE
DATE ORIGINAL SIGNED: 3-23-2022
ORIGINAL ON FILE AT
340 EAST CLARK, POCATELLO, IDAHO 83204

Pocatello / Chubbuck School District #25
Highland High School Welding Shop Exhaust System
1800 Bench Road
Pocatello, Idaho, 83201

REVISIONS

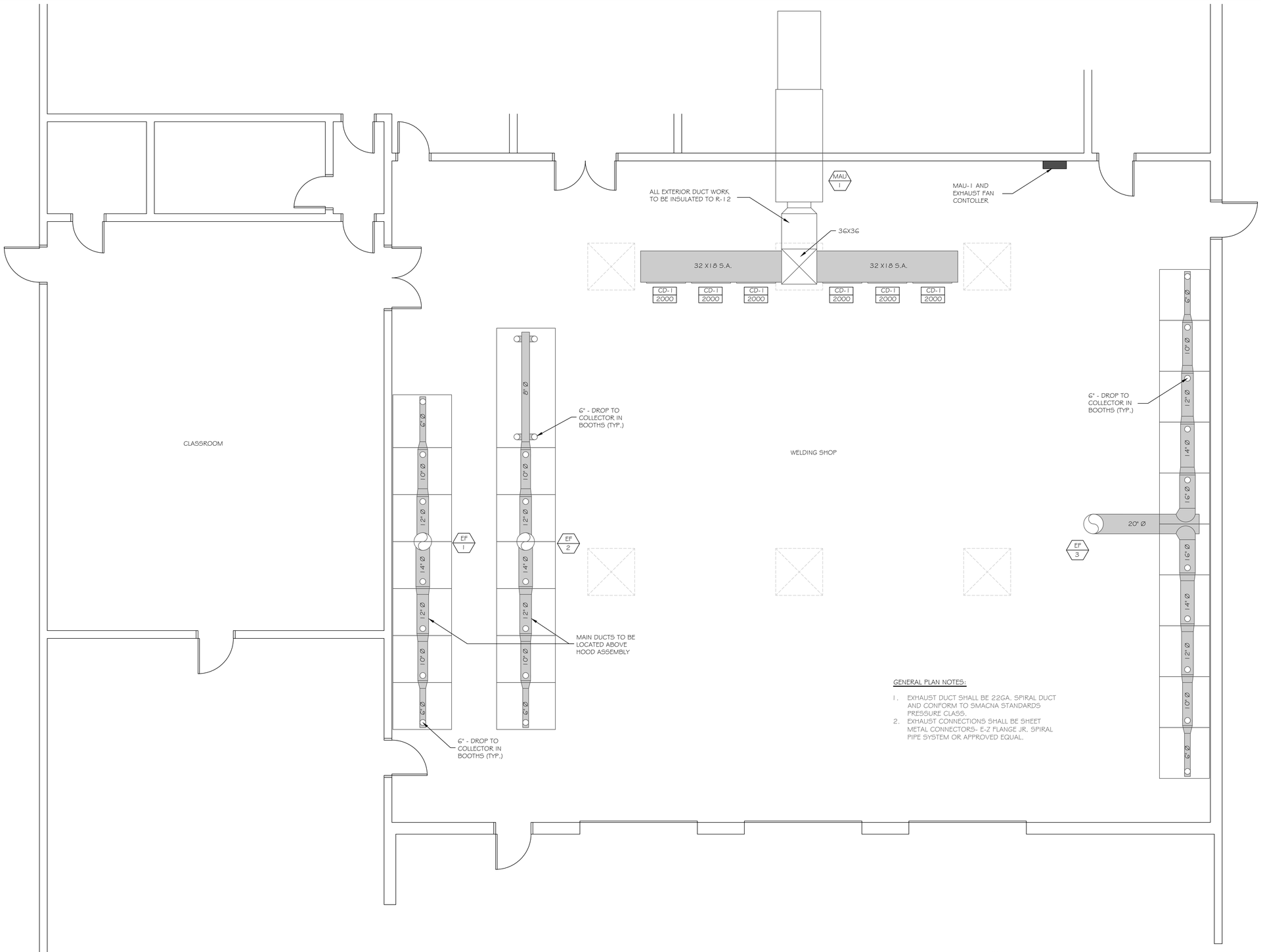
REV	DATE	DESCRIPTION

PROJECT No.: 2193
DATE: 3/23/2022
SCALE: As Shown
ENGINEER: RON RICE
DWG. BY: S.R.

DEMO PLAN

M1.0

SHEET: 1



GENERAL PLAN NOTES:

1. EXHAUST DUCT SHALL BE 22GA. SPIRAL DUCT AND CONFORM TO SMACNA STANDARDS PRESSURE CLASS.
2. EXHAUST CONNECTIONS SHALL BE SHEET METAL CONNECTORS- E-Z FLANGE JR. SPIRAL PIPE SYSTEM OR APPROVED EQUAL.

HVAC FLOOR PLAN

SCALE: 1/4"= 1'-0"

W S NORTH E

Gate City
ENGINEERING SERVICES
340 E. CLARK ST.
POCATELLO,ID 83204
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Highland High School
Welding Shop Exhaust System
Pocatello, Idaho

REVISIONS

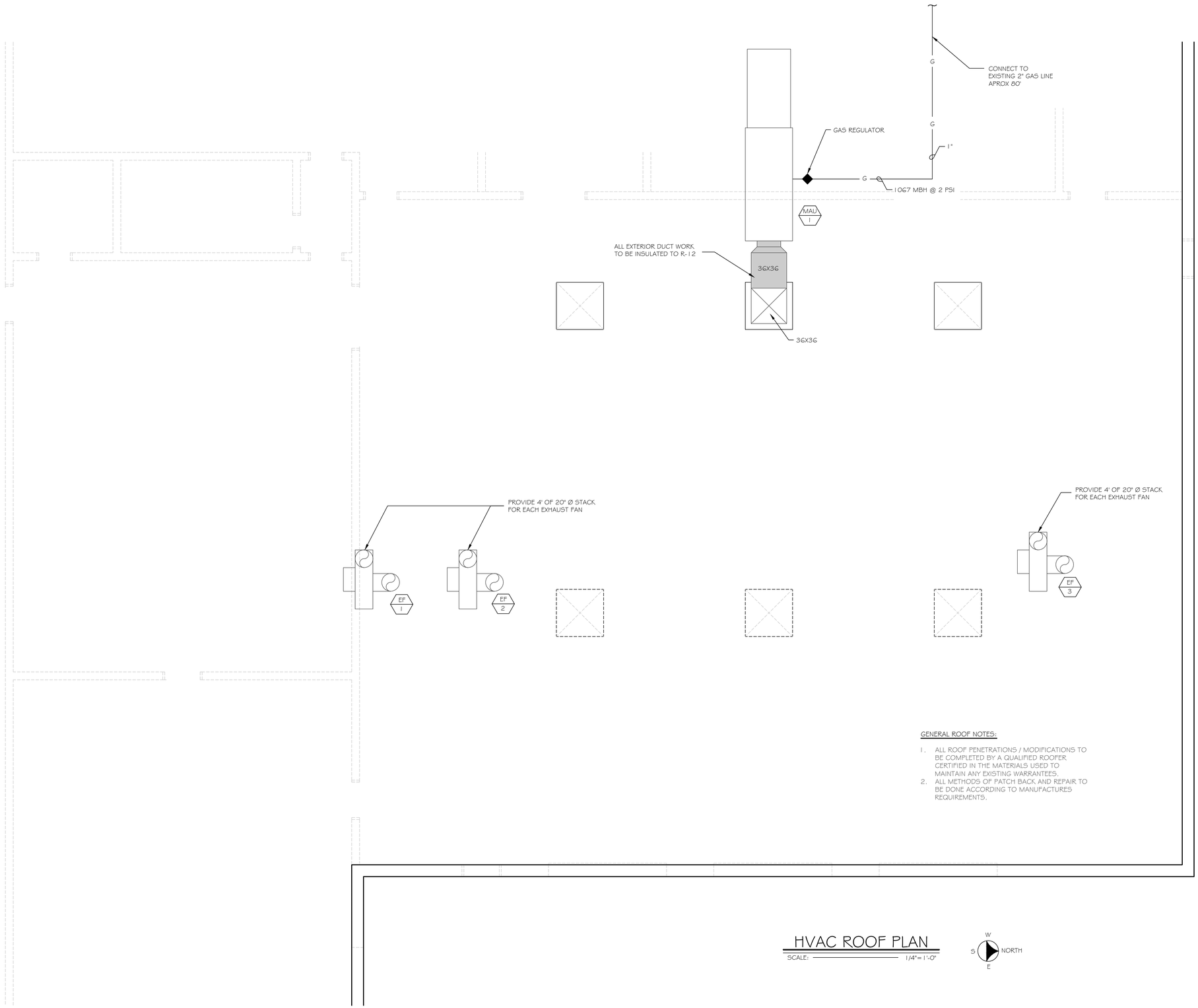
REV	DATE	DESCRIPTION

PROJECT No.: 2193
DATE: 3/23/2022
SCALE: As Shown
ENGINEER: RON RICE
DWG. BY: S.R.

HVAC FLOOR PLAN

M2.0

SHEET: 2



GENERAL ROOF NOTES:

1. ALL ROOF PENETRATIONS / MODIFICATIONS TO BE COMPLETED BY A QUALIFIED ROOFER CERTIFIED IN THE MATERIALS USED TO MAINTAIN ANY EXISTING WARRANTEES.
2. ALL METHODS OF PATCH BACK AND REPAIR TO BE DONE ACCORDING TO MANUFACTURES REQUIREMENTS.

HVAC ROOF PLAN

SCALE: 1/4"= 1'-0"

W
S NORTH
E

Gate City
ENGINEERING SERVICES
340 E. CLARK ST.
POCATELLO,ID 83204
208.221.9506

REGISTERED PROFESSIONAL ENGINEER
6159
STATE OF IDAHO
RON D. RICE

ORIGINAL DRAWING SIGNED BY: RON D. RICE
DATE ORIGINAL SIGNED: 3-23-2022
ORIGINAL ON FILE AT
340 EAST CLARK, POCATELLO, IDAHO 83204

Highland High School
Welding shop Exhaust System
Pocatello, Idaho

REVISIONS

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PROJECT No.: 2193
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ENGINEER: RON RICE
DWG. BY: S.R.

