AGENDA ITEM EXECUTIVE SUMMARY

Agenda Item:	Water Plant HVAC Rehabilitation & Modernization		
Presenter & Title:	Bob Van Gyseghem, Superintendent of Water & Wastewater		
Date:	August 21, 2023		
Please Check Appropriate Box:			
☒	Committee of the Whole Meeting	☐	Special Committee of the Whole Meeting
☒	City Council Meeting	☐	Special City Council Meeting
☐	Public Hearing	☐	Other -
Associated Strategic Plan Goal/Objective: EMS-II, ES-III			
Estimated Cost: 486,153.00	Budgeted? ☒ Yes ☐ No	Other Funding? ☐ Yes ☐ No	

Executive Summary:

On May 1, 2023, the City council rejected bids for the HVAC project at the Water Treatment Plant and directed staff to revise specifications and conduct a new bid letting. Staff re-bid the Water Plant HVAC project and held a bid opening on July 10, 2023. Five (5) bids were received with the low bid submitted by Ogni Group, Wood Dale, IL in the amount of $486,153.00. Engineers revised cost estimate at the time of re-bidding was $550,000.00. Staff is recommending that a 10% contingency be included in the overall not-to-exceed amount to account for any unforeseen field changes that may occur. Any field changes (Change Orders) must be approved by the City Administrator. All costs for the replacement will be accommodated within the existing budget and reflected in a future budget amendment if necessary.

Attachments: *(please list)*

- Resolution
- Bid Summary

Voting Requirements:

This motion requires a simple majority of affirmative votes for passage.

The Mayor may vote on three occasions: (a) when the vote of the aldermen or trustees has resulted in a tie; (b) when one half of the aldermen or trustees elected have voted in favor of an ordinance, resolution, or motion even though there is no tie vote; or (c) when a vote greater than a majority of the corporate authorities is required by state statute or local ordinance to adopt an ordinance, resolution, or motion.

Recommendation / Suggested Action: *(how the item should be listed on agenda)*

Recommend approval of a Resolution authorizing the City Administrator to enter into a contract with Ogni Group in the amount of $486,153.00 and allow the City Administrator to approve up to $48,615.30 in change orders for a total not-to-exceed amount of $534,768.30

RESOLUTION NO. 2023-80

RESOLUTION AUTHORIZING EXECUTION OF
Contract for Water Plant HVAC Rehabilitation and Modernization.

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF GENEVA, KANE COUNTY, ILLINOIS, as follows:

SECTION 1: That the City Administrator is hereby authorized to execute, on behalf of the City of Geneva, a contract with Ogni Group, related to HVAC at Water Plant in a total amount not to exceed $534,768.30.

SECTION 2: This Resolution shall become effective from and after its passage as in accordance with law.

PASSED by the City Council of the City of Geneva, Kane County, Illinois, this ____ day of _____, 2023

AYES: __ NAYS: __ ABSENT: __ ABSTAINING: __ HOLDING OFFICE: __

Approved by me this ____ day of _____, 2023.

_____
Mayor

ATTEST:

_____
City Clerk

City of Geneva

Summary of Bids

Name of Project: Water Plant HVAC Upgrades

Recorded By: Mike Anderson

Opened By: Heather Collins

Date/Time: 7-10-2023

Approved Engineer Estimate/ Budget :

CONTRACTOR NAME	BID PRICE	BID BOND % OF PRICE	TYPE OF PAYMENT FOR BID BOND	REMARKS	ADDENDUM
Ogni Group	$486,153.00	10%	Insurance	$6,000 Maintenance Plan	1 & 2
Complete Mechanical Services	$542,908.00	10%	Insurance	$19,200 Maintenance Plan	1 & 2
AMS Industries, Inc.	$627,770.00	10%	Insurance	$6,680 Maintenace Plan	1 & 2
Amber Mechanical Contractors, Inc.	$772,000.00	10%	Insurance	Maintenance Plan Not Included	1 & 2
Helm Mechanical	$791,000.00	10%	Insurance	$30,000 Maintenance Plan	1 & 2

COMPLETE CONSTRUCTION CONTRACT & PROJECT DOCUMENTS

Herewith is the Complete Construction Contract & Project Documents
Between
The City of Geneva
And
Ogni, Inc.
For
The Water Plant HVAC Upgrade Project.

This Complete Construction Contract & Project Documents, includes the following:

SECTION 00400

AGREEMENT

Water Plant HVAC Upgrade
CITY OF GENEVA
2023

This Agreement, made this 21st day of Aug 2023 by and between the City of Geneva, hereinafter called "Owner", and Ogni, Inc., doing business as a Corporation, hereinafter called "Contractor."

