

BID #WG26-27 SPECIFICATIONS

The specifications shall be construed as minimum. All integral parts not specifically mentioned in the scope of these specifications that are necessary to provide a complete working unit shall be furnished. All workmen and equipment shall be furnished by the Contractor.

Bidder shall give a Lump Sum price as indicated on the Bid Response Form. The price shall include all applicable charges, to include but not limited to delivery, installation, labor, materials, etc.

The use of specific names and numbers in the specifications is not intended to restrict the bidder or any seller or manufacturers, but solely for the purpose of indicating the type, size and quality of equipment considered best adapted to Baldwin County.

No bid may be withdrawn for a period of thirty (30) days following the bid opening unless approved by the Baldwin County Commission, Bay Minette, Alabama.

BID RESPONSE FORM

Each supplier should use the Response Form provided for their bid. All warranties and exceptions are to be attached to the back of the Response Form. The Bid Guarantee should be attached to the front of the Response Form.

WARRANTY

Bidders shall submit a copy of the manufacturer's standard warranty along with a complete explanation of the warranty with their bid.

BIDS FOR ALL OR PART

The County reserves the right to award the contract in whole or in part, according to the best interest of the County.

BIDDERS QUALIFICATIONS

The County may make such investigations as they deem necessary to determine the ability of the bidders to furnish all materials, and the bidder shall furnish to the County all such information and data for this purpose as the County may request. The County reserves the right to reject any bid if the evidence submitted, or investigation of such bidder, fails to satisfy the County that such bidder is properly qualified to carry out the obligations of the contract and to furnish all materials contemplated therein. Conditional bids will not be accepted.

“ALABAMA GENERAL CONTRACTORS LICENSE NUMBER MUST BE CLEARLY LISTED ON THE OUTSIDE OF THE VENDOR BID ENVELOPE”

LAWS AND REGULATIONS

The bidder's attention is directed to the fact that all applicable state laws, municipal ordinances, and rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

POWER OF ATTORNEY

Attorneys-in-fact who sign bid bonds must file with each bond a certified and effectively dated copy of their power of attorney.

PERFORMANCE BOND

A Performance Bond in the amount of one-hundred percent (100%) of the total amount of the project and a Labor and Materials Bond in the amount of fifty percent (50%) of the total amount of the project will be provided prior to any work beginning. The Contractor must furnish to the County at the time of the signing of the Contract a certificate of insurance coverage as provided in the specifications. Bidder(s) must have a Contractor's License issued by the Alabama State Licensing Board for General Contractors under the provision of Title 34, Chapter 8, Code of Alabama. Bidder(s) shall submit a copy of license.

TRAFFIC CONTROL, SAFETY ITEMS

Contractor shall erect all warning signs, and provide the appropriate personnel, if required, and all other items required to safely handle traffic through work area. Traffic Control Devices shall be provided by the Contractor. Traffic Control Devices provided must comply with MUTCD.

CONTRACTORS AND SUBCONTRACTORS AND INSURANCE

The Contractor shall not commence work under this contract until all the required insurance has been obtained by Contractor and approved by the County. Nor shall the Contractor allow any Subcontractor to commence work on his subcontract until the insurance required of the Subcontractor has been obtained and approved.

COMPENSATION INSURANCE

Contractor shall procure and shall maintain during the life of this contract Workmen's Compensation Insurance for all of his employees to be engaged in work on the project under his contract, and, in case of any such work sublet, the Contractor shall require the Subcontractor similarly, to provide Workmen's compensation Insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Compensation Insurance. In case a class of employees engaged in hazardous work on the project under this contract is not protected under the Workmen's Compensation Statute, the Contractor shall provide and shall cause each Subcontractor to provide adequate employer's general liability insurance for the protection of such of his employees as are not otherwise protected. The Baldwin County Commission, its Departments and its employees shall be named as additional insured.

CONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE

The Contractor shall procure and shall maintain during the life of this contract a Comprehensive Liability Policy providing bodily injury and property damage coverage on an occurrence basis including damages arising from blasting explosion or collapse, mechanical equipment digging in streets or highways, and including completed operations, independent contractors and contractual general liability. Insurance shall be contractual general liability \$500,000.00 per occurrence bodily injury and property damage; \$5,000 per person medical payments or medical expense; \$500,000.00 per occurrence bodily injury and property damage; \$5,000 per person medical payments or medical expense; \$500,000.00 personal and advertising injury; \$50,000.00 fire damage (any one firm); \$1,000,000.00. The Baldwin County Commission, its Departments and its employees shall be named as additional insured.

The Contractor agrees to maintain such coverage as is required in this section for a period of one (1) year from the date of acceptance of the work by the County or at the date of the final amounts owed the Contractor by the County, whichever occurs first.

COMPREHENSIVE AUTOMOBILE LIABILITY INSURANCE

The Contractor agrees to carry a Comprehensive Automobile Liability Policy providing bodily injury liability on an occurrence basis and providing property damage liability on an accident basis. This policy shall protect the Contractor against all liability arising out of the use of automobiles, both private, passenger and commercial, regardless of whether such vehicles shall be owned by the Contractor, owned by others or hired. Limits of liability for Comprehensive Automobile Liability Insurance shall be \$1,000,000.00 combined single limit bodily injury and property damage each occurrence. The Baldwin County Commission, its departments and its employees shall be named as additional insured.

COUNTY'S PROTECTIVE LIABILITY INSURANCE

The Contractor shall at his expense provide County's protective Liability policies issued in the names of the County and its departments covering their liability for operation of the Contractor. These policies shall provide limits of liability in the amount of \$1,000,000.00 per occurrence bodily injury and property damage, \$1,000,000.00 aggregate.

HOLD HARMLESS PROVISION

Provider shall indemnify, defend and hold County and its Commissioners, affiliates, employees, agents, and representatives (collectively "County") harmless from and against any and all claims, demands, liabilities, damages, losses, judgments, costs, and expenses including, without limitations, attorneys' fees, for any and all personal injury (including death) and property damage of any kind or nature whatsoever, incurred by, asserted against, or imposed upon County, as a result of or in any manner related to provision of services hereunder, or any act or omission, by Provider. Contractor shall provide the COUNTY with proof of general liability coverage including the COUNTY as an additional insured. This indemnification shall survive the expiration of this Contract.

SUBCONTRACTOR'S PUBLIC LIABILITY & PROPERTY DAMAGE INSURANCE

The Contractor shall require each of his Subcontractors to produce and maintain during the life of his subcontract, Subcontractor's Public Liability and Property Damage Insurance of the type specified in the above paragraph hereof, in amounts approved by the County.

Three (3) executed copies of each subsequent endorsement affecting the coverage of policies and of each cancellation shall be forwarded to the County.

SAFETY STANDARDS AND ACCIDENT PREVENTION

With respect to all work performed under this Contract, the Contractor shall:
Comply with the safety standards provisions of applicable laws, building and construction codes as required by the Associated General Contractors of America, and the requirements of OSHA (Occupational Safety and Health Act). Exercise every precaution at all times for the prevention of accidents and the protection of people (including employees) and property. The Contractor shall furnish and maintain sufficient and adequate danger signals, lights, barriers, etc., as necessary to prevent accidents and to protect the work site. These items are Considered incidental and are considered as part of the Contract.

TIME OF COMPLETION

Projects must be completed within **NINETY (90) days** of notification to proceed including 45 days of construction once the equipment is available. Project shall be complete after receipt of Manufacturer's Warranty.

LIQUIDATED DAMAGES

Liquidated damages shall be applied to this project. Liquidated damages shall be applied in two phases. The first phase of liquidated damages is based on the number of days beyond the maximum four days allotted for the shut-down to install the new chiller and verify the chiller is operational. The first phase of liquidated damages shall be \$750.00 per day. The construction schedule beyond the chiller becoming operational is sufficient for completing construction of the project. However, failure to complete project construction within the 90 days beyond the notice to proceed shall initiate a second phase of liquidated damages. The second phase of liquidated damages shall be \$500.00 per day.

CLEANUP

Accumulated debris shall be removed periodically to assure maximum safety and sanitation at all times. At the time of completion, the Contractor shall remove all excess material and debris from the site and leave all roof surfaces free from accumulations of dirt, debris and other extraneous materials.

FINAL PAYMENT

The Contractor, immediately after the completion of the contract, shall give notice of said completion by an advertisement in some newspaper of general circulation in the local area, for a period of three (3) successive weeks. Proof of publication of said notice shall be made by the Contractor to the County, by affidavit of the publisher and a printed copy of the notice published. The advertisement of completion shall provide that any person having claims for labor and/or materials are requested to file notice of such claims with the County. The final payment shall not be made upon the contract until the expiration of 30 days after the completion of the notice and including all necessary cleanup, and the Baldwin County Commission receives written verification of completion and intent to warranty job, by the Manufacturing Company.

FUNDING SOURCE

This public works project is being funded 100% by the Baldwin County Commission.

BID DOCUMENTS AND DRAWINGS ATTACHED

State of Alabama)

County of Baldwin)

CONTRACT FOR PROFESSIONAL & CONSTRUCTION SERVICES

This Contract for **Professional and Construction** Services is made and entered into by and between the County of Baldwin (hereinafter called “COUNTY”) acting by and through its governing body, the Baldwin County Commission, and _____, (hereinafter referred to as “PROVIDER”).

WITNESSETH:

Whereas,

Whereas,

NOW, THEREFORE, in consideration of the premises and the mutual covenants herein contained the sufficiency of which being hereby acknowledged, PROVIDER and COUNTY do hereby agree as follows:

- I. Definitions. The following terms shall have the following meanings:
 - A. COUNTY: Baldwin County, Alabama
 - B. COMMISSION: Baldwin County Commission
 - C. PROVIDER: _____

- II. Obligations Generally. The COUNTY hereby retains, and the PROVIDER agrees to perform for the COUNTY, those services as hereinafter set forth. This document shall serve as the binding contract for the services of the PROVIDER. The PROVIDER shall immediately commence performance of the services outlined herein upon full execution of this Contract. All work shall be commenced and completed in a timely manner as, and at the times, herein set out.

- III. Recitals Included. The above recitals and statements are incorporated as part of this Agreement and shall have the effect and enforceability as all other provisions herein.

- IV. Professional Qualifications. For the purpose of this Contract, the PROVIDER represents and warrants to the COUNTY that it possesses the professional, technical, and administrative personnel with the specific

experience and training necessary to provide the professional services required herein.

- V. No Prohibited Exclusive Franchise. The COUNTY neither perceives nor intends, by this Contract, a granting of an exclusive franchise or violation of Art. I, Section 22 of the Alabama Constitution.
- VI. Representation/Warranty of Certifications, Etc. PROVIDER represents and warrants that PROVIDER is presently certified, licensed and otherwise permitted under all necessary and applicable laws and regulations to perform the services herein, and that PROVIDER shall renew, maintain, and otherwise ensure that all such certifications, licenses, and permits are current and valid, without interruption, for and through completion of the services. The representation and warranty aforesaid is a material inducement to the COUNTY in entering this Contract, and the parties agree that the breach thereof shall be deemed material at the County's option.
- VII. Legal Compliance. PROVIDER shall at all times comply with all applicable Federal, State, local and municipal laws and regulations.
- VIII. Independent Contractor. PROVIDER acknowledges that it is an independent contractor, and PROVIDER shall at all times remain as such in performing the services under this Contract. PROVIDER is not an employee, servant, partner, or agent of the COUNTY and has no authority, whether express or implied, to contract for or bind the COUNTY in any manner. The parties agree that PROVIDER shall be solely responsible for and shall have full and unqualified control over developing and implementing its own means and methods, as it deems necessary and appropriate in providing the aforementioned services, and that the COUNTY's interests herein are expressly limited to the results of said services. PROVIDER is not entitled to unemployment insurance benefits, and PROVIDER is responsible for and obligated to pay any and all federal and state income tax on any monies paid pursuant to this Contract.
- IX. No Agency Created. It is neither the express nor the implied intent of PROVIDER or COUNTY to create an agency relationship pursuant to this Contract. Therefore, the PROVIDER does not in any manner act on behalf of COUNTY and the creation of such a relationship is prohibited and void.
- X. Unenforceable Provisions. If any one or more of the provisions contained herein shall, for any reason, be held to be invalid, illegal or unenforceable in any respect, then such provision or provisions shall be deemed severable from the remaining provisions hereof, and such invalidity, illegality or unenforceability shall not affect any other provision hereof. This Contract shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.

- XI. Entire Agreement. This Contract represents the entire and integrated agreement between COUNTY and PROVIDER and supersedes all prior negotiations, representations, or agreements, either written or oral. This Contract may be amended only by written instrument signed by all parties.
- XII. Failure to Strictly Enforce Performance. The failure of the COUNTY to insist upon the strict performance of any of the terms, covenants, agreements and conditions of this Contract shall not constitute, and shall never be asserted by PROVIDER as constituting, a default or be construed as a waiver or relinquishment of the right of the COUNTY to thereafter enforce any such term, covenant, agreement, or condition, but the same shall continue in full force and effect.
- XIII. Assignment. This Contract or any interest herein shall not be assigned transferred or otherwise encumbered by PROVIDER without the prior written consent of the COUNTY, which may be withheld or granted in the sole discretion of the COUNTY.
- XIV. Ownership of Documents/Work. The COUNTY shall be the owner of all copyright or other intellectual property rights in reports, documents and deliverables produced and paid for under this Contract, and to the extent permitted by Alabama law, any such material may be reproduced and reused at the discretion of the COUNTY without payment of further consideration. PROVIDER shall not transfer, disclose, or otherwise use such information for any purpose other than in performance of the services hereunder, without the COUNTY's prior written consent, which may be withheld or granted in the sole discretion of the COUNTY.
- XV. Notice. Notice required herein shall be in writing, unless otherwise allowed, and said notice shall be deemed effective when received at the following addresses:

PROVIDER:

COUNTY: Baldwin County Commission
c/o Chairman
312 Courthouse Square
Suite 12
Bay Minette, AL 36507

XVI. Services to be Rendered. PROVIDER is retained by the COUNTY as a professionally qualified Contractor. The general scope of work for the services shall include all the terms and Conditions of “**Competitive Bid #WG26-27**”, the same being expressly incorporated herein by reference, and without limitation will encompass:

“Competitive Bid #WG26-27 – Purchase and Installation of One (1) New 90 Ton Air-Cooled Chiller for the Baldwin County Satellite Courthouse located in Fairhope, Alabama, for the Baldwin County Commission.”

- A. PROVIDER will provide ongoing communications with COUNTY regarding this service, including updates, emails, etc. as requested. Additionally, PROVIDER will meet with COUNTY as needed or requested.
- B. PROVIDER is responsible for the professional quality, technical accuracy, timely completion, and coordination of all services furnished by or in relation to this Contract.
- C. PROVIDER represents and warrants that its services shall be performed within the limits and standards provided by the COUNTY, in a manner consistent with the level of care and skill ordinarily exercised by similar providers under similar circumstances at the time the services are performed.

XVII. General Responsibilities of the COUNTY.

- A. The COUNTY shall provide reasonable notice to PROVIDER whenever the COUNTY actually observes or otherwise actually becomes aware of any development that affects the scope or time of PROVIDER’s services hereunder or any defect or nonconformance in the work of PROVIDER.
- B. The COUNTY shall pay to PROVIDER the compensation as, and subject to the terms set out below.

XVIII. Termination of Services. The COUNTY or PROVIDER may terminate this contract, with or without cause or reason, by giving ten (10) days written notice of such to the other party. Upon receipt of such notices, PROVIDER shall discontinue its work to the extent specified in the notice.

In the event of termination, the COUNTY shall pay PROVIDER for all services satisfactorily rendered, and for any expenses deemed by COUNTY to be a reimbursable expense incurred pursuant to this Contract and prior to the date of termination.

XIX. Compensation Limited. The compensation to be paid to the PROVIDER shall be the full compensation for all work performed by PROVIDER under this Contract. Any and all additional expenditures or expenses of PROVIDER, not listed in full within this Contract, shall not be considered as a part of this Agreement and shall not be demanded by PROVIDER or paid by COUNTY.

XX. Direct Expenses. Compensation to PROVIDER for work shall be paid \$ _____. Said compensation shall be all inclusive, including without limitation, reimbursement of all cost, incidentals and operating expense associated with those directly engaged in performance of the requested services

XXI. Method of Payment. PROVIDER shall submit invoices to the COUNTY for payment for work performed. Such invoices shall be accompanied by a detailed account of compensation to be paid PROVIDER.

Payment shall be made by the COUNTY within thirty (30) days of the approval of the invoice submitted by the PROVIDER. The COUNTY agrees to review and approve invoices submitted for payment in a timely manner.

XXII. Effective and Termination Dates. This Contract shall be effective and commence immediately upon the same date as its full execution and shall terminate upon either the expiration of not more than **ninety (90) days** after the Notice to Proceed is given including 45 days of construction once the equipment is available or upon a written notification thereof received by either party within the required ten (10) day period. [Nothing herein stated shall prohibit the parties from otherwise terminating this Contract according to the provisions herein.]

XXIII. Force Majeure. The Parties hereto shall incur no liability to the other if performance becomes impossible or impracticable by reason on an event or effect that the parties could neither have anticipated nor controlled. This allowance shall include both an act of nature and acts of third parties. Any costs that would otherwise be incurred and/or necessitated by the provisions herein shall be alleviated for either party by such event or effect.

XXIV. Indemnification. Provider shall indemnify, defend and hold County and its Commissioners, affiliates, employees, agents, and representatives (collectively "County") harmless from and against any and all claims, demands, liabilities, damages, losses, judgments, costs, and expenses including, without limitations, attorneys' fees, for any and all personal injury (including death) and property damage of any kind or nature whatsoever, incurred by, asserted against, or imposed upon County, as a result of or in any manner related to provision of services hereunder, or any act or omission, by Provider. Contractor shall provide the COUNTY with proof of general liability coverage including the COUNTY as an additional insured. This indemnification shall survive the expiration of this Contract.

- XXV. Number of Originals. This Contract shall be executed with three originals, all of which are equally valid as an original.
- XXVI. Governing Law. This Contract in all respects, including without limitation its formation, validity, construction, enforceability, and available remedies, shall be governed by the laws of the State of Alabama, without regard to Alabama conflict of law principles.
- XXVII. Insurance. Prior to performing services pursuant to this Contract, Provider shall carry, with insurers satisfactory to County, throughout the term of hereof, Auto Liability Insurance, including owned, hired and non-owned vehicles, with limits of not less than \$1,000,000, combined single limit, for both bodily injury liability and property damage liability each occurrence; Commercial General Liability Insurance, including all contractual liability hereunder, with limits not less than \$1,000,000, combined single limit, for both bodily injury liability and property damage liability each occurrence, and Worker's Compensation Insurance, meeting the statutory limits of the State of Alabama and Employer's Liability Insurance fully covering all employees and supervisors participating in the work at the subject property site. All liability insurance shall name the County as an additional insured. Prior to commencing operations hereunder, a Certificate of Insurance evidencing such coverage, satisfactory to County, shall be furnished to County, which shall specifically state that such insurance shall provide for at least ten (10) days' notice to County in the event of cancellation, termination, or any change in such insurance policies. The worker's compensation certificate shall bear an endorsement clearly, evidencing a waiver of the right of subrogation against County and County Representatives. Should Provider fail to furnish current evidence upon demand of any insurance required hereunder, or in the event of cancellation, termination or change in any such insurance, County may, at its option, suspend this Contract until insurance is obtained, terminate this Contract immediately without further action, or hold Provider in material default and pursue any and all remedies available.
- XXVIII. Surety: As a material inducement for the County to enter this Contract, any and all bond and/or surety guarantees required by the County in reference to the Project shall be in a form acceptable to the County and shall, without limitation, meet the following requirements:
- (a) Acceptance of Surety. The bond and/or surety document must be reviewed by, and be acceptable to, County staff and approved by the County Commission. In the event that such document is not in an acceptable form at any time prior to or during the effectiveness of this Contract, the services and/or work described in this Contract shall either not commence or immediately cease, depending on the situation. Any project delay that is attributable to the County's acceptance, or non-acceptance, of the bond and/or surety document form shall in no way be consider as a delay caused by the County, and the Contractor and/or

Provider waives all rights to claim that any such delay was the fault of the County.

(b) Value of Surety. The bond and/or surety guarantee shall be of an amount equal to or greater than 100 percent of the total cost identified in the bid response.

(c) Term of Surety. Any bond and/or surety guarantees required by the County must be valid at all times during the life of this Contract. Notwithstanding anything written or implied herein to the contrary, in no event shall the bond and/or surety document lapse, terminate, expire, or otherwise become invalid prior to the County, or the County's authorized agent, providing a written Notice to the Provider/Contractor that the Project is in fact completed in all respects. Said Notice from the County or its authorized agent shall not be provided until the County, in its sole discretion, is satisfied that the Project is complete in all respects.

(d) Scope of the Surety. The terms and provisions of any bond and/or surety guarantee provided as part of this Project shall in all respects, without limitation, be consistent and in agreement with, the provisions of this Contract. In the event that the bond and/or surety guarantee is in conflict with this Contract, this Contract shall govern. Neither this section nor this provision limits the duties of the Provider/Contractor to satisfy all of the requirements in this Contract.

XXIX. The public works project which is the subject of this Contract is 100% funded by the Baldwin County Commission.

XXX. Title 39/Code of Alabama Compliance. As a condition of any Bid Award and the respective contract(s) pursuant thereto, the County places full reliance upon the fact that it is the sole responsibility of any contractor, person or entity entering into such a contract with Baldwin County for the prosecution of any public works, to ensure that they and/or any of their respective agents comply with all applicable provisions of Title 39-1-1 et seq. Code of AL 1975, as amended. More specifically, any contractor, person or entity entering into such a contract with Baldwin County for the prosecution of any public works shall be in compliance with, and have full knowledge of, the following provisions of Title 39 including, but not limited to, the following:

“(f) The Contractor shall, immediately after the completion of the contract give notice of the completion by an advertisement in a newspaper of general circulation published within the city or county in which the work has been done, for a period of three successive weeks. A final settlement shall not be made upon the contract until the expiration of 30 days after the completion of the notice. Proof of publication of the notice shall be made by the contractor to the authority by whom the contract was made by affidavit of the publisher and a printed copy of the notice published . . .” §39-1-1(f) Code of AL 1975.