HVAC ROOF PLAN

M3.0

SHEET: 3

HVAC EQUIPMENT SCHEDULE

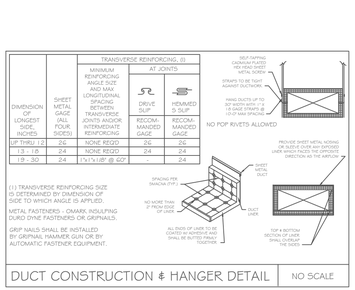
MARK	DESCRIPTION	MANUF. & MODEL NUMBER	SUPPLY FAN CFM	SUPPLY FAN ESP	SUPPLY FAN HP	VOLTAGE	MOP/ M.C.A.	HEATING INPUT	HEATING OUTPUT	LENGTH	HEIGHT	WIDTH	WEIGHT (LBS)	ACCESSORIES
MAU 1	DIRECT GAS FIRED MAKE-UP AIR UNIT	ECON-AIR EA4-D-1000-30D	12000	.5	10	460/3/60	25 / 16.7	10667	9813	195"	52"	48"	1581	CURB ASSEMBLY, MOTORIZED INLET DAMPER, DISCONNECT, CONTROL PANEL

DIFFUSER, GRILLE, & REGISTER SCHEDULE

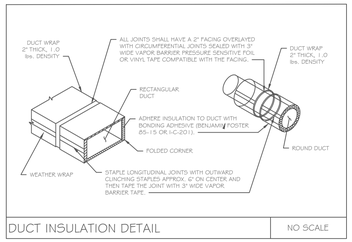
SYMBOL	DESCRIPTION	NECK SIZE	FACE SIZE	MATERIAL	PATTERN	INSTALLATION	NOTES
CD-1	BEVELED EDGE	40 X 14	42 X 16	ALUMINUM	DOUBLE DEFLECTION	DUCT	KRUEGER 5880H

EXHAUST FAN SCHEDULE

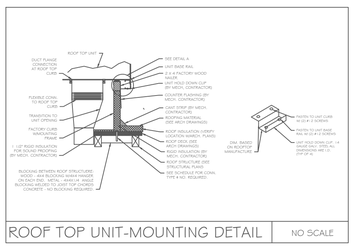
SYMBOL	TYPE	C.F.M.	S.P.	H.P.	CHAR.	R.P.M.	CONTROL	MANUFACTURE / MODEL	ROTATION	DISCHARGE	ACCESSORIES
EF 1	UTILITY SET	4200	4"	5	460/3/60	1881	FROM MAU-1 CONTROLLER	CAR-MON CMB-30	CW-UB	UP BLAST	FAN INLET / DISCHARGE FLEX CONNECTIONS, WEATHER COVER, VIBRATION RAILS, DRAIN, BACK-DRAFT DAMPER
EF 2	UTILITY SET	4200	4"	5	460/3/60	1881	FROM MAU-1 CONTROLLER	CAR-MON CMB-30	CW-UB	UP BLAST	
EF 3	UTILITY SET	6000	4"	7.5	460/3/60	1790	FROM MAU-1 CONTROLLER	CAR-MON CMB-32	CW-UB	UP BLAST	



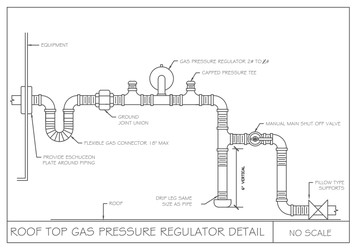
DUCT CONSTRUCTION & HANGER DETAIL | NO SCALE



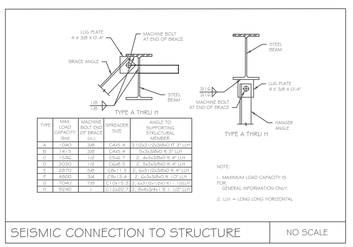
DUCT INSULATION DETAIL | NO SCALE



ROOF TOP UNIT-MOUNTING DETAIL | NO SCALE



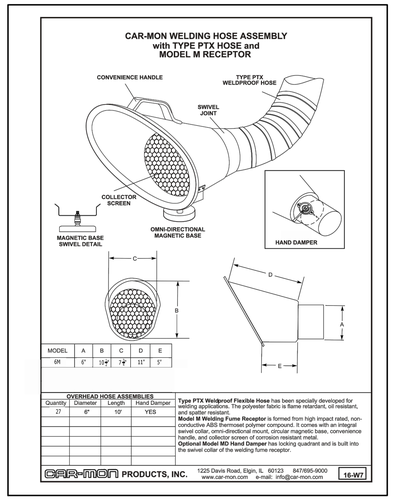
ROOF TOP GAS PRESSURE REGULATOR DETAIL | NO SCALE



TYPE	MAX. LOAD CAPACITY (lbs)	MACHINE BOLT AT END OF BRACE (in.)	SPREADER SIZE	ANGLE TO ATTACH TO STEEL STRUCTURAL MEMBER
A	1,040	3/8	C4X5.4	3-1/2x3-1/2x5/16 3" (in)
B	1,415	3/8	C4X5.4	3-1/2x3-1/2x5/16 3" (in)
C	1,760	1/2	C6X8.7	3" - 3x3x3/8x3 1/8 4" (in)
D	2,020	1/2	C6X8.7	3" - 3x3x3/8x3 1/8 4" (in)
E	2,800	5/8	C8X11.5	4" - 4x3x3/8x3 1/8 4" (in)
F	3,800	5/8	C8X11.5	4" - 4x3x3/8x3 1/8 4" (in)
G	7,040	7/8	C10X15.3	4" - 4x3x1/2x3 1/2 - (out)
H	10,140	1	C12X20.7	4" - 4x3x3/4x3 1/2" (out)

NOTE:
1. MAXIMUM LOAD CAPACITY IS GENERAL INFORMATION ONLY.
2. LLH = LONG LONG HORIZONTAL

SEISMIC CONNECTION TO STRUCTURE | NO SCALE



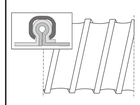
MODEL	A	B	C	D	E
6M	6"	10"	7"	11"	5"

OVERHEAD HOSE ASSEMBLIES			
Quantity	Diameter	Length	Hand Damper
27	6"	10'	YES

Type PTX Weldproof Flexible Hose has been specially developed for welding applications. The polyester fabric is flame retardant, oil resistant, and spatter resistant.
Model M Welding Fume Receptor is formed from high impact rated, non-conductive ABS thermoset polymer compound. It comes with an integral swivel collar, omni-directional mount, circular magnetic base, convenience handle, and collector screen of corrosion resistant metal.
Optional Model MD Hand Damper has locking quadrant and is built into the swivel collar of the welding fume receptor.

CAR-MON PRODUCTS, INC. 1225 Davis Road, Elgin, IL 60123 847/695-9000 www.car-mon.com e-mail: info@car-mon.com 16-W7

CAR-MON TYPE PTX HOSE



MATERIAL
Hose wall constructed of neoprene-coated polyester fabric. External helix made of galvanized steel

APPLICATIONS
- Transfer of hot or cold air
- Air conditioning and ventilation
- Exhaust fumes
- Welding fumes
- Extraction of corrosive media

PROPERTIES
- Good temperature resistance
- Flame resistant, passed UL 94-VO
- Good chemical resistance
- Highly flexible, extreme compressibility, small bend radius
- External helix protects against abrasion

Temperature Range	-30° to +325°F. Intermittent to +400°F
Diameter Range	Standard 3" through 16" (Special order through 36")
Standard Length	25'
Standard Color	Black

QUANTITY: 24 - 6" X 10' PTX HOSES

TECHNICAL DATA

Size ID Inches	Approx. Weight (Lbs./Ft.)	Bending Radius (Inches)*	Positive (in. w.c.)	Negative (in. w.c.)
6	.50	3.00	88	18

*Referring to the inner side of the elbow of hose.
The above mentioned data refers to an average and ambient temperature of 68°F. Subject to technical changes and color variations.

CAR-MON PRODUCTS, INC. 1225 Davis Road, Elgin, IL 60123 Phone (847) 695-9000
Web Site: www.car-mon.com e-mail: info@car-mon.com

Gate City
ENGINEERING SERVICES
340 E. CLARK ST.
POCATELLO,ID 83204
208.221.9506

REGISTERED PROFESSIONAL ENGINEER 6159 STATE OF IDAHO RON D. RICE

ORIGINAL DRAWING SIGNED BY: RON D. RICE
DATE ORIGINAL SIGNED: 3-23-2022
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340 EAST CLARK, POCATELLO, IDAHO 83204

Highland High School
Welding Shop Exhaust System
Pocatello, Idaho

REVISIONS

REV.	DATE	DESCRIPTION

PROJECT No.: 2193
DATE: 3/23/2022
SCALE: As Shown
ENGINEER: RON RICE
DWG. BY: S.R.

SCHEDULES DETAILS

M4.0

SHEET: 4

POWER SYMBOL SCHEDULE

NOTE: ALL SYMBOLS MAY NOT BE USED

SYMBOL	DESCRIPTION
'MSB'	ELECTRICAL SWITCHBOARD EQUIPMENT, (SEE POWER RISER AND PANEL SCHEDULES FOR ADDITIONAL INFORMATION)
'T##'	DRY-TYPE TRANSFORMER, (SEE POWER RISER FOR ADDITIONAL INFORMATION)
'LA'	ELECTRICAL PANELBOARD, (SEE POWER RISER AND PANEL SCHEDULES FOR ADDITIONAL INFORMATION)
30A/3P/3R	DISCONNECT SWITCH, SIZE/POLES/TYPE AS INDICATED TYPES: 1=NEMA 1, 3R=NEMA 3R, 4X=NEMA 4X
30A/3P/3R (30A FUSES)	FUSED DISCONNECT SWITCH, SIZE/POLES/TYPE AS INDICATED TYPES: 1=NEMA 1, 3R=NEMA 3R, 4X=NEMA 4X
30A/3P/3R SIZE 1 (30A FUSES)	COMBINATION STARTER & FUSED DISCONNECT SWITCH, SIZE/POLES/TYPE AS INDICATED. TYPES: 1=NEMA 1, 3R=NEMA 3R, 4X=NEMA 4X
J	JUNCTION BOX CR = CORD REEL; SEE DRAWINGS FOR INFORMATION CD = CORD DROP; SEE DRAWINGS FOR INFORMATION
	EQUIPMENT CONNECTION; COORDINATE CONNECTION WITH EQUIPMENT PRIOR TO ROUGH-IN
M	MOTOR CONNECTION
F	SMALL EXHAUST FAN CONNECTION
	POWER AND/OR DATA SERVICE POLE
FB#	FLOORBOX (SEE FLOORBOX SCHEDULE FOR ADDITIONAL INFORMATION)
	PUSHBUTTON STATION
	SPECIAL RECEPTACLE (COORDINATE NEMA TYPE WITH EQUIP.) (REFER TO PANEL SCHEDULES FOR AMPS)
	CEILING MOUNTED DUPLEX RECEPTACLE (COORDINATE PLACEMENT WITH CEILING EQUIPMENT PRIOR TO ROUGH-IN)
	DUPLEX RECEPTACLE, UL TAMPER-RESISTANT WHERE MOUNTED BELOW 5FT
	GFCI-TYPE DUPLEX RECEPTACLE, UL TAMPER-RESISTANT WHERE MOUNTED BELOW 5FT
	DOUBLE-DUPLEX RECEPTACLE, UL TAMPER-RESISTANT WHERE MOUNTED BELOW 5FT
	GFCI-TYPE DOUBLE-DUPLEX RECEPTACLE, UL TAMPER-RESISTANT WHERE MOUNTED BELOW 5FT.

