



INVITATION FOR BID (IFB)

IFB Number	Scope Number	Closing Date	Closing Time	Return IFB Submittal
PR139389-002097	9649	1/21/2022	4:00pm CST	bids@synergynds.com

IFB Reference Information:	Plumbing Repairs and Installation			
Insured Property Owner:	City of McGregor			
Property Location Name:	Fire Station			
Address Line 1:	1701 Bluebonnet Pkwy			
Address Line 2:	Enter Text Here			
City:	McGregor	State:	Texas	Zip Code: 76557

DESCRIPTION: Furnish all required labor, materials and equipment necessary to provide Scope-of-Work at the above described location. Work is being authorized under the elected TML TurnKey Recovery ProgramSM administered by Synergy NDS, Inc. (SynergyNDS) on behalf of the Insured Property Owner, a Member of the Texas Municipal League (TML).

SUBMITTAL INSTRUCTIONS: In support of Procurement Guidelines, the IFB Packet includes specifications and terms & conditions associated with the above referenced project information.

1. Bids shall be received no later than the Closing Date & Time indicated above. Bids received after above deadline or that are not submitted in accordance to Submittal Instructions may be rejected without further explanation or contractor notification.
2. Bid shall be completed and submitted using **ONLY** the **Contractor Submittal Form** (provided at the end of the IFB Packet).
3. Contractor is responsible to validate all Quantities and Units of Measurements specific to the following scope items &/or products. The information and descriptions provided in the IFB are intended for general guidance purposes only. Contractor may not change or alter any material &/or specifications identified in the IFB for submission purposes without prior written/email notification to: bids@synergynds.com.
4. Contractor has the sole responsibility to ensure that all services and material for BID Submittal (whether stated correctly in the IFB or not) satisfactorily meet all required Codes & Standards, OSHA Guidelines and The Americans with Disabilities Act (ADA).
5. Contractor should also consider the approach (if necessary) in which to stock/store material at the jobsite in a safe and secure manner. SynergyNDS will not be responsible for lost or stolen material, supplies or equipment stocked at the jobsite.
6. Bid award will be made based on best overall LUMP SUM project value as determined by SynergyNDS in accordance to market valuation, project demands, critical path scheduling – as well as overall Insured Member's WorkForce Participation Goals. Contributing factors, in addition to price, may be considered as necessary to help determine bid award based on any additional criteria set forth by the specific TML Insured Member.

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7. SynergyNDS reserves the right to modify the IFB Specifications and Terms & Conditions at any time during the bid solicitation process. Timely notice to all bidders will be given via an electronically distributed Addendum.
8. All registered HUB & HUB Zone Contractors, as well as DBEs are encouraged to participate. Additional Contractor Financial Assistance is available to help support daily HUB/DBE Contractor's operations under the terms and condition of a successful contract award.
9. SynergyNDS is an equal opportunity employer and administers all Contracts & Contractor Agreements in accordance to the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a).
10. Contractor is strongly encouraged to schedule a Site Visit of the property as necessary to support the IFB Submittal. All scheduled site visits can be requested at bids@synergynds.com.
11. When a mandatory Pre-BID Meeting is identified and scheduled in a specific IFB, Contractor Attendance is a requirement as part of the Solicitation. Contractors who fail to attend the Pre-BID Meeting will not be eligible to participate in the IFB and subsequent submittal process.
12. Contractor can submit all questions &/or concerns specific to the IFB by email to: bids@synergynds.com.

SCOPE-OF-WORK SUMMARY

Refer to **EXHIBIT A** and any subsequent **ATTACHMENTS** for scope-of-work description that will be included after the IFB Contractor Submittal Form on Page #9.

- *This IFB is part of a potential Federally Funded Project.
- *This IFB does not require a Contractor Payment or Performance Bond.
- *This IFB does not require a Pre-BID Meeting
- *This IFB supports workforce participation goals.

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GENERAL TERMS & CONDITIONS

1. Contractor shall be responsible for field verifying all conditions, dimensions & quantities prior to IFB Submittal and the implementation of this scope of work. Any Exhibits, Plans, Drawing &/or Other Supporting Documents have been included for general reference purposes only.
2. Contractor is responsible to identify and satisfactorily address all applicable regulatory requirements, including but not limited to Codes & Standards, HUD/DBE Participation Goals & Guidelines and ADA/FHA Specifications.
3. Contractor shall indicate in writing and be responsible to submit to SynergyNDS via email distribution to projects@synergynnds.com any request or need for additional 3rd Party Assignment as necessary to further identify required codes & standards, scope specifications or public health safety concerns outside of Contractor's professional competence &/or licenses.
4. Contractor is to obtain their own permits and schedule all applicable inspections. Permits can be obtained by contacting the Building Department or other administering entity. Permit Fees are reimbursable direct from SynergyNDS (in addition to contractor's Lump Sum Proposal) if incurred and submitted with proper documentation.
5. Contractor shall prohibit discrimination against staff &/or available workforce based on their status as protected veterans or individuals with disabilities and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity or national origin. Moreover, these regulations require that Contractor and its subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, protected veteran status or disability.
6. Contractor is to abide by all applicable OSHA and project safety requirements and standards. Contractor shall require all employees to utilize proper PPE when applicable, including but not limited to: fall protection harnesses, hard hats, safety glasses, safety foot wear, gloves and etc.
7. Contractor is responsible for submitting applicable project and associated contract documents as defined by Architectural Drawings Specifications, Engineering Requirements, Certificates of Insurance, Change Order Requests and any written or documented deviations from approved scopes-of-work or Contract.
8. Contractor may be asked to provide Material Safety Data Sheets (MSDS) to the Industrial Hygienist of record (for the project) for chemical-based products that will be used including, but not limited to, glues, cleaners, solvents, anti-microbial products, sanitizing agents, etc. The Industrial Hygienist of record retains the right to not allow the use of any of the products selected.
9. Contractor shall be responsible under terms of the Agreement for supplying any and all necessary labor, equipment, tools, materials and travel expense to complete the scope of work unless directed otherwise in the IFB. This includes but is not limited to: Rental Equipment, Dumpsters, Storage Containers, Jobsite Trailer, General Conditions, Associated Expenses, Travel Cost and Overhead & Profit which are to be included in the IFB Contractor Lump Sum Proposal.
10. Contractor shall protect all property from new and supplemental damage during the performance of work. This includes, but necessarily limited to: wall finishes, floor finishes, windows, electrical systems, mechanical systems, communication systems, life safety systems, security systems, HVAC control

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systems, plumbing systems, lighting systems, structurally related components, exterior elements, vegetation, property-of-others, and etc.

11. Contractor shall be responsible for any breakage &/or cleaning of unintended damage, debris, coatings, coverings, overspray and residual caulking from the aforementioned property described above. If affected property can't be successfully cleaned &/or restored to pre-existing condition, SynergyNDS will seek reimbursement from Contractor &/or deduct the appropriate replacement cost from outstanding Invoice Payment (Contract Value).
12. Contractor is EXPECTED to maintain a Clean & Safe Work Environment throughout the lifecycle of the awarded scope-of-work. This includes daily clean-up and organization of the Contractor's work area specific to all material waste, debris, tools &/or equipment. Failure to do so (after 3 documented warnings) can result in back charges to Contractor in the amount of \$25.50 hourly rate with a minimum \$150.00 per day clean-up rate (as determined by the SynergyNDS or the Insured Property Owner).
13. Contractor shall be responsible for securing work area(s) from access by non-authorized building occupants, including all persons not directly part of the restoration, repair and/or rebuild efforts. This includes securing work area(s) as identified in the IFB Scope-of-Work &/or under Contractors control.
14. Contractor shall provide and implement a site-specific health and safety plan to include hazard communication and related OSHA requirements to protect workers as well as the general public with access to the work area.
15. If the Contractor determines that deviations, modifications (change order or supplemental costs) from the initial scope-of-work are required, the Contractor shall submit a written request to SynergyNDS for review and approval prior to start of any additional work not otherwise included in initial BID. The written request will contain, at a minimum:
 - a. Reason for deviation or modification
 - b. Description of deviation or modification
 - c. Project cost addition or subtraction for deviation or modification
 - d. Estimated time required for deviation or modification.
16. Contractor is NOT responsible for any conditions or activities the building owner or employees implemented prior to their arrival to the job site. This includes removal of contents, equipment or personnel from the affected areas to the non-affected areas of the building.
17. During the performance of Contractor's scope-of-work, pre-existing damage to the building, structure, system failures or other anomalies may be found. If this occurs, the Contractor has the responsibility to identify, document and report these deficiencies immediately to SynergyNDS by email notification to projects@synergynnds.com. Verbal notification &/or discussion only with the Onsite Project Manager is encouraged but not binding. Written documentation must be provided in efforts to comply with the required transparent approach.
18. Contractor is responsible to ensure that their employees &/or its sub-contractors comply with the provisions and terms of the IFB and Contract Agreement.

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PAYMENT: Project is managed by SynergyNDS, Inc., under the TML Turnkey Recovery Program. Payments will be made directly to the contractor(s) in accordance with described terms & conditions. Qualified contractors may be eligible for an upfront material deposit or progress payments as determined prior to BID AWARD. **Contractor must be registered in the MVP (Managed Vendor Program) whereby required contractor documents must be uploaded to the database. There is annual \$49.95 processing fee as part of the initial contractor vetting and background check.**

PAYMENT TERMS: Payments will be made after inspection and approval of work by SynergyNDS, City Building Official &/or Insurance Adjuster. Accurate invoices and required project documentation must be submitted to SynergyNDS for project audit prior to payment. *Material Deposits &/or Advanced Payments require Contractor to complete online registration in the Managed Vendor Program (MVP). MVP has an annual \$49.99 Registration Fee to be part of the Contractor Direct Repair Program. Material Deposits &/or Advanced Payments will require a 2% Invoice Payment Discount.

HOLD HARMLESS: To the fullest extent permitted by law, the Contractor/Vendor shall indemnify, defend, and hold harmless SynergyNDS, Inc & TML, their officers, agents, employees, elected, and appointed officials, Insurance Representatives and volunteers from and against any and all claims, losses or liability, including attorney's fees, arising from injury or death to persons or damage to property occasioned by any act, omission, or failure of the Contractor/Vendor and any of its officers, agents, employees, and volunteers in satisfying the terms required by this contract.

RIGHT TO ACCEPT, REJECT AND WAIVE DEFECTS: SynergyNDS &/or Contracting Agent reserves the right to: reject all quotations; waive formalities, technical defects, and minor irregularities; accept the quotation (if any) deemed most advantageous to and in the best interests of Insured Members of TML. Award will be based on price, contractor's daily performance capabilities, availability to provide the specified services when required &/or in accordance to critical path scheduling.

DAMAGES: Contractor will be held liable for any damage caused to the building and ancillary structure, and/or injury to the occupants resulting from the execution of the work or from not exercising proper precautionary protective measures. Any cost of repair/replacement resulting from damages shall be at the Contractor's expense.

WORK-SITE PRACTICES: Contractor's workers, as well as the various trade contractors entering or leaving the work area, will all attend a site-specific safety meeting as well as daily safety meetings prior the scheduled workday. Contractor's workers entering or leaving the work area will don or remove personal protective equipment and clothing in the staging area outside of each work area. All debris & trash in the work area will be removed and disposed.

WORKER PERSONAL PROTECTION EQUIPMENT: The National Institute for Occupational Safety and Health (NIOSH) provides the following interim guidelines and warnings to restoration workers.

- a) Steel toed leather boots should be worn. Tennis shoes or sneakers should *not* be worn because they will transfer contamination and will not prevent punctures, bites, or crush injuries.
- b) Goggles, safety glasses with side shields or full-face shields shall be used when performing restoration related activities that involve demolition, cutting or the use of ANY power tools. Sun/glare-protective

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lenses may be needed in some work settings. The use of goggles or protective eyewear should also be worn during the application of any cleaners, sanitizers or disinfectants.

- c) Soft hat or another protective head cover. Wear an American National Standards Institute (ANSI) rated hardhat if there is any danger of falling debris or electrical hazards.
- d) Hearing protection (when working in an environment with any noise that you must shout over to be heard).
- e) Comfortable, form fitting, light weight clothing including long pants and a long-sleeved shirt or coveralls. Additional PPE, respiratory protection, or clothing may be required when specific exposure hazards are identified or expected at the work site. In some instances, the protective ensemble components (garment, boots and gloves) may need to be impervious to contaminated flood or other site-specific chemical, physical, or biological hazards. In all instances, workers are advised to wash their hands with soap and clean water, especially before eating or drinking. Protect any cuts or abrasions with waterproof gloves and dressings. The use of insect repellent, sun block and lip balm may also be required for some work environments. Drink plenty of bottled water and take frequent rest breaks to avoid overexertion.

THERMAL STRESSES: HEAT: Workers are at serious risk for developing heat stress. Excessive exposure to hot environments can cause a variety of heat-related problems, including heat stroke, heat exhaustion, heat cramps, and fainting. To reduce the potential for heat stress, drink a glass of fluid every 15 to 20 minutes and wear loose- fitting clothing. Additionally, incorporate work-rest cycles into work routines and when possible distribute the workload evenly throughout the day.

****Temporary cooling to the work areas shall only be authorized by the owner's representative based on the actual need for the work being performed. Where the conditions allow for the operation of part or all of the ventilation systems serving the work area then the need for temporary cooling is NOT necessary. The work area should be maintained at conditions that meet OSHA requirements for health and safety.****

WORKING IN CONFINED SPACES: If you are required to work in a boiler, furnace, pipeline, pit, pumping station, septic tank, sewage digester, storage tank, utility vault, well, or similar enclosure, you should be aware of the hazards of working in confined spaces. A confined space has one or more of the following characteristics:

- a) limited openings for entry or exit;
- b) unfavorable natural ventilation; or
- c) Is not designed for continuous worker occupancy.

Toxic gases, a lack of oxygen, or explosive conditions may exist in the confined area, resulting in a potentially deadly atmosphere. Because many toxic gases and vapors cannot be seen or smelled, never trust your senses to determine if safe entry is possible. **Never** enter a confined space unless you have been properly trained, even to rescue a fellow worker! If you need to enter a confined space and do not have the proper training and equipment, contact your local fire department for assistance.

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CONTRACT IMPLEMENTATION: Contract will be awarded upon review of all bids and proposals received by SynergyNDS. Initiation of intent-to-contract with Contractor will be engaged upon email notification and signed/returned Contractor Agreement Form. Contract-in-full will occur upon SynergyNDS receipt of all required documentation including but not limited to:

- a) Performance Bond &/or Payment Bond (If Required)
- b) Certificate of General Liability Insurance
- c) Certificate of Auto Insurance
- d) Certificate of Worker's Compensation or Letter of Exemption
- e) Contractor's W-9
- f) State Licenses

Further description of insurance requirements is listed in "Insurance & Licensing Requirements." No material deposits &/or payments will be made to Contractor until all required documentation has been received.

ASSIGNMENT OF CONTRACT: Contractor shall not assign the contract or any part thereof to any person, firm, corporation or company unless such assignment is approved in writing by SynergyNDS. Such acceptance shall be at the sole discretion of the SynergyNDS upon request of the Contractor. Upon approved and executed Transfer-of-Contract-Agreement, Contractor will be responsible for the coordination and hand-off of work/trades with the newly Assigned Contractor. Failure to coordinate this work will not relieve original Contractor of their obligations and shall not constitute additional cost as governed by the Lump Sum Contract Award.

ASSIGNMENT OF CONTRACTOR: Contractor is responsible for supplying all required Personal Protective Equipment (PPE), including but not limited to the furnishing and appropriate use of: hard hat(s), safety glasses, face shields, ear plugs, gloves, boots, fall protection (where required), breathing protection (where required), tie off ropes/apparatuses/points (where required), fire extinguishers, first aid kits, etc. Contractor is required to be familiar with and follow all OSHA and State of Texas's safety requirements.

- a) Contractor is to hold daily jobsite safety meetings that review the work to be performed, the hazards involved and the methods for reducing and eliminating such hazards, as well as maintain meeting records, - including attendance lists, which shall be kept onsite and available for SynergyNDS review at all times. Contractor shall be solely liable for any and all OSHA violations associated with his/her employees.
- b) SynergyNDS reserves the right to hold weekly progress meetings for which the Subcontractor shall attend. Contractor shall be responsible for daily cleanup of the work performed herein. Failure to cleanup daily after trade will result in cleanup supplementation at Contractor's cost. Twenty-Four (24) hour notice will be given prior to supplementation. Contractor shall be responsible for delivery, loading, unloading, storage, protection, etc. of all work provided herein.