“(g) Subsection (f) shall not apply to contractors performing contracts of less than one hundred thousand (\$100,000) in amount. In such cases, the governing body of the contracting agency, to expedite final payment, shall cause notice of final completion of the contract to be published one time in a newspaper of general circulation, published in the county of the contracting agency and shall post notice of final completion on the agency’s bulletin board for one week, and shall require the contractor to certify under oath that all bills have been paid in full. Final settlement with the contractor may be made at any time after the notice has been posted for one entire week.” §39-1-1 (g) Code of AL 1975.

NOTE: Any failure to fully comply with this section or any applicable laws of the State of AL shall be deemed a material breach of the terms of both the Bid Award and the Respective contracts resulting there from. Furthermore, Baldwin County takes no responsibility for resulting delayed payments, penalties, or damages as a result of any failure to strictly comply with Alabama Law.

IN WITNESS WHEREOF, the parties hereto have executed this contract on the last day of execution by the COUNTY as written below.

COUNTY

ATTEST:

James E. Ball /Date
Chairman

Roger H. Rendleman /Date
County Administrator

State of Alabama)

County of Baldwin)

I, _____ Notary Public in and for said County, in said State, hereby certify that, James E. Ball, whose name as Chairman of Baldwin County Commission, and Roger H. Rendleman, whose name as County Administrator, are known to me, acknowledged before me on this day that, being informed of the contents of the Contract for Professional and Construction Services, they, as such officers and with full authority, executed same knowingly and with full authority to do so on behalf of said Commission.

GIVEN under my hand and official seal, this the _____ day of _____ 2026.

Notary Public
My Commission Expires

SIGNATURE AND NOTARY PAGE TO FOLLOW

PROVIDER:

Insert Providers Name

_____/_____
By _____/Date
Its _____

State of Alabama)

County of _____)

I, _____, Notary Public in and for said County and State, hereby certify that _____ as _____ of _____, whose name is signed to the foregoing in that capacity, and who is known to me, acknowledged before me on this day that, being informed of the contents of the foregoing, he executed the same voluntarily on the day the same bears date for and as an act of said _____.

GIVEN under my hand and seal on this the _____ day of _____ 2026.

Notary Public
My Commission Expires

FAIRHOPE SATELLITE COURTHOUSE
CHILLER UPGRADE
1100 FAIRHOPE AVENUE
FAIRHOPE, ALABAMA 36532

FOR

BALDWIN COUNTY COMMISSION
312 COURTHOUSE SQUARE
BAY MINETTE, ALABAMA 36507

BY

H. M. YONGE & ASSOCIATES, INC.
CONSULTING ENGINEERS
253 ST. ANTHONY STREET
MOBILE, ALABAMA 36603
(251) 690-7446

MARCH 2026

SECTION 01030 – DESCRIPTION OF WORK, ALTERNATES AND PHASING**PART 1 - GENERAL****1.1 DESCRIPTION OF WORK**

- A. This project consists of the installation of one new air cooled water chillers for Fairhope Satellite Courthouse. The description of work for this project is as follows:
1. The removal and replacement of the existing air-cooled water chiller and two chilled water circulation pumps located in the main mechanical equipment yard. The chiller shall be provided and installed by the contractor. This project shall include chilled water supply and return branch piping, fittings and connections, starters, power connections, and control wiring.
 2. The Contractor shall provide all equipment and accessories required in the project documents for a complete system installation.
 3. Reference project plans and specifications for additional information.

1.2 DESCRIPTION OF ALTERNATES

- A. There are not any Additive Alternates for this project.

1.3 DESCRIPTION OF PHASING PLAN

- A. This project shall commence once a contract has been awarded. It is intended work shall proceed though completion without delays. A specific time frame has not been established for this project relative to holidays, vacations and equipment deliveries. The construction period for this project shall be 90 days from the date of notice to proceed including 45 days of construction once the equipment is available.
- B. Mechanical contractor shall be responsible for coordinating a shut-down of the chilled water system with Baldwin County Commission Facility Maintenance. A shut-down shall be coordinated prior to beginning any work. The extent of the shut-down shall be for a maximum of four days (96 hours). Mechanical contractor shall be responsible for providing chilled water for building operations through the use of a temporary chiller. Acquiring a temporary chiller with power and operation shall be the responsibility of the mechanical contractor. Additive Alternate #1, on the bid form, shall identify the cost of a temporary chiller for use to supply chilled water to the building until the project chiller is installed and operational.
- C. Liquidated damages shall be applied to this project. Liquidated damages shall be applied in two phases. The first phase of liquidated damages is based on the number of days beyond the maximum four days allotted for the shut-down to install the new chiller and verify the chiller is operational. The first phase of liquidated damages shall be \$750.00 per day. The construction schedule beyond the chiller becoming operational is sufficient for completing construction of the project. However, failure to complete project construction within the 90 days beyond the notice to proceed shall initiate a second phase of liquidated damages. The second phase of liquidated damages shall be \$500.00 per day.

END OF SECTION 01030

SECTION 15100 - GENERAL REQUIREMENTS FOR MECHANICAL WORK**PART 1 - GENERAL****1.1 GENERAL SCOPE OF WORK**

- A. This project is for the removal of the existing heating, ventilating and air conditioning equipment that are connected to the hydronic piping system and the installation of a completely new equipment with piping modifications. Air cooled water chillers, piping and circulation pumps are to be installed new. It is intended that specifically identified equipment shall be installed new to ensure complete and functional systems. More specifically, equipment included in this scope of work shall include, but is not limited to:
1. Air Cooled Water Chiller
 2. Pumps
 3. Hydronic Piping Systems with Auxiliary Chiller Branch Piping Connections
 4. Controls
- B. The contract drawings specifically describe the work required for each unit of equipment. The contract specifications specifically describe the products to be provided. All documents shall serve as an integral part of the other and be considered as one. Any conflicts between these documents shall be resolved prior to bidding. It is expected the worst case description shall take precedence in the event of a discrepancy.

1.2 GENERAL REQUIREMENTS

- A. Scope of Section: Include all materials, equipment, and labor necessary for complete and properly functioning mechanical installations in accordance with local and state codes, contract drawings and as specified in all 15000 series of these specifications.

1.3 DRAWINGS

- A. Mechanical drawings indicate the general arrangement and extent of work. Exact locations and arrangements of materials and equipment shall be determined in the field prior to beginning any work to conform in the best possible manner with the surroundings and with the adjoining work of other trades. References to locations of equipment, devices or fixtures shall be verified in the field with actual dimensions and not by scaling drawings.

1.4 COORDINATION OF WORK

- A. Prior to installation, coordinate all work with work of other trades and with field conditions in sufficient detail to preclude interferences between the work of different trades and to insure necessary clearances at equipment. Work requiring necessarily fixed locations such as graded piping shall take precedence over work not requiring such fixed locations and shall establish permissible routing of services associated with the latter. Should work be performed without adequate coordination so that interferences occur between work of different trades, Contractor shall eliminate such interferences by requiring necessary rework by the trades involved. Such rework shall meet approval of Engineer and shall incur no additional cost to Owner.

- B. The Contractor shall coordinate the contract drawings and specifications for all other trades and shall report any discrepancies between them to the Engineer and obtain from him written instructions for changes necessary in the mechanical or electrical work.
- C. All work shall be installed in cooperation with all other trades. Before installation, the Contractor shall make proper provision to avoid interferences in a manner approved by the Engineer. All changes required in the work of the Contractor due to his neglect shall be corrected by the Contractor at his own expense.

1.5 CODES, PERMITS, TAXES

- A. Governing Law: Refer to "General Conditions". Work shall meet requirements of applicable codes, ordinances, rules and regulations, in effect at time of signing contract of any body or bodies having jurisdiction, including utilities.
- B. The Contractor shall comply with all county, district, municipal, or local building codes, interpretations, buildings permits to include but not be limited to the latest editions of:
 - 1. International Building Code – 2021
 - 2. International Plumbing Code – 2021
 - 3. International Mechanical Code – 2021
 - 4. International Fire Protection Code – 2021
 - 5. NFPA-90A - Installation of Air Conditioning and Ventilation Systems
 - 6. Local Municipal Codes
- C. The Contractor shall obtain and pay for all required permits, inspections, and certificates of inspection. Certificates of inspection shall be delivered to the Engineer upon completion of the job.
- D. Correction of Work: Work done contrary to above requirements shall be corrected at no additional cost to Owner.
- E. Permits, Fees and Taxes: Refer to "General Conditions". Secure and pay for all necessary permits, inspections, licenses, meters, connections, etc. that may be required; pay all required taxes. Owner shall pay any environmental impact fee incurred.

1.6 DISCREPANCIES

- A. In case of difference between drawings and specifications or where drawings and/or specifications are not clear or definite, the subject shall be referred to Engineer for clarification and instructions. Such items should be directed to Engineer prior to taking bids.

1.7 SUBMITTALS

- A. Refer to Section "General Requirements".
- B. Material List: Within thirty (30) days of award of contract submit a complete list of materials to be provided for the mechanical work. List shall include manufacturer's name and catalog number or series for each item on list.
- C. Shop Drawings: Before commencing work, submit drawings of all mechanical materials and equipment to be furnished under this contract. In addition, submit other drawings or diagrams, dimensioned and in correct scale, requested by Engineer to clarify the work intended to show its relationship to adjacent work or work of other trades. Drawings shall clearly indicate all

characteristics, special modifications or features, and exceptions to or deviations from contract requirements.

- D. Samples: Submit samples of materials upon request for approved substitutions and as listed elsewhere herein. Samples shall duplicate materials, workmanship, and finish of products intended for installation.

1.8 RECORD DRAWINGS

- A. Provide in accordance with "General Requirements" section.

1.9 INSTRUCTIONS

- A. Personnel: After completion of installation, competent personnel shall be furnished to instruct Owner's personnel in operation and maintenance of systems.
- B. Written: Furnish three (3) copies of instructions for operating various systems, including complete description of functions and operations of each piece of equipment, automatic control hook-up. Control devices shall be identified and their actual location in building noted on diagrams. Include cleaning, oiling, and greasing instructions of each item of equipment. Spare parts list and source of supply shall be identified for each item of equipment. Furnish in loose leaf hardboard 3-ring binders to Engineer (for delivery to Owner).

1.10 FINAL CHECK

- A. Before submitting proposals, each bidder shall examine all drawings and specifications issued by the Engineer and shall examine the site of work. He shall be fully informed as to character of his work and coordination of his work with that of other trades. No consideration will be given at a later date for alleged misunderstandings as to requirements of work, materials to be furnished or conditions required by nature of site.

1.11 FOUNDATIONS

- A. The Contractor shall furnish all special foundations and supports for equipment which he installs and which are separate and distinct from building construction as shown by Engineers drawings. Support equipment from building structures in a manner acceptable to the Engineer.

1.12 SAFETY PROVISIONS

- A. Belt, pulleys, chains, gears, couplings, projecting set screws, keys and other rotating parts located so that any person may come in close proximity thereto, shall be fully enclosed or properly guarded.

1.13 RELATED WORK

- A. The following items of material and labor incidental to or related to the work will be provided as follows:
- B. Cutting and patching of existing building structure for location of pipes, air ducts, etc., shall be provided by this Contractor. Patching and finishes shall be performed by affected trades.
- C. Furring around pipes, ducts, etc., shall be by General Contractor.
- D. All exposed metal work shall be coated or painted with a corrosion resistant material. Coordinate procedure and color with Engineer.
- E. All electrical power wiring, conduit, etc., for motors and motor starters shall be furnished and installed by the electrical contractor. Electrical automatic control devices, relays, etc., required

for electrical interlock for operation of system shall be furnished complete by this Contractor in strict accordance with all requirements of wiring specifications as a part of the control system. Motor starters shall be provided under this section of this specification.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Quality: Conform to the quality and features specified and indicated on drawings. Where material or equipment is indicated or necessary, but not specifically described in the specifications or drawings, such shall conform to the quality and features of similar items so described or otherwise indicated.

2.2 SLEEVES

- A. Pipe Sleeves:
1. Walls and Partitions: Sleeves 8" Diameter and Smaller (Above Grade): Mild steel or plastic built into wall, partition or beam sized to pass pipe and covering, leaving a clear space of ¼" minimum between covering and sleeves.
- B. Above Grade: Make openings around pipes, etc., passing through sleeves draft-free and vermin-proof by packing solidly using mineral wool or glass fiber.

2.3 SUPPORTING DEVICES

- A. Inserts:
1. Preset Type: Malleable iron with removable interchangeable nuts having lateral adjustment of not less than 1". Continuous inserts shall have a capacity of 2000 lbs. per foot and shall be hooked over reinforcing. Acceptable: C-B Universal Fig. 282; Unistrut Products Co., P-300; Binkley B-32-1.
 2. Afterset Types: Self-drilling style expansion shields shall be used in concrete and brick. Toggle bolts shall be used on block walls and partitions.
- B. Steel Framing:
1. Support hangers from bar joists with clamps or other means acceptable to Engineer. Refer to Construction Drawings for limitations and requirements for providing reinforcing of joists at hanging points.
 2. Hangers shall be plumb within 1/2" in 4' and spaced as required for the service intended.
 3. Where unforeseen conditions necessitate additional hangers, install same in locations subject to Engineer's approval.
- C. Stud Partitions:
1. All anchorage shall be to studs or solid blocking built into the wall.
- D. Equipment and Piping:

1. Provide angles, brackets, clamps, anchors, braces, frames, rods and other miscellaneous steel items as necessary for support of equipment and piping specified herein.
2. All piping, etc., shall be run parallel with the lines of the building, unless otherwise shown or noted on the drawings. The different service pipes, valves, fittings, etc., shall be so installed that after the covering is applied there will be not less than 1/2" clear space between the finished covering and other work, and between the finished covering of parallel adjacent pipes. Hangers shall be so spaced to prevent sag and to permit proper drainage. Exact location of piping, ducts, etc., shall be coordinated between subcontractors so that there will be no interference.
3. Pipe shields shall be provided at all pipe hangers supporting insulated pipe. Pipe shields shall be provided in conjunction with wood spacers of equal thickness to insulation and placed on bottom half of pipe between pipe and hanger.

2.4 FLOOR, WALL AND CEILING PLATES OR ESCUTCHEONS

- A. Furnish escutcheons or fabricated plates or collars and install at each location where pipe or duct passes through a finished surface. Escutcheons for flush sleeves shall be equal to Benton & Caldwell No. 3A chromium plated brass; for sleeves extending above floor shall be equal to Benton & Caldwell No. 36 chrome plated brass. Collars or plates for ducts and large diameter insulated pipe shall be fabricated of 18-gauge galvanized copper bearing steel, secured to structure and neatly fitted around duct or pipe.

2.5 BELT DRIVES

- A. Each motor driven machine not direct connected shall be equipped with V-belt drive. Belts shall be of correct cross section to fit properly in sheave grooves. Belts for each drive shall be carefully matched. Sheaves shall be of cast iron or steel, bored to fit properly on shafts and secured with keys of proper size. Variable and adjustable pitch sheaves shall be furnished for fans and shall be selected to that required rpm will be obtained with sheave set approximately in mid-position. Rating of each drive shall be as recommended by manufacturer for service, but shall be at least 1.5 times nameplate rating of motor.
- B. Mechanical Contractor shall be responsible for providing and installing all necessary sheaves required to properly balance systems.

2.6 BELT AND COUPLING GUARDS

- A. Equip each belt drive with a guard constructed of #12 U.S. standard gauge 3/4" diamond mesh steel wire screen or equivalent, welded to 1/2" steel angle frames which shall enclose all belts and sheaves. Tops and bottoms of guards shall be of #18 U.S. standard gauge steel. Braces or supports must not "bridge" sound and vibration isolators. Guards shall be designed with adequate provision for movement of motor required to adjust belt tension. Provide means to permit oiling, use of speed counters, and other maintenance and testing operations with guard in place. All direct drive equipment shall have coupling guards in accordance with Florida Department of Business Regulation safety regulations.

2.7 MARKING

- A. Marking:

1. Pipes: All utility piping above and below the ceiling shall be stenciled with name of service to indicate the use of pipe and with arrows to indicate direction of flow. Stencils shall be applied after final painting is completed. In lieu of stencils, pipe identification labels similar to "Brady" may be used. Bands shall be color coded. Markings shall be in accordance with ANSI Standard A-12.1.
2. Equipment: Shall be stenciled as specified above. Small equipment such as starters, control devices, etc., shall be neatly labeled with 3/4" engraved, plastic labels, white letters on black background.

PART 3 - EXECUTION

3.1 ELECTRICAL

- A. General: Unless specified otherwise, motors, starters, and control devices shall be furnished under the division of the specifications that covers the driven equipment. Motor starters shall be installed by the electrical contractor except where as an integral part of the equipment. Reference electrical plan for location of starters relative to specific equipment. All electrical power wiring, conduits, and connections shall be provided under the Electrical Section. Contractor furnishing driven equipment shall coordinate wiring diagrams with contract requirements and shall furnish coordinated wiring diagrams for installation.
- B. Motors: Unless otherwise specified, each motor shall have sufficient capacity to start and operate the machine it drives without exceeding the motor nameplate ratings the speed required. (Except that the NEMA standard service factor may be applied to motors that are water or refrigerant cooled). The horsepower specified are those estimated to be required by the equipment when operating at specified duties and efficiencies. If the actual horsepower for the equipment to be furnished differs from that specified or indicated on drawings, it shall be the responsibility of the Section furnishing equipment to insure that proper size feeders, breakers, etc., are provided at no change in contract cost. Motors shall be rated for continuous duty, at 100% of nameplate rating with a service factor of 1.15. Squirrel cage induction motors shall have normal starting torque, full voltage low starting current, constant speed continuous duty type. Motors shall be wound for specified voltage.
Starters shall be furnished under this section of the specification:

1. General: As specified with modifications and accessories as indicated in other Sections of this specification or by control diagrams on drawings. Starters shall have proper rating for motors controlled.
2. Over Current Protection: Contacts shall break each ungrounded line to the motor. A thermal Over current device shall be provided in each ungrounded line. All contacts shall open simultaneously upon tripping of any Over current device.
3. Magnetic Starters: For motors of 1/2 HP or larger, combination type with unfused disconnect switch, unless specified otherwise in other sections. Each starter shall have a control transformer with fused 120 volt maximum control circuit. Control transformer shall be of adequate capacity for all controls on the circuit. Starters shall have on-off-automatic switches in cover.
4. Manual Starters: Provide for motors through 3/4 HP unless specified otherwise under equipment specifications.

5. All starters shall be provided with hand-off-auto switches, normally open and normally closed auxiliary contact.

END OF SECTION 15100

SECTION 15200 - TESTING AND BALANCING WATER DISTRIBUTION SYSTEMS**PART 1 - GENERAL****1.1 GENERAL REQUIREMENTS**

- A. The General Conditions, Supplementary Conditions and Division 1, General Requirements, apply.
- B. This portion of work shall be provided for all new equipment. Water flow shall be validated through the chiller, two pumps and three air handling units. The sequence of operation shall be verified with minimum flow through the chiller being the minimum flow through the chilled water pumps.

1.2 QUALITY ASSURANCE

- A. Testing Agency:
 1. Submit name, address, and qualifications of testing agency to Engineer for approval prior to start of testing.
 2. All system adjustments, test and balances are to be performed by a company regularly and exclusively engaged in this work. Agency shall be a member in good standing of the Associates Air Balance Council (AABC).
 3. Procedures shall be as outlined in the AABC Publication 716-79 for total system balance.

1.3 SUBMITTALS

- A. Test Reports: After completion, submit three (3) hard copies of the certified copies of test and balance report to the Engineer for review and as a project record document.

1.4 JOB CONDITIONS

- A. Commencement of Test: Do not begin balancing until the systems have been completed and are in full working order, or at the direction of the Engineer, place any part thereof in operation for the purpose of balancing.
- B. Plans and Data: Furnish the balance agency one (1) complete set of all approved up-to-date mechanical plans and shop drawings of all hydronic water distribution equipment.

1.5 FIELD QUALITY CONTROL

- A. Performance Data: Record the following data and submit to the Engineer.
 1. System Component Capacity: Record and calculate all data necessary to demonstrate capacity under actual operating conditions, and adjust valves, control valves and machine drives to obtain a suitable operating balance for each system. Record data for each item of equipment simultaneously with data from all associated equipment to permit evaluation of total system performance. Data to include the following:
 - a. Actual voltage and current input for each motor.
 2. Check and record water flow, entering and leaving temperatures for all chillers, pumps, etc.

3. Mechanical contractor is responsible for providing and installing all necessary sheaves required to properly balance systems.

1.6 COORDINATION

- A. It shall be the test and balance sub-contractors responsibility to coordinate the owner, program manager, design consultant, general contractor, HVAC sub-contractor and HVAC controls sub-contractor to ensure all parties are informed of progress toward completion as well as difficulties encountered toward that end.

1.7 TEMPERATURE CONTROLS

- A. Set adjustments of all controllers to operate as indicated. Provide testing agency personnel with instruments to verify reports to Engineer.

1.8 FINAL TEST

- A. At conclusion of testing agency's work, demonstrate to the Engineer that the equipment is mechanically sound, that the systems deliver the rated output without objectionable noise, distress or vibration, and that the temperature controls are functioning properly.

END OF SECTION 15200

SECTION 15800 - HEATING, VENTILATION AND AIR CONDITIONING**PART 1 - GENERAL****1.1 GENERAL REQUIREMENTS**

- A. The General Conditions, Supplementary Conditions and Division 1, General Requirements, apply.