Witnesseth: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The Contractor will commence and complete the construction of the **Water Plant HVAC Upgrade**

2. The Contractor will furnish all of the material, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the Project described herein.

3. The Contractor will commence the work required by the Contract Documents within ten (10) calendar days after the date of the Notice to Proceed. The Contractor will Substantially Complete the Work by July 26th, 2024 and will meet Final Completion by August 26th, 2024, unless the period for completion is extended otherwise by the Contract Documents.

   ****Final substantial completion date will be mutually agreed upon by Owner and Contractor based on final equipment selection, lead times, and material delays. Contractor shall not be held responsible for delays or lead times from suppliers or manufacturers.**

4. The Contractor agrees to perform all of the Work described in the Contract Documents and comply with the terms therein for the following sums, as shown in the Bid Form - Section 00300.

   Supply & Install Project ---------- $486,153.00
   ~~Maintenance Plan (1st year) ---------- $6,000.00~~ BV

5. The term "Contract Documents" means and includes the following:
   A. Advertisement for Bids
   B. Instructions for Bidders
   C. Bid Form
   D. This Agreement
   E. Notice of Award
   F. Notice to Proceed

G. Change Order Form
H. Performance Bond
I. Payment Bond
J. Certificates of Insurance
K. Certifications (various)
L. Specifications prepared or issued by Engineering Solutions Team.
M. Drawings prepared by Engineering Solutions Team.
N. Addenda:
No. 1, dated June 26th, 2023
No. 2, dated July 6th, 2023

O. Any modification, including Change Orders, duly delivered after execution of Agreement.

6. The Owner will pay to the Contractor in the manner and at such times as set forth in the Special Provisions, such amounts as required by the Contract Documents.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

8. CONTRACTOR and OWNER recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified above, plus any extensions thereof allowed. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty), CONTRACTOR shall pay OWNER $100.00 for each day that expires after the time specified for Substantial Completion until the Work is substantially complete.

In witness whereof, the parties hereto have executed or caused to be executed by their duly authorized officials this Agreement in **quadruplicate** each of which shall be deemed an original on the date first above written.

Owner:

City of Geneva

By: Stephanie K. Dawkins
Name: Stephanie K. Dawkins
Title: City Administrator

(Seal)

Attest:

Name: Jeanne Fornari
Title: Deputy City Clerk

Contractor:

Ogni, Inc.

By: Charlie Engasser
Name: Charlie Engasser
Title: President

(Seal)

Attest:

Name: Adam D. Johnson
Title: Notary

ADAM DAVID JOHNSON
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/2024

END OF SECTION

SECTION 00610

Bond # 107917073

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that:

NAME OF CONTRACTOR: Ogni, Inc

ADDRESS OF CONTRACTOR: 140 E Commercial St Ste 1
Wood Dale, IL 60191

a Corporation, hereinafter called Principal, and

NAME OF SURETY: Travelers Casualty and Surety Company of America

ADDRESS OF SURETY: One Tower Square
Hartford, CT 06183

Hereinafter called Surety, are held and firmly bound unto the **CITY OF GENEVA**, hereinafter Called **OWNER**, in the penal sum of $ 486,153 00, in lawful money of the United States, For the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the **OWNER**, dated the 21st day of August, 2023, a copy of which is hereto attached and made a part hereof for the construction of the **Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID.**

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the **OWNER**, with or without Notice of the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the **OWNER** from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the **OWNER** all outlay and expense which the **OWNER** may incur in making good any default, then his obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the **WORK** to be performed thereunder or the **SPECIFICATIONS** accompanying the same shall in any wise affect its obligation on this **BOND,** and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the **WORK** or to the **SPECIFICATIONS.**

PROVIDED, FURTHER, that no final settlement between the **OWNER** and the **CONTRACTOR** shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 4 counterparts, each of which shall be deemed an original, this the 26th day of September, 2023.

Any suit under this bond must be instituted before the expiration of the Statute of Limitations applicable to any claim against the contractor named herein.

CONTRACTOR

BY: _____

NAME: Charlie Engasser

TITLE: President

ADDRESS: 140 E Commercial St Ste 1, Wood Dale, IL 60191

CONTRACTORS CORPORATE SEAL

SURETY

BY: Robin Vinci

NAME: Robin Vinci [ATTORNEY IN FACT]

[ATTACH VERIFICATIONOF POWER OF ATTORNEY]

ADDRESS: 215 Shuman Blvd. | Suite 139, Naperville, IL 60563

SURETY CORPORATE SEAL

TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA
HARTFORD, CONN.

WITNESS AS TO SURETY

BY: Evonne Brown

NAME: Evonne Brown

ADDRESS: 215 Shuman Blvd. | Suite 139, Naperville, IL 60563

NOTE: Date of BOND must not be prior to date of Contract. IF CONTRACTOR is Partnership, all Partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current line [Circular 570 as amended] and be authorized to transact business in the State where the PROJECT is located.