ENERGY EFFICIENCY: The Contractor shall comply with all mandatory standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub.L. 94-163) for the State in which the work under this contract is performed.

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PROCUREMENT OF RECOVERED MATERIALS: In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. The Contractor should procure items designated in the EPA Guidelines that contain the highest percentage of recovered materials practical unless the Contractor determines that such items:

- a) are not reasonably available in a reasonable period of time;
- b) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology;

FAILURE TO COMPLY: For failure to deliver in accordance with specifications, SynergyNDS may cancel the contract or any part thereof and purchase services on the open market, charging any additional cost to the Contractor. Contractor shall comply with all applicable state, federal and local codes, and pay all permits, licenses and certificates, and other fees as required by the work.

INSURANCE & LICENSING REQUIREMENTS: Before starting work, the Contractor will provide SynergyNDS proof of Worker's Compensation and Commercial and Public Liability Insurance. The Contractor must be licensed to do business in the State of Texas and SynergyNDS must be named as an additional insured on general liability insurance certificate. Contractor will need to go to www.synergynnds.com and complete the initial registration for the Managed Vendor Program (MVP). Contractor will be required to upload the following information (when applicable) prior to contract award and eligible material deposits.

- a) The Contractor will carry Worker's Compensation Insurance for all employees engaged in work at the site, in accordance with State or Territorial Worker's Compensation Laws.
- b) Commercial and Public Liability with bodily injury and property damage limits will be at a combined single limit of at least \$500,000 to protect the contractor and each subcontractor against claims for injury to or death of one or more persons.
- c) Automobile Liability on owned and non-owned motor vehicles used on the site(s), or in connection with the sites, for a combined single limit for bodily injury and property damages of not less than \$500,000.00 per occurrence.
- d) Builder's Work Insurance limit of at least \$5,000.00 per occurrence and \$10,000.00 aggregate.
- e) Professional Liability \$1,000,000 per occurrence (if applicable).

Contractor will not allow insurance coverage to lapse and will provide SynergyNDS with updated Certificates of Insurance as necessary. All policies must provide that at least thirty (30) days' notice of cancellation will be given to SynergyNDS. All Contractor employees &/or subcontractors are bound by the Insurance Requirement. Contractor is the sole responsible party for all its Employee &/or SubContractor infractions, accidents, damages and all general liability concerns that occur, whether directly or indirectly, as related to Contracted Scope-of-Work.

The certificate holder(s) must be noted as:

Synergy NDS, Inc.
1400 Sarno Rd
Melbourne, FL 32935

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FEDERAL CONTRACT REQUIREMENTS ONLY (In a Declared Event)

If stated in the IFB, the Contractor and its subcontractors must follow the provisions, as applicable, as set forth in 2 C.F.R. §200.326 Contract provisions and Appendix II to 2 C.F.R. Part 200, as amended, including but not limited to:

9.29.1 Davis-Bacon Act, as amended (40 U.S.C. §§3141-3148). When required by Federal program legislation, which includes emergency Management Preparedness Grant Program, Homeland Security Grant Program, Nonprofit Security Grant Program, Tribal Homeland Security Grant Program, Port Security Grant Program and Transit Security Grant Program, all prime construction contracts in excess of \$2,000 awarded by non-Federal entities must comply with the Davis-Bacon Act (40 U.S.C. §§3141-3144, and §§3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, “Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction”). In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. If applicable, SynergyNDS must place a current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. SynergyNDS must report all suspected or reported violations to the Federal awarding agency. When required by Federal program legislation, which includes emergency Management Preparedness Grant Program, Homeland Security Grant Program, Nonprofit Security Grant Program, Tribal Homeland Security Grant Program, Port Security Grant Program and Transit Security Grant Program (it does not apply to other FEMA grant and cooperative agreement programs, including the Public Assistance Program), the contractors must also comply with the Copeland “Anti-Kickback” Act (40 U.S.C. § 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, “Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States”). As required by the Act, each contractor or subrecipient is prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. SynergyNDS must report all suspected or reported violations to the Federal awarding agency.

1. Contractor. The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract.
2. Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clause above and such other clauses as the FEMA may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.
3. Breach. A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12.

9.29.2 Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708). Where applicable, which includes all FEMA grant and cooperative agreement programs, all contracts awarded by SynergyNDS in excess of

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\$100,000 that involve the employment of mechanics or laborers must comply with 40 U.S.C. §§ 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. §3702 of the Act, each contractor must compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

9.29.3 Rights to Inventions Made Under a Contract or Agreement. If the Federal award meets the definition of “funding agreement” under 37 CFR §401.2 (a) and the recipient or subrecipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that “funding agreement,” the recipient or subrecipient must comply with the requirements of 37 CFR Part 401, “Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements,” and any implementing regulations issued by the awarding agency.

9.29.4 Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387). Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. §§7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. §§1251-1387) and will report violations to FEMA and the Regional Office of the Environmental Protection Agency (EPA). The Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended—applies to Contracts and subgrants of amounts in excess of \$150,000.

9.29.5 Debarment and Suspension (Executive Orders 12549 and 12689)—A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689(3 CFR part 1989 Comp., p. 235), “Debarment and Suspension.” SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

9.29.6 Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)—Contractors that apply or bid for an award exceeding \$100,000 must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with non- Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.

9.29.7 Compliance with Procurement of recovered materials as set forth in 2 CFR § 200.322. CONTRACTOR must comply with section 6002 of the Solid Waste disposal Act, as amended, by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered

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materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

OTHER FEDERAL REQUIREMENTS (In a Declared Event)

9.29.9 Americans with Disabilities Act of 1990, as amended (ADA) – The CONTRACTOR will comply with all the requirements as imposed by the ADA, the regulations of the Federal government issued thereunder, and the assurance by the CONTRACTOR pursuant thereto.

9.29.10 Disadvantaged Business Enterprise (DBE) Policy and Obligation - It is the policy of SynergyNDS that DBE's, as defined in 49 C.F.R. Part 26, as amended, shall have the opportunity to participate in the performance of contracts financed in whole or in part with SYNERGYNDS funds under this Agreement. The DBE requirements of applicable federal and state laws and regulations apply to this Agreement. SynergyNDS and its CONTRACTOR agree to ensure that DBE's have the opportunity to participate in the performance of this Agreement. In this regard, all recipients and contractors shall take all necessary and reasonable steps in accordance with 2 C.F.R. § 200.321(as set forth in detail below), applicable federal and state laws and regulations to ensure that the DBE's have the opportunity to compete for and perform contracts. SynergyNDS and the CONTRACTOR and subcontractors shall not discriminate on the basis of race, color, national origin or sex in the award and performance of contracts, entered pursuant to this Agreement. 2 C.F.R. § 200.321 CONTRACTING WITH SMALL AND MINORITY BUSINESSES, WOMEN'S BUSINESS ENTERPRISES, AND LABOR SURPLUS AREA FIRMS

- a) If the CONTRACTOR, with the funds authorized by this Agreement, seeks to subcontract goods or services, then, in accordance with 2 C.F.R. §200.321, the CONTRACTOR shall take the following affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used whenever possible.
- b) Affirmative steps must include:
 - I. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
 - II. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
 - III. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;
 - IV. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises;
 - V. Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

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VI. Requiring the Prime contractor, if subcontractor are to be let, to take the affirmative steps listed in paragraph (1) through (5) of this section.

9.30 The Contractor shall utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the Contractor during the term of the Contract and shall expressly require any subcontractors performing work or providing services pursuant to the Contract to likewise utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the Contract term.

9.31 If attached, the CONTRACTOR is bound by the terms and conditions of the Federally-Funded Subaward and Grant Agreement between SYNERGYNDS and the Texas Division of Emergency Management (Division).

9.32 The CONTRACTOR shall hold the Division and SYNERGYNDS harmless against all claims of whatever nature arising out of the CONTRACTOR's performance of work under this Agreement, to the extent allowed and required by law.

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IFB – CONTRACTOR SUBMITTAL FORM

IFB Number	Scope Number	Closing Date	Closing Time	Return IFB Submittal
PR139389-002097	9649	1/21/2022	4:00pm EST	bids@synergyns.com

Company Name:

Address Line 1:

Address Line 2:

City:

State:

Zip Code:

Contractor Certification: ☐ DBE ☐ WBE/WOSB ☐ HUB ☐ SDVOSB/VOSB

CONTRACTOR LUMP SUM PROPOSAL:

IFB TITLE	Plumbing Repairs and Installation	PROPOSAL:	\$
IFB TITLE	Click or tap here to enter text.	PROPOSAL:	\$
IFB TITLE	Click or tap here to enter text.	PROPOSAL:	\$
IFB TITLE	Click or tap here to enter text.	PROPOSAL:	\$

Material Deposit | ☐ Required | ☐ Requested | in the amount of \$

I, having the legal authorization to represent the "Company" (the undersigned) have read and understood all previous 1-9 pages and the subsequent Attached Exhibits in accordance to the applicable Terms & Conditions as described in the IFB Packet preceding the attached Contractor Submittal Form:

Company Contact Name (Please Print)

Company Title (Please Print)

Signature

Date

*Material Deposits &/or Advanced Payments require Contractor to complete online registration in the Managed Vendor Program (MVP). MVP has an annual \$49.99 Registration Fee to be part of the Contractor Direct Repair Program. Material Deposits &/or Advanced Payments will require a 2% Invoice Payment Discount.

INVITATION FOR BID (IFB)

PR139389 - Exhibit A

Project Summary: The City of McGregor Fire Station sustained damages as a result of the winter storm that hit Texas in February 2021. Upon inspection of the Plumbing system, it was found that the associated components were affected by freezing causing lines to break in various areas. The inspection also noted lack of compliance with current law and ordinances requiring system to be brought up to current requirements.

Building Information:

Fire Station
1701 Bluebonnet Pkwy.
McGregor, TX 76557

Bidding Information:

Bids are to be returned to: bids@synergynds.com

This is a 2 part bid for requested work:
Lump Sum for Part A: (Insurance coverage)
Lump Sum for Part B: (City coverage)

Award criteria includes: Reputation of contractor, previous relationship with the City of McGregor, TML, and/or SynergyNDS, proposed timeline which is best overall for the project, and/or as approved by the City of McGregor, TML, and/or SynergyNDS.

Anticipate start date to be the week of Jan 24, 2022.

Bid packets shall include the following:

- 1) Completed IFB Form.
- 2) Proposed timeline for project from beginning of project to completion.

Work Scope:

- Contractor shall coordinate all work with SynergyNDS.
- Contractor is responsible for registering and pulling permit for scope of work.
- Contractor shall work in conjunction with other MEP contractors to ensure smooth work flow and that all needs are communicated with each other.
- **Part A:**
 - Contractor is to remove any remaining plumbing items from the building.
 - All fixtures have been removed to date.
 - This shall include all plumbing lines.
 - All shall be properly disposed of.

INVITATION FOR BID (IFB)

PR139389 - Exhibit A

- Water heater is still present and will need to be removed.
- Contractor shall provide and install all new pex lines from point of entry throughout to identified fixture locations.
- Contractor shall provide and install new fixtures as identified on the plans.
 - It shall be noted the kitchen sink was retained and is to be reused.
 - Fixtures shall be commercial grade:
 - Porcelain toilets and urinals.
 - Sloan style flushing valves
 - Wall mounter sinks for bathrooms.
 - Contractor shall ensure proper backing is in place prior to walls being covered to support the weight.
 - Shower heads and control valves were indicated on drawings.
 - Mop sink where indicated on drawings.
 - Water fountain – either wall mounted or stand up.
 - Water heater – meet minimum specifications as provided below.
- Contractor shall provide and install all stops, valves, cut-offs, back flow preventers, etc.
- Contractor shall install new gas lines to feed hot water heater, stove, and generator.
- Contractor shall insulate all water lines which are in the attic space or in an uninsulated wall space.
- Contractor shall provide and install pipe covers for all exposed p-traps and water lines. (Bathroom and kitchen sink).

➤ **Part B:**

- Contractor shall provide cost to replace sewer line from building to tie into city sewer system.
- During inspections it was found that the main sewer line and various branches were found to be collapsed.
 - Current lines are a mixture of cast and clay.
- This is to be listed as a separate bid and will be compensated by the City of McGregor.
 - Bid should include all necessary supplies, labor, materials, to include any further required preliminary testing.
 - Video footage is provided in dropbox link:
 - <https://www.dropbox.com/sh/790616jqxwshbu8/AABv67TEbYg9N5eUmOKp5c35a?dl=0>
 - Bid shall be all encompassing to allow Part A work to be tied into the lines for proper functioning.

INVITATION FOR BID (IFB)

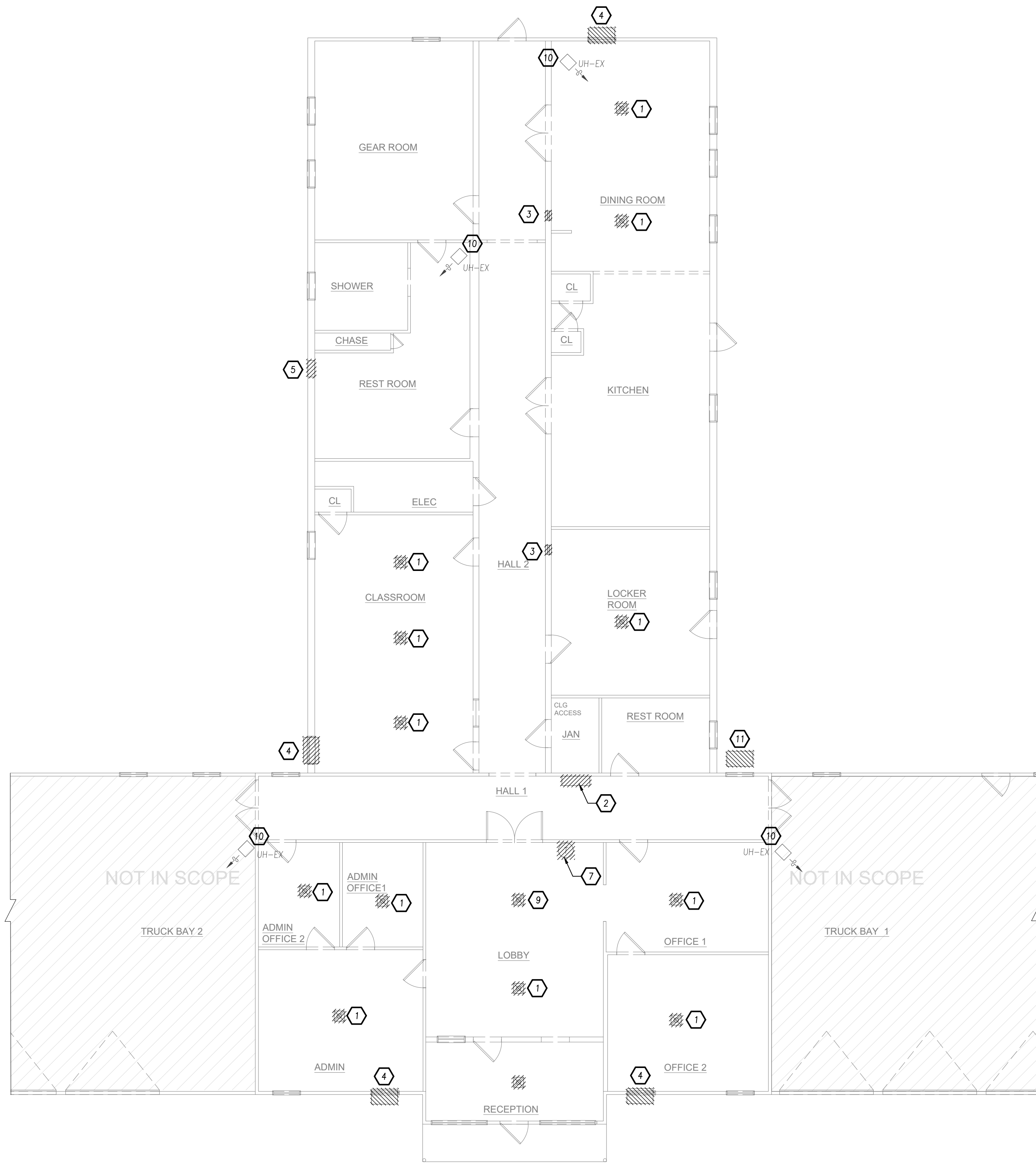
PR139389 - Exhibit A

- Contractor shall include any cost to remove and replace flooring as necessary to access.
- **System Testing:**
 - Contractor is responsible to ensure that all systems are tested and functioning properly.
- **Safety Expectations:**
 - Contractor shall abide by all site safety requirements.
 - Contractor shall hold a Job Hazard Analysis (JHA) with workers each day prior to starting work for the day. A copy of the JHA shall be provided to the Project Manager each day as requested.
 - Contractor and their workers are expected to utilize appropriate PPE for the task being performed each day.
 - Minimum PPE is to include but not limited to: Hard hat, safety glasses, safety shoes, gloves, etc.
 - Specialty trades may require additional PPE appropriate for the task being performed.
 - Contractor is responsible for installation of any addition signage and/or barriers as indicated for work being performed. (ex. Crane activities will require barriers to be installed for turning radius of the crane, signage for hot work activities, asbestos abatement in progress, etc.)