1.2 CODES, FEES, PERMITS

- A. The Contractor shall comply with all county, district, municipal, or local building code, interpretations, building permits and assessments of fees for building permits, and ordinances.
- B. The Contractor shall obtain and pay for all required permits, inspections, and certificates of inspection. Certificates of inspection shall be delivered to the Engineer upon completion of the job.
- C. The Contractor shall comply with the latest revisions of all county, district, municipal, or local building codes, interpretations, buildings permits to include but not be limited to:
 - 1. International Building Code – 2021
 - 2. International Mechanical Code – 2021
 - 3. International Plumbing Code – 2021
 - 4. Local Municipal Codes

1.3 RELATED WORK SPECIFIED ELSEWHERE IN THE SPECIFICATIONS

- A. General Requirements for Mechanical Work - Section 15100.
- B. Test and Balance - Section 15200.
- C. Controls – Section 15950.
- D. Electrical - Division 16000.

1.4 RESPONSIBILITY OF BIDDER

- A. Each bidder shall visit the site of the proposed work and fully acquaint himself with conditions relating to the construction requirements so that he may fully understand the facilities, difficulties and restrictions contingent upon the execution of the work under this contract. The failure or omission of any bidder to receive or examine any form, instrument, addendum or other document shall in no way relieve any bidder from his obligations with respect to his bid or the contract. The submission of a bid shall be taken as prima facia evidence of compliance with this paragraph and that he has included in his proposal every item of cost necessary for a complete installation of air conditioning, heating and ventilation operations strictly as planned, specified, and intended.

1.5 SUB-DIVISIONS OF WORK

- A. Each sub-division of work includes furnishing and installing all materials to make that part of work complete, and shall comprise all auxiliaries, setting of equipment, sleeves through building construction where required and etc., all in complete coordination with General Contractor and in cooperation with other trades. It is contemplated that all sub-divisions of work when completed will form heating, air conditioning, and ventilation system for this

project.

1.6 DRAWINGS

- A. The drawings for the Heating, Ventilating and Air Conditioning for this job are diagrammatic. The Contractor shall make his own measurements at the site and in the buildings during construction and install the systems as the work progresses in such a manner that the equipment, piping, conduit, panels, and ductwork will fit into the finished space provided maintaining headroom and maintenance accessibility; and be neatly installed.
- B. Contractor shall provide all fittings and accessories as necessary for a complete installation, whether or not specifically mentioned or shown.

1.7 FOUNDATIONS

- A. The Contractor shall furnish all special foundations and supports for all equipment and piping which he installs.

1.8 SAFETY PROVISIONS

- A. Contractor shall be required at all times to perform his work in strict accordance with the Williams-Steiger Occupational Health and Safety Act of 1970.

1.9 NOISE AND VIBRATION

- A. This Contractor shall be held responsible for elimination of all noises or vibrations transmitted to occupied areas from all equipment and piping which he may install.

1.10 PAINTING

- A. Any air device finish that is damaged or chipped, shall be spot painted to match existing surface. Any rusty or corroded finishes shall be thoroughly cleaned and painted two coats of paint - one prime and one finish coat.

1.11 TESTS AND GUARANTEES

- A. After completion of his work, and when the building is ready for occupancy, this Contractor shall operate the air conditioning or heating system for a period of two days. During the tests, the Contractor shall adjust outlets, etc.
- B. The Contractor shall repeat operational sequence during heating and/or cooling season, whichever had not been subject to prior test period.

1.12 SHOP DRAWINGS

- A. Materials and equipment schedules shall be submitted (at least one hard copy) as soon as practicable but not later than thirty (30) days after the date of award of contract, and before commencement of installation of any material or equipment. A complete schedule of the material and equipment proposed for installation shall be submitted for approval. The schedule shall include catalogs, cuts, diagrams, drawings, specifications and such other descriptive data as may be required by the Engineer. All materials required to be submitted for approval under this section shall be submitted at one time. Partial submittals will not be considered. They will be returned as "not approved".
- B. Shop drawings shall be submitted for approval on the following items of equipment. Subject drawings shall include all data pertinent to the performance and installation of all equipment.

1. Insulation Materials
2. Air Cooled Water Chiller
3. Pumps
4. Temperature Controls
5. Heat Tracing

1.13 QUALITY OF MATERIALS AND EQUIPMENT

- A. It is not the intent of these specifications to limit material and/or equipment selections to one manufacturer; however, the Engineer reserves the right to be the final and sole judge with regard to equals.
- B. Approvals of equipment are based on capacities, equality of workmanship and components, or general and special construction features. Approval of equipment does not relieve the Contractor of coordination responsibility with other trades.

1.14 SUBMITTALS

- A. Product Data: Submit manufacturer's latest published product data for all materials for approval. See Section 15100.

1.15 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver distribution devices in individual wrappings to prevent damage to finish surface of device. Store in a dry, protected area until installed. After installation of devices, clean soiled finishes.

1.16 CHILLED WATER SYSTEM FLUSHING CHEMICAL TREATMENT PROCEDURES

- A. Reference project plans for flushing/chemical treatment procedures to be followed and strictly adhered to without deviation.

PART 2 - PRODUCTS

2.1 INSULATIONS

- A. General: All insulation work shall be done by workmen thoroughly competent in this trade and employed by a full-time insulation contractor. Failure to finish work neatly, failure to vapor proof joints, ragged edges, failure to cover all fittings, valves, dents on surface, etc., shall be proper cause to reject this work. This Contractor shall call same to the attention of the Engineer before such work has progressed beyond the point of economical correction.
- B. All material used shall be new and of first line quality and shall be as recommended by the manufacturer for the service intended. All insulation materials, including sealer material, adhesive, finishes, etc., shall be non-combustible. Complete installation shall be in accordance with manufacturer's requirements.
- C. This Contractor shall be responsible for the removal from the site of all excess materials, cartons, scrap, etc. He shall protect equipment installed by others, cleaning such equipment should mortar, plaster, adhesive, etc., fall on same.
- D. The following service shall be insulated with the listed thickness of materials:

SERVICE	INSULATION MATERIAL	THICKNESS	FINISH
Water Box of Chilled Water Pumps	Sheet Armaflex	3/8"	None
*Chilled Water Supply & Return Piping Above Grade	Foam Glass Sectional	1-1/2"	FRJ jacket

* All exposed exterior chilled water piping shall be provided with an 18 gage aluminum jacket over insulation. Labels with directional flow arrows shall be applied to outside of jacket.

- E. All Armaflex insulation shall be slipped over piping with all joints sealed with an approved mastic.
- F. All insulation shall be installed as per material manufacturer's printed instructions. All valves, fittings, strainers, Pete's plugs, etc., shall be insulated with molded fittings of same material as piping and plastic fitting covers installed over all fittings. Insulation shall be Owens-Corning Fiberglass, or approved equal, as scheduled above. All materials, jackets, adhesives, etc., shall meet smoke developed ratings and fire classifications of UL.
- G. Insulation subcontractor shall submit complete product data brochures on insulation materials, jackets, finishes, mastics, cements, etc., for approval along with complete installation brochures for all materials used on this project. Installation methods shall be in accordance with printed instructions from material manufacturers.
- H. It shall be the responsibility of the insulating subcontractor to coordinate hanger locations and prevent crushing or breaking finishes.
- I. All chilled water piping at chillers at exterior of building shall be covered with 18-gauge aluminum jacket over insulation. Coordinate insulation with heat tracing.
- J. All insulation materials, jackets, adhesives, coatings, etc., shall meet the Underwriters' Laboratories fire hazard classification (UL 723), for flame spread rating of 25, smoke developed rating of 50, and fuel contributed rating of 50.
- K. Pipe insulation shall have tightly butted joints, taped seams to cover the entire system, including air vents.

2.2 PIPE HANGERS, SUPPORTS, ETC.

- A. Support all piping from building structure with hangers fastened to structural framing members at locations as indicated on the Structural Drawings. Refer to Structural Drawings for limitations and requirements for providing reinforcing of joists at hanging points. Do not anchor into metal deck. Hangers shall be located on points not to exceed the spans indicated on Structural Drawings. Where the provided structural support members are spaced greater than allowable spacing for the pipe sizes provide supplements support designed to support the pipe and spanning between the structure provided. Where no limitations are indicated on

Structural or Mechanical Drawings hangers shall be located on points not to exceed the following maximum span. Support hangers with all thread rods of diameter shown. This does not apply to PVC piping.

1 1/4" pipe	Max. span 7', hanger rod 3/8"
1 1/2" pipe	Max. span 9', hanger rod 3/8"
2" pipe	Max. span 10', hanger rod 1/2"
3" pipe	Max. span 12', hanger rod 5/8"
PVC piping	Max. span 4', hanger rod 3/8"

- B. Pipe hanger selection and application shall conform to the Manufacturer's Standardization Society of the Valves and Fittings Industry Publication Sp-69, Materials Design, and Manufacturer's Publication SP-58. See "Mechanical General Requirements" for additional requirements.
- C. Supports used on steel or cast iron pipe shall be malleable iron or steel.
- D. Where pipe hangers penetrate fire rated barriers at the underside of the joists, seal openings around hangers with UL approved fire caulking equal to barrier rating.
- E. Where necessary to prevent transmission of vibration, supports with vibration suppressors shall be installed as required.
- F. Wherever pipe passes through existing walls above grade, 10-gauge galvanized steel sleeves of the proper size and length shall be provided. Where pipe is insulated, sleeves shall be large enough to accommodate insulation.
- G. Wherever pipes pass through finished floors, walls, or ceilings, provide chromium plated brass escutcheons. Escutcheons or insulated lines shall be large enough to extend around insulation. All escutcheons shall be firmly attached to pipe and shall cover entire masonry opening.
- H. Anchors shall be installed on pipe lines where necessary to control direct expansion or contraction.
- I. Hangers on insulated lines shall be large enough to accommodate the insulation. Saddles and spacers shall be provided at all pipe hangers. Hangers shall be provided at all pipe supports. Do not support piping from other piping.
- J. Insulation protector shields of 20-gauge steel, 18" long and extending half around insulated pipe shall be used at all hanger points. Provide wooden spacers of thickness equal to insulation between pipe and hanger.

2.3 PIPING INSTALLATION

- A. Pipe shall be cut accurately to measurements established at the building, and shall be worked into place without springing or forcing, properly clearing all windows, doors, and other openings. Excessive cutting or other weakening of the building structure to facilitate piping installation will not be permitted. All changes in direction shall be made with fittings. All pipes extending through the roof shall be flashed by this Contractor, but counter flashed by the roofing contractor. Piping connections to equipment shall be in accordance with details shown on the drawings. All open ends of the pipe lines or equipment shall be properly capped or plugged during installation to keep dirt or other foreign material out of the system.
- B. Service valves shall be installed where required for the proper servicing of the equipment. All joints between sections of pipe and between pipe and fittings 2½" and larger shall be fusion welded. The welding shall be in accordance with the recommendations of the American

- Welding Society. All such changes in direction and intersections of lines shall be made with welding fittings, except as otherwise specifically permitted hereinbefore. Mitering of pipe to form elbow, notching straight runs to form tees, or any similar construction will not be permitted. Cement solvent fittings shall be installed on all PVC piping.
- C. Threadolets and weldolets may be used where branch size is less than one-half the main size.
 - D. Joints: All screw joints shall be made with tapered threads properly cut. Screw joints shall be made perfectly tight with a stiff mixture of graphite and oil, applied with a brush to the pipe threads only, and in no case to the fittings. All flange joints shall be faced true, packed and made up perfectly square and tight.
 - E. All piping systems shall be pressure tested at 100 psi as hereinafter specified.
 - F. This Contractor shall provide for expansion and contraction of all piping installed by him and must make proper provisions so that there will not be undue strain on any part of the piping or any work installed by others.
 - G. All lines shall be of sizes indicated, shall run approximately where shown on plans. Water lines shall grade downward against the direction of flow 1" in 30 lineal feet of run.
 - H. The high points of all forced water mains and branches shall be manually vented. Copper drain lines from manual air vents shall be extended to nearest floor drain or as directed by Engineer.
 - I. All changes in pipe size shall be made with reducing fittings or couplings. No bushings will be allowed.
 - J. Unions shall be provided adjacent to all valves and mechanical equipment receiving screwed pipe and companion flanges shall be provided on all flanged valves, pumps, and other mechanical equipment.
 - K. All piping systems shall be flushed with clean water and all strainer baskets thoroughly cleaned before placing into operation. Flushing shall be witnessed by Engineer.
 - L. Piping Materials: Piping materials to be of domestic standards, new and free of defects. Piping certification shall be provided upon request of Engineer.
 - M. The following classification of piping shall be used on the following services:
 - 1. Chilled Water Piping - Schedule 40 black steel, ASTM A53, Grade B. At contractors option, piping 2 1/2" and smaller can be type "L" hard drawn copper type.
 - 2. Drain Piping - Schedule 40 PVC pipe.
 - 3. Cold Water Piping - Type "L" hard drawn copper.
 - N. Heat trace all piping exposed to weather with electric heat cable. Cable to be 120 volt self-regulating type with 3.8 watts per linear foot. Cable shall be rated for 500°F and shall be 15-gauge outside diameter with Teflon insulation. Cable shall be equal to Raychem Type XL and shall be installed in accordance with manufacturer's requirements. Coordinate power requirements with Electrical Contractor.
 - O. Fittings: All fittings shall be new, free of defects and of the following types for service listed:
 - 1. For chilled water piping - 2" and smaller, 150# screw pattern, black malleable in accordance with WW-P-521. 2 1/2" and larger, steel welding fittings, long radius type.
 - 2. For water piping - wrought copper sweat pattern.
 - 3. Drain piping - 150 psi PVC cement joint fittings.

- P. Unions: Unions shall be installed at all locations shown on drawings. For 2" and smaller on systems with 150# fittings, use 150# ground joint screw pattern unions. For welded systems, use 150# flanges.

2.4 VALVES AND COCKS

- A. Valves shall be manufactured by Crane, Jenkins, Milwaukee, Nibco, Red-White or Stockham. Valves shall be equal to the following:

Gate Valves:

2 1/2" and Larger - 125#, Stockham No. G612
2" and Smaller - 125#, Stockham No. B-105

Ball Valves:

2 1/2" and Larger - 125#, Stockham No. S214-BR-TT
2" and Smaller - 150#, Stockham No. S216-BR-RT

Check Valves:

2 1/2" and Larger - 150#, Stockham No. G-931
2" and Smaller - 200#, Stockham No. B-435

Globe Valves:

2 1/2" and Larger - 125#, Stockham No. G-512
2" and Smaller - 200#, Stockham No. B-22

Butterfly Valves:

2 1/2" and Larger - 200#, Stockham No. LG512-DS3-B

- B. Provide extended neck for all valves to allow for proper installation of insulation. Provide exposed tag for valve with manufacturer, model, size, and unit served.
- C. Globe valves shall be used for balancing hot water service. Globe valves shall be used for balancing chilled water service on 2" and smaller pipes. Butterfly valves shall be used for balancing chilled water service on 2 1/2" and larger pipes. Ball valves may be used in lieu of gate valves 4" and smaller. Flow Design, Inc. flow set balancing system with valves, strainers, P/T plugs, unions, and venturi flow meter may be provided by single manufacturer at contractor's option.

2.5 SPECIALTIES, PIPING SYSTEM (CHILLED WATER)

- A. Strainers shall be provided before each control valve ach pump and each chiller. Strainers to be Sarco Type AT with brass mesh for water operation.
- B. Thermometer wells shall be stainless steel 3/4" NPT with extension neck, cap and chain equal to Trerice #5370.
- C. Gauge Cocks shall be Trerice Model 380, 1/4" size with union connection. Provide 1/4" plug in gauge openings.
- D. Thermometers: Pipe thermometers to be 9" adjustable angle type with aluminum case. Size to be 3/4" brass separable socket type with extension neck type stainless steel well. Unit to be Trerice BX Series. Range to be 0 - 100°F for chilled water and 30 - 240°F for

hot water. Duct thermometers to be Trerice B 80,000, range 09 - 180°F, 5" dial.

Thermometers shall be installed in piping assembly of chillers, pumps, air handling units, etc on the entering and leaving sides.

- E. At all cooling and heating coils, provide pressure/ temperature indicating devices, ¼" NPT with extended neck equal to "Pete's Plugs" as manufactured by Peterson Engineering Company. Provide cap with chain.
- F. Gauges: Gauges to be 4 1/2" dial cast aluminum cast with range from 30" vacuum to 60 psi. Provide Trerice #835 needle valve at each gauge. Unit to be equal to Trerice Series 500 X. Vents on water system - Hoffman No. 79 or approved equal. Gauges shall be installed in piping assembly of chillers, pumps, air handling units, etc on the entering and leaving sides.
- G. Expansion Tank: Construction shall be fabricated steel designed and constructed per ASME code requirements. Bladder shall be heavy duty and shall be removable for horizontal mounting and operation up to 125 psig working pressure and 240° F operating temperature. Manufacturer shall be Armstrong, Bell and Gossett, Taco or Wheatley.
- H. Air Separator: Construction shall be fabricated steel designed and constructed per ASME code requirements. Air separator shall have NPT or flanged connections as required. Air separator shall have separate top fittings for connection to system expansion tank and for air vent. There shall be a separate bottom connection for blowdown cleaning. Manufacturer shall be Armstrong, Bell and Gossett, Taco or Wheatley.
- I. Water pressure reducing valves, Bell and Gossett No. 7 or approved equal, set at 25 psi.
- J. ASME Safety Relief Valves: Bell and Gossett No. 5 or approved equal, set to 40 psi.
- K. Circuit setters shall be designed for vertical or horizontal mounting with ball valve construction, Teflon internal seats, calibrated nameplate, precision machined orifice, shredder valve connections and urethane packing insulation. Venturi flow meter and ball valve may be installed in lieu of circuit setter at contractor's option.
- L. Flexible pipe connectors shall be furnished and installed where indicated in specifications and/or on drawings. Flexible connectors shall be 300 series stainless steel braided type manufactured by Flow Design, Inc., Keflex, Metra-Flex, Resisto-flex, Southeastern Hose or approved equal. Joints shall be suitable for pressure and temperature of fluid handled.
- M. At Contractor's option suction diffusers may be used at all pumps to replace valves and strainers.

2.6 PIPE MARKERS

- A. Contractor shall furnish and install pipe markers with flow directions and codes on the following services in all locations:

	Service	Letter	Background
	<u>Code</u>	<u>Color</u>	<u>Color</u>
Chilled water supply	CHWS	Green	White
Chilled water return	CHWR	Green	White
Domestic water	DW	Green	White

- B. Pipe markers shall meet ANSI Standards and shall be equal in all respects to Sexton Name Plate Corporation's Setmark System.

2.7 CIRCULATING PUMPS (CHILLED WATER)

- A. Pumps shall be end suction flexible coupled type mounted on steel or cast iron bases with

enclosed ends and access to permit grouting. Chilled water pump bases shall be cast iron. Motors shall be of horse power and speed as scheduled on the plans. Motor shall be open dripproof type with 1.15 service factor. Casing shall be cast iron with bronze case wear rings. Pumps shall be of the back pull-out type which will allow removal of the rotating element without disturbing the piping. Pump impeller shall be of the enclosed type of cast iron construction and shall be trimmed for scheduled capacities. Pump shaft shall be fitted with a leakless mechanical seal. Pumps shall be mounted on heavy duty cast iron bearing frame. Shaft shall be constructed of carbon steel. Pump bearings shall be permanently sealed type.

- B. Pumps shall be Armstrong, Aurora, Bell & Gossett, or Taco.
- C. All end suction, frame mounted, flex coupled pumps shall have flushed mechanical seals with cyclone separator.
- D. Per Hydraulic Institute recommendation all flex coupled pumps shall be re-aligned after approximately 72 hours (or earliest opportunity to facilitate shut down of equipment) of operation under specified conditions.
- E. Alignment shall be performed by the manufacturer or his assigned representative. Upon completion of alignment a report shall be issued to the Engineer. The coupling shall be aligned with either a dial-indicator or laser. The report shall reflect the coupling make and model number and allowable tolerance. The report shall reflect the final information as recorded for both parallel and angular dimensions.
- F. For one year after "substantial completion," the pump manufacturer on his designated representation shall inspect on a quarterly basis each pump and clean the cyclone separator. If during this one year, seals, bearings, of couplings require replacement it shall be performed at no cost to the owner.
- G. Contractor has option to use close coupled pumps in lieu of flex coupled pumps.

2.8 SUCTION DIFFUSER

- A. Furnish and install as shown on plans, an angle pattern flow straightening fitting equipped with a combination diffuser-strainer-orifice cylinder, flow straightening vanes, start-up strainer, permanent magnet, and adjustable foot support. The combination diffuser-strainer-orifice cylinder shall be designed to withstand a pressure differential equal to the system pump shut-off head pressure and shall have a free area equal to five times the cross-sectional area of the pump suction opening. The length of the flow straightening vanes shall be no less than 2+ times the diameter of the system pump suction connection.
- B. The flow straightening fitting shall be of cast-iron construction with flanged system and pump connections. The fitting shall have a carbon steel combination diffuser-strainer-orifice cylinder with 3/16" diameter perforations to protect the system pump. The full-length carbon steel flow straightening vanes shall provide non-turbulent flow to the suction side of the pump. The magnet shall be positioned in the flow stream to protect the pump seal(s). The start-up strainer shall be of 16 mesh bronze and the adjustable foot support shall eliminate pipe strain at the flow fitting and pump connection. All internal components shall be replaceable.

2.9 TRIPLE DUTY VALVE

- A. Furnish and install as shown on plans, a pattern valve designed to perform the functions of a non-slam check valve, throttling valve, shut-off valve, and calibrated balancing valve.
- B. The valve shall be of heavy duty iron construction suitable for system working pressures. The valve shall be fitted with a bronze seat, replaceable bronze disc with seat insert, stem, and

chatter-preventing stainless steel spring. The valve design shall permit repacking under full system pressure.