END OF SECTION

SECTION 00605

Bond # 107917073

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that:

NAME OF CONTRACTOR Ogni, Inc

ADDRESS OF CONTRACTOR 140 E Commercial St Ste 1, Wood Dale, IL 60191

a Corporation, hereinafter called Principal, and

NAME OF SURETY Travelers Casualty and Surety Company of America

ADDRESS OF SURETY One Tower Square
Hartford, CT 06183

Hereinafter called Surety, are held and firmly bound unto the **CITY OF GENEVA**, hereinafter Called **OWNER**, in the penal sum of $ 486,153 00, in lawful money of the United States, For the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the **OWNER**, dated the 21st day of August, 2023, a copy of which is hereto attached and made a part hereof for the construction of the **Water Treatment Plant HVAC system Rehabilitation & Modernization Project: RE-BID.**

NOW, THEREFORE, if the Principal shall promptly make payment in all persons, firms, **SUBCONTRACTORS**, and corporations furnishing materials for or performing labor in the prosecution of the **WORK** provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such **WORK**, and all insurance premiums on said **WORK,** and for all labor performed in such **WORK** whether by **SUBCONTRACTOR** or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the **WORK** to be performed thereunder or the **SPECIFICATIONS** accompanying the same shall in any way affect its obligation on this **BOND**, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the **WORK** or to the **SPECIFICATIONS.**

PROVIDED, FURTHER, that no final settlement between the **OWNER** and the **CONTRACTOR** shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

In witness whereof, this instrument is executed in four [4] counterparts, each of which shall be deemed an original, this the 26th day of September, 2023.

CONTRACTOR

BY: _____

NAME: Charlie Engasser

TITLE: President

ADDRESS: 140 E Commercial St Ste 1, Wood Dale, IL 60191

CONTRACTORS CORPORATE SEAL

SURETY

BY: Robin Vinci [ATTORNEY IN FACT]

NAME: Robin Vinci

[ATTACH VERIFICATIONOF POWER OF ATTORNEY]

ADDRESS: 215 Shuman Blvd. | Suite 139, Naperville, IL 60563

SURETY CORPORATE SEAL

TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA
HARTFORD, CONN.

WITNESS AS TO SURETY

BY: Evonne Brown

NAME: Evonne Brown

ADDRESS: 215 Shuman Blvd. | Suite 139, Naperville, IL 60563

NOTE: Date of BOND must not be prior to date of Contract. IF CONTRACTOR is Partnership, all Partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current line [Circular 570 as amended] and be authorized to transact business in the State where the PROJECT is located.

END OF SECTION

COMPLETE CONSTRUCTION CONTRACT DOCUMENT

TRAVELERS

Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Robin Vinci** of **Chicago / Naperville** , **Illinois** , their true and lawful Attorney(s)-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **21st** day of **April, 2021**

State of Connecticut

City of Hartford ss

By _____
Robert L Raney, Senior Vice President

On this the **21st** day of **April, 2021**, before me personally appeared **Robert L Raney**, who acknowledged himself to be the Senior Vice President of each of the Companies, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of said Companies by himself as a duly authorized officer

IN WITNESS WHEREOF, I hereunto set my hand and official seal

My Commission expires the **30th** day of **June, 2026**

_____
Anna P Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of each of the Companies, which resolutions are now in full force and effect, reading as follows

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her, and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary, and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary, or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority, and it is

FURTHER RESOLVED, that the signature of each of the following officers President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of each of the Companies, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect

Dated this **26th** day of **September** , **2023**

_____
Kevin E Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney(s)-in-Fact and the details of the bond to which this Power of Attorney is attached.

COMPLETE CONSTRUCTION CONTRACT DOCUMENT

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 9/25/2023

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Baldwin Krystyn Sherman Partners LLC 4211 W Boy Scout Blvd. STE 800 Tampa FL 33607 License#: L002281	**CONTACT NAME:** **PHONE (A/C, No, Ext):** 847-353-7147 **FAX (A/C, No):** **E-MAIL ADDRESS:** jaime.moscoso@rosenthalbros.com
INSURED Ogni, Inc. 140 E Commercial St. Ste 1 Wood Dale IL 60191 OGNIINC-01	**INSURER(S) AFFORDING COVERAGE** / **NAIC #** **INSURER A :** Cincinnati Insurance Company — 10677 **INSURER B :** Underwriters at Lloyd's London — 15792 **INSURER C :** Cincinnati Indemnity Co — 23280 **INSURER D :** **INSURER E :** **INSURER F :**