Reminder Notes:

1. Contractor is responsible to validate all quantities and units of measurements specific to the scope items above. Information above is intended as a general guidance purpose only.
2. Contractor has the sole responsibility to ensure that all services and materials for bid submittal meet all codes and standards. This include that all work must be completed in order to meet all codes and standards.
3. Contractor should also consider method to stock/store materials at the jobsite in a safe and secure manner. SynergyNDS will not be responsible for lost or stolen materials, supplies, or equipment from the location.
4. Contractor is strongly encouraged to schedule a site visit of the property as necessary to support the IFB submittal.
5. Contractor can submit request for site visit, all questions &/or concerns to the specific IFB by emailing: bids@synergynds.com

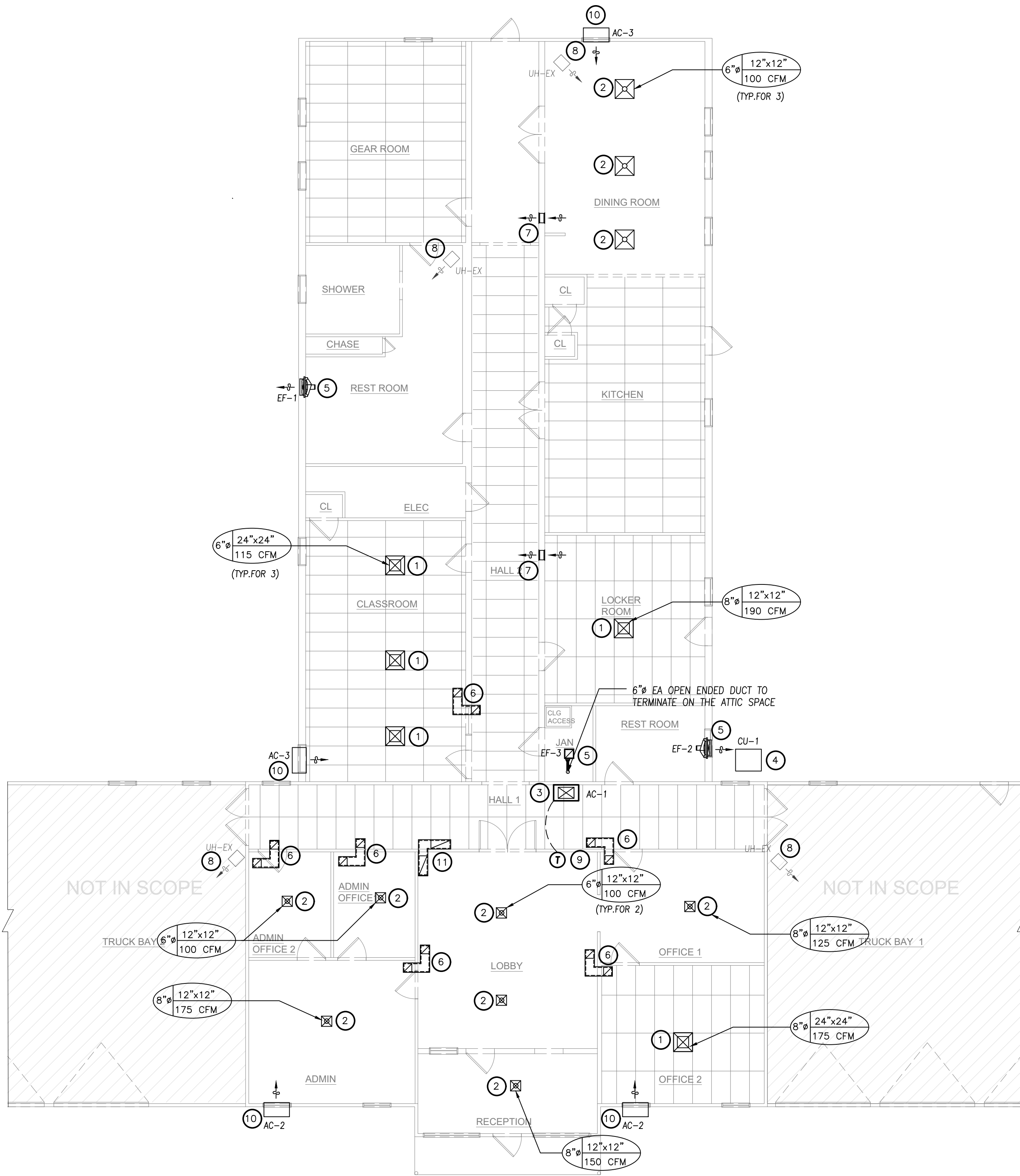
MECHANICAL SPECIFICATIONS			
1.0 GENERAL CONDITIONS	1. CONTRACT: PERFORM ALL WORK AS DETAILED ON THE DRAWINGS AND/OR SPECIFICATIONS TO PROVIDE A COMPLETE AND FULLY FUNCTIONAL MECHANICAL SYSTEM TO THE SATISFACTION OF THE OWNER AND ENGINEER.		
	2. SELECTED WORK: NO WORK DEEMED OR INDICATED ON THE DRAWINGS DOES NOT DELEGATE FUNCTION TO ANY SPECIFIED SUBCONTRACTOR OR IDENTIFY ABSOLUTE CONTRACTUAL LIMITS BETWEEN MECHANICAL OR SUBCONTRACTORS.		
	3. CODES, RULES & STANDARDS: ALL WORK SHALL MEET THE DESIGN INTENT AND BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITIONS OF ALL APPLICABLE CODES, STANDARDS, RULES AND REGULATIONS AND MEET THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION. ALL CODES AND BYLAWS MUST BE STRICTLY ADHERED TO.		
	4. PERMITS & FEES: OBTAIN ALL PERMITS REQUIRED FOR THE MECHANICAL WORK, ARRANGE FOR INSPECTIONS AND TESTS. PAY ALL FEES AND COSTS FOR THE PERMITS, INSPECTIONS AND TESTS.		
	5. SCHEDULES: COMPLY WITH GENERAL CONTRACTOR'S CONSTRUCTION SCHEDULES.		
	6. PREMIUM TIME: INCLUDE COST OF PREMIUM TIME FOR WORK OUTSIDE NORMAL WORKING HOURS INCLUDING NIGHTS AND WEEKENDS THAT ARE REQUIRED TO COMPLETE THE WORK.		
	7. ALTERNATIVES: THE TENDER SHALL BE BASED ON THE MATERIALS AND MAKE OF THE EQUIPMENT NAMED. ALTERNATIVES MAY BE QUOTED WITH THE TENDER AS AN INCREASE OR DECREASE TO THE BASE BID PRICE ONLY, AND DELIVERY DATES. THE QUALITY AND PERFORMANCE CHARACTERISTICS OF THE ALTERNATIVE PRODUCTS MUST BE EQUAL OR BETTER THAN THE SPECIFIED PRODUCTS.		
	8. EXAMINATION OF SITE: VISIT AND EXAMINE THE SITE WHERE THE WORKS IS TO BE PERFORMED BEFORE SUBMITTING THE TENDER. BECOME FAMILIAR WITH ALL FEATURES AND CHARACTERISTICS OF THE SITE AND SURROUNDING ENVIRONMENTS. NO ALLOWANCES WILL BE MADE BY THE OWNER FOR ANY DIFFICULTIES ENCOUNTERED DUE TO CONDITIONS WHICH WERE VISIBLE UPON, OR REASONABLY MEASURABLE FROM AN EXAMINATION OF THE SITE PRIOR TO SUBMISSION OF THE TENDER.		
	9. CONTRACT DRAWINGS: CONTRACTOR SHALL EXAMINE THE MECHANICAL, STRUCTURAL, ARCHITECTURAL, ELECTRICAL, INTERIOR DESIGN, OR ANY OTHER DRAWINGS ISSUED FOR THIS PROJECT DURING THE TENDER STAGE TO SATISFY HIMSELF THAT THE WORK CAN BE SATISFACTORILY CARRIED OUT, BEFORE COMMENCING WORK, EXAMINE THE WORK OF OTHER TRADES AND REPORT AT ONCE ANY DEFICIENCY OR INTERFERENCE AFFECTING THE WORK OF THE MECHANICAL TRADE OR THE GUARANTEE OF SAME.		
	10. QUESTIONS DURING BIDDING: CONTRACTOR SHALL INFORM THE OWNER/ENGINEER DURING BIDDING OF ANY PROBLEMS IN MEETING THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION, ANY COST SAVING IDEAS OR METHODS, AND OF ANY DISCREPANCIES IN THE WORK.		
2.0 GENERAL REQUIREMENTS	11. ALLOWANCES FOR SITE CONDITIONS: ALLOW IN THE TENDER PRICE ADJUSTMENT IN THE LOCATION OF THE NEW EQUIPMENT (UP TO 10'-0" IN ANY DIRECTION) TO SATISFY SITE CONDITIONS AS DIRECTED BY THE ENGINEER PRIOR TO INSTALLATION WITH NO EXTRA COST TO THE OWNER.		
	12. WARRANTY: A 1-YEAR WRITTEN WARRANTY SHALL BE PROVIDED FOR THE COMPLETE MECHANICAL INSTALLATION FROM DATE OF FINAL ACCEPTANCE. ANY DEFECTIVE ITEMS FOUND DURING THE WARRANTY PERIOD SHALL BE REPAIRED AND/OR REPLACED BY THE CONTRACTOR AT HIS OWN COST. THIS WILL INCLUDE ANY REPAIR REQUIRED TO OTHER ITEMS, MATERIALS OR EQUIPMENT DAMAGED DUE TO THE DEFECT.		
	13. CHANGE NOTICES: WHENEVER A CHANGE NOTICE IS ISSUED FOR THE PROJECT, SUBMIT A COMPLETE ITEMIZED COST OF MATERIALS, EQUIPMENT AND LABOUR FOR THE CHANGE FOR THE OWNER AND ENGINEER'S CONSIDERATION. THE HOURLY RATE SHALL BE INCLUSIVE OF ALL CHARGES FOR SUPERVISION, VARIABLE LABOUR FACTORS, TOOLS, PATTERNS, BURNERS, HEAT TREATING, MATERIALS, STORAGE, REMOVAL, STORAGE, ADDITIONAL DRAWINGS, CLEAN-UP, AS-BUILT DRAWINGS, TESTING, FREIGHT & DELIVERY, BUT EXCLUSIVE OF OVERHEAD AND PROFIT. DO NOT START CHANGES UNTIL THE SUBMITTED COST IS ACCEPTED BY THE OWNER AND ENGINEER.		
	2.1. BASE BUILDING STANDARDS: WHERE AVAILABLE, BASE BUILDING STANDARDS SHALL FORM THE BASIS OF THIS CONSTRUCTION. COMPLY WITH BASE BUILDING'S STANDARD FOR MATERIALS AND EQUIPMENT AND LANDLORD'S REQUIREMENTS FOR SYSTEM SHEDDING AND CONNECTIONS.		
	2.2. PROCEDURES: ALL WORK PROCEDURES, SCHEDULING OF INSTALLATION, SECURITY, MATERIAL STORAGE ETC., SHALL BE IN COMPLIANCE WITH THE OWNER AND/OR GENERAL CONTRACTOR'S DIRECTIVES.		
	2.3. SITE COORDINATION: CONTRACTOR SHALL CO-ORDINATE HIS WORK WITH OTHER TRADES PROPERLY ON SITE TO AVOID ANY CONFLICT. ENSURE ALL WORK TO BE PERFORMED IN PROPER SEQUENCE AND THAT THE MECHANICAL WORK WILL BE FULLY ACCESSIBLE FOR MAINTENANCE AND SERVICING WHEN ALL WORK IS COMPLETED.		
	2.4. EQUIPMENT & MATERIALS: ALL EQUIPMENT AND MATERIALS PROVIDED MUST CONFORM TO THE DRAWINGS AND SPECIFICATIONS. ALL PRODUCTS USED MUST BE NEW AND OF TOP QUALITY AND OF UNIFORM PATTERN THROUGHOUT THE PROJECT.		
	2.5. WORKMANSHIP: WORKMANSHIP SHALL BE OF BEST QUALITY, EXECUTED BY TRADES PEOPLE EXPERIENCED AND SKILLED IN THEIR RESPECTIVE DUTIES FOR WHICH THEY ARE EMPLOYED.		
	2.6. SITE WORK PROTECTION: PROTECT ALL MECHANICAL WORK FROM CONSTRUCTION DIRT OR DAMAGE FROM ANY CAUSE. SECURELY PLUG OR CAP ALL OPENINGS IN PIPE, DUCT, EQUIPMENT AND FUTURES TO PREVENT OBSTRUCTION.		
	2.7. ARCHITECT/INTERIOR DESIGNER'S APPROVAL: OBTAIN APPROVAL FROM THE ARCHITECT AND INTERIOR DESIGN ON COLOUR, FINISH, AND/OR LOCATIONS OF ALL NEW AIR TERMINALS, TERMINALS, AND ACCESS DOORS PRIOR TO ORDERING OR INSTALLATION.		
3.0 BASIC MATERIALS AND METHODS	2.8. BASE BUILDING CONDITIONS: EXISTING BASE BUILDING HVAC AND PLUMBING COMPONENTS WHERE REMOVED I.E. DIFFUSERS, FANS, AND PLUMBING FIXTURES ETC. SHALL BE TURNED OVER TO THE LANDLORD AT THEIR DISCRETION.		
	2.9. TEMPORARY FILTERS: PROVIDE 25mm (1") DISPOSABLE FILTERS AT ALL BASE BUILDING RETURN AIR OPENINGS WHICH REMAIN OPERATIONAL DURING CONSTRUCTION. FILTERS SHALL BE REPLACED WEEKLY DURING CONSTRUCTION. REMOVE UPON CONSTRUCTION COMPLETION.		
	2.10. CLEAN UP: UPON COMPLETION OF THE WORK, REMOVE ALL SURPLUS AND WASTE MATERIALS FROM SITE, CLEAN ALL EQUIPMENT AND LEAVE ALL ITEMS IN PERFECT ORDER AND READY FOR OPERATION.		
	2.11. COMMISSIONING: ADJUST AND SET UP ALL PARTS AND EQUIPMENT TO ACHIEVE THE DESIRED OPERATION. ALL EQUIPMENT, EXISTING AND/OR NEW, SHALL BE STARTED UP BY QUALIFIED TECHNICIANS. SUBMIT AND REPORT TO THE ENGINEER THAT ALL EQUIPMENT IS OPERATIONAL AS INTENDED.		
	2.12. INSPECTIONS: ENGINEER INSPECTIONS ARE IMPERATIVE. PRIOR TO INSTALLATION OF CEILING OR CLOSING THE WALLS, THIS CONTRACTOR SHALL CONTACT THE ENGINEER AND OWNER TO PERFORM INSPECTIONS. WHEN CEILING TILES HAVE BEEN INSTALLED OR WALLS ARE CLOSED PRIOR TO INSPECTION, IT WILL BE NECESSARY FOR THE CONTRACTOR TO REMOVE PORTIONS FOR INSPECTION AT HIS COST.		
	2.13. CUTTING & PATCHING: PERFORM ALL CUTTING AND PATCHING THAT ARE REQUIRED FOR THE WORK. PROVIDE PROPER UNITS SUPPORTS OVER WALL OPENINGS. PERMISSION MUST BE OBTAINED FROM BASE BUILDING STRUCTURAL ENGINEER BEFORE STRUCTURAL WALLS, FLOORS OR OTHER MEMBERS ARE CUT. FINAL FINISH AND PAINTING BY GENERAL CONTRACTOR.		
	2.14. OPENINGS: ALL OPENING SIZES SHOWN FOR THE ROOFS, WALLS OR FLOORS ON THE DRAWINGS ARE BASED ON THE EQUIPMENT NAMED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL DIMENSIONS. IF THE EQUIPMENT SUPPLIED IS NOT AS NAMED, THEN THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE NECESSARY MODIFICATIONS AT HIS OWN COST.		
	2.15. CORE DRILLING: IN ALL AREAS REQUIRING CORE DRILLING THROUGH EXISTING FLOOR SLAB FOR PLUMBING SERVICES, ETC. ALLOW FOR ALL NECESSARY RADIOSURVEY (X-RAY OR ULTRA-SOUND) TO LOCATE HIDDEN ELECTRICAL SERVICES, STRUCTURAL RE-INFORCING, ETC., AND INCLUDE ALL COSTS IN TENDER PRICE. CO-ORDINATE HIS WORK WITH LANDLORD AND/OR GENERAL CONTRACTOR CO-ORDINATOR FOR TIME, DURATION AND LOCATIONS REQUIRED, AND ADHERE TO THE LANDLORD'S REQUIREMENTS. SUBMIT CORE-DRAWING PLANT TO BASE BUILDING STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF WORK.		
	2.16. VERIFICATION OF EXISTING SERVICES BEFORE CORE DRILLING OR CUTTING: CHECK AND VERIFY LOCATION OF EXISTING MECHANICAL AND ELECTRICAL INTERFERENCES IN CEILING SPACE OF FLOOR BELOW AND/OR FLOOR SLAB IN ALL AREAS REQUIRING DRILLING AND/OR CUTTING OF FLOOR SLAB ON GRADE AND ENSURE COMPATIBILITY OF AREA BELOW TO THE SATISFACTION OF THE LANDLORD.		
	2.17. FLASHING AND COUNTER FLASHING: PROVIDE FLASHING AND COUNTER FLASHING FOR ALL EXTERIOR PENETRATIONS OR WATERPROOFED FLOORS AS PART OF THE CONTRACT.		
4.0 SHOP DRAWINGS & CLOSE OUT DOCUMENTS	2.18. SLEEVES: PROVIDE SLEEVES WHERE PIPING PASSES THROUGH FOUNDATIONS, FLOORS, ROOFS, OR WALLS. SLEEVES SHALL BE OF SCH. 40 BLACK STEEL OR TYPE "K" COPPER THROUGH FOUNDATIONS, FLOORS, OR ROOFS AND OF 20 GAUGE GALVANIZED STEEL THROUGH ABOVE GRADE WALLS. SLEEVES ARE NOT REQUIRED FOR PLUMBING KITS.		
	2.19. HANGERS AND SUPPORTS: ALL EQUIPMENT, PIPING AND DUCTWORK SHALL BE PROPERLY SUPPORTED WITH NECESSARY AND SUITABLE HANGERS, SADDLES, STRUCTURAL SUPPORTS AND/OR BRACKETS. PROVIDE AND INSTALL ALL INSERTS REQUIRED. ALL HANGERS SHALL BE SUPPORTED FROM STRUCTURAL BEARINGS SUCH AS BEAMS, TOP CORNERS OF STEEL JOISTS OR STRUCTURAL CONCRETE SLABS, SIZES AND SPACING AS PER ASHRAE RECOMMENDATIONS. DO NOT SUSPEND HANGERS FROM THE ROOF DECK, WHERE STRUCTURAL BEARINGS DO NOT EXIST, THE CONTRACTOR SHALL PROVIDE ANGLE OR CHANNEL IRON FROM NEAREST STRUCTURAL BEARINGS TO SUPPORT HANGERS. ALL STEEL HANGERS OR SUPPORTS SHALL BE GIVEN ONE COAT OF ZINC CHROMATE PRIMER, EQUAL TO C.S.S.S. SPECIFICATIONS 1, GP, 40 LATEST ISSUE.		
	2.20. ACCESS DOORS: PROVIDE ACCESS DOORS IN CEILINGS OR WALLS WHERE SHOWN ON THE DRAWINGS OR AS REQUIRED FOR ALL CONCEALED MECHANICAL EQUIPMENT AND SERVICES REQUIRING INSPECTION OR SERVICE. ACCESS DOORS SHALL BE EQUAL TO MILEOR OR LEVAGE, FINISH SHALL SUIT ARCHITECT/INTERIOR DESIGNER'S REQUIREMENTS AND COMPLY WITH CEILING/PANEL TYPE AND FINISH.		