- C. Each valve shall be equipped with brass readout valves (with integral check valves) to facilitate taking differential pressure readings across the orifice for accurate system balance.

2.10 HEAT TRACING

- A. Heat tracing shall be provided for all exterior, above grade chilled water piping in accordance with the manufacturer's recommendations. Heat trace system shall include all cables, connection kits, electronic controller, and installation accessories required in order to provide a complete, fully functioning freeze protection system for the above grade piping. Heating cable shall be stored in a clean dry location. Cable shall be protected from water damage by protecting all cables ends from water ingress. The entire heat trace system shall be listed by a NRTL for freeze protection of above ground water piping.
- B. The electric heat tracing shall be designed, manufactured, and tested in accordance with the latest edition of the following codes and standards:
 - 1. ANSI – American National Standards Institute
 - 2. CSA – CSA Group
 - 3. NEC – U.S. National Electrical Code (NFPA 70)
 - 4. NEMA – National Electrical Manufacturer's Association
 - 5. NESC – National Electrical Safety Code
 - 6. UL – Underwriters' Laboratories, Inc.
- C. The heat tracing cables shall be the self-regulating type designed for 5 watts/ft with 120VAC power. The self-regulating heating cable shall vary its power output relative to the temperature of the surface of the pipe or vessel [Constant wattage cables are not acceptable]. The cable shall be designed such that it can be crossed over itself and cut to length in the field.
- D. Heating cables shall be attached to the piping with general purpose, high temperature, glass filament tape. Contractor shall fix the heating cable to the pipe at 12" intervals by wrapping the tap around the pipe and over the heating cable. Metal cable ties will not be allowed.
- E. Provide with two (2) year manufacturer warranty (from date of purchase) against faulty workmanship and defective materials. Contractor shall provide the Owner an extended product warranty of ten (10) years (from date of purchase) for the heater cables and components. The Contractor shall follow all requirements and procedures necessary to obtain the extended warranty.
- F. The heating cable shall consist of a continuous core of conductive polymer that is radiation cross-linked, extruded between two (2) 16 AWG nickel-plated copper bus wires.
- G. The heating cable shall have a tinned copper braid with a resistance less than the heating cable bus wire resistance as determined in type test (ASTM B193). The braid shall be protected from corrosion and mechanical abuse by a polyolefin outer jacket and a modified polyolefin inner jacket.
- H. Contractor shall provide and installed ETL "Electric Heat Traced" labels on the exterior of the aluminum jacket every ten (10) feet on opposite sides of the pipe for the entire length of heat traced piping. Additionally, all splices, tees, crosses, and power connections shall be labeled on the exterior of the aluminum jacket indicating the presence of a connection kit.

- I. The Contractor shall provide a controller for the heat tracing system. The controller shall be designed for use in non-hazardous locations and have a fixed (non-adjustable) setpoint at 40 °F and can be used for ambient or line-sensing. Controller shall be capable of controlling a single heat-tracing circuit or as a pilot controller of a contactor switching multiple circuits. The controller shall have a NEMA 4X enclosure and be UL listed. It shall be accurate to +/- 3 °F and have a silicone bulb sensor. Sensor material shall be tin-plated copper.
- J. The Contractor shall provide one temperature sensor for ambient temperature sensing for each heat tracing controller. Sensor shall be 100 ohm, platinum, 3-wire RTD. Control shall use proportional ambient sensing for enhanced energy saving.
- K. In order to ensure that the self-regulating heating cable does not increase power output when accidentally exposed to high temperatures, resulting in thermal run-away and self-ignition, the cable shall produce less than 0.5 watts per foot when energized and heated to 350 °F for 30 minutes. After this test, if the cable is re-energized, it must not have an increasing power output leading to thermal run-away.
- L. All connection kits used to terminate heating cables, including power connectors, splices, tees, and end seal kits shall be approved as a system with the particular type of heating cable in use. Under no circumstances shall terminations be used which are manufactured by a vendor other than the cable manufacturer. All splices, tees, and crosses shall be installed underneath the pipe insulation with service loops installed to allow for future service of the piping.
- M. In order to keep connections dry and corrosion resistant, connection kits shall be rated NEMA 4X. All components shall be UV stabilized.
- N. Heating cable terminations shall use cold-applied materials and shall not require the use of a heat gun, torch, or hot work permit for installation.
- O. Components shall be rated to a minimum installation temperature of -40 °F, minimum usage temperature of -75 °F, and maximum pipe temperature of 500 °F.
- P. Prior to installation of heating cable system, Contractor shall verify that all piping to be heat traced has passed all hydrostatic/pressure tests and has been signed off by inspector. Prior to installing heating cable, an insulation resistance test shall be performed by the installing Contractor in accordance with the manufacturer's instructions to ensure the integrity of the cable. All heating cable ends shall be protected from moisture until cable is terminated. Acceptable termination method shall be to install manufacturer's end seals. The installer shall be responsible for providing a complete functional system installed in accordance with applicable national and local codes. Coordinate with Electrical for connection of all electrical wiring and grounding of controller. The following tests shall be performed after the heat cable has been installed but before and after insulating the piping:
 - 1. Continuity test
 - 2. Insulation resistance
 - 3. Capacitance check – circuit length verification
 - 4. Power check
 - 5. Ground fault test
 - 6. Any heat tracing circuit that fails any of the above tests must be corrected prior to system start-up.
 - 7. The results of both sets of tests shall be recorded per the manufacturer's requirements and provided to the Owner.

- Q. A factory certified technician or manufacturer's representative shall be provided for start-up and commissioning of the heat tracing system and controller. Coordinate all controller settings with the Mechanical Engineer prior to programming the Controller. A copy of the commissioning report shall be provided in the submittals package to the Owner.
- R. The heating cable shall be equal to Raychem XL-Trace self-regulating type heating cables. Connection kit system shall be equal to RayClic. Entire system shall be Raychem as manufactured by Pentair Thermal Management.

2.11 AIR COOLED WATER CHILLER

- A. Furnish and install where shown on plans air cooled water chiller. The unit shall have capacity as scheduled when operating in 95°F ambient air.
- B. The unit shall operate at the scheduled voltage and phase electrical service. Total unit power consumption shall not exceed that indicated on the plans. Total unit EER including compressors, fan motors, and controls shall be at least equal to that shown on the plans at the design operating conditions. The unit shall have dual independent refrigerant circuits complete with lead-lag switch for each compressor and be completely factory tested.
- C. The chiller shall be completely factory assembled on a rugged channel steel base and be individually performance tested at full and part load conditions. The unit shall be lead tested and shipped with a full operating charge of Refrigerant R454B. Construction and ratings shall be in accordance with latest ARI Standard 590 and shall comply with ANSI B9.1 Safety Code, National Electrical Code, and ASME Code.
- D. Cabinet: Unit casing and all structural members shall be fabricated of continuous galvanized steel and galvanized steel channel. Exterior casing shall be phosphatized and painted with a baked enamel finish. Chiller shall be provided with spring vibration isolators to reduce vibration transmission.
- E. Compressors: Compressors shall be scroll type with a completely enclosed compression chamber. Compressor shall include centrifugal oil pump, oil level sight glass, and oil charging valve. The number of compressors shall be as scheduled. Provide direct drive motor cooled by suction gas with only three major moving parts and a completely enclosed compression chamber that leads to increased efficiency. Each compressor shall have overload protection internal to the compressor. Note: any deviations from equipment schedules shall require a written request for prior approval fifteen (15) days prior to bid opening. Written requests shall specifically state deviations. (NOTE: 100 ton air cooled water chiller shall have scroll compressors accepted subject to screw compressors not being available. Submit for prior approval before bidding.)
- F. Compressor motors shall be refrigerant gas cooled, high torque, hermetic type, 3600 rpm with inherent overload protection. Provide with across the line motor starter with weather resistant enclosures. Compressors shall be mounted on rubber-in-shear isolators to minimize noise and vibration transmission. Each compressor shall have heaters installed and properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles.
- G. Evaporator: Evaporator shall be a shell and tube type evaporator made of steel with copper tubes. Evaporator shall withstand a refrigerant side working pressure of 430 psig and a water side working pressure of 150 psig. The evaporator shall be tested at 1.1 times the maximum allowable refrigerant side working pressure and 1.5 times the maximum allowable water side working pressure. The evaporator shall have one pass and be provided with immersion heaters to protect the evaporator down to an ambient temperature of -20 °F. The evaporator

shall be covered with a factory installed 1-1/4" Armaflex II or equal (k=0.28) insulation. Foam insulation shall be used on the suction line. Water pipe extensions with insulation shall go from the evaporator to the edge of the unit.

- H. Air Cooled Condenser Coil: The condenser coil shall aluminum fins mechanically bonded to internally-finned copper tubing. The maximum allowable working pressure shall be 650 psig. The condensers shall be factory proof and leak tested at 715 psig. A subcooling coil shall be an integral part of the main condenser coil. Provide architectural louvered panels to cover the complete condensing coil and service area beneath the condenser to prevent unauthorized access to unit components. Condenser coil shall have seacoast application (seacoast protection coating – 6000 hr salt spray test).
- I. Condenser Fans and Motors: Condenser fans shall be direct drive type arranged for vertical discharge. The fans shall be statically and dynamically balanced. Each fan shall be protected by a heavy gauge fan guard. The fan motors shall have permanently lubricated ball bearings and inherent thermal overload protection.
- J. Controls: Field power connection, control interlock terminals and unit control system shall be centrally located in a weatherproof enclosure. Panel access doors shall key lock and include steel rod door retainers to prevent flapping while open. Dead front panels shall protect service personnel against contact with line voltage components.
1. Factory-mounted to the control panel door, the operator interface has a 7 inch LCD touch-screen display
 2. Display shall consist of a menu driven interface with easy touch screen navigation to organized sub-system reports for compressor, evaporator, and motor information as well as associated diagnostics.
 3. The chiller control panel shall provide password protection of all set-points
 4. Chilled water temperature control shall be microprocessor-based, proportional and integral controller to show water and refrigerant temperature, refrigerant pressure, and diagnostics. This microprocessor-based controller is to be supplied with each chiller by the chiller manufacturer.
 5. The front of the chiller control panel shall display the following in clear language, without the use of codes, look-up tables, or gauges:
 - Run time.
 - Number of starts.
 - Current chiller operating mode.
 - Chilled water set point and set point source.
 - Electrical current limit set point and set point source.
 - Entering and leaving evaporator water temperatures.
 - Saturated evaporator and condenser refrigerant temperatures.
 - Evaporator and condenser refrigerant pressure.
 - Differential oil pressure.
 - Phase reversal/unbalance/single phasing and over/under voltage protection.
 - Low chilled water temperature protection.
 - High and low refrigerant pressure protection.
 - Load limit thermostat to limit compressor loading on high return water temperature.
 - Condenser fan sequencing to automatically cycle fans in response to load, expansion valve pressure, condenser pressure, and differential pressure to optimize chiller efficiency.

- Display diagnostics.
 - Compressors: Status (on/off), %RLA, anti-short cycle timer, and automatic compressor lead-lag.
6. On chiller, mount weatherproof control panel, containing starters, power and control wiring, factory wired with terminal block power connection. Provide primary and secondary fused control power transformer.
 7. The chiller controller shall utilize a microprocessor that will automatically take action to prevent chiller shutdown due to abnormal operating conditions associated with: evaporator refrigerant temperature, high condensing pressure and motor current overload.
 8. Provide the following safety controls with indicating lights or diagnostic readouts.
 - Low chilled water temperature protection.
 - High refrigerant pressure.
 - Loss of chilled water flow.
 - Contact for remote emergency shutdown.
 - Motor current overload.
 - Phase reversal/unbalance/single phasing.
 - Over/under voltage.
 - Failure of water temperature sensor used by controller.
 - Compressor status (on or off).
 9. Provide the following operating controls:
 - A variable method to control capacity in order to maintain leaving chilled water temperature based on PI algorithms. Five minute solid state anti-recycle timer to prevent compressor from short cycling. Compressor minimum stop-to-start time limit shall be 2 minutes. If a greater than 5 minute start-to-start, or greater than 2 minute stop-to-start timer is included, hot gas bypass shall be provided to insure accurate chilled water temperature control in light load applications.
 - Chilled water pump output relay that closes when the chiller is given a signal to start.
 - Load limit thermostat to limit compressor loading on high return water temperature to prevent nuisance trip outs.
 - High ambient unloader pressure controller that unloads compressors to keep head pressure under control and help prevent high pressure nuisance trip outs on days when outside ambient is above design.
 - Compressor current sensing unloader chiller that unloads compressors to help prevent current overload nuisance trip outs.
 - Low ambient lockout control with adjustable setpoint.
 - Condenser fan sequencing which adjusts the speed of all fans automatically in response to ambient, condensing pressure and expansion valve pressure differential thereby optimizing chiller efficiency.
 10. Provide user interface on the front of the panel. If display is on the inside of the panel, then a control display access door shall be provided to allow access to the display without removal of panels. Provide user interface with a minimum of the following features:
 - Leaving chilled water setpoint adjustment from LCD input
 - Entering and leaving chilled water temperature output
 - Pressure output of condenser
 - Pressure output of evaporator

- Ambient temperature output
 - Voltage output
 - Current limit setpoint adjustment from LCD input.
11. The chiller control panel shall provide leaving chilled water temperature reset based upon return water temperature.
 12. Digital Communications to BAS system shall consist of a BACnet MS/TP interface via a single twisted pair wiring.
 13. The controller shall be capable of controlling chiller in variable applications. At flow rate changes of 10% or less per minute, controller shall maintain leaving temperature control of +/-2degF). At flow rate changes of up to 30% or less per minutes, chiller shall stay online.
- K. Power and starting components shall include individual factory fusing of each compressor and condenser fan motor, separate fusing for the control circuit, starting contactors including individual contactors for each fan motor, solid state compressor sequence start times, solid state compressor overload protection in all three phases, inherent condenser fan motor overload protection, and unit power terminal block for field connection to a single remote disconnect switch. Disconnect switch shall be provided by Electrical.
- L. Safety and operating controls shall be of the microprocessor type to include unit emergency stop switch, recycling pump down control, manual pump down switch, compressor lead-lag switches, leaving water temperature controller, freeze protection pressure stat, vapor-proof flow switch, fan cycling controls, and low voltage phase failure and phase reversal protection. Controls shall be of the automatic reset type and control chiller capacity in response to the leaving water temperature. Terminals shall be provided for field connection of 115 volt power supplies to the control circuit and cooler heater circuit. During part-load operation, the unit's refrigerant circuits shall be alternately unloaded in steps as scheduled. Unit controls shall provide recycling pump down protection at all times. Chiller capacity controller shall be in response to leaving water temperature.
- M. Low and High Ambient Operation: Units shall be provided with automatic head pressure control to permit satisfactory operation at ambient air temperatures down to 0° F by cycling condenser fans in response to refrigerant head pressure and ambient air temperature.
- N. Unit shall be rated for operation at ambient air temperatures up to 125°F.
- O. Refrigerant Piping: Dual refrigerant circuits shall be completely independent of each other and include a factory insulated suction line, manual liquid line shutoff valve with charging connection, refrigerant filter/drier with replaceable core, liquid sight glass/ moisture indicator, liquid line, solenoid valve, thermal expansion valve, purge valve, and 450 psi relief valve.
- P. Refrigerant and oil pressure connections shall be located within the control center with manual shutoff valves and flare fittings suitable for service gauge hookup.
- Q. Factory start-up and instruction shall be furnished by a factory authorized technician to completely check-out and start-up the liquid chillers. (Minimum 8 hours per chiller). Start-up report shall be faxed to the Owner.
- R. Manufacturer shall provide a ten (10) year parts (including refrigerant), and a ten (10) year repair labor warranty for each chiller. Manufacturer's factory service agency shall execute parts and repair labor warranty. Also manufacturer shall provide an annual inspection with report to the Owner of each chiller. These inspections and reports are to prevent the chiller warranty from becoming void due to the lack of maintenance requirements. Submit a certified letter, signed by an officer of the manufacturer, stating that the start up service agency is approved to conduct check out and start up of the chiller. This certified letter is to be

submitted with the chiller submittal data for approval. Start up log shall be completed on each chiller and submitted to the Owner/Engineer. The manufacturer's service technician shall provide one day of instruction to the Owner's operating personnel. The date of instruction shall not coincide with start up and shall be determined by the Engineer. Manufacturer shall be given 15 days notice prior to the instruction date. The warranty period starts on the same date as the project is determined to be substantially complete.

- S. Annual inspections shall include, but not be limited to: tests and inspections, lubricating, tightening, adjusting, coil cleaning, coil sample analysis, refrigerant leak test, etc. of the chiller as required by the chiller manufacturer's annual inspection report.
- T. The manufacturer's representative shall provide a certified document from the manufacturer stating that the chiller satisfies the minimum energy efficiency ratio scheduled on the drawings. This certification shall be based on factory tests conducted at the manufacturer's plant prior to unit shipment. This document shall be included with the submittal data.
- U. Chiller installation shall include a sound attenuation package to minimize sound transmissions. Sound reduction shall include, but not limited to, compressor and evaporator fans.
- V. Rapid Restart™ after power restoration. The Chiller shall be capable of starting in 85 seconds after power restoration and be able to attain 80% load in less than 150 seconds after power restoration.
- W. Basis of design is Trane Model CGAM. Manufacturers having equipment with similar specifications and characteristics but demonstrate the same salient qualities shall be considered.

2.11 CONTROLS

- A. Existing controls for equipment operations shall be disconnected from the equipment prior to beginning demolition. These controls shall be prepared for reconnection to new equipment. Prior to reinstalling the existing controls a professional review shall be performed to ensure all system components are fully functional. The mechanical contractor shall submit a written report to the Owner identifying deficiencies with associated costs of repair. Once the new equipment is installed the existing controls shall be reconnected. The existing sequences of operation for the removed equipment shall be reused for operation of the new equipment.
- B. Reference control specifications for variations in sequence of operations subject to acceptance of additive alternatives.

2.12 VIBRATION ISOLATORS

- A. Vibration isolator pads shall be provided by equipment manufacturer for proper support of chiller. Installation shall be per manufacturer's written instructions.

PART 3 - EXECUTION

3.1 WATER TREATMENT SYSTEMS

- A. Capable of automatically feeding chemicals, and bleeding system water to prevent scale, corrosion, and biological growths. Systems shall include chemical feed pump, tank, bleed-off solenoid valve, electric timer, and conductivity controller. Provide a polyethylene tank and injection valve assembly for each feed pump. Entire systems shall be warranted for one full year including parts, labor and chemical supplies.

1. Note that the chilled water system is the only system requiring chemical treatment.
- B. Feed Pumps: Positive displacement type with an adjustable capacity and discharge pressure not less than 1.5 times the line pressure at the point of connection. Provide with pressure relief valve, and check valve mounted in the pump discharge.
- C. Tanks: Construct of high density polyethylene, cylindrical in shape, and with a hinged cover. Tanks shall have sufficient capacity to require recharging only once per 7 days during normal operation. Provide tanks with a valved cold water line with suitable air gap. Provide tanks with device to indicate quantity of solution in the tank. Provide electric mixing device with tank.
- D. Valve Injection Assemblies: Provide for each feed pump. Construct of bronze or material suitable for chemicals being used and install in water line to all pumps. Injection fittings shall have male pipe threads. Assemblies shall include shut-off valve and check valve provided close to water line.
- E. Bleed-Off Solenoid Valves: Provide in bleed-off line. Valves shall normally be in closed position and be opened by a 120-volt waterproof solenoid coil. Connect bleed-off line to water line and include a gate valve ahead of solenoid valve. Extend a discharge line from solenoid valves to sewer drain.
- F. Timers: Automatic reset, adjustable type, and electrically operated. House in metal NEMA type cabinet with a hinged front. Timers shall be suitable for 120 volt current.
- G. Conductivity Controllers: Controllers shall measure total dissolved solids in system water by conductivity. Conductivity sensors shall consist of epoxy insulated carbon electrodes and shall not require platinizing. Controllers shall have a meter with a visual readout, set point adjustment with a range between 200 micro ohms/cm and 4000 micro ohms/cm and a red pilot light indicating water conductivity above set point. Units shall operate from a 120-volt power source.
- H. Control Panels: Provide a factory-wired, NEMA 12, control panel for each system. Construct of steel with hinged door and lock, and suitable for surface mounting. Pre-wire controls to numbered terminal strips. Provide laminated plastic nameplates identifying the switch function. Include the following with the panel:
 1. Main power switch and indicating lamp;
 2. MAN-OFF-AUTO selector switch;
 3. Indicating lamp for bleed-off valve;
 4. 120 Volt, heavy-duty, grounded duplex receptacle;
 5. Conductivity controller;
 6. Electric timer; and
 7. Accumulative counter.
- I. Sequence of Operation:
 1. Conductivity Controllers: Provide to open the bleed-off solenoid valve when conductivity of chilled water rises above set point of controller. When conductivity falls below set point, valve shall close.
 2. Timers: Provide to turn feed pumps on for a pre-set amount of time.
 3. Piping: Provide plastic piping and fittings conforming to ASTM D 2996 for water

- treatment system. Piping for feed pump suction shall contain a foot valve and strainer.
4. Water Analysis: Provide make-up water analysis in accordance with the methods of tests of ASTM. Analysis shall include test results for the following:]
- Silica (SiO₂)
 - Insoluble
 - Iron and Aluminum Oxides
 - Calcium (Ca)
 - Magnesium (Mg)
 - Sodium and Potassium (Na and K)
 - Carbonate (CO₃)
 - Bicarbonate (HCO₃)
 - Sulfate (SO₄)
 - Chloride (Cl)
 - Nitrate (NO₃)
 - Turbidity
 - pH
 - Residual Chlorine
 - Total Alkalinity
 - Non-carbonate Hardness
 - Total Hardness
 - Dissolve Solids
 - Fluorine
 - Conductivity

J. Work Includes:

1. Furnish all labor, materials, tools, equipment and services for water treatment system as indicated, in accordance with provisions of the contract documents.
2. Completely coordinate with work of all other trades.
3. See Division 15100 for General Requirements.
4. Services of manufacturer's representative company to provide automatically controlled water treatment programs and equipment as specified herein.