RECEPTACLE AND EQUIPMENT SUBSCRIPTS

AC	ABOVE COUNTER	TV	120V RECEPT. FOR TV; VERIFY HEIGHT WITH ARCH. DRAWINGS & ELEVATIONS
WP	WEATHERPROOF (UL LISTED WEATHER-RESISTANT)	USB	120V RECPT. WITH USB CHARGING PORTS
42"	MOUNTING HEIGHT AFF OR AFG	EWC	ELECTRIC WATER COOLER; (SEE DETAIL. RECPT. SHALL BE ACCESSIBLE, DO NOT MOUNT BEHIND HOUSING.)
IG	ISOLATED GROUND	DISP	GARBAGE DISP. (UNDER SINK)
S	SURGE-PROTECTION TYPE	DW	DISHWASHER (COORDINATE W/ MILLWORK, INSTALL PER NEC 422.16(B)(2))
REF	REFRIGERATOR	M/R	MICROWAVE/RANGE HOOD (COORDINATE W/ MILLWORK)
W	WASHING MACHINE	R	ELECTRIC RANGE (50A-240V RATED RECPT.)
D	DRYER (30A-240V RATED RECPT.)		
M	MICROWAVE		

T OR S	HVAC THERMOSTAT OR SENSOR; PROVIDE & INSTALL BACKBOX,3/4" CONDUIT AND CONDUCTORS TO ASSOCIATED HVAC UNIT. COORDINATE EXACT LOCATION & SIZE AND NUMBER OF CONDUCTORS WITH M.C.

GENERAL SPECIAL SYSTEM NOTES:

A. ALL DEVICES SHOWN AT OR NEAR MILLWORK/CASEWORK SHALL BE COORDINATED WITH THE ARCHITECTURAL ELEVATION DRAWINGS AND MILLWORK INSTALLER TO INSURE PROPER MOUNTING HEIGHTS. CONTRACTOR SHALL ADJUST DEVICES AS NECESSARY IN ORDER TO POSITION DEVICES SUCH THAT THEY WILL NOT FALL BEHIND MILLWORK, CABINETS OR BE DIRECTLY ABOVE SINKS OR MIDWAY BETWEEN TILEWORK/WALL OR WAINSCOATING, ETC.
B. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL A GFCI TYPE RECEPTACLE FOR ALL RECPTACLES SHOWN IN TOILET RMS, BATHROOMS, KITCHENS/SERVING AREAS, ROOFTOP, OUTDOORS OR WITHIN 6FT OF ANY SINK, BASIN, TUB OR FLOOR SINK AND ALL OTHER AREAS DEFINED BY THE NEC.

FIRE ALARM SYMBOL SCHEDULE

NOTE: ALL SYMBOLS MAY NOT BE USED

SYMBOL	DESCRIPTION
FACP	FIRE ALARM CONTROL PANEL (WALL MOUNTED, TOP AT 6'-0" AFF)
NAC	NOTIFICATION DEVICE EXTENDER PANEL. PROVIDE QTY AS REQUIRED BASED ON DEVICE VOLTAGE DROP CALC'S PER NFPA 72 REQUIREMENTS. (WALL MOUNTED, TOP AT 5'-0" AFF)
RA	REMOTE ANNUCIATOR PANEL (FLUSH MOUNTED IN WALL AT 5'-0" AFF)
F	MANUAL PULL STATION (MOUNTING HEIGHT PER ADA & NFPA 72)
	MAGNETIC DOOR HOLD OPEN
CM	ADDRESSABLE CONTROL/RELAY MODULE
MM	ADDRESSABLE MONITORING MODULE
FS	FIRE ALARM FLOW SWITCH
TS	FIRE ALARM TAMPER SWITCH
#'	ADDRESSABLE DETECTOR WITH BASE
	DETECTOR SUBSCRIPTS P PHOTOELECTRIC SMOKE DETECTOR ID IN-DUCT SMOKE DETECTOR M MULTI-STATION SMOKE DETECTOR (120V W/BATTERY BACKUP) D DUCT SMOKE DETECTOR H HEAT DETECTOR
SD	FIRE/SMOKE DAMPER; COORDINATE LOCATIONS WITH MECH. DRAWINGS
	EXTERIOR 120V FIRE BELL, INSTALL NEXT TO FDC.
	WALL MOUNTED FIRE ALARM HORN ONLY
##	WALL MOUNTED FIRE ALARM STROBE ONLY (CANDELA RATING AS INDICATED)
##	CEILING MOUNTED FIRE ALARM STROBE ONLY (CANDELA RATING AS INDICATED)
##	WALL MOUNTED FIRE ALARM HORN STROBE (CANDELA RATING AS INDICATED)
##	CEILING MOUNTED FIRE ALARM HORN STROBE (CANDELA RATING AS INDICATED)

GENERAL FIRE ALARM SYSTEM NOTES

A. DO NOT INSTALL MORE THAN (10) NOTIFICATION APPLIANCES ON ANY SINGLE CLASS "A" SIGNAL CIRCUIT. DO NOT EXCEED 400 FT. OF NO. 14 WIRE IN THE TOTAL LOOP.
B. NFPA ALLOWS NOTIFICATION APPLIANCES TO BE MOUNTED AT A HEIGHT RANGE BETWEEN 80" TO 96" ABOVE FINISH FLOOR. THE PREFERRED HEIGHT IS 80". IF THIS CONFLICTS WITH OTHER TRADES OR ROOM FURNISHINGS, LOCATE AS CLOSE TO 80" AS POSSIBLE, NOT EXCEEDING 96". ALL NOTIFICATION APPLIANCES IN A COMMON ROOM OR LINE OF SIGHT SHALL BE LOCATED AT A COMMON HEIGHT.
C. MOUNT PULL STATIONS AT 46-48" A.F.F. TO THE OPERATING HANDLE TO MEET ADA REQUIREMENTS.
D. DO NOT CONNECT THE FIRE ALARM SYSTEM TO ANY DEVICE WHICH HAS A POWER HELD CONTACTS,(FLOW, TAMPER, HOOD SYSTEM, DUCT DETECTOR, ETC..FALSE ALARM WILL OCCUR.
E. ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL CONDUCTOR QUANTITIES PER FIRE ALARM SYSTEM SUPPLIER, AND AS PER NFPA AND NEC REQUIREMENTS.
F. DO NOT INSTALL ANY SMOKE OR HEAT DETECTORS WITHIN 3 FEET OF ANY AIR DIFFUSER.
G. DO NOT EXCEED 2500 FEET ON ANY ADDRESSABLE DEVICE RUN. DO NOT EXCEED 120 DEVICES ON ANY ONE ADDRESSABLE DEVICE RUN.
H. ALL AIR HANDLING EQUIPMENT 2000 CFM OR MORE MUST BE SHUT DOWN UPON FIRE ALARM AS PER LIFE SAFETY CODES.
I. ALL CLASS "B" INITIATING CIRCUITS WITH ADDRESSABLE DEVICES NEED EOLR. (END OF LINE RESISTORS).
J. IN CORRIDORS, NOTIFICATION APPLIANCES MUST BE LOCATED WITHIN 15' FROM ENDS OF CORRIDORS AND A MAXIMUM OF 100' SPACING.
K. NOTIFICATION APPLIANCES TO BE SYNCHRONIZED TO PROVIDE A 3-3-3 TEMPORAL PATTERN.
L. ALL WIRING AND CONDUIT ROUTING TO BE AS DESCRIBED ON SUPPLIED SHOP DRAWINGS. FIRE ALARM PLAN IS SHOWN FOR GENERAL LOCATION AND LAYOUT ONLY.
M. THE FIRE ALARM SYSTEM TO BE IN COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND ADA REQUIREMENTS.
N. ELECT. CONTR. TO CONNECT SPRINKLER SYSTEM TAMPER SWITCHES AND FLOW VALVES TO FIRE ALARM SYSTEM AS REQUIRED. SEE FIRE SPRINKLER SYSTEM DRAWINGS FOR EXACT LOCATIONS AND QUANTITIES.

CIRCUITING & GENERAL SYMBOL SCHEDULE

NOTE: ALL SYMBOLS MAY NOT BE USED

SYMBOL	DESCRIPTION
1	KEYED NOTE REFERENCE
1 / ES101	DETAIL # / SHEET REFERENCE
A-1,3,5 3/4"C.-6#12,1#12G	BRANCH CIRCUIT HOME-RUN TO PANEL INDICATED A-1,3,5 — PANEL AND CIRCUIT DESIGNATIONS 3/4"C.-6#12,1#12G QTY & SIZE OF EQUIPMENT GROUND CONDUCTOR QTY & SIZE OF NEUTRAL AND PHASE CONDUCTOR(S) SIZE OF CONDUIT
	TICK MARKS EQUIPMENT GROUNDING CONDUCTOR NEUTRAL CONDUCTOR(S) PHASE AND/OR SWITCH-LEG CONDUCTOR(S)
*25,000A	CALCULATED AVAILABLE FAULT CURRENT AT EQUIPMENT(SEE POWER RISER)
	BRANCH CIRCUIT/FEEDER CONCEALED IN CEILING OR WALL
	BRANCH CIRCUIT/FEEDER CONCEALED UNDERGROUND OR FLOOR
	NEW EQUIPMENT, DEVICES, ETC.
	EXISTING EQUIPMENT, DEVICES, ETC.
	DEMOLITION EQUIPMENT, DEVICES, ETC.