	2.21. PIPING INSTALLATION: UNLESS SPECIFIED OTHERWISE, ALL PIPING SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THE AMERICAN STANDARD CODE FOR PRESSURE PIPING AND SECTION B31.1 TO B31.8 AS APPLICABLE SERVICE. ALL PIPING SHALL BE INSTALLED SO AS TO BE FREE FROM STRAINS AND DISTORTIONS DUE TO EXPANSION AND CONTRACTION.		
	2.22. PIPE PRESSURE TESTS: ALL PIPING SHALL BE PRESSURE TESTED AS REQUIRED, IN THE PRESENCE OF THE OWNER/ENGINEER. FURNISH ALL PUMPS, PIPING AND GAUGES ETC. NECESSARY FOR THE TESTS. HYDRAULICALLY TEST STEAM AND HYDRONIC PIPING WITH 1-1/2 TIMES THE SYSTEM PRESSURE, NATURAL GAS SYSTEMS TO CSA B149.1, FUEL OIL TO CSA B139, DRAINAGE AND VENTING TO GAS AND AUTHORITIES HAVING JURISDICTION, DOMESTIC WATER TO 1-1/2 TIMES WORKING PRESSURE, FIRE SYSTEMS IN ACCORDANCE WITH AUTHORITIES HAVING JURISDICTION. MAINTAIN TEST PRESSURE FOR 4 HRS WITHOUT LOSS OF PRESSURE, REPAIR LEAKS IF ANY AND REPEAT TESTS UNTIL SATISFACTION.		
	2.23. ELECTRICAL WORK: ELECTRICAL DISCONNECTS, FUSES AND ALL POWER WIRING NECESSARY FOR THE LINE VOLTAGE POWER SUPPLY TO MECHANICAL EQUIPMENT SHALL BE SUPPLIED, INSTALLED AND CONNECTED TO THE EQUIPMENT OR CONTROL DEVICES BY THE ELECTRICAL CONTRACTOR. UNLESS OTHERWISE NOTED TO BE SUPPLIED BY EQUIPMENT MANUFACTURER AND INTERNALLY MOUNTED FOR NEW EQUIPMENT SHALL BE SUPPLIED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. VERIFY AND COORDINATE VOLTAGE AND PHASE WITH THE ELECTRICAL CONTRACTOR PRIOR TO ORDERING EQUIPMENT.		
	2.24. CONTROL WORK: ALL LOW VOLTAGE ELECTRICAL INTERLOCK WIRING, CONTROL WIRING, SPECIALIZED TEMPERATURE CONTROL CABLES ETC. SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR AND PROPERLY RATED TO FULL LOAD CURRENTS. CONTROL COMPONENTS WHICH ARE PART OF TEMPERATURE AND/OR EQUIPMENT CONTROLS, E.G.: FREEZE/STATS, FRETVALS, FLOW SWITCHES, INTERLOCKS, THERMOSTATS, RELAYS ETC., SHALL BE SUPPLIED AND SET IN PLACE BY THE MECHANICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL PERFORM ALL POWER WIRING ONLY. PROVIDE WHERE REQUIRED FOR A PNEUMATIC SYSTEM, ALL NECESSARY CONTROL AIR PIPING FROM EXISTING CONTROL AIR MAINS TO ROOM THERMOSTATS, CONTROL VALVES, DAMPERS AND OTHER CONTROL DEVICES AS NECESSARY FOR A COMPLETE AND FUNCTIONAL SYSTEM. PNEUMATIC CONTROL PIPING SHALL BE TYPE "L" COPPER TUBING AND/OR AS PER BASE BUILDING SPECIFICATIONS AND STANDARDS. PLASTIC TUBING SHALL NOT BE USED IN CEILING SPACES.		
	2.25. FIRE STOPS: PROVIDE FIRE STOPS AT ALL PIPES, DUCTS, CONDUITS, ETC. PENETRATIONS THROUGH FIRE RATED ASSEMBLIES. ALL FIRE STOPPING MATERIALS SHALL BE OF NON-WIDENING AND ULG LISTED FOR THE REQUIRED SEPARATIONS.		
	2.26. FIRE DAMPERS: PROVIDE FIRE DAMPERS AT ALL DUCT PENETRATIONS THROUGH FIRE RATED WALLS OR FLOORS COMPLETE WITH ACCESS DOORS.		
	2.27. TAGS: UPON COMPLETION OF THE WORK FURNISH AND INSTALL VALVE TAGS, VALVE DIRECTORY AND EQUIPMENT TAGS.		
5.0 PLUMBING	2.28. SHOP DRAWINGS: CONTRACTOR SHALL SUBMIT ELECTRONIC COPIES OF SHOP DRAWINGS OF ALL EQUIPMENT, COMPLETE WITH ALL PERFORMANCE DATA, DIMENSIONS AND WIRING DIAGRAMS, FOR REVIEW BY THE OWNER AND ENGINEER. DO NOT ORDER ANY EQUIPMENT UNTIL IT IS REVIEWED TO OWNER AND ENGINEER'S SATISFACTIONS.		
	2.29. BALANCING REPORTS: SUBMIT AIR BALANCING REPORTS FOR ALL EQUIPMENT AND/OR SYSTEMS INSTALLED FOR THE PROJECT PRIOR TO FINAL ACCEPTANCE. ALL MECHANICAL EQUIPMENT AND SYSTEMS MUST PROVE OPERATING TO DESIGN INTENT.		
	2.30. AS-BUILT DRAWINGS: FURNISH TWO (2) SETS OF "AS-BUILT" DRAWINGS AS PART OF PROJECT CLOSE OUT DOCUMENTS. MAINTAIN AN ACCURATE RECORD OF ALL MECHANICAL WORK AND ALL DEVIATIONS IN PIPING, DUCTWORK AND EQUIPMENT DURING CONSTRUCTION FOR THE PREPARATION OF "AS-BUILT" DRAWINGS. ALL CONCEALED PIPING RUNS, VALVES & DAMPER LOCATIONS, SERVICE LOCATIONS, ETC. MUST BE REFLECTED ON THE AS-BUILT DRAWINGS.		
	2.31. WARRANTY LETTER: INCLUDED IN THE O & M MANUAL, THE WRITTEN GUARANTEE THAT ALL MATERIALS AND WORKMANSHIP PROVIDED ARE IN STRICT ACCORDANCE WITH THE SPECIFICATIONS AND DRAWINGS TO ONE EFFICIENT OPERATION AND ARE FREE FROM MECHANICAL DEFECTS. THE WARRANTY LETTER SHALL CLEARLY STATE THE COMMENCE DATE AND EXPIRY DATE OF THE WARRANTY, AND THE EXTENT AND REMEDIAL ACTION COVERED UNDER THE WARRANTY.		
	2.1. PIPING MATERIALS:		
	SANITARY ABOVE GROUND	PIPE SIZE 2 1/2" & SMALLER	PIPE SIZE 3" & LARGER
	SANITARY BELOW GROUND	CLASS 4000 C.I. PIPE AND FITTINGS TO CAN/CSA-B70, MECHANICAL JOINTS, NEOPRENE OR BUTYL RUBBER COMPRESSION GASKETS WITH STAINLESS STEEL CLAMPS, OR PVC PIPES & FITTINGS TO CAN/CSA B181.2, SOLVENT CEMENT JOINTS TO ASTM D2584.	
	DOMESTIC HOT AND COLD WATER PIPING	TYPE "L" COPPER PIPE WITH WROUGHT COPPER FITTINGS, 95/5 TIN/ANTIMONY SOLDER JOINTS.	
	(NOTE: ALL SOLDER JOINTS MUST BE LEAD FREE AND MEET ALL REGULATORY REQUIREMENTS.)		
	2.2. VALVES:		
	VALVE SIZE 2" & SMALLER	VALVE SIZE 2 1/2" & LARGER	
GATE VALVE	USE BALL VALVE	KITZ 72, U.S. & Y IRON BODY WITH FLANGED ENDS.	
BALL VALVES (INSTEAD OF GATE VALVE)	KITZ F58 NPT OR F59 SOLDER ENDS, FULL PORT SOLID BALL AND TFE SEATS	N/A	
CHECK VALVE	KITZ #12 3/8" SOLDER ENDS, MAG #12A-10V 3/8" INCH, SWING CHECK, SILENT TYPE SILENT TYPE.		
PRESSURE RELIEF	WATTS, OR APPROVED EQUAL, A.S.M.E. RATED WITH TEST VESSELS, DISCHARGE PIPES FROM ALL RELIEF VALVES SHALL BE PIPED TO FLOOR DRAIN.		
3. ISOLATION VALVE: PROVIDE ISOLATION VALVES FOR EACH GROUP OF FIXTURES OR EACH FIXTURE AS PER CODE REQUIREMENTS.			
4. CLEANSOUTS: SUPPLY AND INSTALL CLEANSOUTS WHETHER SHOWN OR NOT, AS REQUIRED BY CODE OR BY AUTHORITIES HAVING JURISDICTION, ON ALL DRAINAGE PIPES.			
5. TRAP PRIMING: EVERY FIXTURE SHALL BE PROVIDED WITH TRAPS IN ACCORDANCE WITH PLUMBING REGULATIONS. EACH TRAP SHALL BE PROVIDED WITH ITS OWN BRASS PLUG AND FERRULE CLEANSOUT. PROVIDE AUTOMATIC TRAP SEAL PRIMER FOR FLOOR AND HUB DRAINS. TRAP SHALL BE CONNECTED TO NEAREST WATER SUPPLY APPROVED BY THE ENGINEER. USE SWS INC. #PR-500 AUTOMATIC TRAP SEAL PRIMER.			
6. WATER HAMMER ARRESTER: INSTALL ANCON SHOCK-GUARD (OR EQUAL) FOR EACH GROUP OF PLUMBING FIXTURES. LOCATION AND SIZE SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION. UNIT SHALL BE ALL STAINLESS STEEL CONSTRUCTION WITH WELDED NESTED BELLOWS.			
7. VENT ALL SANITARY FIXTURES AS REQUIRED BY THE ONTARIO BUILDING CODE.			
8. PROVIDE ONE PRECISE CHROME PLATE ESCUTCHEONS ON ALL PIPING PASSING INTO EXPOSED AREAS.			
9. INSTALL ALL DRAINAGE PIPES IN CONFORMITY WITH ELEVATIONS AND GRADES INDICATED. ALL DRAINAGE PIPES SHALL BE SLOPED AS INDICATED OR AS PER CBC REQUIREMENTS. SLOPE BETWEEN ELEVATIONS SHALL BE EVEN AND CONSISTENT.			
8.0 DUCTWORK			
1. GENERAL REQUIREMENTS:			
1.1. CONSTRUCT DUCTWORK AND FITTINGS AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN, BETWEEN PLENUMS, AIR MOVING EQUIPMENT, TERMINALS, INLETS AND OUTLETS.			
1.2. DUCTWORK AND RELATED COMPONENTS SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE LATEST EDITION OF ASHRAE AND SMACNA STANDARDS, AND THE NFPA'S PAMPHLET NO. 90A.			
1.3. COMMERCIAL KITCHEN DUCTWORK SHALL CONFORM TO THE LATEST EDITION OF NFPA NO. 96.			
1.4. DO NOT FABRICATE DUCTWORK UNTIL IT IS FULLY CO-ORDINATED WITH OTHER TRADES FOR CLEARANCE AND INTERFERENCE.			
1.5. WELDING OF DUCTWORK WHERE REQUIRED SHALL BE PERFORMED BY CERTIFIED WELDERS QUALIFIED FOR WELDING IN ACCORDANCE WITH APPLICABLE PROVINCIAL REQUIREMENTS. SHEET METAL WELDING SHALL ONLY BE PERFORMED BY QUALIFIED WELDERS WITH RECENT EXPERIENCE IN SHEET METAL WELDING.			
2. PRODUCTS:			
2.1. SHEET METAL RECTANGULAR DUCTS: PRIME QUALITY GALVANIZED SHEET STEEL GUARANTEED TO BEND AND FLATTEN WITHOUT FRACTURE OF THE GALVANIZATION, FREE FROM BUSTERS, PITS AND CORRODING IMPERFECTIONS, PITS AND CORRODING IMPERFECTIONS TO SUIT DUCT SIZES AND CLASSES OF DUCT PRESSURE AS PER ASHRAE AND SMACNA RECOMMENDATIONS.			
2.2. PRE-FABRICATED SPIRAL OR FLAT DUAL DUCTS: GALVANIZED STEEL ASTM-A-5271, LOCKSEAM CONSTRUCTION WITH SMOOTH INTERIOR. FITTINGS SHALL BE FACTORY FABRICATED CONTINUOUS WELDED SEAMS WITH SLP JOINT CONNECTIONS. ELBOWS SHALL BE LONG RADIUS 5-SECTION STYLE. FIELD FABRICATED FITTINGS AND ELBOWS ARE NOT ACCEPTABLE.			
3. ACCESSORIES:			
3.1. DUCT HANGERS: GALVANIZED IRON BEND HANGERS ON DUCTS UP TO 36" IN WIDTH, 3/4" DIAMETER RODS AND 1-3/8" CHANNEL IRON SUPPORT ON LARGER DUCTS.			
3.2. DUCT SEALANT: ULG LISTED, OIL RESISTANT POLYMER TYPE ADHESIVE, FIRE RETARDANT WHEN DRY, "O" FLAME SPREAD RATING AND "O" SMOKE GENERATING RATING. ACCEPTABLE MATERIALS: DURO DYNE S-2.			
3.3. DUCT TAPES: POLYIMIDE TREATED, OPEN WEAVE FIBERGLASS TAPE, 2" IN WIDTH AND WATER BASE DUCT SEALER. ACCEPTABLE MATERIALS: DURO DYNE TT-2, METALLIC DUCT TAPE IS NOT ACCEPTABLE.			
3.4. FLEXIBLE CONNECTORS: 4" WIDE UL/ULC LISTED FIRE RETARDANT, WATERPROOF FABRIC COMPLETE WITH GALVANIZED STEEL RAIL AS MANUFACTURED BY DURO DYNE OF CANADA LIMITED. FLEXIBLE CONNECTORS SHALL BE AIR TIGHT FOR PRESSURE FROM -10 TO 15" WC.			
3.5. FLEXIBLE DUCT: ALUMINUM SPUN, ROUND TUBE CORRUGATED FOR STRENGTH, WITH A TRIPLE MECHANICAL LOCK AS MANUFACTURED BY FLEXMASTER CANADA LTD., MODEL 7/4 FOR BARE DUCT AND MODEL 7/4-MT FOR INSULATED DUCT. ULG LISTED AS CLASS "1" OR "O" DUCT MATERIAL. FLEXIBLE DUCT SHALL BE FULLY EXTENDED TO REDUCE AIRFLOW RESISTANCE.			
3.6. TURNING VANES: DOUBLE WALL TYPE ON VANE RAILS.			
3.7. SPLITTER DAMPERS: ONE GAUGE HEAVIER THAN SURROUNDING DUCT, REINFORCED, IF NECESSARY, FOR RIGIDITY AND FITTED WITH LOCKING TYPE QUADRANT OPERATOR.			
3.8. VOLUME CONTROL OR BALANCING DAMPERS: FOR DUCTS 14" OR LESS IN HEIGHT, SINGLE BLADE GALVANIZED STEEL MANUAL DAMPER AS MANUFACTURED BY VALOR INDUSTRIES INC. FOR DUCTS GREATER THAN 14" IN HEIGHT, OPPOSED BLADE GALVANIZED STEEL LOW LEAKAGE DAMPER WITH MANUAL LOCKING TYPE QUADRANT.			
3.9. FIRE DAMPERS: ALL FIRE DAMPERS SHALL BE OUT OF AIR STREAM, STYLE "B" OR "C" GALVANIZED STEEL CURTAIN TYPE DAMPERS COMPLETE WITH A REPLACEABLE FIBREGLASS METAL LINK, UL & ULG LISTED. USE DYNAMIC FIRE DAMPERS UNLESS OTHERWISE NOTED ON THE DRAWINGS.			
3.10. DUCT ACCESS PANELS: LOW LEAKAGE DIE FORMED PANELS WITH GASKOLOC CLOSURE AND POSITIVE SEALING GASKETING AS MANUFACTURED BY VALOR INDUSTRIES INC. ON INSULATED DUCTS ACCESS PANELS TO BE INSULATED WITH 1" FIBERGLASS AND BACKING PLATE, AND EXTERNALLY MOUNTED TO CLEAR THE INSULATION.			
4. EXECUTION			
4.1. GENERAL:			
4.1.1. FABRICATE DUCTWORK AS PER ASHRAE AND SMACNA GUIDELINES. ALL DUCTWORK SHALL BE SELF SUPPORTING.			
4.1.2. SEAL ALL TRANSVERSE JOINTS AND CONNECTIONS WITH AN OIL-RESISTANT POLYMER TYPE DUCT SEALING COMPOUND WITH A POLY-IMIDE COATED OPEN WEAVE FIBERGLASS TAPE TO AIR TIGHT. LONGITUDINAL JOINTS SHALL BE UNSEALED. RED DUCT TAPE IN SEALER AND RECORD WITH MINIMUM ONE COAT OF SEALER TO MANUFACTURER'S RECOMMENDATIONS. SEAL CLASSIFICATION: CLASS C FOR PRESSURE UP TO 500 Pa, CLASS A FOR PRESSURE HIGHER THAN 500 Pa.			