COVERAGES **CERTIFICATE NUMBER:** 978044545 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X **COMMERCIAL GENERAL LIABILITY** CLAIMS-MADE X OCCUR X $0 Deductible GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT LOC OTHER:			ENP 0231472	2/3/2023	2/3/2024	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG $	$ 2,000,000 $ 100,000 $ 10,000 $ 2,000,000 $ 4,000,000 $ 4,000,000 $
A	**AUTOMOBILE LIABILITY** X ANY AUTO OWNED AUTOS ONLY / SCHEDULED AUTOS X HIRED AUTOS ONLY / X NON-OWNED AUTOS ONLY			EBA0231472	2/3/2023	2/3/2024	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$ 1,000,000 $ $ $ $
A	X **UMBRELLA LIAB** X OCCUR **EXCESS LIAB** CLAIMS-MADE DED RETENTION $			ENP 0231472	2/3/2023	2/3/2024	EACH OCCURRENCE AGGREGATE $	$ 5,000,000 $ 5,000,000 $
C	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) N / A If yes, describe under DESCRIPTION OF OPERATIONS below			EWC 0462061	10/28/2022	10/28/2023	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000
B	Professional Liability			B0621POGNI000122	10/28/2022	10/28/2023	Each Claim Aggregate	1,000,000 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Rented / Leased Equipment: $86,000; Deductible: $500

The following are included as additional insured re: General Liability on a primary/non-contributory, ongoing/completed operations basis and auto on a primary/non-contributory per written contract.

Waivers of subrogation are included in favor of additional insureds listed above re: General Liability, auto & Workers Compensation.

30 days notice of cancellation applies except 10 days notice for non-payment of premium. Work Comp notices are sent per state requirements

See Attached...

CERTIFICATE HOLDER

City of Geneva
22 S. First Street
Geneva IL 60134

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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COMPLETE CONSTRUCTION CONTRACT DOCUMENT

AGENCY CUSTOMER ID: OGNIINC-01

LOC #:

ACORD®

ADDITIONAL REMARKS SCHEDULE

AGENCY		NAMED INSURED
Baldwin Krystyn Sherman Partners LLC		Ogni, Inc. 140 E Commercial St. Ste 1 Wood Dale IL 60191
POLICY NUMBER		
CARRIER	NAIC CODE	EFFECTIVE DATE:

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,

FORM NUMBER: 25 FORM TITLE: CERTIFICATE OF LIABILITY INSURANCE

Additional Insured per wording above:
City of Geneva, Its Public Officials, Officers, Trustees, Employees, Agents, Assigns,
and Volunteers.
Engineering Solutions Team, its Officers, Employees and Agents.

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Response to RFP

Water Treatment Plant HVAC System Rehabilitation & Modernization Project REBID

Presented by:

OGNI GROUP
ENERGY SERVICES

140 E Commercial St, Suite 1
Wood Dale, IL, 60191

07/10/2023

OGNI GROUP
ENERGY SERVICES

Cover Letter

Dear Stephanie Dawkins,

Thank you for the opportunity, to respond to your RFP for the **"Water Treatment Plant HVAC System Rehabilitation & Modernization Project - RE-BID"**.
Ogni Inc. is perfectly suited to deliver high-quality materials and services to meet the requirements of the City of Geneva. Ogni Inc., has a proven track record of excellent service to our customers, delivering HVAC system modifications/installations, lighting system modifications/installations, energy consulting, and rebate management solutions tailored to suit your needs.

Our company has previously worked on projects for Governments, Universities, and various commercial sector clients, providing funding recommendations that result in significant initial upfront cost savings through available incentives in addition to millions of dollars in energy and operational cost savings.

Our team of engineers has capabilities in developing solutions that not only reduce energy costs but also improve the operational performance of the equipment thereby increasing overall system energy efficiency.

Over the years, Ogni has worked with numerous clients across the United States in helping them reduce their energy expenditure through improvements in lighting, air conditioning, and heating systems.

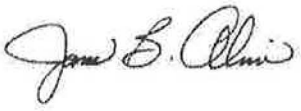
We have a clear understanding of your requirements for this project based on the RFP documents. We are experienced and adaptable in our work and can give the most beneficial partnership to the public works facility. Our organization values hard work, honesty, and integrity and those values will be exhibited through our work together.

1. **We hereby acknowledge that addenda #1 and #2 has been released for this Bid.**
2. **A Bid Bond of 10% has been included in this bid proposal.**
3. **We have confirmed that the project is Tax Exempt and therefore, we've not included any tax in the bid value submitted.**
4. **We hereby acknowledge that Permit fees are not included in the bid amount.**
5. **The maintenance quote provided is based on one visit per quarter for general maintenance and system checks. Further classification and discussion with the owner is required to establish the exact requirements for a maintenance plan and a final cost.**

OGNI GROUP
ENERGY SERVICES

We look forward to providing you with exceptional service under this partnership and to exceeding your expectations. Please contact me directly with any further questions. We thank you for your consideration.