PROJECT GENERAL NOTES:

A. E.C. SHALL REFER TO THE MECHANICAL DRAWINGS FOR EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT AND ELECTRICAL CONNECTIONS.
B. E.C. SHALL PROVIDE MINIMUM WORKING CLEARANCE AS PER NEC BEFORE INSTALLING ANY ELECTRICAL PANELS OR CABINETS. SEE ELECTRICAL EQUIPMENT CLEARANCE DETAIL.
C. INSTALL ALL LIGHT FIXTURES IN MECHANICAL ROOM AFTER THE MECHANICAL EQUIPMENT IS IN PLACE. ADJUST AS NECESSARY. PROVIDE CHAIN SUSPENSION KITS AS REQUIRED.
D. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN(S) FOR EXACT FIXTURE LOCATIONS, CEILING TYPES, ETC.
E. E.C. SHALL PROVIDE ALL CONCRETE PADS AS REQUIRED FOR ALL ELECTRICAL EQUIPMENT.
F. CONFIRM EXACT LOCATIONS OF ALL TELEPHONE/DATA OUTLETS WITH OWNER PRIOR TO ROUGH-IN.
G. LOCATE SWITCHES, OUTLETS, ETC., SHOWN AT ROOM ENTRY DOORWAYS, AS CLOSE TO DOOR FRAME AS POSSIBLE, SO AS NOT RO INTERFERE WITH ROOM CABINETS, ETC.
H. SUPPORT ALL LIGHT FIXTURES INDEPENDENT OF CEILING.
I. ELECTRICAL CONTRACTOR SHALL OBTAIN ALL APPLICABLE PERMITS FOR WORK AND PAY ASSOCIATED FEES.
J. MAINTAIN 24" MIN. CLEARANCE FROM ALL COMMUNICATIONS CABLING AND ELECTRONIC BALLASTS.
K. UNLESS SPECIFICALLY INDICATED OTHERWISE, E.C. SHALL COORDINATE WITH ANY SPECIAL SYSTEMS SUPPLIER/SHOP DRAWINGS; DENTAL, MEDICAL, KITCHEN, SPECIALIZED EQUIPMENT, ETC. FOR THE EXACT ROUGH-IN REQUIREMENTS FOR THEIR EQUIPMENT. ALSO UNLESS INDICATED OTHERWISE, THE E.C. TO BE RESPONSIBLE FOR FINAL ELECTRICAL CONNECTIONS TO ALL SPECIAL EQUIPMENT.
L. ALL CONDUIT/RACEWAY/CABLES TO BE CONCEALED IN WALLS OR ABOVE CEILINGS. IF ANY SURFACE WORK IS NECESSARY, IT SHALL BE APPROVED BY THE ARCHITECT/ENGINEER PRIOR TO INSTALLATION.
M. ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID AND THOROUGHLY INVESTIGATE THE EXISTING CONDITIONS, AS THEY RELATE TO THE SCOPE OF WORK DESCRIBED. MAKE NECESSARY PROVISIONS IN THE BASE BID TO ADEQUATELY ACCOMMODATE THESE CONDITIONS.
N. DATA CABLING SYSTEM PRE-INSTALLATION CONFERENCE:
   1. E.C. SHALL SCHEDULE A MEETING A MINIMUM OF FIVE CALENDAR DAYS PRIOR TO BEGINNING DATA CABLING INSTALLATION . ATTENDEES SHOULD INCLUDE OWNER'S REP., ENGINEER, GC, EC AND CABLING SUB. REFER TO SECTION 26 6210(1.4)(E) FOR ADDITIONAL INFORMATION.

FIRE ALARM EXPANSION NOTES:

A. PROVIDE ALL EQUIPMENT, MATERIALS AND LABOR NECESSARY TO EXPAND THE EXISTING BUILDING FIRE ALARM SYSTEM. THE SYSTEM ADDITION SHALL BE CONNECTED DIRECTLY TO THE EXISTING MAIN FIRE ALARM PANEL.
   THE INSTALLATION SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND ACCEPTED BY THE LOCAL AHJ. WHEN THE SYSTEM IS COMPLETE, A FACTORY REPRESENTATIVE SHALL TEST THE SYSTEM, MAKE ADJUSTMENTS AND PLACE THE SYSTEM IN OPERATING ORDER.
B. WITHIN 30 DAYS AFTER THE CONTRACT AWARD AND PRIOR TO THE PURCHASE OF ANY EQUIPMENT, THE FIRE ALARM SYSTEM CONTRACTOR SHALL SUBMIT FOR APPROVAL SIX (6) COPIES OF THE FOLLOWING:
   a. A LIST OF MATERIALS THAT ARE TO BE USED ON THE PROJECT, INCLUDING MANUFACTURER, MODEL NUMBER AND TECHNICAL INFORMATION.
   b. PRELIMINARY CIRCUIT DIAGRAMS SHOWING INTERCONNECTION OF ALL MONITORING, NOTIFICATION AND ANNUNCIATION DEVICES, PANELS AND WIRING COUNTS. DIAGRAMS ARE TO BE 11"X17", DONE IN A GOOD WORKMAN LIKE MANNER.
   c. TECHNICAL MANUALS FOR ALL OF THE EQUIPMENT THAT IS TO BE USED ON THE PROJECT.
   d. SUBMIT SHOP DRAWINGS AND REQUIRED CALCULATIONS TO THE LOCAL AHJ.
   e. OBTAIN A WRITTEN LETTER OF ACCEPTANCE OF THE PROPOSED SYSTEM AND INCLUDE WITH THE SHOP DRAWING SUBMITTAL TO THE ENGINEER.
C. CONTRACTOR SHALL PROVIDE AND INSTALL ALL REQUIRED POWER SUPPLIES, ELECTRONICS AND CONNECTIONS TO MODIFY EXISTING SYSTEM TO ACCEPT NEW ADDITION. THE COMPLETE SYSTEM SHALL MAINTAIN A UL LISTING.
D. ELECTRICAL CONTRACTOR SHALL INCLUDE A $2,000.00 CASH ALLOWANCE IN THE BID FOR MISCELLANEOUS ADDITIONS AND/OR REQUIREMENTS IMPOSED BY THE LOCAL AHJ.

(#) KEY NOTES:

1 E.C. SHALL ELECTRICALLY DISCONNECT MECH. EQUIPMENT FOR REMOVAL. REMOVE ALL ASSOCIATED CONDUIT AND CONDUCTORS BACK TO SOURCE. MAINTAIN/RE-ESTABLISH ALL DOWNSTREAM DEVICES THAT ARE TO REMAIN. COORDINATE WITH MECH. CONTRACTOR.

2 EXISTING TRANSFORMER TO BE RELOCATED BY OWNER TO ACCOMMODATE SPACE FOR NEW PANEL; E.C. SHALL COORDINATE WORK WITH OWNER.

3 EXISTING ABANDONED TELECOMM. DEMARC, CONDUITS AND WIRING TO BE REMOVED BY OWNER TO ACCOMMODATE NEW PANEL; E.C. SHALL COORDINATE WORK WITH OWNER.

DEMOLITION GENERAL NOTES:

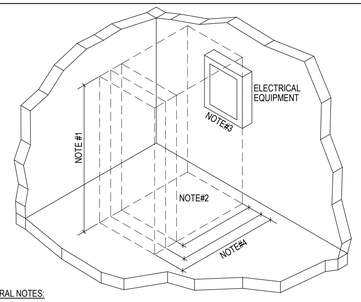
A. ALL EXISTING ELECTRICAL MAY NOT APPEAR ON THESE PLANS, HOWEVER THE ABOVE INFORMATION APPLIES.
B. PROVIDE AND INSTALL BLANK COVERS ON ALL UNUSED SWITCH/OUTLET/J-BOXES WHERE REQUIRED.
C. ALL WALL DEVICES THAT ARE EXISTING TO REMAIN, SHALL BE ADAPTED TO NEW WALL COVERINGS, REFER TO ARCHITECTURAL DRAWINGS FOR EXACT WALL LOCATIONS, THICKNESS, ETC.
D. PRIOR TO THE START OF ANY DEMOLITION WORK, DISCONNECTING ANY POWER AND OR TELE/DATA SYSTEMS, THE CONTRACTOR SHALL COORDINATE DOWN-TIME WITH THE OWNER.
E. REMOVE OR RELOCATE ELECTRICAL AS NECESSARY FOR NEW WORK.
F. WHERE EXISTING CIRCUITS ARE TO BE RE-USED, EXTEND AS NECESSARY. MAINTAIN ELECTRICAL CONTINUITY TO DOWNSTREAM EQUIPMENT TO REMAIN.
G. EXISTING SHOWN TO REMAIN, MAY NEED TO BE REMOVED AND RE-INSTALLED ONLY AS NECESSARY FOR EXTENDING OR MODIFICATION OF EXISTING CIRCUITS OR WIRING.
H. REFER TO MECHANICAL PLANS FOR EXTENT OF MECHANICAL EQUIPMENT TO BE REMOVED OR RELOCATED.
I. REMOVE ALL UNUSED EQUIPMENT WIRING, CONDUIT AND BOXES IN ALL AREAS. ABANDON ONLY IN CONCEALED AREAS.
J. CONTRACTOR MY UTILIZE ANY EXISTING CONDUIT WHERE COMPATIBLE WITH NEW DESIGN, AND IF IN GOOD CONDITION AND COMPLIES WITH SPECIFICATIONS.
K. WHEN ANY MODIFICATIONS ARE MADE TO ANY EXISTING ELECTRICAL PANEL TO REMAIN, CONTRACTOR TO PROVIDE NEW TYPE WRITTEN INDEX TO REFLECT ALL NEW AND EXISTING LOADS.
L. REMOVE ALL EQUIPMENT, RACEWAYS, CABLES,ETC. NOT USED IN FINISHED AREAS.