4.1.3. CHANGES IN DUCT SIZES SHALL BE GRADUAL, AT A RATE OF 1" FOR 4" OF DUCT LENGTH. WHERE LARGEST DIMENSION OF DUCT IS OVER 18", STIFFEN DUCT BY CROSS BRACING BETWEEN STANDING SEAMS OR REINFORCING ANGLES.			
4.1.4. WHERE INSULATION IS APPLIED INTERNALLY TO THE DUCTWORK, SEAL ALL JOINTS TO FORM A CONTINUOUS VAPOUR BARRIER WITH THE SHEET METAL. ALL DUCT SIZES SHOWN ON THE DRAWINGS ARE CLEAR INTERNAL SIZES; INCREASE DUCT SIZE TO ALLOW FOR INSULATION THICKNESS.			
4.1.5. SINGLE THICKNESS PARTITIONS BETWEEN DUCTS ARE NOT ACCEPTABLE.			
4.1.6. STEEL ANGLES ON ALL APPARATUS AND PLENUM HANGERS SHALL BE INSTALLED ON NOT MORE THAN 4'-0" (1200MM) CENTRES AND AT ALL VERTICAL AND LONGITUDINAL SEAMS OF THE PLENUM CONSTRUCTION.			
4.1.7. DO NOT BREAK CONTINUITY OF INSULATION VAPOUR BARRIER WITH HANGERS OR RODS. INSULATE STRAP HANGERS 4' (1000MM) BEYOND INSULATED DUCT.			
4.1.8. SUPPORT RISERS IN ACCORDANCE WITH ASHRAE AND SMACNA.			
4.1.9. INSTALL BREAK AWAY JOINTS IN DUCTWORK ON EACH SIDE OF FIRE DAMPER/FIRE SEPARATION.			
4.1.10. MAKE CONNECTIONS FROM DUCTWORK TO GRILLES, DIFFUSERS, ETC. WITH FLEXIBLE DUCT, EXCEPT WHERE DIFFUSER COLLAR AND CONNECTING DUCT ARE SIGHT-EXPOSED.			
4.1.11. SECURE FLEXIBLE DUCT TO COLLARS WITH METAL BRIDGE GEAR CLAMPS. PROVIDE RIGID ROUND DUCT AS REQUIRED TO LIMIT THE LENGTH OF FLEXIBLE DUCT TO 10'-0" FOR ANY CONNECTION.			
4.1.12. WHERE SPACE REQUIREMENTS PROHIBIT FULL RADIUS TURNS, INSTALL TURNING VANES ON 2' CENTRES IN MITRED ELBOWS.			
4.1.13. INSTALL SPLITTER BALANCING DAMPERS AT ALL BRANCH DUCT JUNCTIONS, WHETHER SHOWN ON DRAWINGS OR NOT. REINFORCE SURROUNDING DUCTWORK TO PREVENT SAGGING OR DRAMPING.			
4.1.14. MAKE DUCT CONNECTIONS TO ALL AIR MOVING EQUIPMENT WITH FLEXIBLE CONNECTIONS. PROVIDE SUITABLE COLLARS AND SECURE SAME TO ACHIEVE LEAK PROOF CONNECTIONS. ENSURE THAT THE FLEXIBLE CONNECTION IS SUFFICIENTLY SLACK TO PERMIT NORMAL MOVEMENT OF EQUIPMENT WITHOUT TRANSMITTING VIBRATION TO THE DUCTWORK.			
4.1.15. INSTALL ACCESS PANELS IN DUCTWORK WHERE REQUIRED FOR INSPECTING AND MAINTAINING FIRE DAMPERS, COILS AND CONTROL DEVICES ETC. COORDINATE PANEL LOCATIONS WITH SURROUNDING ENVIRONMENT TO ENSURE SUFFICIENT CLEARANCE FOR ACCESS.			
4.2. DUCT HANGERS:			
4.2.1. SUPPORT DUCT HANGERS FROM STRUCTURAL MEMBERS. SEE SECTION 2.0 GENERAL REQUIREMENTS ABOVE FOR DETAILS.			
4.2.2. FOR DUCTS UP TO 18" (450MM) IN WIDTH, HANGERS SHALL BE PLACED AT NOT MORE THAN 8'-0" (2438MM) CENTRES.			
4.2.3. FOR DUCTS MORE THAN 18" (450MM) IN WIDTH SHALL BE SUPPORTED AT NOT MORE THAN 4'-0" (1200MM) CENTRES.			
4.2.4. IF STEEL BAND TYPE HANGERS ARE USED, ATTACH HANGERS TO DUCTWORK WITH NOT LESS THAN THREE NAILS OR SCREWS. PERFORATED BAND IRON WILL NOT BE PERMITTED.			
7.0 INSULATION			
1. PIPING:			
(a) INSULATE PIPES WHERE APPLICABLE AS LISTED BELOW AND AS INDICATED ON THE DRAWINGS, WITH PREFORMED FIBERGLASS PIPE INSULATION AS SPECIFIED:			
PIPE TYPE	PIPE SIZE	INSULATION THICKNESS	
DOMESTIC COLD WATER MAINS & CHILLED WATER PIPES	1-1/4" (30mm) & BELOW 1-1/2" (40mm) & UP	1/2" (13mm) 1" (25mm)	
DOMESTIC HOT WATERS, RECIRCULATION WATER LINES AND HEATING WATER PIPES FOR TEMPERATURE UP TO 200°F	1-1/4" (30mm) & BELOW 1-1/2" (40mm) & UP	1-1/2" (40mm) 2" (50mm)	
DOMESTIC COLD, HOT AND REGR. RUNOUTS TO INDIVIDUAL FIXTURES NOT EXCEEDING 12'-0" (3.7m) AND TRAP PIPING WATER LINES	UP TO 2" (50mm)	1/2" (13mm)	
HORIZONTAL CAST IRON OR COPPER SANITARY AND STORM DRAINAGE PIPING ABOVE GROUND	ALL SIZES	1/2" (13mm)	
CONDENSATE DRAIN PIPES.	ALL SIZES	1/2" (13mm)	
2. DUCTWORK:			
(a) INSULATE ALL DUCTS WHERE APPLICABLE AS LISTED BELOW AND AS INDICATED ON THE DRAWINGS WITH FIBERGLASS INSULATION AS SPECIFIED:			
DUCT TYPE	INSULATION TYPE	INSULATION THICKNESS	
SUPPLY, RETURN AND EXHAUST AIR DUCTS, INDIRECTLY CONDITIONED SPACE INCLUDING RETURN AIR PLENUM.	NOT REQUIRED	N/A	
SUPPLY AIR DUCTS, WHERE INDICATED ON THE DRAWINGS OR IN UNCONDITIONED SPACE.	FLEXIBLE	1" (25mm) TO R-15	
RETURN AIR DUCTS IN UNCONDITIONED SPACE EXCEPT IN ATTIC.	NOT REQUIRED	N/A	
EXHAUST AIR DUCTS WITH #7 OF PENETRATIONS THROUGH EXTERIOR WALLS OR ROOFS.	FLEXIBLE	1" (25mm) TO R-15	
SUPPLY, RETURN AND EXHAUST AIR DUCTS IN ATTIC SPACE.	FLEXIBLE	2" (50mm) TO R-6	
OUTDOOR AIR DUCTS AND INTAKE AIR PLENUMS.	FLEXIBLE	2" (50mm)	
ALL EXTERIOR DUCTS	RIGID	2" (50mm) TO R-8	
(b) INTERNALLY LINE ALL DUCTWORK WITH 1" (25MM) ACOUSTIC LINER WHEN SHOWN ON THE DRAWINGS.			
3. REFRIGERANT PIPES:			
3.1. INSULATE ALL REFRIGERANT PIPES WITH 3/4" (19MM) ARMAFLEX PIPING INSULATION OR AS PER SYSTEM MANUFACTURER'S RECOMMENDATIONS.			
4. PIPING INSULATION MATERIALS:			
4.1. PREFORMED PIPE INSULATION: FIBERGLASS PIPE INSULATION WITH A THERMOSETTING RESIN COMPLETE WITH FACTORY APPLIED FOL/ARMAFLEX LAMINATE REINFORCED VAPOUR BARRIER. MAXIMUM CONDUCTIVITY AT 0.25 BTU-IN/(HR FT ² °F). INSULATION SHALL BE SUITABLE FOR 0-BEAST TEMPERATURE APPLICATIONS. MICRO-LOK PREFORMED FIBERGLASS PIPING INSULATION AS MANUFACTURED BY JOHNS MANVILLE OR ACCEPTED EQUAL FROM FIBERGLAS CANADA INC.			
5. DUCT INSULATION MATERIALS:			
5.1. ACOUSTIC DUCT LINER: (0.25 BTU/(HR FT ² °F)) FIBERGLASS FORMED INTO A RIGID BOARD WITH A FACTORY APPLIED COAT OF BLACK NEOPRENE LATEX ON THE AIR SIDE, MANUFACTURED BY JOHNS MANVILLE. MAXIMUM CONDUCTIVITY AT 0.25 BTU-IN/(HR FT ² °F).			
5.2. FLEXIBLE DUCT INSULATION: 3.0 LB./CU.FT. (48 KG/M ³) FIBERGLASS FORMED INTO A FLEXIBLE BLANKET WITH A FACTORY APPLIED FACED WITH REINFORCED FOL AND FLAME RESISTANT KRAFT VAPOUR BARRIER, MANUFACTURED BY FIBERGLAS CANADA INC.			
6. EXECUTION:			
6.1. GENERAL:			
6.1.1. INSULATION SHALL BE SUPPLIED AND INSTALLED IN A WORKMANLIKE MANNER BY SKILLED TRADESMEN REGULARLY ENGAGED IN THIS WORK, AND IN CONFORMANCE TO NFPA 90A.			
6.1.2. ALL SPACE FINISHES SHALL BE EXTENDED IN SUCH A MANNER AS TO PROTECT ALL RAW EDGES, ENDS, AND SURFACES OF INSULATION.			
6.1.3. ALL PIPE OR DUCT INSULATION SHALL BE CONTINUOUS THROUGH WALLS, CEILINGS OR FLOOR OPENINGS OR SLEEVES, EXCEPT WHERE FIRE STOP MATERIALS ARE REQUIRED.			
6.1.4. ON COLD SURFACES, INSULATION SHALL BE CONTINUOUS, UNBROKEN VAPOUR SEAL. ALL HANGERS, SUPPORTS, ANCHORS OR OTHER PROJECTIONS THAT ARE SECURED TO COLD SURFACES SHALL BE INSULATED AND VAPOUR SEALED TO PREVENT CONDENSATION.			
6.1.5. THE AMBIENT SPACE TEMPERATURE SHALL NOT BE LESS THAN 50°F DURING APPLICATION OF ANY INSULATION OR FINISHING.			
6.1.6. DO NOT APPLY INSULATION UNTIL THE ITEM TO BE COVERED HAS BEEN TESTED AND PASSED AS REQUIRED.			
6.1.7. DO COVER EQUIPMENT IMMEDIATELY WITH INSULATION OR JACKING MATERIAL.			
6.1.8. GALVANIZED METAL SHELLS SHALL BE INSTALLED BETWEEN HANGERS OR SUPPORTS AND THE PIPING INSULATION. RIGID INSULATION INSERTS SHALL BE INSTALLED AS REQUIRED.			
8.2. DUCTWORK INSULATION:			
8.2.1. RIGID INSULATION: APPLY RIGID DUCT INSULATION WITH ALL JOINTS TIGHTLY BUTTED. FASTEN INSULATION TO DUCTWORK WITH ADHESIVE AND MECHANICAL FASTENERS. SPACE FASTENERS A 12" (300MM) TO 18" (450MM) CENTER, WITH A MINIMUM OF 2 ROWS PER SIDE OF DUCT. SECURE INSULATION WITH SPEED WISHERS. ALL JOINTS, BREAKS AND PUNCTURES SHALL BE COMPLETELY SEALED USING VAPOUR BARRIER MASTIC AND 3" (75MM) WIDE STRIPS OF GLASS FIBRE MESH.			
8.2.2. FLEXIBLE INSULATION: APPLY FLEXIBLE DUCT INSULATION WITH ALL JOINTS TIGHTLY BUTTED WITH A MAXIMUM ALLOWABLE COMPRESSION OF 25%. OVERLAP ALL SEAMS OF INSULATION. ALL JOINTS, BREAKS AND PUNCTURES SHALL BE COMPLETELY SEALED USING FACTORY SUPPLIED VAPOUR BARRIER MASTIC AND 3" (75MM) WIDE STRIPS OF FIBERGLASS MESH.			
8.2.3. ACOUSTIC LINING: APPLY ACOUSTIC DUCT LINER WITH JOINTS BUTTED TOGETHER. FASTEN LINER TO INTERIOR SURFACE OF DUCTWORK WITH ADHESIVE AND MECHANICAL FASTENERS. ALL ACOUSTIC LINER ON AIR STREAM SIDE MUST BE COMPLETE WITH MAT FACING. APPLY ADHESIVE WITH MINIMUM COB COVERAGE OF DUCT SURFACE. SPACE FASTENERS A 12" (300MM) TO 18" (450MM) CENTER, WITH A MINIMUM OF 2 ROWS PER SIDE AND WITHIN 3" (75MM) OF LEADING EDGES. SECURE INSULATION WITH SPEED WISHERS. COAT ALL EXPOSED LEADING EDGES AND TRANSVERSE JOINTS WITH FACTORY RECOMMENDED ADHESIVE.			
8.2.4. FINISHES:			
• CONCEALED DUCTS: ABOVE INSULATION IS SUFFICIENT, NO JACKET OR COVERING IS REQUIRED.			
• EXPOSED DUCTWORK: RECOVER INSULATED DUCTS WITH 6 OZ CANVAS APPLIED WITH 2 COATS OF WHITE FIRE RETARDANT LAGGING ADHESIVE.			
• EXTERIOR DUCTWORK: RECOVER INSULATED DUCTS WITH 1/16" (1.5MM) THICK LAYER OF FIRE RETARDANT BLACK VAPOUR BARRIER MASTIC. EMBED A LAYER OF WOVEN GLASS FABRIC INTO NET COATING, LAPPING EDGES AND ENDS AT LEAST 3" (75MM). APPLY TOP COATING OVER ENTIRE SURFACE OF FABRIC.			
8.3. PIPING INSULATION:			
8.0.1. APPLY PREFORMED INSULATION ON PIPING WITH ALL JOINTS TIGHTLY BUTTED. SEAL ALL JOINTS WITH ASJ JACKET LAPS AND 3" (75MM) WIDE BUTT JOINT STOPS WITH FIRE RETARDANT LAGGING ADHESIVE. LEANS METAL STRAPES TO SECURE LAPS AND JOINTS ARE NOT ACCEPTABLE.			
8.0.2. FITTINGS: INSULATE VALVES AND FITTINGS WITH MITRED SECTIONS OF PREFORMED INSULATION OR PREFORMED FITTINGS WROED IN PLACE, TO THE SAME THICKNESS OF ADJACENT INSULATION. APPLY SAW COAT OF INSULATING CEMENT TO PROVIDE A SMOOTH SURFACE. FINISH WITH WOVEN GLASS FABRIC EMBEDDED IN MASTIC, OR PVC JACKET.			
8.0.3. REFRIGERANT PIPES: INSULATE REFRIGERANT PIPES WITH ARMAFLEX OR EQUAL CLOSED CELL FLOW PIPE INSULATION. SEAL ALL LONGITUDINAL JOINTS AND BUTT ENDS WITH FACTORY RECOMMENDED PIPES AND ADHESIVE.			
8.0.4. FINISHES:			
• CONCEALED PIPING: ABOVE INSULATION IS SUFFICIENT, NO JACKET OR COVERING IS REQUIRED.			
• EXPOSED PIPING: RECOVER INSULATED PIPES WITH PVC JACKETING EXCEPT FOR REFRIGERANT PIPES. OVERLAP ALL JOINTS MINIMUM 2" (50MM) ON THE DOWNSIDE TO SHED WATER.			
• EXTERIOR PIPING: RECOVER INSULATED PIPES WITH 1/16" (1.5MM) THICK LAYER OF FIRE RETARDANT BLACK VAPOUR BARRIER MASTIC; EMBED A LAYER OF WOVEN GLASS FABRIC INTO NET COATING, LAPPING EDGES AND ENDS AT LEAST 3" (75MM). APPLY TOP COATING OVER ENTIRE SURFACE OF FABRIC. ALTERNATIVE: PVC JACKETING SAME AS EXPOSED PIPING INSULATION.			
8.0 TESTING, ADJUSTING & BALANCING			
1. PERFORM AIR BALANCING AND TESTING FOR ALL AIR HANDLING EQUIPMENT, GRILLES AND DIFFUSERS.			
2. BALANCING AND TESTING OF THE SYSTEM MUST NOT BEGIN UNTIL THE SYSTEM IS COMPLETE, INSPECTED AND ACCEPTED, AND IS IN FULL WORKING ORDER. SYSTEM MUST BE KEPT IN OPERATION DURING EACH BALANCING AND TESTING WORKING DAY.			
3. ALL BALANCING AND TESTING WORKS MUST BE PERFORMED BY AN INDEPENDENT AGENCY, QUALIFIED TECHNICIANS USING ACCURATE TESTING EQUIPMENT APPROVED BY THE ENGINEER, AND COMPLETE RECORDS OF BALANCING AND TESTING MUST BE KEPT AS SPECIFIED HEREINFTER.			
4. SUBMIT BALANCING REPORT TO ENGINEER FOR REVIEW.			
DRAWING LIST			
M1	MECHANICAL SPECIFICATION		
M2	HVAC LAYOUT – DEMOLITION AND NEW		
M3	PLUMBING LAYOUT – DEMOLITION AND NEW		
M4	SCHEDULES		