Sincerely,



James B. Alwin, PE
Engineering/Marketing Manager
Ogni Inc
140 E Commercial St, Suite 1, Wood Dale, IL, 60191
Tel: 630-222-7260 **Fax:** 708-236-9412
Email:JBA@ognigroup.com

BID BOND

Travelers Casualty and Surety Company of America
Hartford, CT 06183

CONTRACTOR:
(Name, legal status and address)

Ogni, Inc.
140 E Commercial St. Ste 1
Wood Dale, IL 60191

SURETY:
(Name, legal status and principal place of business)

Travelers Casualty and Surety Company of America
One Tower Square
Hartford, CT 06183

OWNER:
(Name, legal status and address)

City of Geneva
4000 Keslinger Road,
Geneva, IL 60134

BOND AMOUNT: 10% of total price of bid
PROJECT:
(Name, location or address, and Project number, if any)

Water Treatment Plant HVAC System Rehabilitation & Modernization Project, Geneva IL.
4000 Keslinger Road, Geneva, IL 60134

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 10th day of July, 2023

Ogni, Inc.

(Principal) *(Seal)*

President

(Title)

(Witness)

Travelers Casualty and Surety Company of America

(Surety) *(Seal)*

Sonia Travolta - Attorney in Fact

(Title)

(Witness)

TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA
HARTFORD, CONN.

TRAVELERS

Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **SONIA A TRAVOLTA** of **DEERFIELD** , **Illinois** , their true and lawful Attorney(s)-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **21st** day of **April**, **2021**.

State of Connecticut

City of Hartford ss.

By: _____
Robert L. Raney, Senior Vice President

On this the **21st** day of **April**, **2021**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of each of the Companies, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of said Companies by himself as a duly authorized officer.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June**, **2026**

_____
Anna P. Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of each of the Companies, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of each of the Companies, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 10th day of July , **2023** .

_____
Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney(s)-in-Fact and the details of the bond to which this Power of Attorney is attached.

SECTION 00 91 13.01

CITY OF GENEVA
Water Treatment Plant
HVAC System Rehabilitation & Modernization Project: RE-BID
BID DATE: July 10, 2023 at 10:00 am

ADDENDUM NO. 1

DATE: Jun 26, 2023
FROM: Edward Kalina and Larry McElheny
TO: All Plan Holders
 # PAGES: Pages

Please acknowledge receipt of this addendum by filling out the following and email a scanned copy to bvangyseghem@geneva.il.us immediately upon receipt of this addendum.
Also acknowledge receipt on Section 00 41 00 - Bid Form, page 00 41 00-1.

COMPANY NAME: Ogni Inc.

SIGNATURE OF COMPANY REPRESENTATIVE: _____

DATE: 07/07/2023

SECTION 00 91 13.01

CITY OF GENEVA
Water Treatment Plant
HVAC System Rehabilitation & Modernization Project: RE-BID
BID DATE: July 10, 2023 at 10:00 am

ADDENDUM NO. 2

DATE: July 06, 2023
FROM: Edward Kalina and Larry McElheny
TO: All Plan Holders
 # PAGES: Pages

Please acknowledge receipt of this addendum by filling out the following and email a scanned copy to bvangyseghem@geneva.il.us immediately upon receipt of this addendum. Also acknowledge receipt on Section 00 41 00 - Bid Form, page 00 41 00-1.

COMPANY NAME: Ogni Inc.

SIGNATURE OF COMPANY REPRESENTATIVE: James B. Allen

DATE: 07/07/2023

SECTION 00300

BID FORM

Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID CITY OF GENEVA 2023

Proposal of Ogni Inc. (hereinafter called "BIDDER"), organized and existing under the laws of the State of Illinois, doing business as A Corporation (insert "A Corporation," "A Partnership," or "An Individual," as applicable) to the City of Geneva (hereinafter called "Owner").

I. The undersigned BIDDER proposes and agrees, if this bid is accepted, to enter into an agreement with the Owner in the form in the Bidding Documents to perform and furnish all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

II. BIDDER accepts all of the terms and conditions of the Advertisement for Bids and Instructions for Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that BIDDER may agree to in writing upon request of Owner.

III. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

A. BIDDER has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.	Addendum Date
01	06/26/2023
02	07/06/2023

B. BIDDER has visited the site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, performance, and furnishing of the Work.

C. BIDDER is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. BIDDER has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or

relating to existing surface or subsurface structures at or contiguous to the Site. BIDDER acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information or data shown or indicated in the Bidding Documents with respect to Underground Facilities at or contiguous to the Site.