3.2 **TESTING OF PIPING SYSTEMS**

- A. General: Contractor shall notify Engineer of tests twenty-four hours in advance. All tests shall be witnessed by the Engineer or his representative. Contractor shall provide a minimum 6" dial pressure gauge to indicate all test pressures and the scale shall be not more than 0 to 160 psi and 1 psi graduations. Test shall be held for a minimum of five (5) hours with no apparent loss of pressure.
- B. The following systems shall be tested at pressures indicated:
- Chilled water piping - system operating pressures
- C. All tests shall be verified by a test record maintained on the site and witnessed by the signature of inspector.
- D. Any portion of system failing to pass test shall be retested until proven acceptable.

3.3 GUARANTEE

- A. The Contractor shall guarantee, in writing, the entire system when completed to be free from any and all defects and shall guarantee the entire system, controls and other equipment against defective materials and workmanship for a period of one (1) year from date of completion and acceptance.
- B. Upon receipt of notice from the Owner of the failure or any part of the guaranteed equipment during the guarantee period, the affected part or parts shall be promptly repaired or replaced with new parts by and at the expense of the Contractor.
- C. Under the guarantee clause, the Contractor shall include free routine maintenance for a period of one (1) year from the date of final acceptance. At the end of one year of operation, the Contractor and mechanical subcontractor shall inspect and repair any problems which may exist. Contractor shall lubricate bearings, adjust or replace belts, replace filters, and provide all necessary preventative and corrective maintenance required. Contractor shall provide Engineer with a table identifying each air handling unit model and serial number, quantity and size of filters, filter manufacturer and efficiency, belt manufacturer and size, motor HP, frame, and power supply.

3.4 CLOSEOUT MANUALS

- A. Operating and maintenance information shall be provided to the building owner. This information shall include, but not be limited to, the information specified.
- B. Construction documents shall require that an operating manual and a maintenance manual be provided to the building owner or the designated representative of the building owner within 90 days after the date of system acceptance. These manuals shall be in accordance with industry-accepted standards and shall include, at a minimum, the following:
 - 1. Submittal data stating equipment size and selected options for each piece of equipment requiring maintenance.
 - 2. Operation manuals and maintenance manuals for each piece of equipment and system requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall be clearly identified.
 - 3. Names and addresses of at least one service agency.
 - 4. HVAC controls system maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions. Desired or field-determined setpoints shall be permanently recorded on control drawings at control devices or, for digital control systems, in programming comments.
 - 5. A complete narrative of how each system is intended to operate, including suggested setpoints.

END OF SECTION 15800

SECTION 15950 - AUTOMATIC TEMPERATURE CONTROLS SYSTEM (ATCS)**PART 1 - GENERAL****1.1 GENERAL REQUIREMENTS**

- A. All control system components shall be new and the latest products of the manufacturers. Basis of design for these products is Honeywell. Manufacturers providing products equal to Honeywell are acceptable if all parts of this specification are met.
- B. The Automatic Temperature Control System for the Fairhope Courthouse shall be as manufactured by Honeywell International per the requirements of this specification section. In order to efficiently manage the countywide HVAC equipment, all required control systems and security points for this bid shall report to the existing Honeywell P.C. operator stations by interfacing with the Honeywell DDC controls to be installed for the chiller replacements at the Fairhope Courthouse. No separate workstations, gateways or software are allowed in order to make the system 100% operational or compatible. The software for this bid shall be **100% Honeywell N4 compatible** and with the latest software revisions w/ the new controls, the controls in the existing County buildings and Honeywell P.C. operator stations.
- C. The contractor shall be authorized, licensed and trained to provide this software. Proof of Honeywell authorization and training schools attended by at least 4 employees shall be supplied prior to award if requested. Inability to provide proof shall be grounds for rejection of bid without compensation.
 - 1. It is the requirement of this bid that Honeywell parts will be installed with like Honeywell parts, or equal, used throughout the system without any additional devices or cost other than the device. Therefore, all DDC controls and major control devices shall be manufactured by Honeywell International, or equal, and installed by a Honeywell Branch office or a Honeywell Authorized Controls Integrator (ACI) certified to work on Honeywell XL5000 and Honeywell WEBS N4 systems.
 - 2. The contractor shall have been in business and have been working on Honeywell Commercial XL5000 and WEBS N4 DDC systems for at least 8 years and have a locally staffed office within 60 miles for the last 8 years. Controls shall be provided and installed by the Honeywell branch or ACI responsible for the warranty and servicing of the system. The Honeywell contractor currently under contract for servicing the county system is Walters Controls, Inc.
- D. The control system shall be installed by competent control mechanics and electricians regularly employed or supervised by the ATCS contractor.
- E. The drawings and general provisions of the Contract, including General and Supplementary Conditions of Section 1, apply to the work of this section.
- F. The control system specified is based on an electric/electronic design of direct digital control (DDC). It is the intent of this specification to describe the basic architecture and performance requirements of the ATCS. The ATCS shall be based on a distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on a true peer-to-peer, token passing Local Area Network (LAN), called the

Controller LAN. The ATCS shall include all workstation software and hardware, DDC controllers, DDC programming, Local Area Networks (LAN's), sensors, control devices, actuators, installation and calibration, supervision, adjustments and fine tuning necessary for a complete and fully operational system. Provide a system made up of one or more digital controllers. Required climate control and energy management functions for complete operation of an HVAC System shall be provided by DDC from digital controllers. No conventional control devices (pneumatic or electronic) such as receiver-controllers, thermostats, and logic units shall be used unless specifically indicated. Provide digital controllers in a system linked in a communications network composed of one or more levels of local area networks (LAN's). ATCS system as installed shall be capable of the following energy management and control functions:

1. Proportional, integral, derivative (PID) control.
2. Night setup/setback control.
3. Analog alarm limits and reporting.
4. Digital alarm reporting.
5. Event and time-initiated programs.
6. Point trending.
7. Custom, Owner-usable database and DDC programming including predefined DDC modules, Boolean logic and mathematical calculations and point definitions.

1.2 SUBMITTALS AND COORDINATION

- A. Submit manufacturer's specifications for each control device. Submit wiring connection details to each electrical device and system control flow diagrams showing all control devices and mechanical equipment controlled. Submit printed bill of material describing each component and referencing its unique identifier as shown on the flow diagrams. Submit printed sequence of operations conforming to the specifications and referencing control device identifiers as shown on the flow diagrams.
- B. Coordinate power requirements with Division 16 contractor. Where power supplies or transformers integral with other equipment are used for control power, it shall be the responsibility of this contractor to ensure that the connected loads do not exceed the rated capacity of the power supply or transformer.
- C. Maintenance data and spare parts lists for each type of control device shall be submitted before the close of the project in a separately bound binder titled "Operation and Maintenance Manuals".
- D. Final "As Built" drawings shall be provided prior to project close-out.

1.3 DESCRIPTION OF WORK

- A. The ATCS shall consist of all thermostats, temperature transmitters, controllers, software, relays, transformers, automatic valves and dampers, damper operators, switches, control panels, and other necessary equipment along with a complete system of electrical control wiring to fulfill the intent of the specifications and provide for a complete and operating system. Installation of control components shall conform to manufacturers' recommendations. Where manufacturer's recommendations conflict with the specifications, the ATCS contractor shall obtain the Engineer's prior approval for any deviations.
- B. Combination magnetic starters for HVAC equipment shall be furnished by the Mechanical

contractor for installation by the Electrical contractor. Starters shall include hand-off-auto switches, control transformers of 24 or 120 volts, matching contactors, and normally open auxiliary contacts. Power from sources outside the starter shall not be used to operate the starter contactor.

- C. Electrical work performed by this section shall conform to the Electrical codes of the State and County.
- D. Control Wiring: Install control wiring in a neat and workman-like manner, securely fastened. Install in accordance with NFPA 70, NEC and manufacturers' recommendations. Install circuits over 30 volts with # 16 AWG, 600V wire or larger in electric metallic tubing ("EMT"). Install circuits under 25 volts using # 18 AWG wire or larger with 300V insulation on each conductor. Where low voltage, open wiring is used in accessible air plenums, cable shall be protected by a plenum-rated, polymer jacket. Open, low voltage non-plenum wiring is approved where codes allow. For all exposed and inaccessible locations, wire shall be installed in conduit.
- E. Installation by Others: all valve bodies, dampers, flow measuring stations, control sensor wells and other pipe sensors etc. shall be installed by the Mechanical contractor. Except for dampers, each of these items shall be provided by the controls contractor as required for this project. All dampers shall be provided and installed by the Mechanical contractor. VAV Application Specific Controllers (ASC'S) shall be furnished by the ATCS contractor and installed by the Control contractor.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide control products in sizes and capacities indicated and as required to accomplish control functions, conforming to manufacturers' standard materials and components as published in their product information. All devices shall be selected for the load and UL listed for the application. Control devices specially built or modified for this project are not acceptable without prior approval from the Engineer.

2.2 AUTOMATIC TEMPERATURE CONTROLS SYSTEM

- A. User Interface Terminal (UIT): Not required
- B. DDC Controllers: Provide Honeywell XL50, Stryker, Spyder, Cipher30, Plant Controllers, Optimizer controllers and Honeywell JACE N4 DDC controllers as required and indicated for specified control and monitoring. Each AHU controller shall be fully programmable and have a minimum of 20 hardware points (except VAV controllers) consisting of AO, DO, AI and AO points. DDC controllers shall function standalone for the local loop functions of the controller. All DDC controllers shall be connected via LAN or sub-LAN to the UIT as required. The following point types must be supported by DDC controllers serving air terminal boxes (e.g. VAV'S):
 1. Discrete/digital input (contact status).
 2. Discrete/digital output (maintained, momentary).
 3. Resistance analog input.
 4. Pulse Width Modulation (PWM) output capable of producing a pulse anywhere between 0-655 seconds in duration with 0.01 second resolution.

5. Floating control output.
- C. The following point types must be supported by DDC controllers serving non-air terminal equipment:
1. Discrete/digital input (contact status).
 2. Discrete/digital output (maintained, momentary).
 3. Resistance analog input.
 4. Pulse Width Modulation (PWM) output.
 5. Floating control output.
 6. 0-10v DC or 4-20 mA analog output
 7. 0-5 VDC, 0-10 VDC or 4-20 mA analog input
- D. All DDC programs shall be contained in the DDC controllers in firmware and all database shall be contained on the DDC controllers in nonvolatile RAM (NOVRAM) or be battery-maintained for a minimum of 24 hours.
1. Non-terminal unit controllers: Provide Honeywell programmable, standalone DDC controllers for all applications other than air terminal units. All AHU controllers shall have internal clocks. Controllers shall communicate with the UIT and be capable of sharing data with other connected controllers. Provide a minimum of one fully standalone controller for each three discrete mechanical systems, remote I/O's can only be used for up to 3 systems. Discrete mechanical systems include:
 - a. VAV air handler.
 - b. Multizone air handler.
 - c. Any air handler with more than four connected DDC points.
 - d. Heating hot water system.
 - e. Chilled water/condenser water system.
- E. Temperature Sensors: Provide thermistor, thin film silicon or platinum RTD sensors for all temperature applications except differential chilled water for BTU calculation, where precision matched Platinum RTD'S with transmitters may be used. Solid state sensors shall be linear, drift-free, and require only a one-time calibration. Thermistors or similar non-linear temperature devices shall be linearized by a look-up table in the connected controller. For all temperature sensors, measured accuracy from sensor to UIT display shall be +/- 1 degree F except differential chilled water for BTU calculation, where accuracy from sensor to UIT display shall be +/- 5-degree F. Sensors for liquid or steam service shall be of thermal well insertion type; "strap-on" pipe sensors are permitted only where specifically indicated. Sensors for duct mounting that serve as control points in DDC shall be serpentine averaging type in duct having greater than 20 sq., ft. cross section.
- F. Humidity transmitters: Provide 0-5VDC, 0-10VDC or 4-20mA relative humidity transmitters -where indicated or required by the sequence. Measured accuracy shall be +/- 3% RH. Honeywell or ACI
- G. Pressure transmitters: Provide 0-5VDC, 0-10VDC or 4-20mA pressure transmitters where indicated or required by the sequence. Measured accuracy from sensor to UIT display shall

be +/- 1% of span. Dwyer, Setra, Veris or Senva

- H. DDC Thermostat: Provide for all space control locations. Thermostat shall have an integral sensor, setpoint adjustment and CO2 sensor as shown on the plans.

2.3 CONTROL COMPONENTS

- A. Control Valves: Valves used to control hot or chilled water shall be modulating, globe type unless otherwise noted in the sequence of operation or on the plans. Ball or butterfly valves for automatic control service are acceptable. Provide 2-way or 3-way valves as indicated. All valves shall have stainless steel stems and be serviceable without removing the valve from the line. Water valves shall be sized for pressure drops not greater than 5 PSI at full flow for the service indicated. Valve bodies shall be cast iron or bronze with Teflon packing. Water valve design shall provide for equal percentage flow characteristics with rangeability of 50 to 1. Steam valve design shall provide for linear characteristics with rangeability of 30 to 1. Valves 2" and smaller shall be screwed, valves 2 1/2 " or larger shall be flanged. Reheat and FCU type valves for service below 12 GPM may be sweat or flare type, modulating or 2-position as described in the sequence or shown on the plans. Honeywell or Belimo Only
- B. Dampers: Provide automatic control dampers (not specified to be furnished with HVAC equipment) as shown. Dampers shall have roll formed, galvanized steel frames, interlocking blades, and spring stainless steel continuous side seal strips. Blades shall have 0.50 inch axles on nylon or oil-impregnated ("Oilite") bearings. Dampers shall have an operating temperature range of -40 to 200 deg. F.
- C. Valve and Damper Operators: Valve actuators shall be sized to ensure tight close-off and be sized for smooth modulating or 2-position action as specified. Damper actuators shall be direct-coupled, requiring no external crank-arm linkage. Where "normal" or "fail-safe" position is indicated, furnish spring-return actuators. Valve actuators for other than terminal unit service shall be foot-mounted, oil-immersed and be sized for smooth modulating or 2-position action as specified. Terminal unit valve actuators shall be direct-coupled. Actuators shall be Belimo or Honeywell ML, MN or Mod IV series.
- D. Low Limit Freeze stats: Shall be of the manual reset type. All freeze stats shall be provided with a 20 ft. sensing element to cover the duct area, which shall respond to the lowest temperature to which any one-foot portion is exposed. Reuse existing freeze stats if operable.
Honeywell or Johnson Controls
- E. High Limit Firestats: Shall be of the 2-position, manual reset type, with an extended helical bimetal element and shall be installed in each air handling unit under 2000 cfm.
- F. Air Flow Measuring Station: Furnish thermal dispersion, multi-sensor type manufactured by Ebtron, Inc. or equal where airflow measuring is shown on the plans or required by the sequence. FMS to be provided by Controls Contractor. Gold series is not required unless duct size dictates
- G. Electric Thermostats: Shall be rated for line or low voltage as required by the sequences. Line voltage thermostats shall be rated for minimum 19 amps at 277 VAC. Sensing element shall be bimetal and include a long-lasting micro-switch mechanism. Thermostats shall require tools for the removal of covers. Where indicated, furnish heavy duty, clear plastic or metal, tamper-proof guards. T651 Honeywell or equal
- H. Remote Bulb Thermostats: Shall have copper remote bulb and capillary tube with duct

mounting, outdoor, or pipe insertion hardware. Provide thermostats with temperature ranges suitable for intended service. Thermostats shall have dial-adjustable setpoint and adjustable dead band. Honeywell T775

- I. Current Relays: Provide wherever fan or pump status inputs are required or indicated to the ATCS. Current relays shall have normally open contacts that close at adjustable current level and furnish proof of air or water flow in constant or variable speed equipment. Veris H800 or Functional devices RIB XKTF.
- J. Local Control Panels:
 - 1. Enclose all DDC controllers except XL10s in control panels together with all pressure and flow transducers, output relays, transformers and power supplies.
 - 2. Provide control panels suitable for wall mounting with interior sub-panels for equipment mounting.
 - 3. Route wires inside panels in plastic wire duct.
 - 4. Fabricate panels of steel with baked-on color finish or extruded aluminum alloy, totally enclosed on four sides. Panels shall have hinged doors with key-operated locks.
 - 5. All door and interior mounted equipment shall be installed in a neat manner with identifying engraved plastic nameplates. Provide numbered, double-terminal barrier strips for all wiring to external devices. No more than two wires may be connected to each side of a terminal.
- K. Provide, as a minimum, ATCS control panels everywhere shown on the Mechanical Drawings containing DDC controllers and connected points for the local HVAC equipment.

2.4 SEQUENCE OF OPERATIONS

- A. General: When occupancy schedule override is initiated by night high or low limit program, the system shall operate normally in the occupied mode.
- B. Central DDC Panel - Provide all electronics, if needed, to interface with the Honeywell panels/ communication bus existing in the Courthouse.
 - 1. Refer to additional work requirements on mechanical plans
- C. Provide surge protection on power supply to each panel, where a communication bus leaves a building. Provide a UPS backup for any JACE or router located in this building.
- D. Run communication cable from all DDC controllers to new router(s) provided in this contract back to the existing DDC controls as required.
- E. Minimum DDC Points:
 - 1. Start / stop / status per pump
 - 2. Supply and Return chilled water sensors (replace new)
 - 3. Common OSA temperature sensor (replace new)
 - 4. Provide any additional control wiring required by the new chillers and their footprint.
 - 5. Existing sequence shall be reused and is basically as follows:
 - 6. Chilled water pumps will be operated through existing VFD'S which will modulate the pump flow between 118 GPM minimum and 186 GPM maximum based on the existing

building differential pressure sensor located in the main mechanical room. When ever the chilled water system is shut down the pumps shall run at least 5 minutes. Pump sequence shall stay as is for freeze protection. Pumps are on below 38 degrees.

7. Chillers will be enabled to run anytime there is a call for cooling from the DDC system and the lead or lag pump is started. Allow a 5-minute delay before the chiller is allowed to run. Send an alarm if either of the pumps fail to run after a command to start. Provide programming to weekly alternate the pumps

2.5 FINAL ADJUSTMENT OF EQUIPMENT

- A. After completion of installation, adjust DDC controls, thermostats, control valves, operators and similar equipment provided as work under this section. Final adjustments shall be performed by trained personnel in direct employment of the installing ATCS contractor.
- B. After installation and commissioning, furnish one, 4-hour training session for the Owner's representative(s) covering the ATCS system for this particular building. The Owner's representative(s) shall use their copies of the Operation & Maintenance manuals and as-built drawings furnished by the ATCS as training aids.

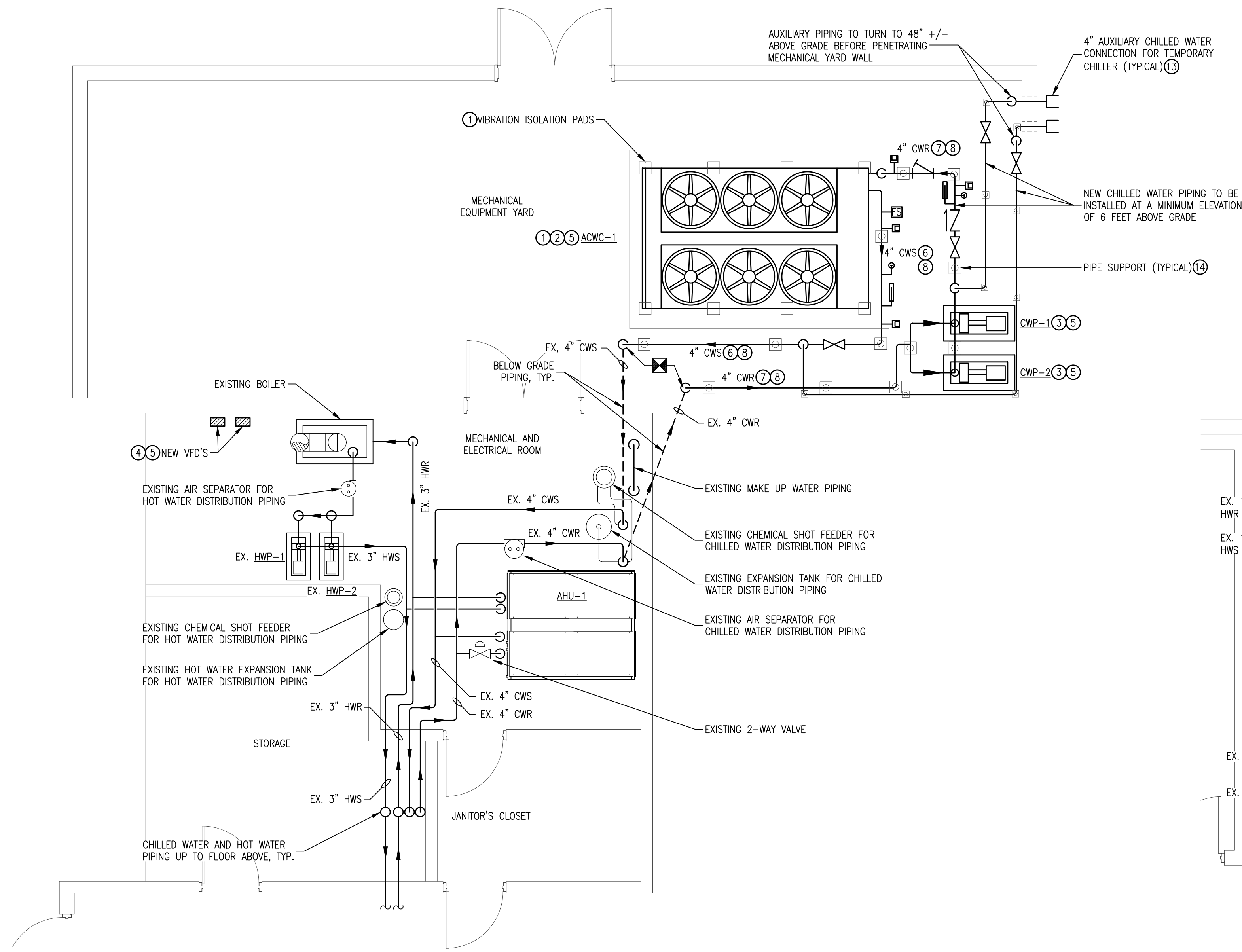
2.6 GUARANTEE

- A. The ATCS contractor shall furnish a one-year parts and labor warranty on all devices and software furnished under this section. Warranty shall include all costs to replace or repair items that fail due to defects in material or workmanship. The ATCS contractor shall respond, on site, to warranty calls within 12 hours if notified before noon, or within 24 hours if notified after noon Monday thru Friday.