1
M-2 HVAC - DEMOLITION LAYOUT
SCALE: 1/8" = 1'-0"

DRAWING NOTES:

- 1 REMOVE AND DISPOSE ALL THE EXISTING SQUARE SUPPLY AIR GRILLE, INCLUDING ALL FLEXIBLE DUCT CONNECTION ON THE ATTIC. (TYP.).
- 2 REMOVE AND DISPOSE EXISTING VERTICAL UNITARY AC UNIT, INCLUDING THE SUPPORT, THERMOSTAT, REFRIGERANT PIPING AND CONDENSATE DRAIN. DISCONNECT EXISTING DUCT CONNECTION.
- 3 REMOVE AND DISPOSE EXISTING TRANSFER GRILLE, (TYP. FOR 2).
- 4 REMOVE AND DISPOSE EXISTING WINDOW TYPE AIR CONDITIONING UNIT. (TYP. FOR 4).
- 5 REMOVE AND DISPOSE EXISTING EXHAUST FAN INCLUDING ALL ASSOCIATED ACCESSORIES.
- 6 REMOVE AND DISPOSE EXISTING OUTDOOR CONDENSING UNIT, INCLUDING ALL ASSOCIATED REFRIGERANT PIPING AND SUPPORTS. CONTRACTOR TO VERIFY ON SITE FOR EXACT LOCATION.
- 7 REMOVE AND DISPOSE EXISTING ROOM THERMOSTAT, INCLUDING ASSOCIATED WIRING.
- 8 EXISTING GAS UNIT HEATER TO REMAIN, (TYP.).
- 9 EXISTING SUPPLY AIR DUCT ON THE ATTIC TO REMAIN. CONTRACTOR TO VERIFY THE EXACT LOCATION ON SITE.
- 10 EXISTING GAS UNIT HEATER TO REMAIN, (TYP. FOR 4).
- 11 REMOVE EXISTING CONDENSING UNIT AND ASSOCIATED REFRIGERANT PIPING. CONTRACTOR TO VERIFY THE EXACT LOCATION ON SITE.
- 12 REMOVE AND DISPOSE ALL THE EXISTING ROUND SUPPLY DIFFUSER, INCLUDING ALL ASSOCIATED DUCTWORK ON THE ATTIC AND PATCH AND PATCH OR CLOSE ALL THE CEILING OPENING TO MATCH THE EXISTING. CONTRACTOR TO VERIFY EXACT LOCATION ON SITE.



2
M-2 HVAC - NEW LAYOUT
SCALE: 1/8" = 1'-0"

DRAWING NOTES:

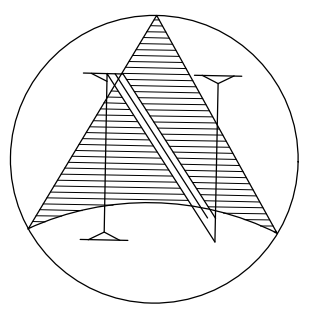
- 1 PROVIDE AND INSTALL NEW 24"x24" SUPPLY DIFFUSER E.H. PRICE MODEL SCD (T-BAR MOUNTED), C/W FLEXIBLE DUCT CONNECTION TO CONNECT TO EXISTING DUCTWORK ON THE ATTIC. CONTRACTOR TO VERIFY ON SITE FOR EXACT EXISTING DUCTWORK LOCATION. BALANCE AIR FLOW AS SHOWN IN THE DRAWING.
- 2 PROVIDE AND INSTALL NEW 12"x12" SUPPLY DIFFUSER E.H. PRICE MODEL SCD (SURFACE MOUNTED), C/W NEW FLEXIBLE DUCT CONNECTION TO CONNECT TO EXISTING DUCT WORK ON THE ATTIC. CONTRACTOR TO VERIFY ON SITE FOR EXACT EXISTING DUCTWORK LOCATION. BALANCE AIR FLOW AS SHOWN IN THE DRAWING.
- 3 PROVIDE AND INSTALL NEW INDOOR UNIT 'AC-1', C/W 10 KW ELECTRIC HEATER, FLOOR MOUNTED STEEL PLATFORM, NEW REFRIGERANT AND 1" CONDENSATION PIPES AND CONTROLS. CONNECT THE UNIT TO THE EXISTING DUCTWORK. CONTRACTOR TO VERIFY ON SITE IF THE EXISTING ELECTRICAL WIRING IS SUITABLE FOR THE NEW AC UNIT AND ELECTRIC HEATER INSTALLATION OR VERIFY WITH THE PROFESSIONAL ELECTRICAL ENGINEER.
- 4 PROVIDE AND INSTALL OUTDOOR CONDENSING UNIT 'CU-1', C/W REFRIGERANT PIPING, MIN. 24" ADJUSTABLE ALUMINUM STAND. CONTRACTOR TO VERIFY ON SITE FOR EXACT LOCATION.
- 5 PROVIDE AND INSTALL NEW EXHAUST FAN 'EF-1, EF-2, EF-3', C/W ON AND OFF SWITCH AND BACK DRAFT DAMPER.
- 6 PROVIDE AND INSTALL NEW 12"x12" TRANSFER AIR DUCT, C/W 1" ACOUSTIC LINER AND 12"x12" GRILLE E.H. PRICE MODEL EGG CRATE SERIES 80 ON BOTH ENDS OF THE TRANSFER DUCT.
- 7 PROVIDE AND INSTALL NEW 12"x12" RETURN AIR GRILLE E.H. PRICE MODEL SERIES 610 (BOTH SIDES OF THE WALL) ON THE EXISTING WALL OPENING, (TYP. FOR 2).
- 8 EXISTING GAS UNIT HEATER, (TYP.).
- 9 PROVIDE AND INSTALL NEW ROOM THERMOSTAT, C/W ALL CONTROL WIRING.
- 10 PROVIDE AND INSTALL NEW WINDOW TYPE AC UNIT 'AC-2', 'AC-3'.
- 11 PROVIDE AND INSTALL NEW 24"x12" TRANSFER AIR DUCT, C/W 1" ACOUSTIC LINER AND 24"x12" GRILLE E.H. PRICE MODEL EGG CRATE SERIES 80 ON BOTH ENDS OF THE TRANSFER DUCT.

1.	ISSUED FOR CLIENT REVIEW	DEC. 24, 2021
No.	Description	Date
ISSUES/REVISIONS		



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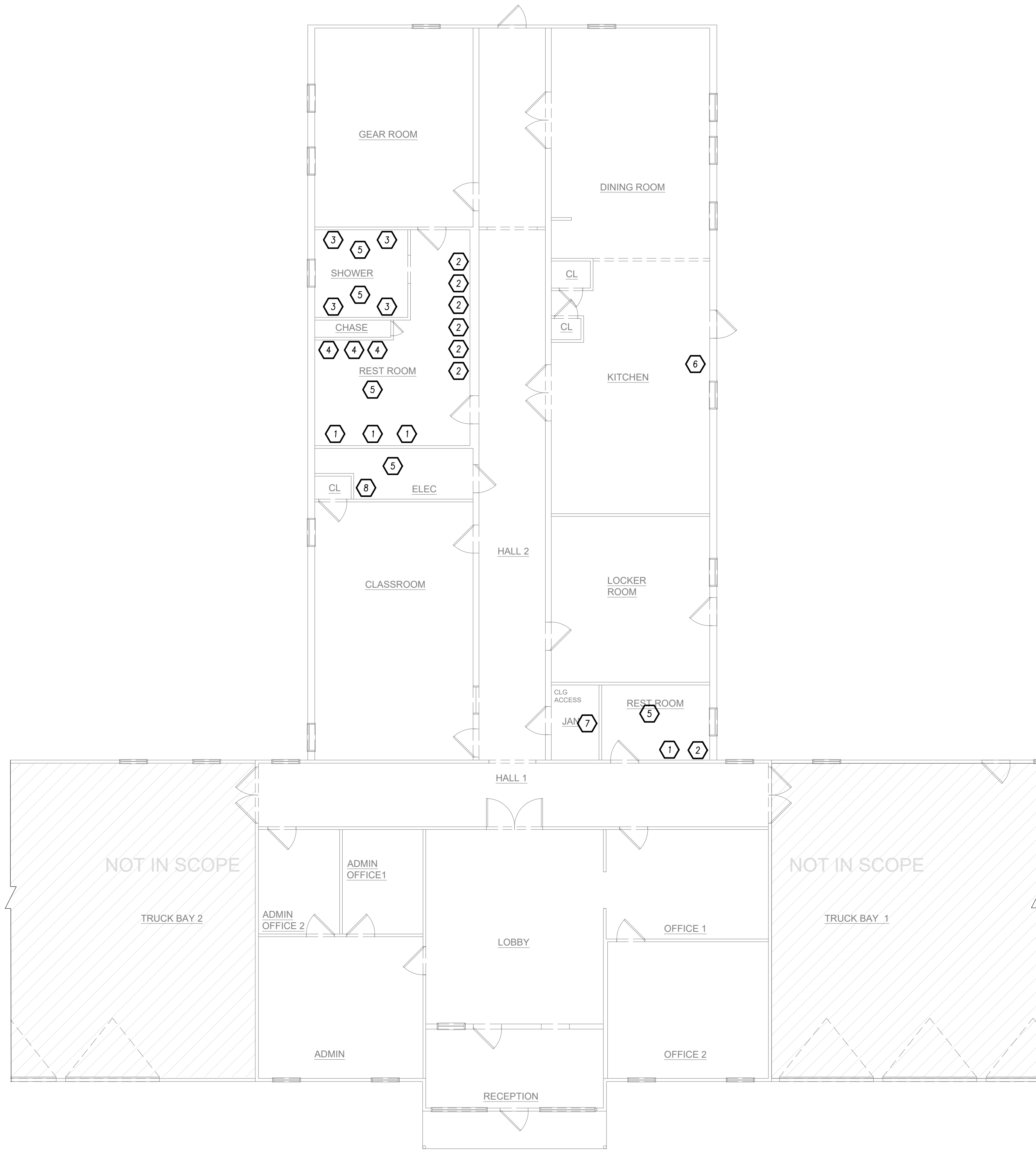
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Project
MCGREGOR FIRE STATION
302 S MADISON STREET
MCGREGOR, TEXAS

Drawing Title
HVAC LAYOUT - DEMOLITION AND NEW

Date DEC. 2021	Scale AS NOTED	Proj. No. ME21640.DES.RM	Dwg. No. M-2 of 4
Drawn Z.L.	Designed P.P.	Checked W.C.	