E. BIDDER is aware of the general nature of Work to be performed by Owner and others at the site that relates to Work for which this Bid is submitted as indicated in the Bidding Documents.

F. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

G. BIDDER has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that BIDDER has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to BIDDER.

H. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.

IV. By submission of the bid, each BIDDER further certifies, and in the case of a joint bid each party thereto certifies as to his own organization, that in connection with the bid:

A. The prices in the bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

B. Unless otherwise required by law, the prices which have been quoted in the bid have not knowingly been disclosed by the bidder, prior to opening, directly or indirectly to any other bidder or competitor; and

C. No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition.

V. Each person signing the Bid certifies that:

A. They are the person in the BIDDER's organization responsible within that organization for the decision as to the prices being bid and that he has not participated, and will not participate, in any action contrary to (4) above; or

B. They are not the person in the BIDDER's organization responsible within that organization for the decision as to the prices being bid, but that they have been authorized to act as an agent for the persons responsible for such decision in certifying that such persons have not participated, and will not participate, in any action contrary to (4) above, and as their agent shall so certify; and shall also certify that he has not participated, and will not participate, in any action contrary to (4) above.

VI. BIDDER will complete the Work in accordance with the Bidding Documents for the following price(s):

ITEM NO	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
100.	MOBILIZATION	1	LS		
200.	DEMOLITION	1	LS		
300.	SUPPLY PROPOSED EQUIPMENT	1	LS		
400.	INSTALL PROPOSEED EQUIPMENT	1	LS		
500.	RESTORATION	1	LS		
600.	TRAINING	1	LS		
	TOTAL PROJECT COSTS				
1000.	MAINTENANCE PLAN				

NOTES:

1. OWNER RESERVES THE RIGHT TO DELETE ANY BID ITEMS WHICH ARE NOT IN THE BEST INTEREST OF THE OWNER. THE OWNER ALSO HAS THE RIGHT TO REDUCE ANY QUANTITIES IN ORDER TO KEEP THE PROJECT UNDER THE BUDGETED VALUE FOR THE FISCAL YEAR.

2. **BIDDER agrees that the Work will be Substantially Complete on October 27, 2023 and will meet Final Completion November 20, 2023.**

3. BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

4. The Owner reserves the right to reject all Bids.

5. Accompanying this Bid is a Bid Security in the amount of $ _____, which is hereby tendered in accordance with the requirements of the Instructions to Bidders and the Specifications.

6. In the event that this Bid is accepted and an award of contract is made to the undersigned BIDDER, the undersigned does hereby covenant and agree to deliver to the Owner the signed and executed Contract and Bonds as specified in the Instructions for Bidders and the Specifications.

VI. BIDDER will complete the Work in accordance with the Bidding Documents for the following price(s):

ITEM NO	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
100.	MOBILIZATION	1	LS		$34,031
200.	DEMOLITION	1	LS		$38,892
300.	SUPPLY PROPOSED EQUIPMENT	1	LS		$243,077
400.	INSTALL PROPOSEED EQUIPMENT	1	LS		$136,123
500.	RESTORATION	1	LS		$29,169
600.	TRAINING	1	LS		$4,862
	TOTAL PROJECT COSTS				$486,153
1000.	MAINTENANCE PLAN				$6,000

NOTES:

1. OWNER RESERVES THE RIGHT TO DELETE ANY BID ITEMS WHICH ARE NOT IN THE BEST INTEREST OF THE OWNER. THE OWNER ALSO HAS THE RIGHT TO REDUCE ANY QUANTITIES IN ORDER TO KEEP THE PROJECT UNDER THE BUDGETED VALUE FOR THE FISCAL YEAR.

2. **BIDDER agrees that the Work will be Substantially Complete on October 27, 2023 and will meet Final Completion November 20, 2023.**

3. BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

4. The Owner reserves the right to reject all Bids.

5. Accompanying this Bid is a Bid Security in the amount of $ 50,000, which is hereby tendered in accordance with the requirements of the Instructions to Bidders and the Specifications.

6. In the event that this Bid is accepted and an award of contract is made to the undersigned BIDDER, the undersigned does hereby covenant and agree to deliver to the Owner the signed and executed Contract and Bonds as specified in the Instructions for Bidders and the Specifications.

7. The undersigned further agrees to begin work within ten (10) days after the executions and acceptance of the Contract, and thereafter to carry on the work diligently and continuously in such manner as to insure final completion and delivery to the Owner of the entire work or equipment under contract in accordance with the provisions of the Contract.

Witness _____ Hand(s) and Seal _____ this _____ day of _____, 202__.