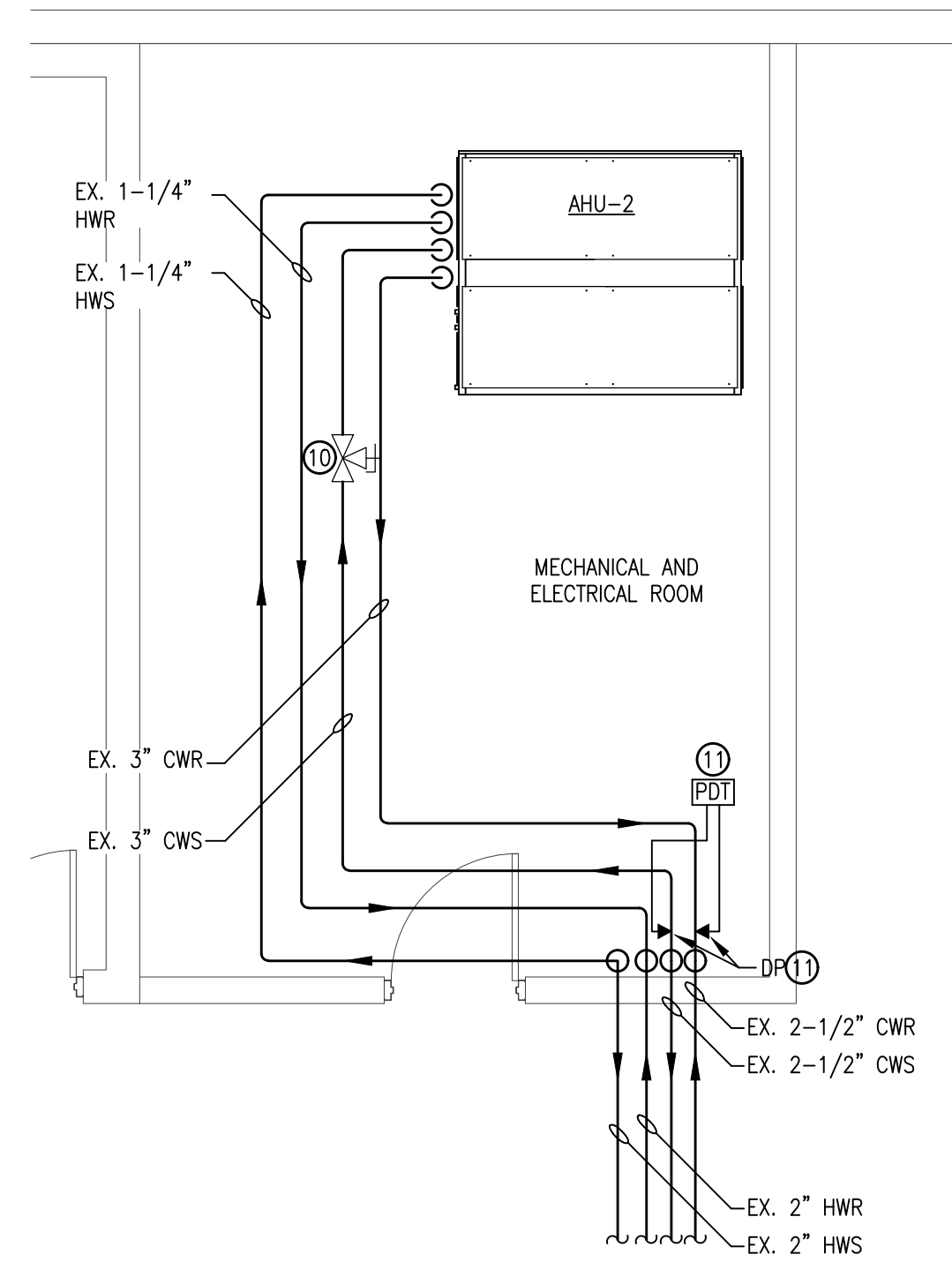
END OF SECTION 15950

SECTION 16100 - ELECTRICAL

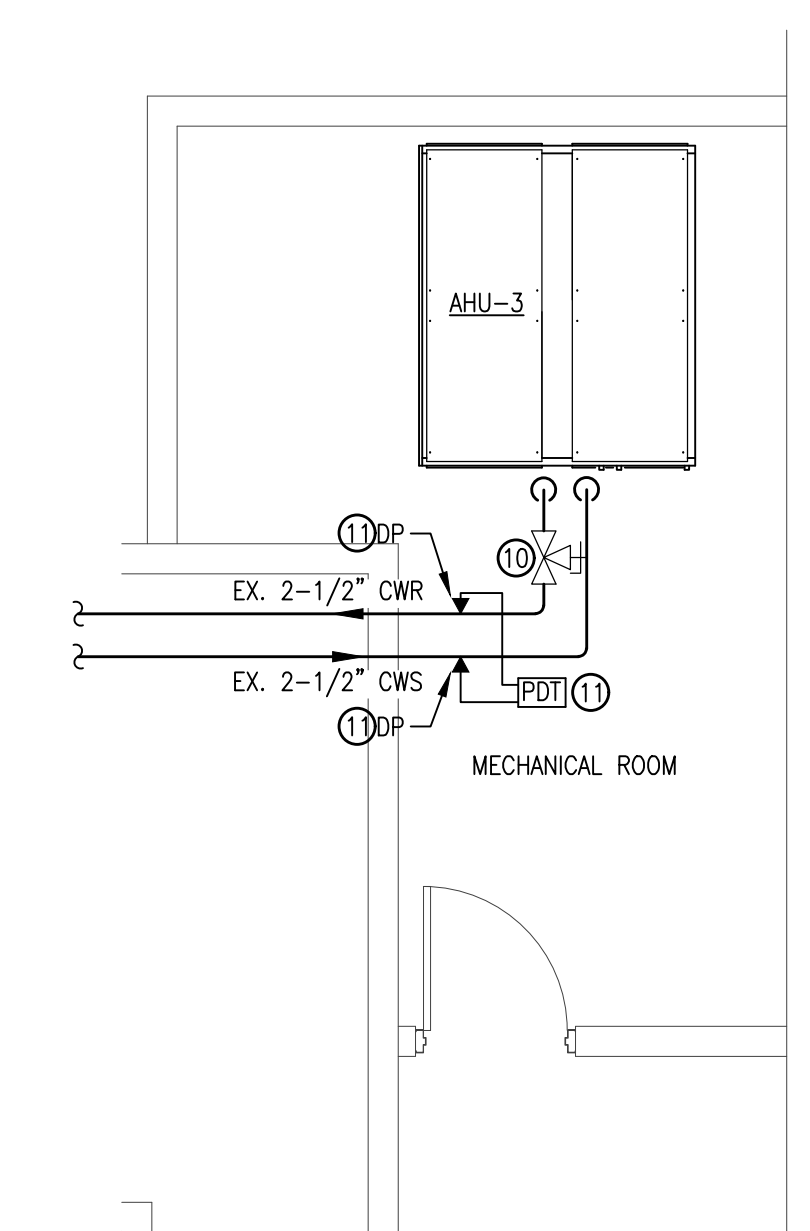
REFERENCE
ELECTRICAL DRAWINGS
FOR
SPECIFICATIONS



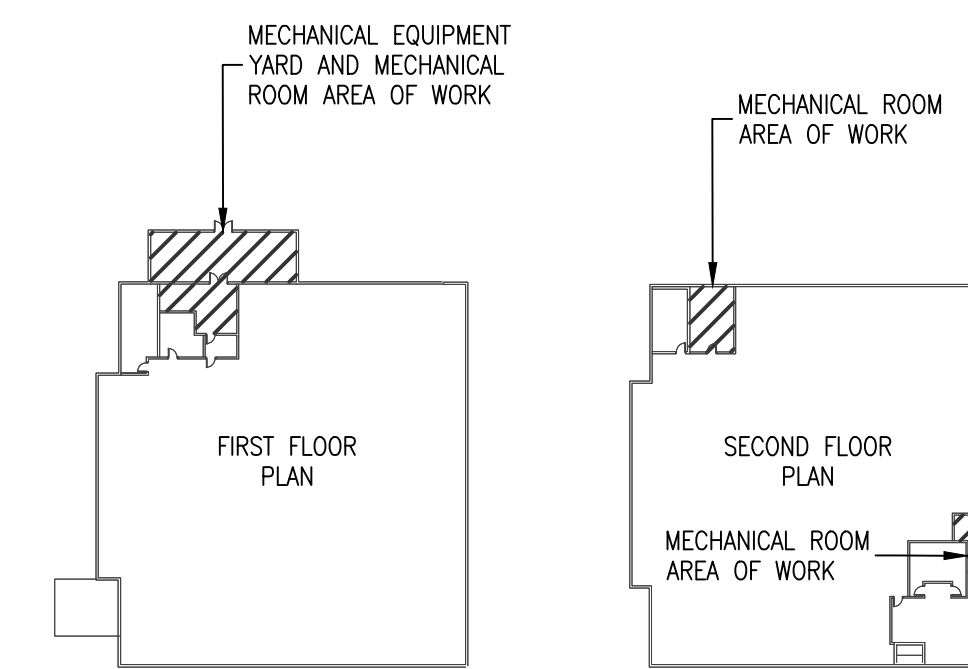
HVAC NEW WORK PLAN: FIRST FLOOR
 1/4" = 1'-0"
 2'-0" 8'-0"
 0" 4'-0" 16'-0"



HVAC NEW WORK PLAN: SECOND FLOOR NORTH SIDE
 1/4" = 1'-0"
 2'-0" 8'-0"
 0" 4'-0" 16'-0"



HVAC NEW WORK PLAN: SECOND FLOOR SOUTH SIDE
 1/4" = 1'-0"
 2'-0" 8'-0"
 0" 4'-0" 16'-0"

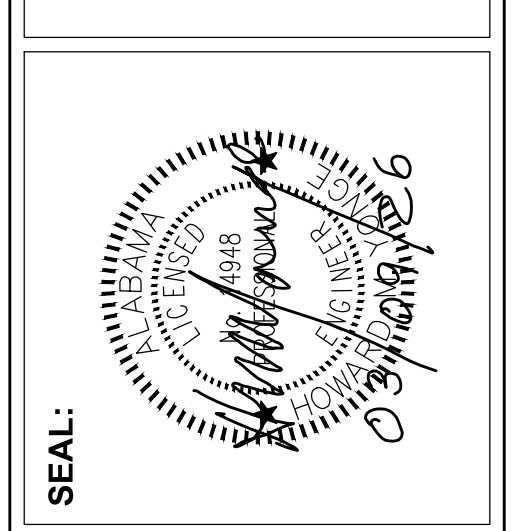


HVAC NEW WORK KEY NOTES

- ① NEW AIR COOLED WATER CHILLER MOUNTED ON EXISTING CONCRETE PAD. INSTALLATION OF CHILLER ON CONCRETE PAD SHALL BE WITH THE USE OF NEOPRENE VIBRATION ISOLATORS AS SUPPLIED BY CHILLER MANUFACTURER. SECURE VIBRATION ISOLATORS TO CONCRETE PAD AND CHILLER TO VIBRATION ISOLATORS WITH MECHANICAL FASTENERS PER MANUFACTURER INSTRUCTIONS.
- ② MECHANICAL CONTRACTOR TO ADJUST FINAL POSITION OF CHILLER ON CONCRETE PAD TO ACCOMMODATE MAINTENANCE ACCESS PER MANUFACTURER REQUIREMENTS.
- ③ NEW CHILLED WATER PUMP TO BE INSTALLED ON EXISTING CONCRETE PAD. MECHANICAL CONTRACTOR SHALL ADJUST PUMP POSITION TO ACCOMMODATE CONNECTIONS TO NEW CHILLED WATER DISTRIBUTION PIPING. ACCESS SHALL BE PROVIDED TO THESE UTILITY SYSTEMS FOR MAINTENANCE PURPOSES. NEW PUMP DRIVES SHALL BE RATED FOR VARIABLE FREQUENCY USE. SECURE PUMP TO CONCRETE PAD.
- ④ NEW VARIABLE FREQUENCY DRIVES FOR CHILLED WATER PUMPS SHALL BE PROVIDED AND INSTALLED BY CONTROLS CONTRACTOR. PROVIDE ONE VFD FOR EACH PUMP (2 REQUIRED). EACH VFD SHALL HAVE AN INTEGRAL BYPASS AND DISCONNECT. INSTALL VFD ON EXISTING MOUNTING STRUCTURE.
- ⑤ LABEL CHILLERS, PUMPS, DISCONNECTS AND BREAKERS. OUTDOOR LABELS SHALL BE ENGRAVED PHENOLIC AND SECURED WITH SCREWS.
- ⑥ NEW CHILLED WATER SUPPLY PIPING ABOVE GRADE IN CHILLER YARD SHALL BE CONNECTED TO EXISTING PIPING EXTENDING UP FROM BELOW GRADE. REFERENCE PUMP DETAIL AND CHILLED WATER PIPING FLOW DIAGRAM FOR ADDITIONAL INFORMATION. NEW CHILLED WATER SUPPLY PIPING SHALL INCLUDE ISOLATION VALVE, TEMPERATURE AND PRESSURE GAUGES, FLOW SWITCH, TWO PETE'S PLUGS, STRAINER WITH BLOW DOWN HOSE BIBB AND FLEXIBLE CONNECTOR. INSTALLATION OF EACH COMPONENT SHALL BE INSTALLED PER MANUFACTURER INSTRUCTIONS. SUPPORT PIPING EVERY 6 FEET AND AT A CHANGE IN DIRECTION. (SEE CHILLED WATER PIPING FLOW DIAGRAM ON SHEET M3 ADDITIONAL INFORMATION)
- ⑦ NEW CHILLED WATER RETURN PIPING ABOVE GRADE IN MECHANICAL EQUIPMENT YARD SHALL BE CONNECTED TO EXISTING PIPING EXTENDING UP FROM BELOW GRADE TO NEW CHILLED WATER PUMPS. PIPING TO BE EXTENDED UP FROM PUMPS TO BE LOCATED 6 FEET ABOVE GRADE. TURN MANIFOLD UP FROM ABOVE PUMPS, ALLOWING FOR MAINTENANCE ACCESS, OVER AND DOWN FOR CONNECTION TO NEW AIR COOLED WATER CHILLER. INCLUDE NEW ISOLATION VALVE IN OVER HEAD PIPING COMING FROM DISTRIBUTION MANIFOLD. NEW CHILLED WATER RETURN PIPING SHALL INCLUDE AN ISOLATION VALVE, A FLEXIBLE CONNECTOR, TEMPERATURE AND PRESSURE GAUGES. (SEE CHILLED WATER PIPING FLOW DIAGRAM ON SHEET M3 FOR ADDITIONAL INFORMATION)
- ⑧ ALL NEW AND EXISTING CHILLER WATER SUPPLY AND RETURN PIPING ABOVE GRADE IN MECHANICAL EQUIPMENT YARD SHALL BE HEAT TRACED, INSULATED AND HAVE AN 18 GAUGE ALUMINUM JACKET. AN 18 GAUGE ALUMINUM JACKET SHALL BE PROVIDED OVER ALL PIPING INSULATION INCLUDING FITTINGS AND VALVES. RUBBERTECH, PAINT AND PLASTIC PROTECTIVE COVERINGS ARE PROHIBITED.
- ⑨ EXISTING CHEMICAL SHOT FEEDER REMAINING IN PLACE WITH NEW CHILLED WATER PIPING SYSTEM. (REFERENCE CHILLED WATER FLOW DIAGRAM FOR ADDITIONAL INFORMATION)
- ⑩ EXISTING 3 WAY CONTROL VALVE TO REMAIN. DO NOT DISTURB UNLESS OTHERWISE NOTED.
- ⑪ DIFFERENTIAL PRESSURE MEASURING DEVICE SHALL BE INSTALLED IN EXISTING CHILLED WATER SUPPLY AND RETURN PIPING. MEASURING DEVICE SHALL CONTROL CHILLED WATER OPERATIONS TO VARY CHILLED WATER FLOW RATES THROUGH THE AIR COOLED WATER CHILLER. CHILLED WATER FLOW RATES SHALL BE CONTROLLED BY PUMP VARIABLE FREQUENCY DRIVE.
- ⑫ NEW 4" AUXILIARY CHILLED WATER CONNECTIONS TO BE INSTALLED IN MECHANICAL EQUIPMENT YARD FOR CONNECTION TO TEMPORARY CHILLER FOR FUTURE USE. INCLUDE IN INSTALLATION AN ISOLATION VALVE ON BOTH THE SUPPLY AND RETURN LINES.
- ⑬ CHILLED WATER PIPING SUPPORT TO BE 4" PAINTED CARBON STEEL PIPING WITH CRADLE AT TOP. PROVIDE 6X6 PAD ON BOTTOM OF PIPE AND SECURE TO 8X8X6 CONCRETE PAD ON GRADE. ADJUST HEIGHT OF SUPPORT TO ACCOMMODATE ELEVATION OF PIPING.

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SEAL:	
TITLE:	
NO:	
DATE:	
REVISIONS:	

PROJECT:
FAIRHOPE SATELLITE COURTHOUSE CHILLER UPGRADE
 1100 FAIRHOPE AVENUE
 FAIRHOPE, ALABAMA 36532

DRAWING:
HVAC NEW WORK PLANS

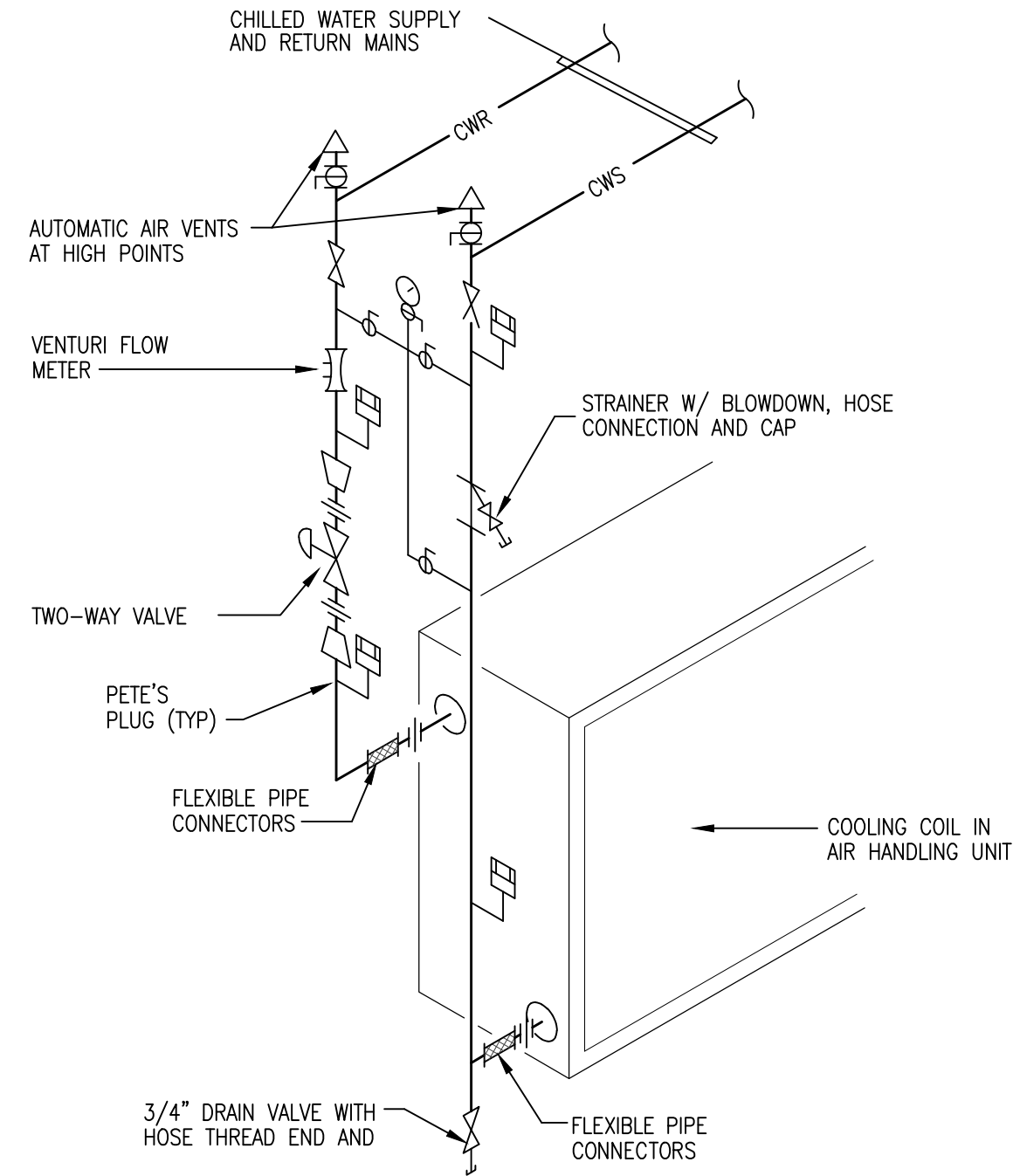
DATE: 03.09.26
 DRAWN BY: JWW
 CHECKED BY: HHY
 JOB NO: 26148

SHEET NO: **M2**

AIR COOLED WATER CHILLER SCHEDULE

MARK	NOMINAL CAPACITY TONS	GPM	MIN. GPM	WATER TEMP.		AMBIENT TEMP. °F	EVAPORATOR		COMPRESSOR		COND. FANS		ELECTRICAL DATA					REMARKS		
				ENT °F	LVG °F		MAX. WPD	NO.	RLA (EA)	NO.	FLA (EA)	MIN. CAPACITY REDUCTION STEPS	MIN. EER (100%)	MIN. IPLV	VOLTS	Hz	PHASE		MCA	MOCIP
ACWC#1	90	170.9	136.9	54	42	95	10 FT. HD.	4	91.3	4	6.7	25-50-75-100	10.41	16.64	208	60	3	396	500	NOTES 1, 2, 3, 4

- NOTE:
 1. PROVIDE 120V/60HZ/1 PH POWER FOR CONTROLS CIRCUIT. PROVIDE CHILLER WITH HEAT TRACE ON CHILLER BARREL AT 120V/60HZ/1 PH.
 2. PROVIDE SINGLE POINT POWER CONNECTION.
 3. MECHANICAL CONTRACTOR TO COORDINATE WITH ELECTRICAL CONTRACTOR FOR IDENTIFYING SPECIFIC POINTS OF POWER CONNECTIONS PRIOR TO ORDERING EQUIPMENT.
 4. PROVIDE CHILLER WITH LOWWORKS CARD
 5. BASIS OF DESIGN: TRANE CGAM
 6. SPLICING OF MAIN ELECTRICAL FEEDER SHALL NOT BE PERMITTED. MECHANICAL CONTRACTOR TO COORDINATE WITH ELECTRICAL CONTRACTOR FOR ONLY A CONTINUOUS (HOME RUN) FEED.