ELECTRICAL SPECIFICATIONS

1. INTENT:
   Provide and install complete and operable electrical systems including but not not limited to; lighting, power, receptacles, data, fire alarm ande etc.
   Provide all required connections to all Mechanical and Plumbing equipment, as indicated and required, including all conduits, wiring and controls. Coordinate with mechanical contractor and drawings.
2. COMPLIANCE WITH CODES:
   All work and material shall comply with all applicable codes, safety orders, laws, ordinances and regulations of governing authorities and other agencies having jurisdiction including regulations of the State and Local Fire Marshall, unless detailed as specified to a more restrictive standard or higher requirement.
3. INTERPRETATION OF DRAWINGS:
   The electrical drawings are essentially diagrammatic in that all provisions necessary to conform to structural, architectural, mechanical and plumbing systems can not be shown. All installations shall be adjusted as necessary to conform and to avoid obstructions, without additional cost to the owner.
   All work, material and equipment called for by notes, schedules or otherwise indicated on the drawings shall be furnished and instalied as though fully set forth in these specifications.
4. VISITING THE SITE:
   Contractor shall visit the site and become acquainted with conditions to be encounterd. Extra funds will not be allowed due to failuer to examine the site and to included existing conditions in bid price.
5. COORDINATION WITH UTILITIES:
   These plans have been prepared without utility company comments. The contractor shall verify exact requirements for the electrical, telephone and communication services with the utility company representatives and provide all work and pay all costs for a complete and operating systems, as directed by the governing utilities.
6. MATERIALS AND WORKMANSHIP:
   All workmanship shall be performed by skilled electricians using the best standard practives of the trade. All materials shall, unless otherwise noted, be new and in perfect condition and working order. All material for similar uses shall be of the same type, material and manufacturer for ease of future maintenance.
   All equipment shall be readily accessible for maintenance and repairs. All materials, fixtures and equipment shall be covered or sealed upon installation so as to provide for safety and to insure that operation and appearance will be maintained after subsequent construction operations.
7. EXECUTION:
   Raceway installation: Seperate underground conduits in a common trench 4" minimum horizontally, 12" minimum from other utility lines. Minimum conduit depth shall be 18".
   Coordinate conduit installation with pipes, steel, footings and ducts installed by other trades. Install conduit runs exposed to view parallel or at right angles to structural members, walls or building lines. Support conduit with one-hole malleable factory made pipe straps, fastended with screws.
8. OPERATING AND ADJUSTING:
   The owner reserves the right to operate any systems of equipment prior to final comletion and acceptance of the work. Such perliminary operation shall not be construed as an acceptance of any work.
   Each piece of equipment and all of the systems shall be adjusted to insure proper functioning and shall be left in first class operating condition.
9. CUTTING AND PATCHING:
   Do all drilling and cutting as necessary for installation of equipment or conduit. Cutting or drilling of structure is only permitted with prior approval of the owner and structural engineer.
   Where cutting and patching of work is necessary, use the same materials, workmanship and finish to neatly match all surrounding work.
10. CONDUIT:
    All conduit material and installation methods shall be as allowed by the NEC, local AHJ and as directed by the owner.
11. CONDUCTORS:
    Type THWN or THHN copper wire insulated for 600V. Smallest wire shall be #14 AWG unless noted otherwise. All wiring shall be Copper unless indicated otherwise.

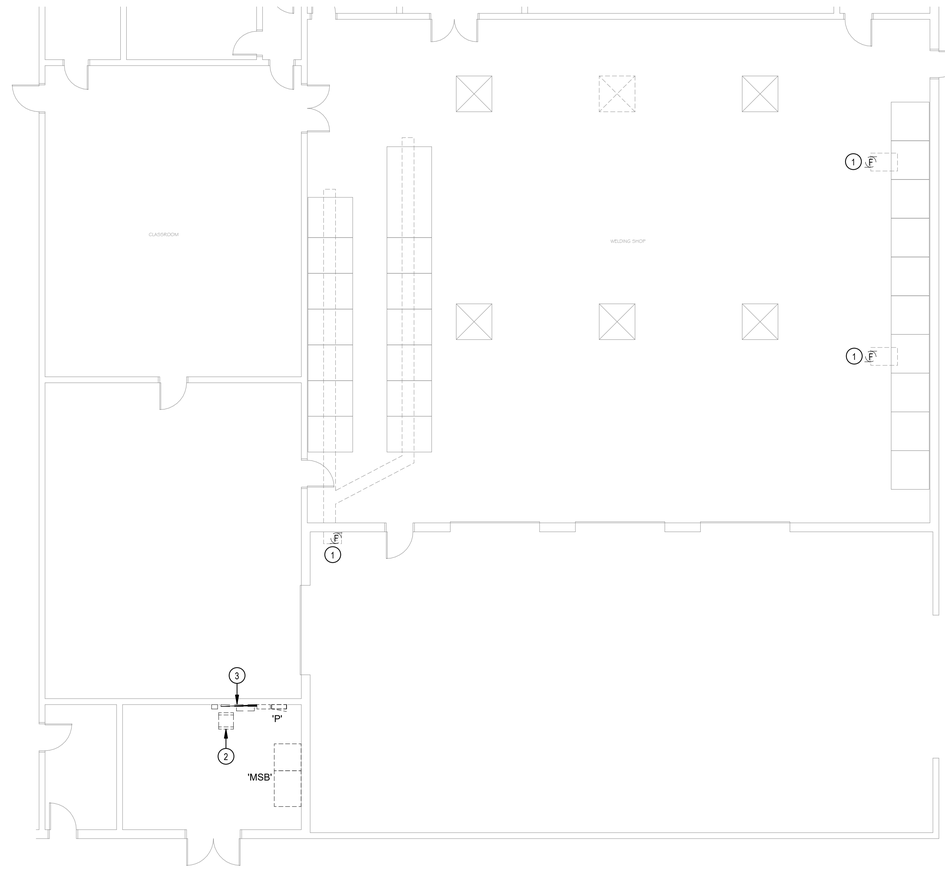
    Use "Ideal Yellow" pulling compound for all wire pulls. Use Scotchlock connectors for all splices in #12 wire and tape bolted pressure connectors for larger wire.
12. GROUNDING:
    All conduit, branch circuits, feeders and etc. shall be provided with a grounding conductor. All grounding conductors shall be insulated and green in color, size as shown.
13. WIRING DEVICES:
    Devices shall be Standard type, Specification grade, color as selected by owner. Decora style devices are prohibited. Utilize GFCI and Tamper-proof devices in all locations as defined by the NEC.
    Wiring devices shall be as installed as allowed by the NEC, local AHJ.
14. DEVICE PLATES:
    Devices plate type and color shall be as directed by owner and as required by the NEC.
15. LIGHTING FIXTURES:
    As selected by owner and/or indicated in schedules. All light fixtures shall be installed and connected by the Electrical Contractor.
16. SERVICE EQUIPMENT & PANELBOARDS:
    Service Equipment: Shall be rated as such and shall comply with local utility co. requirments. .
    Panelbards: Shall be provided with typed writtend directories indicating loads being served.
    Maintain all required clearances around equipment as required by the NEC.
    All equipment dimensions to be field verified.
17. CLEAN-UP:
    Upon completion of the work, prior to final inspection, thoroughly clean all exposed fixtures, trim and equipment and leave the entire installation in a neat, clean and usable condition. Remove all cement, paint, grease, oil and other foreign substances.
18. TEST:
    Test all conductors for shorts, opens, grounds or other defects. Correct any defective work and re-test.
    Demonstrate continuous satisfactory operation of all electrical systems and equipment.
    Provide training to the owner on electrical systems as needed for owner operation and maintenance of building.
19. GUARANTEE:
    Prior to final acceptacne of the project, deliver to the owner a written one year guarantee on all workmanship, materials and equipment and agree to repair or replace all such defective items promptly that may occure during the warranty period; including repair or replacement of the premises that may be damaged due to faulty work and materials furnished under contract.

ELECTRICAL EQUIP. CLEARANCE



GENERAL NOTES:
A. ALL WORKING SPACE CLEARANCES ARE FROM THE FACE OF THE EQUIPMENT.

NOTES:
1. THE MINIMUM HEADROOM OF WORKING SPACE SHALL BE 6 1/2FT.
2. THE WIDTH OF THE WORKING SPACE SHALL BE THE WIDTH OF THE EQUIPMENT OR 30", WHICHEVER IS GREATER. THE PANEL DOOR SHALL OPEN AT LEAST 90 DEGREES.
3. ALL CIRCUIT BREAKERS, WHEN IN THIER HIGHEST POSITION, SHALL NOT BE MORE THAN 6FT 7 IN. ABOVE THE FINISHED FLOOR.
4. 3FT CLEARANCE IF 0-150V TO GROUND, 3.5FT CLEARANCE IF 151-600V TO GROUND. 4FT IF EXPOSED LIVE PARTS ON BOTH SIDES OF THE WORKING SPACE.



1 EXISTING ELECTRICAL PLAN
SCALE: 1/8" = 1'-0"

0" 8' 16' NORTH

P.E. JOB #2237
PAYNE Engineering Inc.
1823 E. Center,
Pocatello, Idaho, 83201
tel (208) 232-4439
www.payneengineeringinc.com

PROFESSIONAL ENGINEER REGISTERED 13053 3/18/22 STATE OF IDAHO SHAWN A. MEADOR

Pocatello / Chubbuck School District #25
Highland High School Welding Shop Exhaust System
1800 Bench Road
Pocatello, Idaho, 83201