If an individual, sign and give address

_____

Address_____

If a partnership, sign all individual names and give address of each partner

_____

_____
Partnership Name

Address_____

Name and Addresses of Individual Partners

_____

_____

_____

_____

If a corporation, officers duly authorized should sign, attach corporate seal

Corporate Name Ogni Inc.

Address 140 E Commercial St, Suite 1,
Wood Dale, IL 60191

By _____
Charlie Engasser, President

Attest:

_____
Ramu Adusumilli, Secretary

Corporate Seal

Contact Phone Number of Bidder: 708-236-9411

Subcontracted Work

To be submitted the day after Bids are received by 2:00 p.m., prevailing time, to Geneva Public Works 1800 South Street, Geneva, IL 60134 Attention Bob VanGyseghem

The following subcontractors will be utilized for portions of the project work. **Changes shall not be made subsequent to the Bid unless change(s) is approved by the Owner.**

Subcontractor	Work to be Performed	Estimated Dollar Amount
American Mechanical Systems	Installation of all Mechanical Equipment.	$107,274

SECTION 00310

GENERAL CERTIFICATIONS

The undersigned, as duly-authorized representative of the Contractor, hereby certifies to the City of Geneva, that regarding this project known as **Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID.**

The Following General Certifications are required:

- **Drug Free Workplace Certification**
- **Certification of Compliance with Safety Regulations**
- **Certification of No Tax Delinquency and No Tax Default**
- **Certification of Compliance with Sexual Harassment Policies**
- **Certification of Non-Segregated Facilities**
- **Certificate of Compliance with Prevailing Wage Rate Act**

1. DRUG FREE WORKPLACE CERTIFICATION

The Contractor ensures that they operate a drug free environment and that drugs are not allowed in the workplace or satellite locations as well as City of Geneva project locations in accordance with the Drug Free Workplace Act of January, 1992.

2. CERTIFICATION OF COMPLIANCE WITH SAFETY REGULATIONS

The Contractor is fully aware of and able to comply with all Local, State, and Federal Safety and other Laws, Codes, and Regulations applicable for the construction of the Project.

3. CERTIFICATION OF NO TAX DELIQUENCY AND NO TAX DEFAULT

The Contractor is not currently delinquent in the payment of any tax administered by or owed to the Illinois Department of Revenue, or otherwise in default upon any such tax as defined under 65 ILCS 5/11-42.1-1, or if it is:

a. It is contesting its liability for the tax or the amount of tax in accordance with procedures established by the appropriate Revenue Act; or

b. It has entered into an agreement with the Department of Revenue for payment of all taxes due and is currently in compliance with that agreement.

4. CERTIFICATION OF COMPLIANCE WITH SEXUAL HARASSMENT POLICIES

The Contractor has a written sexual harassment policy in place in full compliance with all applicable state and local laws and policies.

5. CERTIFICATION OF NON-SEGREGATED FACILITIES

The federally assisted construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term 'segregated facilities' means any waiting rooms, work areas, restrooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom or otherwise. The federally assisted construction contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that he will retain such certification in his files.

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Subscribed and sworn to:

Notary Public

before me this 8th day of July, 2023.

Charles Ingasser

Authorized Agent of Contractor

President

Title

Ogni Inc.

Company

07/10/2023 07/08/2023

Date

Nandi Nefertari Turner

ID NUMBER
132469112
COMMISSION EXPIRES
May 7, 2024

Texas
Fort Bend County

Notarized online using audio-video communication

6. CERTIFICATE OF COMPLIANCE WITH PREVAILING WAGE RATE ACT

The undersigned, upon being first duly sworn, hereby certifies to the City of Geneva, Kane County, Illinois, that all work under this contract shall

comply with the Illinois Prevailing Wage Act, 820 ILCS 130/.01, et. seq, (the "Act") and

current City ordinance, to the extent required by law. Contractors shall submit monthly certified

payroll records to the City.

The undersigned, upon being first duly sworn, hereby certifies to the City of Geneva, Kane County, Illinois, that the bidder will file their substance

abuse prevention plan.

Ogni Inc.
Name of Contractor

By: Charles Engasser

State of Texas),
ss.
County of Fort Bend)

Subscribed and sworn to
before me this 8th day
of July, 2023.

Notary Public

Nandi Nefertari Turner
ID NUMBER
132469112
COMMISSION EXPIRES
May 7, 2024

Notarized online using audio-video communication

END OF SECTION

SECTION 00315

CERTIFICATION OF COMPLIANCE WITH CRIMINAL CODE OF 1961

WHEREAS, a conviction for the offense of bid-rigging or bid rotating bars a person or entity from bidding on public contracts (720 ILCS 5/33D-11), and

WHEREAS, Section 33E-11 of the Criminal Code (720 ILCS 5/33E-11) requires bidders and contractors to certify on a form provided by the unit of local government or school district that they are not barred from public contracting due to bid-rigging or bid rotating convictions.