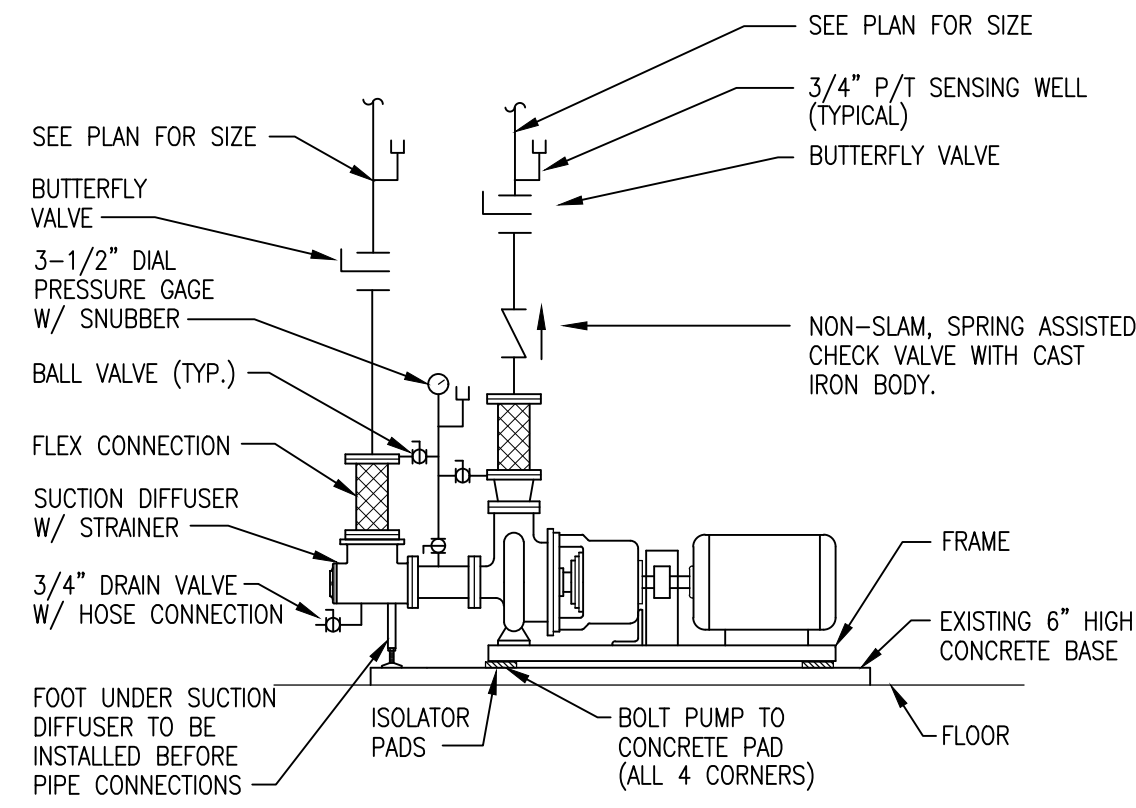


AHU CHILLED WATER COIL DETAIL
NOT TO SCALE

CIRCULATING PUMP SCHEDULE

MARK CWP#	CAPACITY GPM	TDH FT.	NPSH REQ'D (FT)	MAX. RPM	MOTOR HP	TYPE PUMP	ELECTRICAL DATA			REMARKS
							VOLTS	Hz	PHASE	
CWP#1	186	40	3	1750	5.0	BASE MOUNTED END SUCTION	208	60	3	NOTES 1, 2, 3, 4, 5, 6, 7
CWP#2	186	40	3	1750	5.0	BASE MOUNTED END SUCTION	208	60	3	NOTES 1, 2, 3, 4, 5, 6, 7

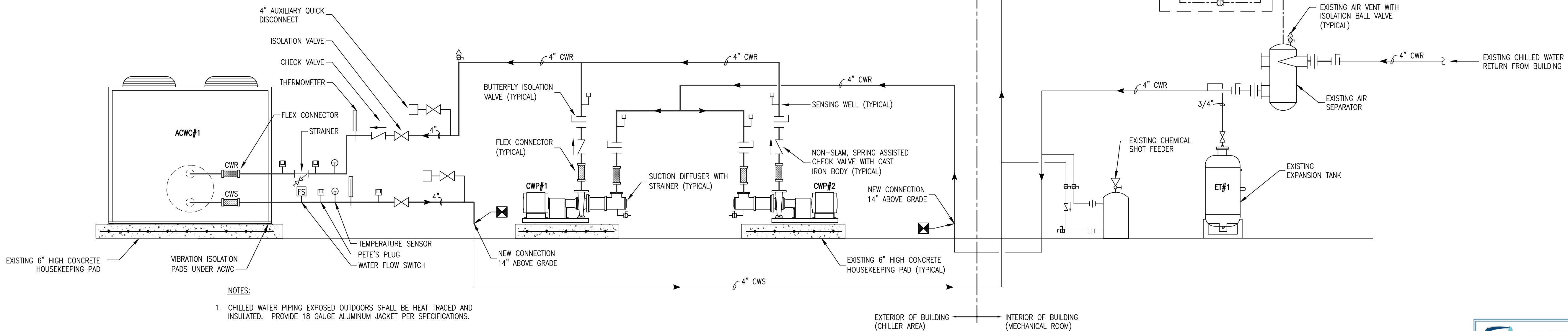
- NOTES:
 1. CIRCULATING PUMP SHALL BE PROVIDED FOR AN OUTDOOR APPLICATION.
 2. PROVIDE PREMIUM EFFICIENCY, INVERTER DUTY MOTORS WITH MINIMUM 3-YEAR WARRANTY.
 3. PUMPS TO BE LASER ALIGNED BY A FACTORY CERTIFIED TECHNICIAN AT START-UP. GROUT PUMP IN PLACE BEFORE ALIGNMENT.
 4. PROVIDE WITH FACTORY MOUNTED SHAFT GROUNDING RINGS.
 5. PROVIDE PUMP WITH MAXIMUM NON-OVERLOADING IMPELLER SIZE.
 6. PROVIDE VARIABLE SPEED DRIVE FOR EACH PUMP - 2 REQUIRED
 7. CONTROL SEQUENCE FOR THE CHILLED WATER SYSTEM SHALL REMAIN AS EXISTING. THE TWO NEW CHILLED WATER PUMPS SHALL OPERATE IN A LEAD-LAG SCENARIO FOR REDUNDANCY.



TYPICAL END SUCTION PUMP DETAIL
NOT TO SCALE

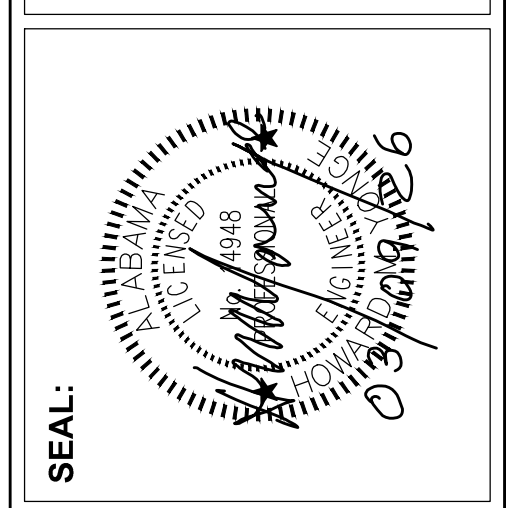
MECHANICAL LEGEND

ACWC	AIR COOLED WATER CHILLER
CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
AHU	AIR HANDLING UNIT
VFD	VARIABLE FREQUENCY DRIVE
CWP	CHILLED WATER PUMP
HWP	HOT WATER PUMP
ET	EXPANSION TANK
TYP.	TYPICAL
EX.	EXISTING
	3-WAY CONTROL VALVE AT AHU
	2-WAY CONTROL VALVE AT AHU
	CHECK VALVE
	BUTTERFLY ISOLATION VALVE
	FLEXIBLE CONNECTION
	FLOW SWITCH
	GAGE COCK
	GAGE COCK WITH GAGE
	ISOLATION VALVE (GATE OR BALL)
	PETE'S PLUG
	STRAINER WITH BLOWDOWN VALVE
	TEMPERATURE SENSOR
	THERMAL SENSOR WELL (3/4" WELDOLET)
	THERMOMETER
	VENTURI MEASURING DEVICE
	UNION
	CHILLED WATER FLOW SWITCH
	AUXILIARY QUICK DISCONNECT CONNECTION



CHILLED WATER PIPING FLOW DIAGRAM
NOT TO SCALE

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SEAL: [Seal]

NO.	DATE:	TITLE:

PROJECT:
FAIRHOPE SATELLITE COURTHOUSE CHILLER UPGRADE
 1100 FAIRHOPE AVENUE
 FAIRHOPE, ALABAMA 36532

DRAWING:
SCHEDULE AND DETAILS
 DATE: 03.09.26
 DRAWN BY: JWW
 CHECKED BY: HMY
 JOB NO: 25148
SHEET NO: M3

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ELECTRICAL SYMBOL LEGEND	
SYMBOL	DESCRIPTION
	PANELBOARD - SEE RESPECTIVE PANELBOARD SCHEDULE.
	BRANCH CIRCUIT CONDUIT RUN CONCEALED IN WALL OR ABOVE CEILING. ARROWS INDICATE CIRCUIT HOMERUN. HASHMARKS INDICATE NUMBER OF CONDUCTORS. ABSENCE OF HASHMARKS INDICATES TWO CONDUCTORS PLUS GROUND. "A" DENOTES PANELBOARD SERVING CIRCUIT. "1" INDICATES CIRCUIT BREAKER SPACE IN PANELBOARD. SEE RESPECTIVE PANEL CIRCUIT SCHEDULE. MINIMUM CONDUCTOR SIZE = #12 AWG.
	NON-FUSED DISCONNECT, HEAVY DUTY (SAFETY) SWITCH - SIZE AND TYPE AS NOTED. TOP OF SWITCH 6"-6" A.F.F. MAX. DISCONNECT SHALL BE PROVIDED WITH PHENOLIC LABELS INDICATING THE SERVING PANEL AND CIRCUIT NUMBER THEY ARE FED FROM.
	ELECTRIC MOTOR - SEE RESPECTIVE EQUIPMENT SCHEDULE.
	INDICATES GROUND FAULT CIRCUIT INTERRUPTING RECEPTACLE. FLUSH WALL MOUNTED 18" A.F.F. WITH GROUND PIN FACING UP UNLESS NOTED OTHERWISE. EQUAL TO R02-GFN1-0KW.
	INDICATES EXTRA DUTY WEATHER RESISTANT WIRING DEVICE WITH CAST ALUMINUM WEATHER PROOF IN-USE COVER PLATE EQUAL TO MG420CS.

ELECTRICAL SPECIFICATIONS:

- ALL ELECTRICAL WORK SHALL BE IN CONFORMANCE WITH THE NATIONAL ELECTRICAL CODE AND LOCAL CODES AND ORDINANCES.
- ALL WIRING SHALL BE COPPER CONDUCTORS WITH TYPE THHN OR TYPE THW INSULATION RUN IN CONDUIT. PROVIDE INDIVIDUAL NEUTRAL CONDUCTORS FOR ALL SINGLE-POLE BRANCH CIRCUITS. TIED BREAKER HANDLES ARE NOT ACCEPTABLE.
- ALL MATERIALS SHALL BE NEW AND UL LISTED FOR THE APPLICATION.
- PROVIDE TYPED PANELBOARD SCHEDULES IN ALL PANELBOARDS.
- RACEWAY AND FITTINGS
 - RIGID METAL CONDUIT - SHALL HAVE THREADED FITTINGS, GALVANIZED STEEL OR THREADLESS COMPRESSION GALVANIZED STEEL OR THREADLESS COMPRESSION CADMIUM PLATED MALLEABLE IRON. FITTINGS SHALL BE RAIN TIGHT/CONCRETE TIGHT.
 - ELECTRICAL METALLIC TUBING (EMT) - MATERIAL OF STEEL OR MALLEABLE IRON IS ACCEPTABLE. COUPLINGS AND CONNECTORS SHALL BE CONCRETE AND RAIN TIGHT, WITH CONNECTORS HAVING INSULATED THROATS. USE GLAND AND RING COMPRESSION TYPE COUPLINGS AND CONNECTORS FOR CONDUIT SIZES 2" AND SMALLER. USE SET SCREW TYPE COUPLINGS WITH FOUR SET SCREWS EACH FOR CONDUIT SIZES OVER 2". USE SET SCREWS OF CASEHARDENED STEEL WITH HEX HEAD AND CUP POINT TO FIRMLY SEAT IN WALL OF CONDUIT FOR POSITIVE GROUNDING. INDENT TYPE CONNECTORS OR COUPLINGS ARE PROHIBITED. DIE-CAST OR PRESSURE-CAST ZINC-ALLOY FITTINGS OR FITTINGS MADE OF "POT METAL" ARE PROHIBITED.
 - RIGID NON-METALLIC CONDUIT - SHALL HAVE POLYVINYL CHLORIDE (PVC) FITTINGS SUITED FOR THE PURPOSE AND JOINED TOGETHER BY A METHOD APPROVED FOR THE PURPOSE. SCHEDULE 80 CONDUIT SECTIONS MAY BE JOINED TOGETHER WITH THREADED FITTING CONNECTORS.
 - FLEXIBLE METAL CONDUIT - FITTINGS SHALL BE ZINC PLATED STEEL OR CADMIUM PLATED MALLEABLE IRON SCREW TYPE WITH INSULATED THROAT AND ANGULAR WEDGE FITTING BETWEEN CONVOLUTIONS OF CONDUIT. LIQUIDTIGHT FLEXIBLE METAL CONDUIT - FITTINGS SHALL BE CADMIUM PLATED, MALLEABLE IRON OR STEEL WITH COMPRESSION TYPE STEEL FERRULE AND NEOPRENE GASKET SEALING RINGS, WITH INSULATED THROAT.
 - CONDUITS INSTALLED CONCEALED IN EARTH FILL, CONCRETE OR, SOLID MASONRY STRUCTURES SHALL BE PVC 40. PVC SHALL NOT BE INSTALLED IN ANY EXPOSED LOCATIONS. ALL EXPOSED EXTERIOR CONDUITS SHALL BE GRS. ANY GRS INSTALLED BELOW GRADE OR IN CONCRETE SHALL HAVE BITUMASTIC APPLIED PRIOR TO INSTALLATION.
 - CONDUITS USED FOR CONNECTION TO RECESSED LIGHTING FIXTURES SHALL BE FLEX. CONDUITS FOR CONNECTION TO MOTORS OR VIBRATING EQUIPMENT SHALL BE LOFLEX NOT LESS THAN 18" LONG AND NOT OVER 60" LONG. ALL FLEXIBLE CONDUITS ARE TO BE SECURED AT A MINIMUM OF EVERY THREE FEET USING APPROVED METHODS.
 - CONDUITS RUN CONCEALED IN THE HOLLOW SPACE OF NON-MASONRY WALLS OR, ABOVE SUSPENDED/HARD CEILINGS SHALL BE EMT. EXPOSED CONDUITS SHALL BE RUN AT RIGHT ANGLES TO OR PARALLEL WITH BUILDING LINES AND EXPOSED STRUCTURE. IN ALL CASES, CONDUIT RUNS SHALL BE GROUPED TOGETHER WHERE POSSIBLE AND SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE, NOT FROM ANY SUSPENDED CEILING SUPPORT SYSTEM.
 - PVC 80 SHALL BE USED ONLY AS INDICATED ON THE DRAWINGS AND SHALL BE UL LISTED AS SUNLIGHT RESISTANT. INSTALL CONDUITS PASSING THROUGH BUILDING SIDEWALLS OR THROUGH BEAMS BELOW GRADE WITH EXPANSION/DEFLECTION FITTINGS. INSTALL EXPANSION FITTINGS WHERE CONDUIT CROSSES AN EXPANSION JOINT. WHERE CONDUIT PENETRATES DAMP-PROOFING MEMBRANES, CUT THE MEMBRANE CAREFULLY AROUND THE CONDUIT AND SEAL THE JOINT WITH PRESSURE SENSITIVE TAPE. ALL CONDUIT BENDS ARE TO BE MADE WITH A DEVICE MADE FOR THE APPLICATION. ALL CONDUIT RUNS ARE TO BE PARALLEL OR PERPENDICULAR TO THE BUILDING STRUCTURE. CONDUIT OFFSETS ARE TO BE UTILIZED AT JUNCTION BOXES AND DEVICE BOXES AND A STRAP PLACED ON CONDUIT AT THE POINT NEAREST THE BOX FOR SUPPORT.
 - SUPPORT RACEWAYS SECURELY WITH PIPE STRAPS, WALL BRACKETS, CONDUIT HANGERS OR CEILING TRAPEZE. FASTENINGS SHALL BE BY WOOD SCREWS OR SCREW TYPE NAILS TO WOOD, BY TOGGLE BOLTS TO CONCRETE BLOCK, EXPANSION BOLTS ON CONCRETE OR BRICK, AND BEAM CLAMP TYPES ON STEEL OR BAR JOISTS. RACEWAYS SHALL NOT BE FASTENED TO SUSPENDED CEILING SUPPORTS BUT MUST HAVE INDEPENDENT SUPPORT FROM THE STRUCTURE. SUPPORTING DEVICES SHALL BE OF MATERIALS HAVING CORROSION PROTECTION AT LEAST EQUAL TO THE RACEWAY. A SUPPORT SHALL BE PROVIDED AS CLOSE AS PRACTICAL TO, AND NOT EXCEEDING 18" FROM AN UNSUPPORTED BOX OR FROM CHANGE OF DIRECTION. IN HORIZONTAL RUNS, THIS SUPPORT MAY BE OMITTED IF THE BOX IS INDEPENDENTLY SUPPORTED AND THE BOX CONNECTION IS NOT MADE WITH CHASE NIPPLE OR THREADLESS BOX CONNECTOR. IN VERTICAL RUNS, LOAD PRODUCED BY WEIGHT OF THE RACEWAY AND CONDUCTORS SHALL NOT BE CARRIED BY THE RACEWAY TERMINAL, BUT MUST BE CARRIED ENTIRELY BY CONDUIT SUPPORTS. INSTALL CONDUIT SUPPORTS IN STRICT ACCORDANCE WITH THE FOLLOWING TABLE, EXCEPT AS REQUIRED BY SUPPORT FOR BOXES AND CHANGES IN DIRECTION:

MAXIMUM SUPPORT TRADE SIZE	LOCATION OF RUNS	SPACING
1/2, 3/4	EXPOSED, HORIZONTAL	7 FEET
1 AND LARGER	EXPOSED, HORIZONTAL	10 FEET
ALL SIZES	CONCEALED, HORIZONTAL	10 FEET
1/2, 3/4	EXPOSED, VERTICAL	7 FEET
1, 1-1/4	EXPOSED, VERTICAL	8 FEET
1-1/2 AND LARGER	EXPOSED, VERTICAL	10 FEET
ALL SIZES	CONCEALED, VERTICAL	10 FEET

L. FOR CONDUIT RUNS THAT ARE NOT SIZED ON DRAWINGS, THE MAXIMUM CONDUIT FILL SHALL BE COMPUTED USING THE REQUIREMENTS FOR TYPE THW CONDUCTORS ALTHOUGH THE ACTUAL WIRING IS WITH TYPE THHN OR OTHER TYPE OF CONDUCTORS HAVING SMALLER CROSS-SECTIONS. THIS REQUIREMENT IS MADE TO PROVIDE SPARE CONDUIT CAPACITY.

EQUIPMENT ELECTRICAL SCHEDULE						
MARK	ITEM	VOLTAGE/Ø	DISCONNECT SWITCH	FEEDER		
				CONDUCTORS	GROUND	CONDUIT
ACWC#1	AIR COOLED WATER CHILLER	208/3	600/3 N3R	2 RUNS 4#250	#2	3.00°C EACH
CWP#1	CHILLED WATER PUMP	208/3	60/3 N1 (L)	3#8	#10	0.75°C
CWP#2	CHILLED WATER PUMP	208/3	60/3 N1 (L)	3#8	#10	0.75°C

(L) - PROVIDE A LOCKABLE DISCONNECT FOR THIS EQUIPMENT.