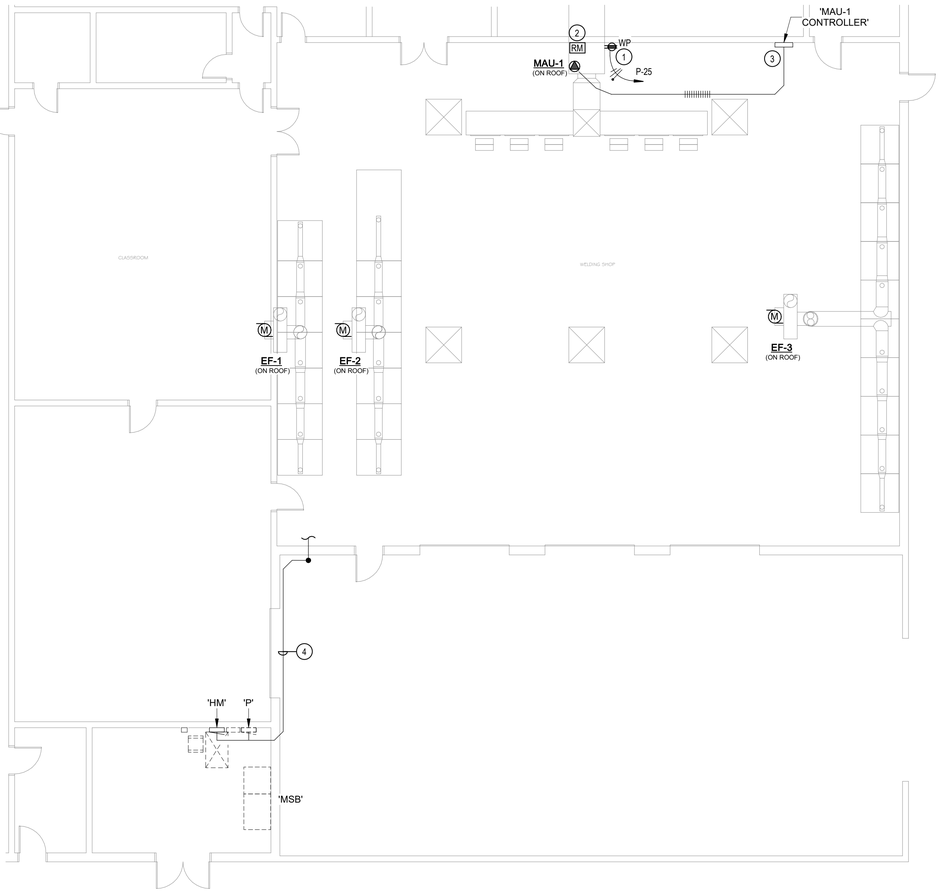
Revisions

No.	Description	Date

Project Number:	2237
Date:	3/10/2022
Designed By:	SAM
Checked By:	TEP

Sheet Title:
ELECTRICAL SYMBOLS & EXISTING ELEC. PLAN

Sheet:
E0.0

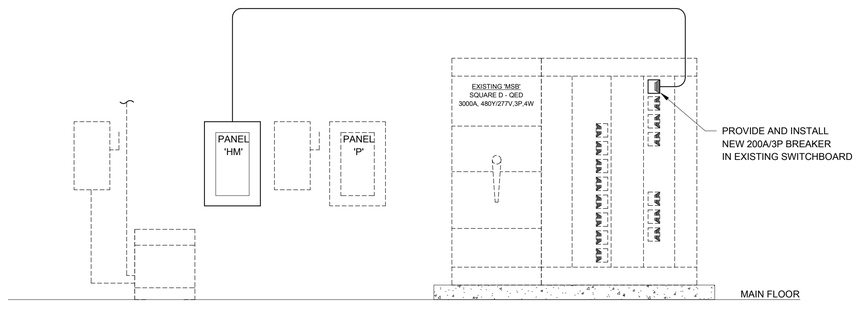


1 MECH. EQUIPMENT CONNECTION PLAN

SCALE: 1/8" = 1'-0"

0" 8' 16'

NORTH



2 PARTIAL POWER RISER DIAGRAM

SCALE: 12" = 1'-0"

MECHANICAL - MAKE-UP AIR UNIT SCHEDULE

EQUIP. ID	VOLTS	PH.	MCA	MOCP	CIRCUIT	FEEDER	DISCONNECT	NOTES
MAU-1	480 V	3	17 A	25 A	HM-1,3,5	3/4"C.,3#10+1#10G	30 A NONFUSED - 3R	1

MECHANICAL - EXHAUST FAN SCHEDULE

EQUIP. ID	VOLTS/PH.	HP	FLA	CONTROL	CIRCUIT	FEEDER	COMBINATION DISC./STARTER	NOTES
EF-1	480 V / 3	5	8 A	INTERLOCK W/ MAU-1	HM-2,4,6	3/4"C.,3#10+1#10G	30 A FUSED - 3R/SIZE 0	2,3
EF-2	480 V / 3	5	8 A	INTERLOCK W/ MAU-1	HM-2,4,6	3/4"C.,3#10+1#10G	30 A FUSED - 3R/SIZE 0	2,3
EF-3	480 V / 3	7-1/2	15 A	INTERLOCK W/ MAU-1	HM-8,10,12	3/4"C.,3#12+1#12G	30 A FUSED - 3R/SIZE 1	2,3

MECHANICAL SCHEDULE NOTES:

1. E.C. SHALL PROVIDE LOCAL DISCONNECT SWITCH FOR EQUIPMENT; SIZE AND TYPE AS INDICATED IN SCHEDULE. IF FUSED DISCONNECT IS SPECIFIED FOR EQUIPMENT, FUSE PER EQUIPMENT NAMEPLATE RATING.
2. E.C. SHALL PROVIDE COMBINATION STARTER/DISCONNECT SWITCH FOR EQUIPMENT; SIZE AND TYPE AS INDICATED IN SCHEDULE. PROVIDE WITH CONTROL XFMR (2) SETS OF NO/NC CONTACTS, CONTROLS WITH M.C. PRIOR TO ROUGH-IN. FUSE DISCONNECT PER EQUIPMENT NAMEPLATE RATING.
3. INTERLOCK EXHAUST FAN WITH MAU-1; COORDINATE WITH MECH. CONTRACTOR.

PANEL: HM

PAYNE ENGINEERING

LOCATION:
FED FROM: MSB
MOUNTING: SURFACE
ENCLOSURE: NEMA 1
MFG & MODEL: SQ. D/NF SERIES
NOTES:

VOLTAGE: 480/277 Wye
PHASES: 3
WIRES: 4
BUSSING: SEE SPEC'S
DIMENSIONS: 20"W x 5.8"D x **"H

A.I.C. RATING: 35k
PANEL TYPE: MLO
PANEL AMPS: 225 A
MBR AMPS: N/A
FEED: TOP

PROJECT:
Highland High School Welding Shop Exhaust System

CKT	CIRCUIT DESCRIPTION	NOTE	AMPS	P	A	B	C	P	AMPS	NOTE	CIRCUIT DESCRIPTION	CKT
1					3702 4212							2
3	Welding - MAU		25 A	3		3702 4212		3	30 A		Welding - EF 1,2	4
5							3702 4212					6
7	SPARE	--	20 A	1	0 4157							8
9	SPARE	--	20 A	1		0 4157		3	20 A		Welding - EF 3	10
11	SPARE	--	20 A	1			0 4157					12
13	SPARE	--	20 A	1	0 0			1	20 A	--	SPARE	14
15	SPARE	--	20 A	1		0 0		1	20 A	--	SPARE	16
17	SPARE	--	20 A	1			0 0	1	20 A	--	SPARE	18
19	SPARE	--	20 A	1	0 0			1	20 A	--	SPARE	20
21	PREPARED SPACE	--	--	1		-- --		1	--	--	PREPARED SPACE	22
23	PREPARED SPACE	--	--	1			-- --	1	--	--	PREPARED SPACE	24
25	PREPARED SPACE	--	--	1	-- --			1	--	--	PREPARED SPACE	26
27	PREPARED SPACE	--	--	1		-- --		1	--	--	PREPARED SPACE	28
29	PREPARED SPACE	--	--	1			-- --	1	--	--	PREPARED SPACE	30
31	PREPARED SPACE	--	--	1	-- --			1	--	--	PREPARED SPACE	32
33	PREPARED SPACE	--	--	1		-- --		1	--	--	PREPARED SPACE	34
35	PREPARED SPACE	--	--	1			-- --	1	--	--	PREPARED SPACE	36
37	PREPARED SPACE	--	--	1	-- --			1	--	--	PREPARED SPACE	38
39	PREPARED SPACE	--	--	1		-- --		1	--	--	PREPARED SPACE	40
41	PREPARED SPACE	--	--	1			-- --	1	--	--	PREPARED SPACE	42
			TOTAL LOAD:		12.1 kVA	12.1 kVA	12.1 kVA					
			TOTAL AMPS:		44 A	44 A	44 A					
			TOTAL ESTIMATED DEMAND AMPS:			47 A						

BRK NOTES:
A = ARC-FAULT BREAKER
S = SHUNT-TRIP BREAKER
GP = GFEPD BREAKER
G = GFCI BREAKER
LCP = CRKT TO BE ROUTED THROUGH LTG CONTROL PANEL
R = RED HANDLED, LOCK-OUT TYPE

POWER RISER FEEDER SCHEDULE

SOURCE	LOAD	# OF CONDUIT RUNS	CONDUIT SIZE	FEEDER SIZE	CONDUCTOR TYPE	LOAD AMPS	FEEDER BREAKER SIZE
MSB	PANEL HM	1	2"	3-#3/0, 1-#3/0, 1-#6	COPPER	44 A	200 A

FEEDER SCHEDULE LEGEND & NOTES

1. # OF RUNS INDICATES THE NUMBER OF PARALLEL RUNS FOR THE FEEDER.
2. FEEDER SIZE IN SCHEDULE IS AS INDICATED BELOW:

QTY-#PHASE SIZE, QTY-#NEUTRAL SIZE, QTY-#GROUND SIZE

QTY & SIZE OF PHASE CONDUCTOR(S) | QTY & SIZE OF NEUTRAL CONDUCTOR(S) | QTY & SIZE OF GROUND CONDUCTOR(S)

GENERAL NOTES:

A. REFER TO SYMBOL SCHEDULE SHEET FOR PROJECT GENERAL NOTES AND GENERAL NOTES ASSOCIATED WITH THE INSTALLATION OF EACH SYSTEM, INCLUDINB BUT NOT LIMITED TO; LIGHTING, POWER, FIRE ALARM, SPECIAL SYSTEMS, ETC.

FIRE ALARM EXPANSION NOTES:

A. PROVIDE ALL EQUIPMENT, MATERIALS AND LABOR NECESSARY TO EXPAND THE EXISTING BUILDING FIRE ALARM SYSTEM. THE SYSTEM ADDITION SHALL BE CONNECTED DIRECTLY TO THE EXISTING MAIN FIRE ALARM PANEL.
THE INSTALLATION SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND ACCEPTED BY THE LOCAL AHJ. WHEN THE SYSTEM IS COMPLETE, A FACTORY REPRESENTATIVE SHALL TEST THE SYSTEM, MAKE ADJUSTMENTS AND PLACE THE SYSTEM IN OPERATING ORDER.
B. WITHIN 30 DAYS AFTER THE CONTRACT AWARD AND PRIOR TO THE PURCHASE OF ANY EQUIPMENT, THE FIRE ALARM SYSTEM CONTRACTOR SHALL SUBMIT FOR APPROVAL SIX (6) COPIES OF THE FOLLOWING:
   a. A LIST OF MATERIALS THAT ARE TO BE USED ON THE PROJECT, INCLUDING MANUFACTURER, MODEL NUMBER AND TECHNICAL INFORMATION.
   b. PRELIMINARY CIRCUIT DIAGRAMS SHOWING INTERCONNECTION OF ALL MONITORING, NOTIFICATION AND ANNUNCIATION DEVICES, PANELS AND WIRING COUNTS. DIAGRAMS ARE TO BE 11"X17", DONE IN A GOOD WORKMAN LIKE MANNER.
   c. TECHNICAL MANUALS FOR ALL OF THE EQUIPMENT THAT IS TO BE USED ON THE PROJECT.
   d. SUBMIT SHOP DRAWINGS AND REQUIRED CALCULATIONS TO THE LOCAL AHJ.
   e. OBTAIN A WRITTEN LETTER OF ACCEPTANCE OF THE PROPOSED SYSTEM AND INCLUDE WITH THE SHOP DRAWING SUBMITTAL TO THE ENGINEER.
C. CONTRACTOR SHALL PROVIDE AND INSTALL ALL REQUIRED POWER SUPPLIES, ELECTRONICS AND CONNECTIONS TO MODIFY EXISTING SYSTEM TO ACCEPT NEW ADDITION. THE COMPLETE SYSTEM SHALL MAINTAIN A UL LISTING.
D. ELECTRICAL CONTRACTOR SHALL INCLUDE A $2,000.00 CASH ALLOWANCE IN THE BID FOR MISCELLANEOUS ADDITIONS AND/OR REQUIREMENTS IMPOSED BY THE LOCAL AHJ.