1
M-3 PLUMBING - DEMOLITION LAYOUT
SCALE: 1/8" = 1'-0"

DRAWING NOTES:

- 1 REMOVE AND DISPOSE EXISTING WATER CLOSET. CUT EXISTING EXPOSED DOMESTIC WATER, SANITARY DRAIN AND VENT PIPES CONNECTION.
- 2 REMOVE AND DISPOSE EXISTING LAVATORY AND FAUCET. CUT EXISTING EXPOSED DOMESTIC WATER, SANITARY DRAIN AND VENT PIPES CONNECTION.
- 3 REMOVE AND DISPOSE EXISTING SHOWER HEAD AND FAUCET. CUT EXISTING EXPOSED DOMESTIC WATER, CONNECTION.
- 4 REMOVE AND DISPOSE EXISTING URINAL. CUT EXISTING EXPOSED DOMESTIC WATER, SANITARY DRAIN AND VENT PIPES CONNECTION.
- 5 REMOVE EXISTING FLOOR DRAIN COVER.
- 6 REMOVE AND DISPOSE EXISTING KITCHEN SINK AND FAUCET. CUT EXISTING EXPOSED DOMESTIC WATER, SANITARY DRAIN AND VENT PIPES CONNECTION.
- 7 REMOVE AND DISPOSE EXISTING MOP SINK AND FAUCET. CUT EXISTING EXPOSED DOMESTIC WATER, SANITARY DRAIN AND VENT PIPES CONNECTION.
- 8 REMOVE AND DISPOSE EXISTING HOT WATER TANK. DISCONNECT EXPOSED DOMESTIC COLD WATER AND DOMESTIC HOT WATER PIPING CONNECTIONS.



2
M-3 PLUMBING - NEW LAYOUT
SCALE: 1/8" = 1'-0"

DRAWING NOTES:

- 1 PROVIDE AND INSTALL NEW WATER CLOSET 'WC' TO MATCH EXISTING, C/W DOMESTIC COLD WATER, SANITARY DRAIN AND VENT PIPE CONNECTION TO TIE-IN WITH THE EXISTING ROUGH-IN. REFER TO FIXTURE CONNECTION SCHEDULE FOR PIPE SIZES.
- 2 PROVIDE AND INSTALL NEW LAVATORY 'LV' AND FAUCET TO MATCH EXISTING, C/W DOMESTIC COLD WATER, DOMESTIC HOT WATER, SANITARY DRAIN AND VENT PIPE CONNECTION TO TIE-IN WITH THE EXISTING ROUGH-IN. REFER TO FIXTURE CONNECTION SCHEDULE FOR PIPE SIZES.
- 3 PROVIDE AND INSTALL NEW SHOWER HEAD 'SH' AND FAUCET TO MATCH EXISTING, C/W DOMESTIC COLD WATER, DOMESTIC HOT WATER CONNECTION TO TIE-IN WITH THE EXISTING ROUGH-IN. REFER TO FIXTURE CONNECTION SCHEDULE FOR PIPE SIZES.
- 4 PROVIDE AND INSTALL NEW URINAL 'UR'. C/W DOMESTIC COLD WATER, SANITARY DRAIN AND VENT PIPE CONNECTION TO TIE-IN WITH THE EXISTING ROUGH-IN. REFER TO FIXTURE CONNECTION SCHEDULE FOR PIPE SIZES.
- 5 PROVIDE AND INSTALL NEW FLOOR DRAIN COVER.
- 6 PROVIDE AND INSTALL NEW KITCHEN SINK 'KS' AND FAUCET TO MATCH EXISTING, C/W DOMESTIC COLD WATER, DOMESTIC HOT WATER, SANITARY DRAIN AND VENT PIPE CONNECTION TO TIE-IN WITH THE EXISTING ROUGH-IN. REFER TO FIXTURE CONNECTION SCHEDULE FOR PIPE SIZES.
- 7 PROVIDE AND INSTALL NEW MOP SINK 'MS' AND FAUCET TO MATCH EXISTING, C/W DOMESTIC COLD WATER, DOMESTIC HOT WATER, SANITARY DRAIN AND VENT PIPE CONNECTION TO TIE-IN WITH THE EXISTING ROUGH-IN. REFER TO FIXTURE CONNECTION SCHEDULE FOR PIPE SIZES.
- 8 PROVIDE AND INSTALL NEW GASFIRED HOT WATER TANK 'HWT-1', C/W DOMESTIC COLD WATER, DOMESTIC HOT WATER AND GAS PIPING CONNECTION. NEW PIPING TO CONNECT TO EXISTING ROUGH-IN. PROVIDE AND INSTALL WITH VENTING KIT AS MANUFACTURER'S RECOMMENDATION.

NOTE: PROVIDE ISOLATION VALVE FOR ALL PLUMBING FIXTURE DOMESTIC WATER PIPING CONNECTION.

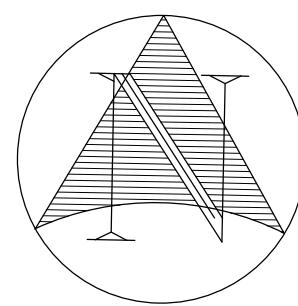
1.	ISSUED FOR CLIENT REVIEW	DEC. 24, 2021
No.	Description	Date

ISSUES/REVISIONS



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Project
MCGREGOR FIRE STATION
302 S MADISON STREET
MCGREGOR, TEXAS

Drawing Title
PLUMBING LAYOUT - DEMOLITION AND NEW

MECHANICAL			
Date DEC. 2021	Scale AS NOTED	Proj. No. ME21640.DES.RM	Dwg. No. M-3 of 4
Drawn Z.L.	Designed P.P.	Checked W.C.	

AIR CONDITIONING UNIT SCHEDULE														
TAG	DESCRIPTION	MAKE	MODEL	QUANTITY	AIRFLOW	E.S.P.	SENSIBLE	TOTAL COOLING	ELECTRIC HEATING CAPACITY	REFRIGERANT TYPE	ELECTRICAL		WEIGHT	REMARKS
					CFM	IN.W.C.	MBH	MBH	KW		V/PH/Hz	M.C.A. (AMPS)	LBS	
AC-1	INDOOR UNIT	FRASER-JOHNSTON OR APPROVED EQUAL	AVC60CX22	1	1860	0.75	41.5	56.9	10	R-410A	230/1/60	56.57	146	
CU-1	OUTDOOR CONDENSING UNIT	FRASER-JOHNSTON OR APPROVED EQUAL	TC660B31S	1	—	—	41.5	56.9	—		230/3/60	22.6	235	24" ALUMINUM ADJUSTABLE STAND
AC-2	WINDOW AC UNIT	GE OR APPROVED EQUAL	AGQ12DWH	2	260/240/220	—	—	12	—	R-410A	230/1/60	5.7	92	C/W REMOTE CONTROLLER
AC-3	WINDOW AC UNIT	GE OR APPROVED EQUAL	AKC014DC	2	295/275/252	—	—	14	—	R-410A	230/1/60	7.5	92	C/W REMOTE CONTROLLER

EXHAUST FAN SCHEDULE											
TAG	DESCRIPTION	MAKE	MODEL	AIRFLOW	E.S.P.	ELECTRICAL				WEIGHT	REMARKS
				CFM	IN.W.C.	V/PH/Hz	FAN RPM	POWER (HP)	F.L.A. (AMPS)	LBS	
EF-1	WALL MOUNTED	GREENHECK OR APPROVED EQUAL	AER-E20C-60S-VG	300	0.50	115/1/60	1120	1/4	3.8	60	C/W WALL COLLAR
EF-2	WALL MOUNTED	GREENHECK OR APPROVED EQUAL	AER-E20C-600-VG	100	0.50	115/1/60	1199	1/4	3.8	60	C/W WALL COLLAR
EF-3	CEILING MOUNTED	GREENHECK OR APPROVED EQUAL	SP-A90-130-VG	100	0.30	115/1/60	960	—	0.29	12	

HOT WATER TANK SCHEDULE									
TAG	DESCRIPTION	MAKE	MODEL	CAPACITY	GAS INPUT	ELECTRICAL		WEIGHT	REMARKS
				GALLON	MBH	V/PH/Hz	AMPS	LBS	
HWT-1	GAS HOT WATER HEATER	A.O.SMITH OR APPROVED EQUAL	BTH-120	60	120	120/1/60	5	490	C/W CONCENTRIC VENT KITS

FIXTURE CONNECTION PIPE SIZE SCHEDULE					
FIXTURE	DOW	DHW	SAN	VENT	REMARKS
WC	1/2"	1/2"	4"	1-1/2"	PLUMBING FIXTURE TO MATCH THE EXISTING
LV	1/2"	1/2"	1-1/2"	1-1/4"	PLUMBING FIXTURE TO MATCH THE EXISTING
UR	1/2"	1/2"	1-1/2"	1-1/4"	PLUMBING FIXTURE TO MATCH THE EXISTING
KS	1/2"	1/2"	1-1/2"	1-1/4"	PLUMBING FIXTURE TO MATCH THE EXISTING
MS	1/2"	1/2"	3"	1-1/2"	PLUMBING FIXTURE TO MATCH THE EXISTING

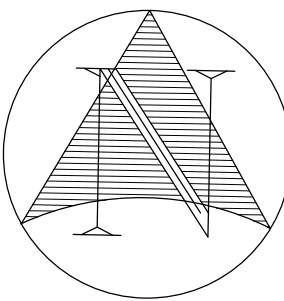
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No.	Description	Date

ISSUES/REVISIONS



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Project
MCGREGOR FIRE STATION
302 S MADISON STREET
MCGREGOR, TEXAS

Drawing Title
SCHEDULES

MECHANICAL			
Date DEC. 2021	Scale AS NOTED	Proj. No. ME21640.DES.RM	Dwg. No. M-4 of 4
Drawn Z.L.	Designed P.P.	Checked W.C.	

CYCLONE® Mxi MODULATING

MODULATING BURNER ADVANCES THE CYCLONE TO HIGHER LEVELS OF EFFICIENCY

The full line of A. O. Smith Cyclone Mxi condensing water heaters has been designed to provide years of dependable service and feature industry leading technology. Models are available from 120,000 to 500,000 Btu/h and all deliver thermal efficiencies of 95% and higher. The unique helical coil heat exchanger limits weld joints for optimal service life while maximizing heat transfer.

Cyclone is the industry leader in high efficiency commercial water heating. The current Mxi modulating models adjust firing rate to the specific demand further increasing efficiency and money savings.

INTELLIGENT CONTROL SYSTEM WITH TOUCH SCREEN DISPLAY AND ICOMM CONNECTIVITY ONBOARD*

- Exclusive A. O. Smith designed color touch display control system
- Provides detailed water heater status information
- Precise temperature control adjustable from 90 to 180 degrees
- Built-in diagnostics
- Run history information
- *Cyclone Mxi models manufactured March 1, 2018 to present come standard with iCOMM Wi-Fi connectivity onboard. Remotely monitor and adjust the water heater via the A. O. Smith app. No charge connectivity using Wi-Fi or Ethernet connection.
- Intelligent Demand Response (IDR) feature senses large water draws and automatically adjusts the differential setpoint. This feature increases the hot water available when it is needed the most.

SUBMERGED COMBUSTION CHAMBER, WITH HELICAL HEAT EXCHANGER COIL

- Positioned in center of tank, surrounded by water to virtually eliminate radiant heat loss from chamber
- Direct spark ignition
- Spiral heat exchanger keeps hot burner gases swirling, uses centrifugal force to maximize efficiency of heat transfer to water in tank
- Spiral heat exchanger reduces lime scale from forming on water-side surfaces, which maintains energy efficiency over time

POWERED ANODES STANDARD ON ALL MODELS

- Provides long-lasting tank protection in varying water conditions

- Powered anodes are non-sacrificial
- Automatically adjusts output needed to properly protect the tank

PERMAGLAS® ULTRA COAT™ GLASS LINING

- Glass coating is applied using a liquid slush coating technique to ensure uniform coating
- Heat exchanger coil is glassed both externally and internally for optimum protection

MECHANICAL VENTING VERSATILITY

- Conventional power venting or direct venting
- Vents vertically or through a sidewall
- Front located exhaust and condensate connections allow for easy install and access
- Vents with low cost PVC Schedule 40 intake and exhaust pipe. Approved for optional CPVC Schedule 40, Polypropylene and AL29-4C stainless steel vent materials
- Direct-vent intake and exhaust pipe can terminate separately outside building or through single opening, using concentric vent assembly
- Canadian installations require ULC S636 PVC/CPVC, ULC S636 Polypropylene and AL29-4C stainless steel pipe for intake and exhaust

HIGH EFFICIENCY MODULATING PRE-MIX POWERED BURNER

- Down-fired pre-mix burner provides optimum efficiency and quiet operation
- Top-mounted burner position prevents condensation from affecting burner operation

3-YEAR LIMITED TANK / 1-YEAR LIMITED PARTS WARRANTY

- For complete warranty information, consult written warranty or go to hotwater.com



BTH-120(A) THROUGH BTH-500(A)
MODEL SHOWN:
BTH-199(A) SERIES 300/301



ASME
(Optional)



Commercial Gas Water Heaters

OTHER FEATURES:

SPACE-SAVING DESIGN FOR INSTALLATION FLEXIBILITY

- Easy-to-remove top cover for convenient access to serviceable parts
- 0" installation clearances on sides and rear, 1-1/2" installation clearance on top
- Handhole cleanout allows easy access to tank interior for cleaning
- 0" clearance to combustibles, approved for installation on combustible floors

CODES AND STANDARDS

- CSA certified and ASME rated T&P relief valve
- Maximum hydrostatic working pressure: 160 psi
- All models are design certified by Underwriters Laboratories (UL), Inc., to ANSI Z21.10.3 - CSA 4.3 Standards
- Meets the thermal efficiency and standby loss requirements of the U.S. Department of Energy and current edition ASHRAE/IES 90.1
- Design Certified by Underwriters Laboratories to NSF standard 5 for 180°F (62°C) water
- Complies with SCAQMD Rule 1146.2 and other Air Quality Management Districts with similar requirements for ultra low-NOx emissions
- ASME tank construction optional on 120-500 model sizes

VENT REQUIREMENTS FOR BTH 120(A) - 250(A)

Number of 90° Elbows Installed	3 Inch Pipe	4 Inch Pipe
	Maximum Feet (Meters)	Maximum Feet (Meters)
One (1)	45 feet (13.7 meters)	115 feet (35 meters)
Two (2)	40 feet (12.2 meters)	110 feet (33.5 meters)
Three (3)	35 feet (10.7 meters)	105 feet (32 meters)
Four (4)	30 feet (9.1 meters)	100 feet (30.5 meters)
Five (5)	N/A	95 feet (29 meters)
Six (6)	N/A	90 feet (27.4 meters)

VENT REQUIREMENTS FOR BTH 300(A) - 500(A)

Number of 90° Elbows Installed	4 Inch Pipe	6 Inch Pipe
	Maximum Feet (Meters)	Maximum Feet (Meters)
One (1)	65 feet (19.8 meters)	115 feet (35 meters)
Two (2)	60 feet (18.2 meters)	110 feet (33.5 meters)
Three (3)	55 feet (16.8 meters)	105 feet (32 meters)
Four (4)	50 feet (15.2 meters)	100 feet (30.5 meters)
Five (5)	45 feet (13.7 meters)	95 feet (29 meters)
Six (6)	40 feet (12.2 meters)	90 feet (27.4 meters)

GAS PRESSURE REQUIREMENTS

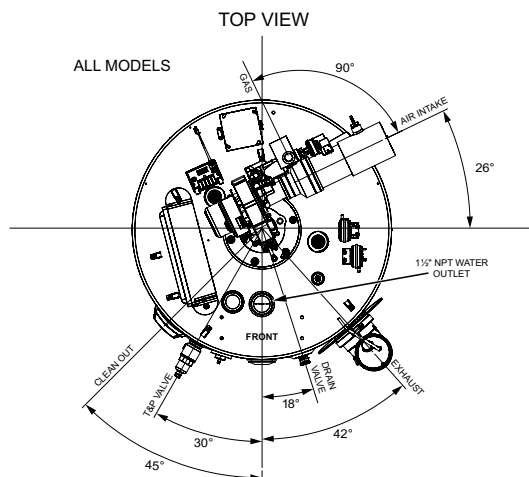
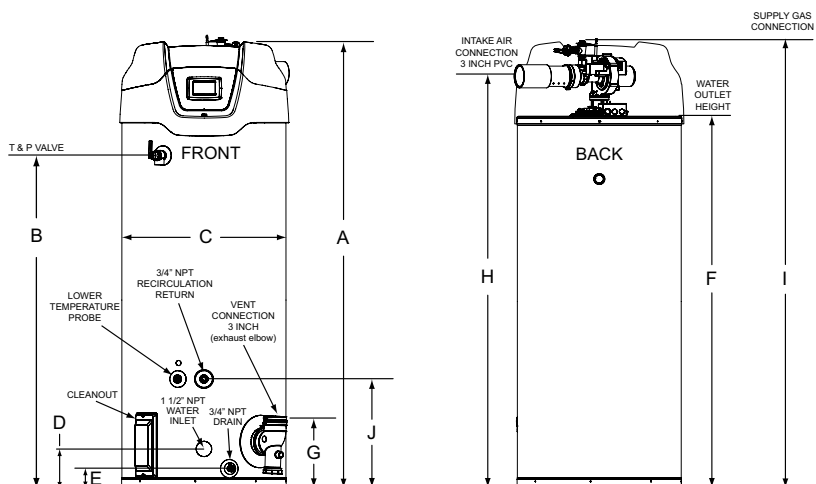
Model Number	Manifold Pressure		Minimum Supply Pressure		Maximum Supply Pressure	
	Natural Gas	Propane Gas	Natural Gas	Propane Gas	Natural Gas	Propane Gas
BTH-120(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	3.5"W.C. (1.10 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-150(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	3.5"W.C. (1.10 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-199(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	3.5"W.C. (1.10 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-250(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	3.5"W.C. (1.10 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-300(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	4.8"W.C. (1.19 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-400(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	4.8"W.C. (1.19 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-500(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	4.8"W.C. (1.19 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)

Depending on the installed equivalent length, and/or the number of appliances connected, the supply gas line size may need to be increased beyond the minimum required size.