M. INSTALL ALL REQUIRED SLEEVES FOR CONDUITS PASSING THROUGH CONCRETE SLABS. FIRE PROOF SPACE BETWEEN CONDUIT AND SLEEVE AFTER INSTALLATION USING OF MINERAL WOOL AS REQUIRED. ALL FIRE WALL PENETRATIONS ARE TO BE SEALED WITH A U. L. APPROVED METHOD. ANY PENETRATIONS OF THE ROOF MEMBRANE MUST BE SEALED BY A CERTIFIED ROOFING CONTRACTOR USING AN APPROVED METHOD.

N. EXPANSION JOINTS:
 1. CONDUITS 3" AND LARGER, THAT ARE SECURED TO THE BUILDING STRUCTURE ON OPPOSITE SIDES OF A BUILDING EXPANSION JOINT, REQUIRED EXPANSION AND DEFLECTION COUPLINGS. INSTALL COUPLINGS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 2. PROVIDE CONDUITS SMALLER THAN 3" WITH JUNCTION BOXES ON BOTH SIDES OF THE EXPANSIONS JOINT. CONNECT CONDUITS TO JUNCTION BOXES WITH SUFFICIENT SLACK OF FLEXIBLE CONDUIT TO PRODUCE 5" VERTICAL DROP MIDWAY BETWEEN ENDS. FLEXIBLE CONDUIT SHALL HAVE A GREEN COPPER GROUND-BONDING JUMPER INSTALLED. IN LIEU OF THIS FLEXIBLE CONDUIT, EXPANSION AND DEFLECTION COUPLINGS AS SPECIFIED ABOVE FOR THREE INCHES AND LARGER CONDUITS ARE ACCEPTABLE.
 3. EXPANSION FITTINGS SHALL BE PROVIDED FOR RACEWAYS TO COMPENSATE FOR THERMAL EXPANSION AND CONTRACTION IN CONDUIT RUNS 200FT OR GREATER AND AT BUILDING EXPANSION JOINTS. BONDING JUMPERS SHALL BE PROVIDED FOR ELECTRICAL CONTINUITY OF THE RACEWAY SYSTEM AT THE EXPANSION FITTINGS.

O. CONDUCTORS:
 1. ALL CONDUCTORS SHALL BE INSTALLED IN CONDUIT. CONDUCTORS FOR BUILDING WIRING SHALL HAVE THHN/THWN, 600-VOLT INSULATION AND SHALL BE SOFT-DRAWN COPPER OF STANDARD AMERICAN WIRE GAUGE (AWG) SIZE. MINIMUM SIZE SHALL BE NO. 12. 20-AMP BRANCH CIRCUITS MORE THAN 100 FEET IN LENGTH SHALL BE UPSIZED TO NO. 10. PROVIDE INDIVIDUAL NEUTRAL CONDUCTORS FOR ALL SINGLE-POLE BRANCH CIRCUITS. TIED BREAKER HANDLES ARE NOT ACCEPTABLE. ALL WIRE NO. 8 AND LARGER SHALL BE STRANDED. ALL BRANCH CIRCUITS NO. 10 AND SMALLER SHALL BE WIRED WITH COLOR-CODED WIRE WITH THE SAME COLOR USED FOR A SYSTEM THROUGHOUT THE BUILDING. POWER FEEDERS AND BRANCH CIRCUITS LARGER THAN NO. 10 SHALL EITHER BE FULLY COLOR CODED OR SHALL HAVE BLACK INSULATION AND BE SIMILARLY COLOR CODED WITH TAPE OR PAINT IN ALL JUNCTION BOXES AND PANELS. WHERE TAPE OR PAINT IS USED TO IDENTIFY CONDUCTORS, APPLY AT ALL TERMINATIONS, JUNCTION BOXES, PULL BOXES AND WIRE WAYS. APPLY TAPE, BUT LAPPED, OR PAINT FOR A MINIMUM DISTANCE OF 2" AND, WHERE APPLIED TO ENDS OF CONDUCTORS, START AT CUT END OF THE CONDUITOR INSULATION. TAPE SHALL NOT COVER MANUFACTURERS CONDUCTORS SHALL BE COLOR CODED OR LABELED AS NECESSARY FOR CLEAR IDENTIFICATION. COLOR CODING OF ALL CONDUCTORS SHALL BE AS FOLLOWS:

GROUNDING	BARE OR GREEN
120/208 VOLT THREE PHASE (WYE) PHASE CONDUCTORS: NEUTRAL:	A-BLACK, B-RED, C-BLUE WHITE
277/480 VOLT THREE PHASE (WYE) PHASE CONDUCTORS: NEUTRAL:	A-BROWN, B-ORANGE, C-YELLOW NATURAL GREY

6. JUNCTION AND PULL BOXES
 A. JUNCTION AND PULL BOXES SHALL MEET REQUIREMENTS OF NATIONAL ELECTRICAL CODE. STANDARD MANUFACTURED BOXES SHALL BE LISTED BY UNDERWRITERS' LABORATORIES, INC. WHERE CUSTOM DESIGNED AND FABRICATED BOXES ARE NEEDED, THEY SHALL MEET THE CONSTRUCTION STANDARDS OF UNDERWRITERS' LABORATORIES, INC. AND THE N.E.C.
 B. JUNCTION AND PULL BOXES SHALL BE INSTALLED WHERE REQUIRED BY NATIONAL ELECTRICAL CODE AND WHERE NECESSARY TO FACILITATE PULLING OF WIRE OR CABLE. CONSIDERATIONS ARE SIZES OF WIRE AND CABLE, NUMBER OF BENDS IN RACEWAY, AND CONDUCTOR SUPPORT REQUIREMENTS IN VERTICAL RACEWAYS. MAXIMUM DISTANCE BETWEEN TERMINATIONS AT JUNCTION OR PULL BOXES, CABINETS, OR OTHER POINTS OF TERMINATION SHALL NOT EXCEED 250 FEET FOR STRAIGHT HORIZONTAL RUNS. THIS LENGTH SHALL BE DECREASED 50 FEET FOR EACH 90 DEGREE BEND. ALL JUNCTION BOXES SHALL BE INDEPENDENTLY AND RIGIDLY SUPPORTED FROM THE BUILDING STRUCTURE. JUNCTION BOX TYPE SHALL CONFORM TO THE AREA IN WHICH IT IS INSTALLED (I.E. WET LOCATION AREAS SHALL BE MOISTURE RESISTANT TYPE JUNCTION BOXES). JUNCTION BOXES AND ASSOCIATED CONDUIT FOR FIRE ALARM SHALL BE PAINTED RED. JUNCTION BOXES FOR LOW VOLTAGE CONTROLS, COMMUNICATION, TECHNOLOGY, ETC. SHALL BE PERMANENTLY MARKED INDICATING USE.

EXISTING PANEL MP2 SCHEDULE							66,000 AIC RATING	
CKT NO.	LOAD DESCRIPTION	BREAKER POLE	AMP	KVA	BREAKER AMP POLE	LOAD DESCRIPTION	CKT NO.	
1	PANEL EMDP1 THRU ATS	(E) 3	600	264.0	141.2	500 3	ACWC#1 (N) 2	
3							4	
5							6	
7	PANEL M1	(E) 3	200	33.0	300	3	SPARE (S) 8	
9							10	
11							12	
13	PANEL H	(E) 3	200	30.3	57.0	200 3	PANEL M2 (E) 14	
15							16	
17							18	
19	SPACE	3	-	-	-	3	SPACE 20	
21							22	
23							24	
25	SPACE	3	-	-	-	3	SPACE 26	
27							28	
29							30	
31	SPACE	3	-	-	-	3	SPACE 32	
33							34	
35							36	
37	SPACE	3	-	-	-	3	SPACE 38	
39							40	
41							42	

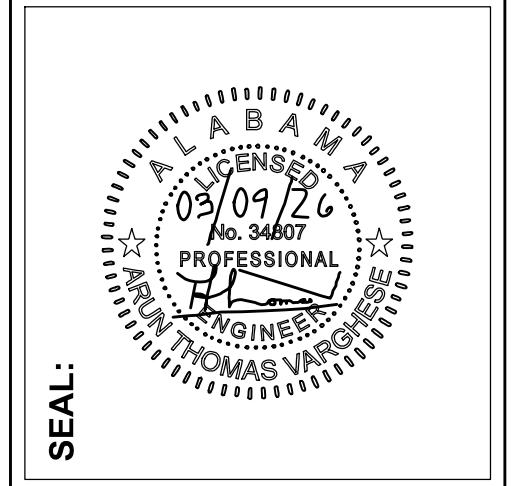
CONNECTED LOAD 525.5 KVA
 (E) INDICATES EXISTING BREAKER AND CIRCUIT TO REMAIN. (S) INDICATES EXISTING BREAKER TO BE MADE SPARE.
 (N) INDICATES NEW BREAKER AND CIRCUIT TO REPLACE EXISTING.

EXISTING PANEL H SCHEDULE							42,000 AIC RATING	
CKT NO.	LOAD DESCRIPTION	BREAKER POLE	AMP	KVA	BREAKER AMP POLE	LOAD DESCRIPTION	CKT NO.	
1	CWP#1	(N) 3	40	6.0	6.0	40 3	CWP-2 (N) 2	
3							4	
5							6	
7	GENERATOR BATTERY	(E) 1	20	1.0	1.8	20 1	CHILLER HEAT TAPE (N) 8	
9	GENERATOR	(E) 1	20	1.0	1.8	20 1	CHILLER HEAT TAPE (N) 10	
11	GENERATOR HEATER	(E) 2	20	6.0	0.4	20 1	CHILLER HEAT TAPE (N) 12	
13							HVAC SERVICE RECS (E) 14	
15	PARKING LOT LTS	(E) 1	20	0.7	0.1	20 1	LIGHTING CONTACTOR LC-1 (E) 16	
17	PARKING LOT LTS	(E) 1	20	0.7	-	-	1 SPACE 18	
19	PARKING LOT LTS	(E) 1	20	0.7	-	-	1 SPACE 20	
21	PARKING LOT LTS	(E) 1	20	0.7	-	-	1 SPACE 22	
23	PARKING LOT LTS	(E) 1	20	0.4	-	-	1 SPACE 24	
25	PARKING LOT LTS	(E) 1	20	0.9	-	-	1 SPACE 26	
27	PORCH LIGHTS	(E) 1	20	0.3	-	-	1 SPACE 28	
29	SPACE	1	-	-	-	1	SPACE 30	
31	SPACE	1	-	-	-	1	SPACE 32	
33	SPACE	1	-	-	-	1	SPACE 34	
35	SPACE	1	-	-	-	1	SPACE 36	
37	SPACE	1	-	-	-	1	SPACE 38	
39	SPACE	1	-	-	-	1	SPACE 40	
41	SPACE	1	-	-	-	1	SPACE 42	

CONNECTED LOAD 30.3 KVA
 (E) INDICATES EXISTING BREAKER AND CIRCUIT TO REMAIN.
 (N) INDICATES NEW BREAKER AND CIRCUIT TO REPLACE EXISTING.

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 1100 FAIRHOPE AVENUE
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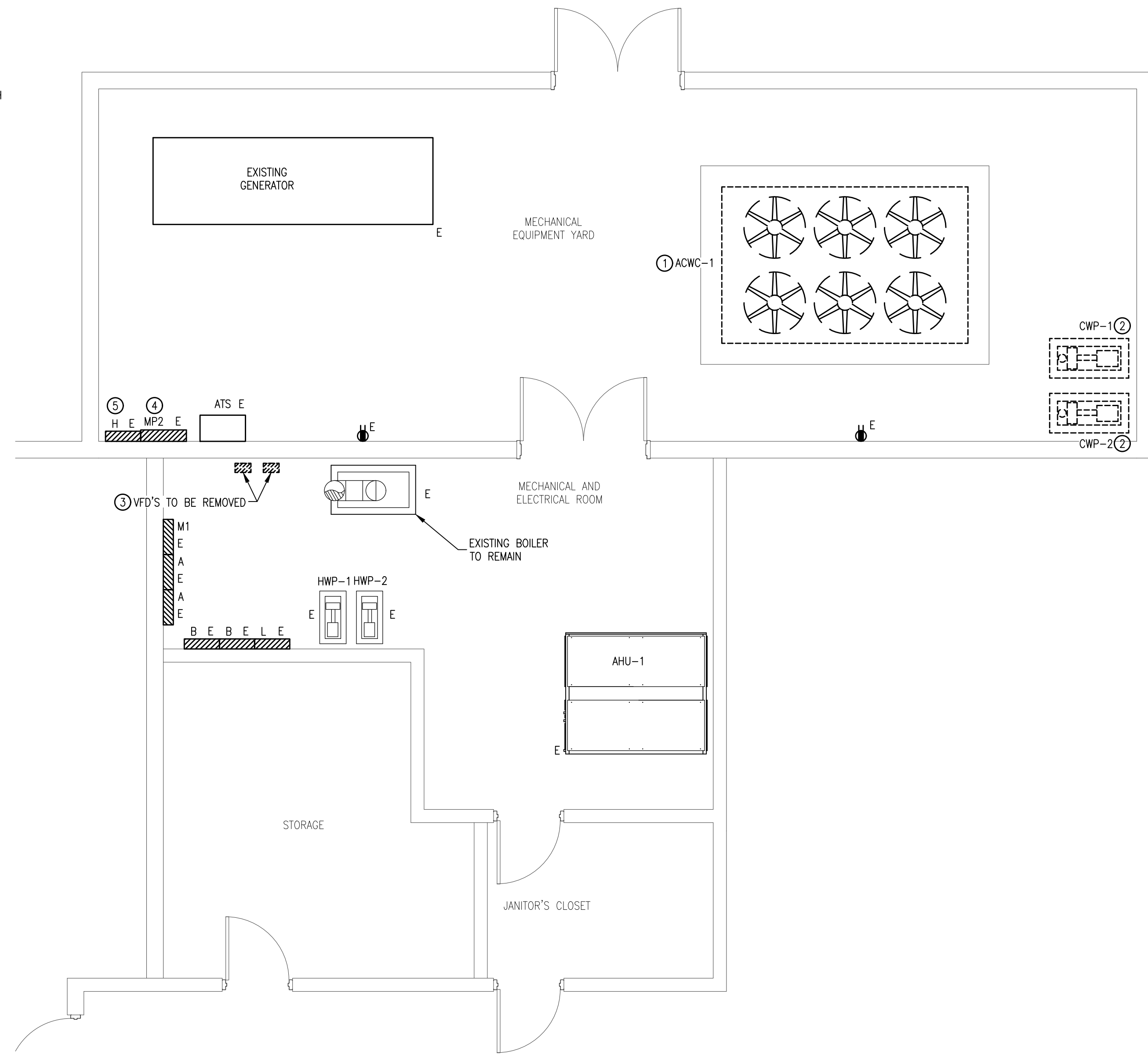
DRAWING: **ELECTRICAL LEGEND AND SCHEDULES**

DATE: 03.09.26
 DRAWN BY: CBP
 CHECKED BY: ATY
 JOB NO: 25148

SHEET NO: **E0**

ELECTRICAL DEMOLITION KEY NOTES

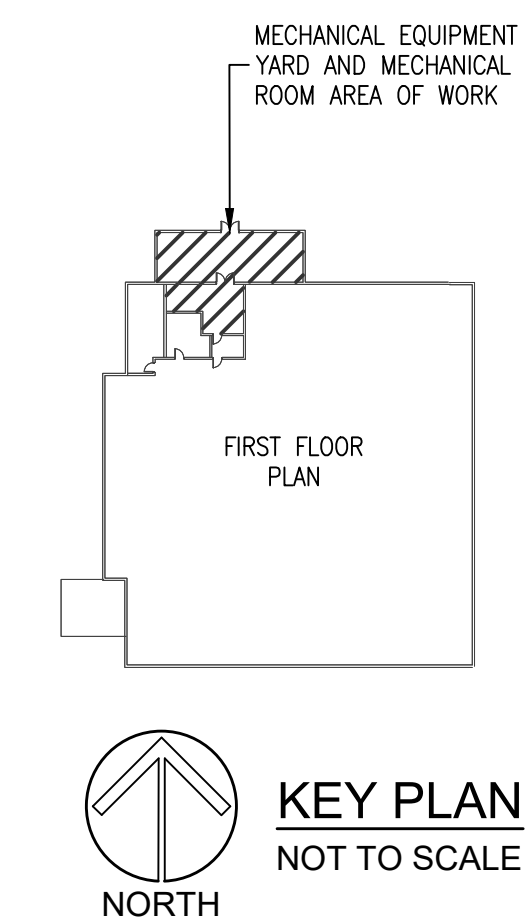
- ① EXISTING AIR COOLED WATER CHILLER TO BE REMOVED AND REPLACED WITH NEW. INCLUDE WITH REMOVAL THE DEMOLITION OF ANY EXISTING CONDUIT, WIRING, AND DISCONNECTS ASSOCIATED WITH EQUIPMENT. SEE ELECTRICAL NEW WORK PLAN E1 FOR MORE INFORMATION.
- ② EXISTING CHILLED WATER PUMP TO BE REMOVED COMPLETELY. INCLUDE WITH REMOVAL THE DEMOLITION OF ANY EXISTING CONDUIT, WIRING, AND DISCONNECTS ASSOCIATED WITH EQUIPMENT.
- ③ EXISTING VARIABLE FREQUENCY DRIVES TO BE REMOVED. INCLUDE WITH REMOVAL THE DEMOLITION OF ANY EXISTING CONDUIT, WIRING, AND DISCONNECTS ASSOCIATED WITH EQUIPMENT.
- ④ EXISTING ELECTRICAL PANEL MP2 SERVING CHILLER CIRCUITS. PROTECT DURING DEMOLITION.
- ⑤ EXISTING ELECTRICAL PANEL H SERVING EXISTING CHILLED WATER PUMPS. PROTECT DURING DEMOLITION.



ELECTRICAL DEMOLITION PLAN: FIRST FLOOR
 1/4" = 1'-0"
 2'-0" 8'-0" 16'-0"
 NORTH

DEMOLITION PLAN NOTES:

1. ALL DASHED SHOWN MECHANICAL UNITS AND CORRESPONDING DISCONNECTS ARE TO BE REMOVED ALONG WITH ASSOCIATED CONDUIT AND WIRING AND BREAKERS, TO BE REPLACED AS PER NEW WORK PLANS, UNLESS OTHERWISE NOTED.
2. "E" INDICATES EXISTING DEVICE TO REMAIN. PROTECT DURING CONSTRUCTION.
3. ALL HOLES LEFT BY REMOVED MECHANICAL UNITS, DISCONNECTS ETC. IN EXISTING AREA TO REMAIN ARE TO BE FILLED AND FINISHED TO MATCH NEW/EXISTING CONDITIONS.
4. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SECURING ALL DEVICES, FIXTURES, WIRES, CONDUIT, ETC. ABOVE THE CEILING PRIOR TO CEILING DEMOLITION. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR DAMAGE CAUSED TO SUCH MATERIALS DURING THE CEILING DEMOLITION PHASE.
5. EXACT LOCATIONS FOR EXISTING MECHANICAL UNITS, DEVICES AND BOXES ARE TO BE FIELD VERIFIED.
6. ALL PENETRATIONS (NEW AND EXISTING) OF THE FIRE RATED BARRIERS SHALL BE FIRE STOPPED USING U.L. APPROVED METHODS AND MATERIALS.
7. COORDINATE ITEMS TO BE SALVAGED WITH THE OWNER PRIOR TO COMMENCEMENT OF WORK. ALL UNUSED WALL BOXES (LEFT FROM SWITCHES REMOVED, THERMOSTATS, ETC.) ARE TO BE COVERED WITH A BLANK PLATE (TO MATCH EXISTING).
8. ALL EXISTING PANELS ARE TO REMAIN (UNLESS OTHERWISE NOTED). THE ELECTRICAL CONTRACTOR IS TO VERIFY THE BREAKER SIZES, WIRE SIZES, PANEL SIZES, AND PANEL LOADS IN THE FIELD. ALL PANELS ARE TO BE COMPLETELY LABELED AND UPDATED DIRECTORIES INSTALLED. ALL PANELS ARE TO BE PROPERLY GROUNDED PER THE NATIONAL ELECTRIC CODE.
9. TERMINATED CIRCUITS THAT ARE NOT USED ON THE NEW WORK PLANS SHALL BE LABELED WITH THE SERVING PANEL AND CIRCUIT NUMBER CLEARLY MARKED ON THE TERMINATING JUNCTION BOX.
10. THE PHASING OF ALL WORK IS TO BE COORDINATED WITH OTHER CONTRACTORS (GENERAL, MECHANICAL, ETC.) PRIOR TO PROJECT COMMENCEMENT.
11. THE ELECTRICAL CONTRACTOR IS TO PROVIDE AND INSTALL JUNCTION BOX COVERS AS REQUIRED. ALL WIRE IN THE AREA OF WORK IS TO BE INSTALLED PROPERLY UPON COMPLETION OF THE PROJECT.
12. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR KEEPING ALL DEVICES, LIGHT FIXTURES AND OTHER EQUIPMENT TO REMAIN ACTIVE - CIRCUITS ASSOCIATED WITH BOTH REMOVED ELECTRICAL WORK AND ELECTRICAL WORK TO REMAIN ARE TO BE EXTENDED WITH WIRE, CONDUIT, BOXES, ETC. (SIZE TO MATCH EXISTING) TO KEEP THE WORK TO REMAIN ACTIVE.
13. THE CONTRACTOR SHOULD MAINTAIN THE INTEGRITY OF THE FIRE ALARM SYSTEM IN THE FACILITY AND IN THE CONSTRUCTION AREA AT ALL TIMES.



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 COURTHOUSE CHILLER
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