(#) KEY NOTES:

1 RECEPTACLE MOUNTED TO HVAC UNIT, COORDINATE MOUNTING WITH M.C. PRIOR TO ROUGH-IN.
2 PROVIDE FIRE ALARM RELAY/MONITOR MODULE FOR INTERCONNECTION TO MAKE-UP AIR UNIT, UNIT SHALL DOWN UPON ACTIVATION OF BUILDING FIRE ALARM SYSTEM.
3 MAU CONTROLLER PROVIDED AND INSTALLED BY M.C. E.C. SHALL PROVIDE, INSTALL AND TERMINATE CONDUCTORS/CABLE BETWEEN CONTROLLER AND UNIT. PROVIDE 1"C., (9)#14 AND (1) 2 CONDUCTOR SHIELDED CABLE PER MAU MANUFACTURER SHOP DRAWINGS. E.C. SHALL COORDINATE FIELD VERIFY EXACT CONDUCTOR/CABLE COLORS AND REQUIREMENTS WITH M.C. PRIOR TO INSTALLATION.
4 TO AVOID ROOF PENETRATIONS, CONDUITS/CONDUCTORS FOR NEW MECH. EQUIPMENT SHALL BE ROUTED THROUGH WALL AND RAN ON EXTERIOR HIGH ON WALL THEN TRANSITION TO ROOF, FIELD VERIFY EXACT CONDUIT ROUTING WITH EXISTING CONDITIONS.

P.E. JOB #2237
PAYNE Engineering Inc.
1823 E. Center,
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tel (208) 232-4439
www.paynengineeringinc.com

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REGISTERED
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3/18/22
STATE OF IDAHO
SHAWN A. MEADOR

Pocatello / Chubbuck School District #25
Highland High School Welding Shop Exhaust System
1800 Bench Road
Pocatello, Idaho, 83201

Revisions		
No.	Description	Date

Project Number:	2237
Date:	3/10/2022
Designed By:	SAM
Checked By:	TEP

Sheet Title:
ELECTRICAL PLAN, RISER & SCHEDULES

Sheet:
E0.1

FOR QUESTIONS, CALL THE
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REGION 109
PHONE: (636) 229-9777
EMAIL: reg109@econair.com

MUA FAN INFORMATION – JOB#5366823

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	BLOWER	HOUSING	MIN CFM	DESIGN CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	MCA	MOCP	WEIGHT (LBS)	SONES
1		1	EA4-D.1000-30D	30MF-4-MOD	A4-D.1000	6000	12000	0.500	1336	ODP,PREMIUM	10.000	6.3900	3	460	12.9	16.7A	25A	1581	26

GAS FIRED MAKE-UP AIR UNIT(S)

FAN UNIT NO	TAG	INPUT BTUs	OUTPUT BTUs	TEMP RISE	REQUIRED INPUT GAS PRESSURE	GAS TYPE	BURNER EFFICIENCY(%)
1		1066653	981321	95°F	7 IN. W.C. - 14 IN. W.C.	NATURAL	92

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1		1	INLET PRESSURE GAUGE, 0-35"
		1	MANIFOLD PRESSURE GAUGE, -5 TO 15" WC
		1	LOW FIRE START
		1	AC INTERLOCK RELAY - 24VAC COIL
		1	MOTORIZED BACKDRAFT DAMPER FOR A4-D HOUSING - MEETS AMCA CLASS 1A RATING
		1	COMMERCIAL SMOKE DETECTOR/ALARM INTERLOCK - ALARM SUPPLIED BY OTHERS
		1	EXHAUST CONTACTOR BEFORE AIRFLOW SWITCH - FIELD WIRED
		1	CURB DUCT HANGER
		1	FREEZESTAT (10)
		1	VAV PACKAGE W/PRESET OR REFERENCE SPEEDS (VFD INCLUDED)
		1	VFD FACTORY MOUNTED AND WIRED IN COMMERCIAL CONTROL VESTIBULE FOR TEMPERED SUPPLY FAN
		1	LOAD REACTOR MOUNTED IN FAN
		1	2 YEAR PARTS WARRANTY

FAN ACCESSORIES

FAN UNIT NO	TAG	EXHAUST			SUPPLY			
		GREASE CUP	GRAVITY DAMPER	WALL MOUNT	SIDE DISCHARGE	GRAVITY DAMPER	MOTORIZED DAMPER	WALL MOUNT
1					YES		YES	

CURB ASSEMBLIES

NO	ON FAN	WEIGHT	ITEM	SIZE
1	# 1	93 LBS	CURB	42.000"W X 42.000"L X 20.000"H ALONG LENGTH, RIGHT INSULATED.
	# 1		RAIL	6.000"W X 42.000"L X 20.000"H RIGHT.

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Highland HS - Welding Shop - R1
POCATELLO, ID, 83201

DATE: 3/17/2022

DWG.#: 5366823

DRAWN BY: Josh Giancola

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 1

FAN #1 EA4-D1000-30D - HEATER
1. DIRECT GAS FIRED HEATED MAKE UP AIR UNIT WITH 30" MIXED FLOW DIRECT DRIVE FAN AND 24" BURNER.
2. INTAKE HOOD WITH EZ FILTERS.
3. SIDE DISCHARGE - AIR FLOW RIGHT -> LEFT.
4. GAS PRESSURE GAUGE, 0-35", 2.5" DIAMETER, 1/4" THREAD SIZE.
5. GAS PRESSURE GAUGE, -5 TO +15 INCHES WC., 2.5" DIAMETER, 1/4" THREAD SIZE.
6. LOW FIRE START. ALLOWS THE BURNER CIRCUIT TO ENERGIZE WHEN THE MODULATION CONTROL IS IN A LOW FIRE POSITION.
7. COOLING INTERLOCK RELAY. 24VAC COIL. 120V CONTACTS. LOCKS OUT BURNER CIRCUIT WHEN AC IS ENERGIZED.
8. MOTORIZED BACK DRAFT DAMPER 34" X 36" FOR SIZE 4 STANDARD & MODULAR HEATER UNITS W/EXTENDED SHAFT, STANDARD GALVANIZED CONSTRUCTION, 3/4" REAR FLANGE, LOW LEAKAGE, NFBUP-S ACTUATOR INCLUDED.
9. COMMERCIAL SMOKE DETECTOR INTERLOCK (DETECTOR BY OTHERS).
10. FIELD WIRED EXHAUST CONTACTOR BEFORE AIRFLOW SWITCH. RATED 23 AMPS. STARTS UP TO (2) SINGLE PHASE MOTORS. 2HP MAX. 115V, 3HP MAX. 240V. STARTS ONE THREE PHASE MOTOR. 5HP MAX. 208V, 7.5HP MAX 230V, 15HP MAX. 460V. OVERLOAD NOT INCLUDED.
11. CURB DUCT HANGER - 1-1/4" ANGLE IRON FRAME WELDED TO CURB TO SUPPORT STANDARD SIZE DUCTWORK. PRICED PER CURB. ONLY AVAILABLE WHEN CURB ASSEMBLY IS ORDERED.
12. FREEZESTAT WITH 10' SENSOR. FACTORY SET AT 35°F AND 10 MINUTES.
13. VAV (VARIABLE-AIR-VOLUME) WIRING PACKAGE FOR COMMERCIAL FANS WITH FREQUENCY DRIVE. PRESET SPEED OR SPEED REFERENCE VARIABLE FREQUENCY DRIVE INPUT FIELD WIRED.
14. VFD FACTORY MOUNTED AND WIRED IN UNIT CONTROL VESTIBULE.
15. MOUNT LOAD REACTOR IN FAN.
16. HINGED DOUBLE WALL INSULATED DOOR ASSEMBLY (BURNER/BLOWER SECTION).
17. 2 YEAR PARTS WARRANTY

*NOTE: SUPPLY DUCT MUST BE INSTALLED TO MEET SMACNA STANDARDS. A MINIMUM STRAIGHT DUCT LENGTH MUST BE MAINTAINED DOWNSTREAM OF UNIT DISCHARGE AS OUTLINED IN AMCA PUBLICATION 201. WHEN USING RECTANGULAR DUCTWORK, ELBOWS MUST BE RADIUS THROAT, RADIUS BACK WITH TURNING VANES. FLEXIBLE DUCTWORK AND SQUARE THROAT/SQUARE BACK ELBOWS SHOULD NOT BE USED. ANY TRANSITION AND/OR TURNS IN THE DUCTWORK WILL CAUSE SYSTEM EFFECT. SYSTEM EFFECT WILL DRASTICALLY INCREASE STATIC PRESSURE AND REDUCE AIRFLOW. DO NOT RELY ON UNIT TO SUPPORT DUCT IN ANY WAY. FAILURE TO PROPERLY SIZE DUCTWORK MAY CAUSE SYSTEM EFFECTS AND REDUCE PERFORMANCE OF THE EQUIPMENT.
SUGGESTED STRAIGHT DUCT SIZE IS 32" x 32".

SUPPLY SIDE HEATER INFORMATION:

WINTER TEMPERATURE = 1°F. TEMP. RISE = 95°F.
BTUs CALCULATED OFF ACTUAL AIR DENSITY.
OUTPUT BTUs AT ALTITUDE OF 0.0 FT. = 1171880.
INPUT BTUs AT ALTITUDE OF 0.0 FT. = 1273783.
OUTPUT BTUs AT ALTITUDE OF 4829 FT. = 981321.
INPUT BTUs AT ALTITUDE OF 4829 FT. = 1066653.