Commercial Gas Water Heaters

BTH 120-250



* Center line of water outlet on top of the water heaters is approximately 7 inches from the front edge of the water heater

Model Number	Approx. Capacity		Dimensions										lb/kg	Approx. Shipping Weight Std	Approx. Shipping Weight ASME
			A	B	C	D	E	F	G	H	I	J			
BTH-120(A)	Gallons	60	55 1/2	35	27 3/4	6 5/16	3	42 1/4	11 1/4	48 1/2	53 1/2	18 1/4	lb	460	490
	Liters	227	141	88.9	70.5	16	7.62	107.32	28.6	123.2	135.9	46.36	kg	208	220
BTH-150(A)	Gallons	100	76 1/2	56 3/8	27 3/4	6 5/16	3	64	11 1/4	70	75 1/2	18 1/4	lb	523	553
	Liters	379	194.9	143.2	70.5	16	7.62	162.6	28.6	177.8	191.8	46.36	kg	237	251
BTH-199(A)	Gallons	100	76 1/2	56 3/8	27 3/4	6 5/16	3	64	11 1/4	70	75 1/2	18 1/4	lb	523	553
	Liters	379	194.9	143.2	70.5	16	7.62	162.6	28.6	177.8	191.8	46.36	kg	237	251
BTH-250(A)	Gallons	100	76 1/2	56 3/8	27 3/4	6 5/16	3	64	11 1/4	70	75 1/2	18 1/4	lb	523	553
	Liters	379	194.9	143.2	70.5	16	7.62	162.6	28.6	177.8	191.8	46.36	kg	237	251

Electrical characteristics-120V-60Hz A.C., 5.0 A

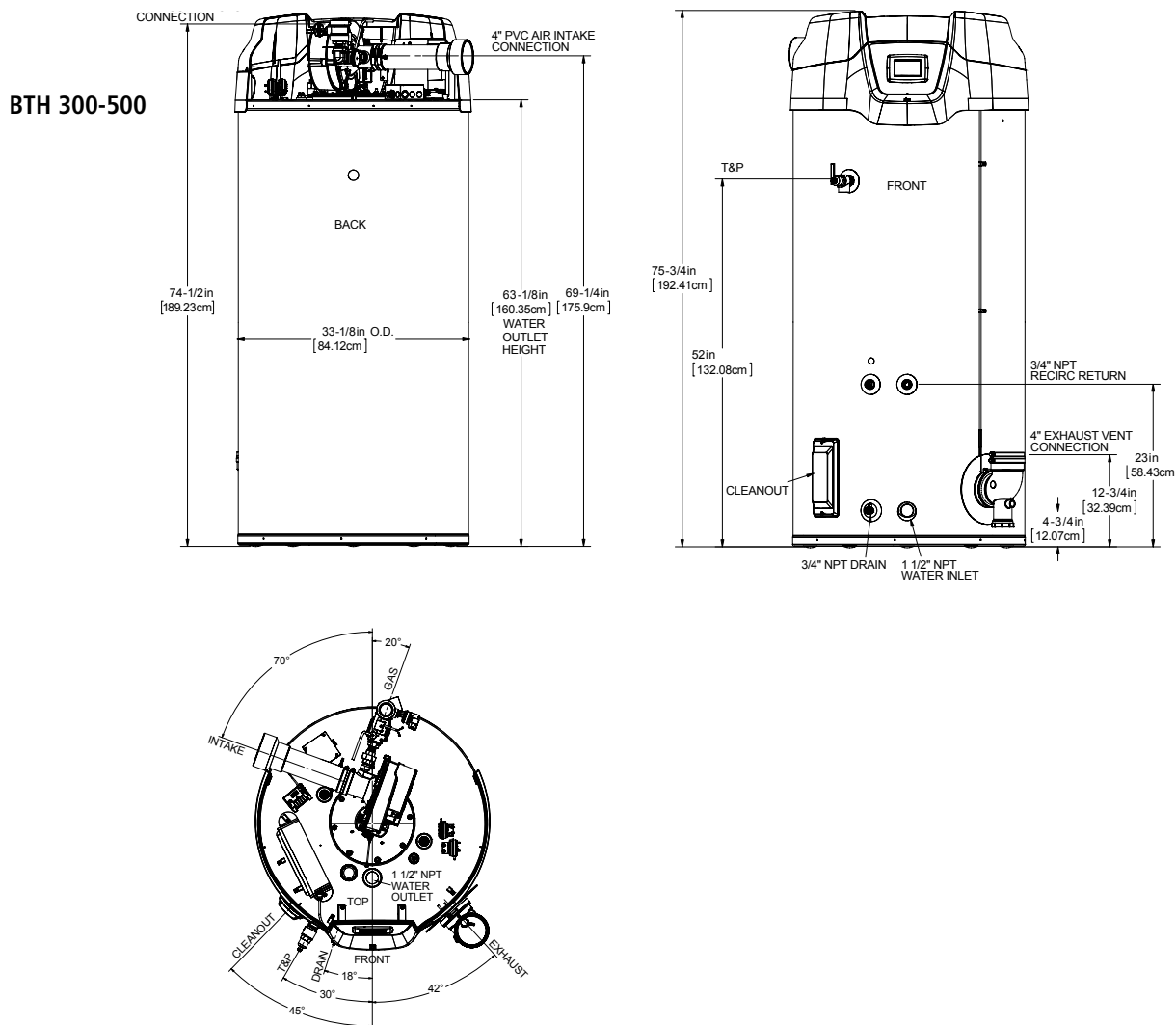
"A" in model represents ASME construction

Propane gas models available

Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.



Commercial Gas Water Heaters



Model Number	Approx. Capacity		Dimensions										lb/kg	Approx. Shipping Weight Std	Approx. Shipping Weight ASME
			A	B	C	D	E	F	G	H	I	J			
BTH-300(A)	Gallons	119	75 3/4	52	33 1/8	4 3/4	4 3/4	63 1/8	12 3/4	69 1/4	74 1/2	23	lb	855	855
	Liters	450.96	192.41	132.08	84.12	12.07	12.07	160.35	32.39	175.9	189.23	58.43	kg	387	387
BTH-400(A)	Gallons	119	75 3/4	52	33 1/8	4 3/4	4 3/4	63 1/8	12 3/4	69 1/4	74 1/2	23	lb	855	855
	Liters	450.96	192.41	132.08	84.12	12.07	12.07	160.35	32.39	175.9	189.23	58.43	kg	387	387
BTH-500(A)	Gallons	119	75 3/4	52	33 1/8	4 3/4	4 3/4	63 1/8	12 3/4	69 1/4	74 1/2	23	lb	855	855
	Liters	450.96	192.41	132.08	84.12	12.07	12.07	160.35	32.39	175.9	189.23	58.43	kg	387	387

Electrical characteristics-120V-60Hz A.C., 5.0 A

"A" in model represents ASME construction

Propane gas models available

Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.



Commercial Gas Water Heaters

RECOVERY CAPACITY

Model Number	Type of Gas	Input		Thermal Efficiency
		BTU/HR	kW	
BTH-120(A)	Natural/Propane	120,000	35	95%
BTH-150(A)	Natural/Propane	150,000	44	98%
BTH-199(A)	Natural/Propane	199,900	58	97%
BTH-250(A)	Natural/Propane	250,000	73	96%
BTH-300(A)	Natural/Propane	300,000	88	96%
BTH-400(A)	Natural/Propane	399,900	117	95%
BTH-500(A)	Natural/Propane	499,900	146	95%

Model Number	U.S. GALLONS/HR AND LITRES/HR AT TEMPERATURE RISE INDICATED													
	Approx. Capacity	°F	30°F	40°F	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
		°C	17°C	22°C	28°C	33°C	39°C	44°C	50°C	56°C	61°C	67°C	72°C	78°C
BTH-120(A)	60 U.S. Gals.	GPH	461	345	276	230	197	173	154	138	126	115	106	99
	227 Litres	LPH	1743	1308	1046	872	747	654	581	523	475	436	402	374
BTH-150(A)	100 U.S. Gals.	GPH	594	445	356	297	255	223	198	178	162	148	137	127
	379 Litres	LPH	2248	1686	1349	1124	963	843	749	674	613	562	519	482
BTH-199(A)	100 U.S. Gals.	GPH	783	588	470	392	336	294	261	235	214	196	181	168
	379 Litres	LPH	2965	2224	1779	1483	1271	1112	988	890	809	741	684	635
BTH-250(A)	100 U.S. Gals.	GPH	970	727	582	485	416	364	323	291	264	242	224	208
	379 Litres	LPH	3670	2753	2202	1835	1573	1376	1223	1101	1001	918	847	786
BTH-300(A)	119 U.S. Gals.	GPH	1164	873	698	582	499	436	388	349	317	291	269	249
	450.96 Litres	LPH	4405	3304	2643	2202	1888	1652	1468	1321	1201	1101	1017	944
BTH-400(A)	119 U.S. Gals.	GPH	1535	1151	921	767	658	576	512	460	419	384	354	329
	450.96 Litres	LPH	5810	4358	3486	2905	2490	2179	1937	1743	1585	1453	1341	1245
BTH-500(A)	119 U.S. Gals.	GPH	1919	1439	1151	959	822	720	640	576	523	480	443	411
	450.96 Litres	LPH	7263	5448	4358	3632	3113	2724	2421	2179	1981	1816	1676	1556

Recovery capacities are based on AHRI rated thermal efficiencies.

For ASME Construction add an "A" to the end of the model number ex: BTH-120A.

STORAGE CAPACITY

Model Number	U.S. Gallons	Liters
BTH-120	60	227
BTH-150	100	379
BTH-199	100	379
BTH-250	100	379
BTH-300	119	450.96
BTH-400	119	450.96
BTH-500	119	450.96

GAS LINE CONNECTION SIZE

Model	Series	Natural Gas	Propane Gas
BTH-120	300/301	3/4" NPT	3/4" NPT
BTH-150	300/301	3/4" NPT	3/4" NPT
BTH-199	300/301	3/4" NPT	3/4" NPT
BTH-250	300/301	3/4" NPT	3/4" NPT
BTH-300	300/301	1-1/2" NPT	1-1/2" NPT
BTH-400	300/301	1-1/2" NPT	1-1/2" NPT
BTH-500	300/301	1-1/2" NPT	1-1/2" NPT



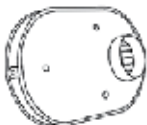
Commercial Gas Water Heaters

OPTIONAL KITS



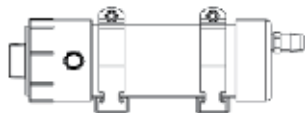
OPTIONAL CONCENTRIC VENT KITS

- BTH-120 - 250 vent kit p/n 100111100
- BTH-300 - 500 vent kit p/n 100113124



OPTIONAL LOW PROFILE TERMINATION VENT KITS

- 3" Flush Mount Vent Kit p/n 100187887
- 4" Flush Mount Vent Kit p/n 100187888
- 6" Flush Mount Vent Kit p/n 100187889



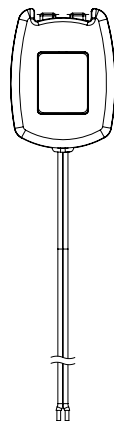
OPTIONAL CONDENSATE NEUTRALIZATION KITS

- BTH-120-300 kit p/n 100289339
- BTH-400-500 kit p/n 100289340

COMMON VENTING KITS FOR UP TO 3 WATER HEATERS (ONE KIT PER WATER HEATER REQUIRED)

Kit	Description
100227396	PVC Common Vent Kit, 120 – 250 Models
100223775	PVC Common Vent Kit, 300 – 500 Models
100227395	Polypropylene Common Vent Kit, 120 -250 Models
100223774	Polypropylene Common Vent Kit, 300 - 500 Models

Installations must comply with all national, state and local codes.
See kit instructions and corresponding water heater manual for detailed installation instructions and additional information.
50 Feet maximum equivalent length of straight pipe common vent and elbows
NOTE: Order 1 kit for each water heater.
See the Common Vent Kit manual or spec sheet for detailed information.



OPTIONAL LEAK DETECTION KIT

- BTH-120 - 500 kit p/n 100302557

SPECIFICATION

(Natural or Propane) gas water heater(s) shall be A. O. Smith Cyclone Mxi model # _____ or equal, minimum 95% thermal efficiency, a storage capacity of _____ gallons, an input rating of _____ BTUs per hour, a recovery rating of _____ gallons per hour (gph) at 100°F rise and a maximum hydrostatic working pressure of 160 psi. Water heater(s) shall: 1. Modulating gas burner that automatically adjusts the input based on demand. 2. Powered anodes that are non sacrificial and maintenance free. 3. Have seamless glass-lined steel tank construction, with glass lining applied to all water-side surfaces after the tank has been assembled and welded; 4. Meets the thermal efficiency and/or standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IES 90.1; 5. Have foam insulation and a CSA Certified and ASME rated T&P relief valve; 6. Have a down-fired power burner designed for precise mixing of air and gas for optimum efficiency, requiring no special calibration on start-up; 7. Be approved for 0" clearance to combustibles.

The control shall be an integrated solid-state temperature and ignition control device with integral diagnostics, graphic user interface, fault history display, and shall have digital temperature readout. No charge connectivity shall be provided allowing for remote viewing and fault notification via app. 1. All models are design certified by Underwriters Laboratories (UL), Inc., according to ANSI Z21.10.3 - CSA 4.3 standards governing storage type water heaters; 2. Meet the thermal efficiency and standby loss requirements of the U. S. Department of Energy and current edition ASHRAE/IES 90.1. Complies with SCAQMD Rule 1146.2 and other air quality management districts with similar requirements for low NOx emissions.

120K-250K BTU Input: For Standard Power Venting: Water heater(s) shall be suitable for power venting using a (3" or 4") _____ diameter PVC pipe for a total distance of (50 ft or 120 ft.) _____ equivalent feet of vent piping. For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using a (3" or 4") _____ diameter PVC pipe for a total distance of (50 ft or 120 ft.) _____ equivalent feet of vent piping and (50 ft. or 120 ft.) _____ equivalent feet of intake air piping.

300K - 500K BTU Input: For Standard Power Venting: Water heater(s) shall be suitable for standard power venting using a (4" or 6") _____ diameter PVC pipe for a total distance of (70 ft. or 120 ft.) _____ equivalent feet of vent piping. For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using a (4" or 6") _____ diameter PVC pipe for a total distance of (70 ft or 120 ft.) _____ equivalent feet of vent piping and (70 ft. or 120 ft.) _____ equivalent feet of intake air piping.

Operation of the water heater(s) in a closed system where thermal expansion has not been compensated for (with a properly sized thermal expansion tank) will void the warranty.

For Technical Information, call 800-527-1953. A. O. Smith Corporation reserves the right to make product changes or improvements without prior notice.