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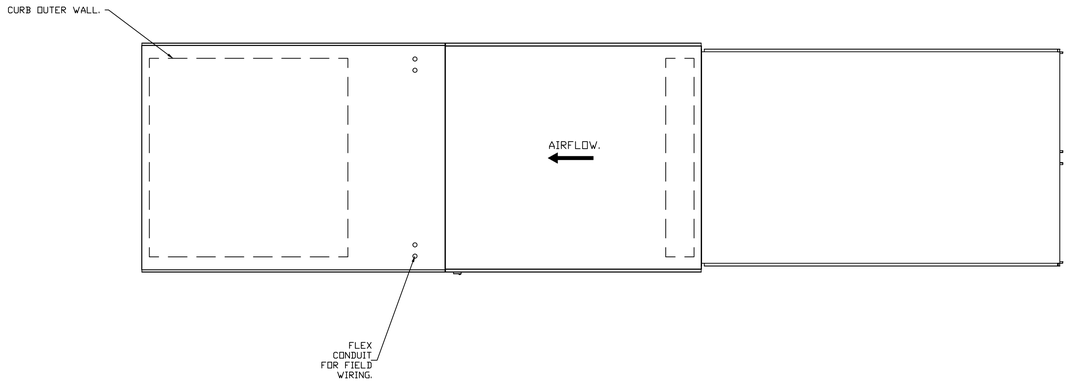

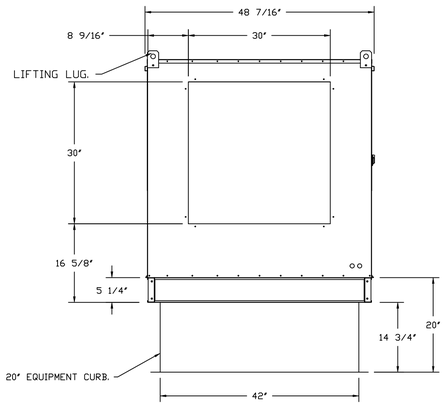

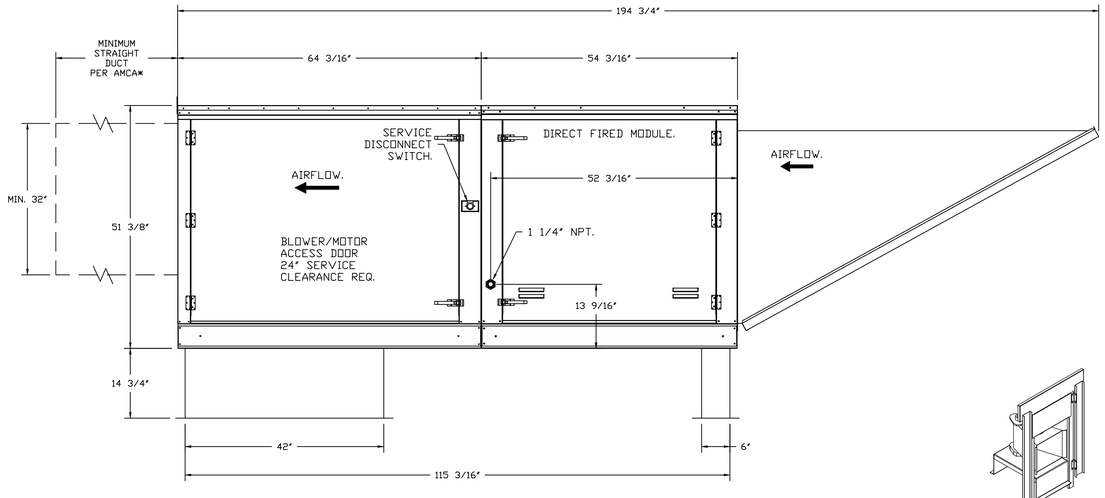

DIRECT FIRED (DF) PROFILE PLATE ASSEMBLY

DIRECT FIRED PROFILE PLATE SPECIFICATIONS:
DESCRIPTION:
DIRECT FIRED BURNERS SHALL HAVE PATENTED (US PATENT NO: US6629523B2), SELF-ADJUSTING PROFILE PLATES DESIGNED TO ENSURE PROPER AIR VELOCITY AND PRESSURE DROP ACROSS THE BURNER. PROFILE PLATES SHALL ALLOW BURNERS TO ACHIEVE CLEAN COMBUSTION BY LIMITING BY-PRODUCT LEVELS TO A MAXIMUM OF 5PPM OF CARBON MONOXIDE (CO), AND 0.5PPM OF NITROGEN DIOXIDE (NO2).DIRECT FIRED UNITS SHALL BE CONFIGURED WITH THE BLOWER MOUNTED DOWNSTREAM OF THE BURNER. THIS ARRANGEMENT WILL ENSURE A CONSISTENT AIRFLOW, REGARDLESS OF INLET AIR TEMPERATURE.

APPLICATION:
SPRING-LOADED BURNER PROFILE PLATES ARE ENGINEERED TO AUTOMATICALLY REACT TO THE MOMENTUM OF A FRESH AIR STREAM, WITHOUT THE NEED FOR ANY MOTORS OR ACTUATORS TO MECHANICALLY ADJUST THEM. WITH THIS FEATURE, ALL DF UNITS ARE DESIGNED FOR DEMAND CONTROL VENTILATION (DCV) REQUIREMENTS.

CERTIFICATIONS:
ALL PROFILE PLATE ASSEMBLIES SHALL BE INCLUDED IN THE DF UNIT'S ETL LISTING AND COMPLY WITH COMBINED SAFETY STANDARDS ANSI Z83.4 AND CSA 3.7 (NON-RECIRCULATING DF HEATERS) AND ANSI Z83.18 (RECIRCULATING DF HEATERS).

GENERAL CONSTRUCTION:
-PROFILE PLATES SHALL BE FORMED FROM G90 GALVANIZED STEEL.
-PROFILE PLATES SHALL VARY IN SIZE PER UNIT.
-PROFILE PLATES SHALL BE MOUNTED ALONG THE SAME PLANE AS THE DISCHARGE OF THE BURNER.
-DESIGN SHALL INCORPORATE PROPERLY TORQUED, PERMANENTLY MOUNTED SPRING HINGES.
-SPRING HINGES SHALL BE MADE FROM PLATED STEEL.

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Highland HS - Welding Shop - R1
POCATELLO, ID, 83201

DATE: 3/17/2022

DWG.#: 5366823

DRAWN BY: Josh Giancola

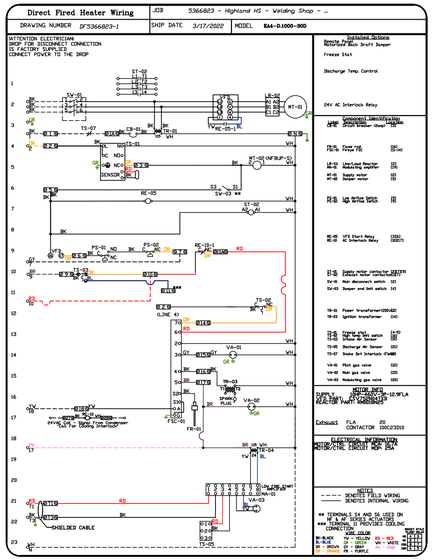
SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 2

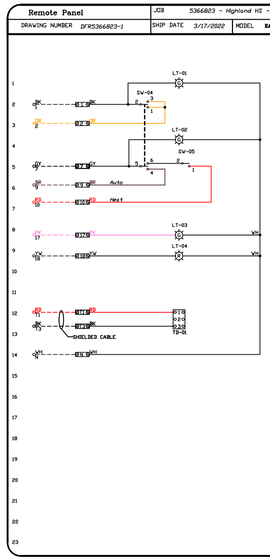
Direct Fired Heater Wiring

JOB 5366823 - Highland HS - Welding Shop - ...
DRAWING NUMBER BFS366823-1 | SHIP DATE 3/17/2022 | MODEL EA4-D.1000-3OD



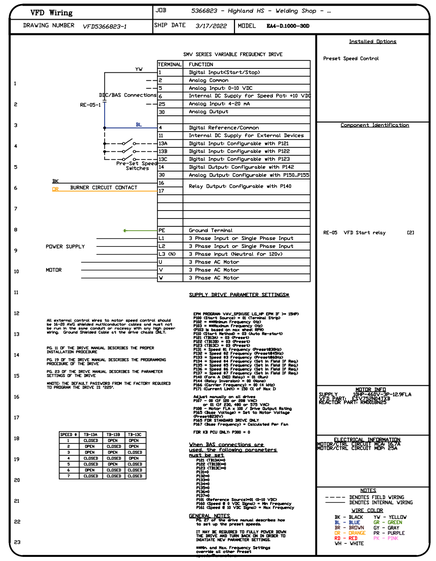
Remote Panel

JOB 5366823 - Highland HS - Welding Shop - ...
DRAWING NUMBER BFS366823-1 | SHIP DATE 3/17/2022 | MODEL EA4-D.1000-3OD



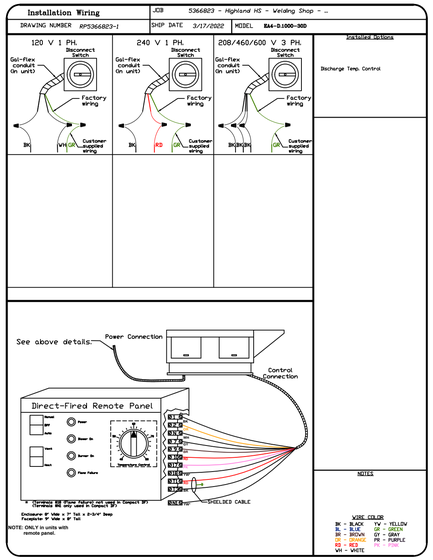
VFD Wiring

JOB 5366823 - Highland HS - Welding Shop - ...
DRAWING NUMBER VFD366823-1 | SHIP DATE 3/17/2022 | MODEL EA4-D.1000-3OD



Installation Wiring

JOB 5366823 - Highland HS - Welding Shop - ...
DRAWING NUMBER BFS366823-1 | SHIP DATE 3/17/2022 | MODEL EA4-D.1000-3OD



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DATE: 3/17/2022
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DRAWN BY: Josh Giancola
SCALE: 1/2" = 1'-0"
MASTER DRAWING
SHEET NO. 3