I, Charlie Engasser, do hereby certify that:
Name

1. I am President of the Ogni Inc.
Position Firm

and have authority to execute this certification on behalf of the firm;

2. This firm is not barred from bidding on or entering into public contracts due to having been convicted of bid-rigging or bid rotating under paragraphs 720 ILCS 5/33E-11 of the Illinois Criminal Code. The undersigned also certifies that no officers or employees of the bidder or contractor have been so convicted and that the bidder or contractor is not the successor company or a new company created by the offices or owners of one so convicted. It is further certified that any such conviction occurring after the date of this certification will be reported to the above named public body, in writing, with seven (7) days of such conviction, if it occurs during any bidding process, contract term or otherwise prior to entering into any contract therewith.

Name of Firm Ogni Inc.

Signature Charles Engasser

Title President

Date 07/10/2023 07/08/2023

Corporate Seal (where appropriate)

On this 8th day of July, 2023, before me appeared (Name) Charles Engasser to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (Name of Firm) Ogni Inc.
to execute the affidavit and did so as his or her free act and deed.

Notary Public _____ Commission Expires 05/07/2024

Notary Seal

Nandi Nefertari Turner
ID NUMBER
132469112
COMMISSION EXPIRES
May 7, 2024

Notarized online using audio-video communication

END OF SECTION

SECTION 00330

AFFIDAVIT OF EXPERIENCE

Water Treatment Plant HVAC System Rehabilitation & Modernization Project:
RE-BID
CITY OF GENEVA
2023

STATE OF Texas)
)SS
COUNTY OF Fort Bend)

Ogni Inc., hereinafter called Principal, Corporation, Partnership or Individual and which has done work for the following parties of the general kind and approximate magnitude under this contract:

Name of Owner	Phone #	Job Description	$ Amount
Baps Youth Activity Center BAPS Shri Swaminarayan Mandir	630-213-2277	HVAC Ductwork and Insulation	$2,950,000
Home2 Bolingbrook Arvind Agerwal	630-728-6712	Electrical and Mechanical both work involved.	$800,000
Chicago - Read Mental Health Center	312-446-0792	Replaced Roof mounted condensing units, existing Dx coils, economizer controls	$125,000
Libertyville High School 2021 summer HVAC Upgrades	---	HVAC	$260,882

and that Ogni Inc. (Name of said Principal, Corporation, Partnership, or Individuals) available for immediate use on the proposed work the following plant and equipment:

CERTIFICATION:

CONTRACTOR

BY: Charles Engasser

NAME: Charlie Engasser **(PRINCIPAL)**

TITLE: President

ADDRESS: 140 E. Commercial St. Suite 1 Wood Dale, IL 60191

CONTRACTORS CORPORATE SEAL

ATTEST

BY: Sworn to and subscribed before me on 07/08/2023 by Charles Engasser.

NAME: Nandi Nefertari Turner **(NOTARY PUBLIC)**

ADDRESS: 3419 Majestic Pine Lane, Rosenberg, Tx 77471

Nandi Nefertari Turner
ID NUMBER
132469112
COMMISSION EXPIRES
May 7, 2024

otarized online using audio-video communication

END OF SECTION

SECTION 00335
AFFIDAVIT OF LITIGATION HISTORY

WATER TREATMENT PLANT HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT: RE-BID
CITY OF GENEVA
2023

STATE OF Texas)
)SS
COUNTY OF Fort Bend)

I, Ogni Inc., on oath state that the information presented below is a complete accounting of the last ten years of litigation history for the Contractor:

YEAR	CASE/ DOCKET NUMBER	COURT OF JURISDICTION	INDICATE IF CONTRACTOR WAS PLAINTIFF OR DEFENDANT	INDICATE THE NAME OF THE OPPOSING PARTY Or PARTIES	DISPOSITION OF CASE INDICATE MONETARY AWARD TO PLAINTIFF/DEFENDANT/ OR SETTLEMENT OR CURRENTLY ONGOING

Add additional pages if necessary.

CERTIFICATION:

CONTRACTOR
BY: Charles Engasser
(PRINCIPAL)

NAME: Charlie Engasser

TITLE: President

ADDRESS 140 E Commercial St, Suite 1, Wood Dale, IL 60191

CONTRACTOR CORPORATE SEAL

ATTEST
BY: Ramu Adusumilli Digitally signed by Ramu Adusumilli
(PRINCIPAL SECRETARY)

NAME: Ramu Adusumilli

TITLE: Principal Secretary

ADDRESS: 140 E Commercial St, Suite 1, Wood Dale, IL 60191

SUBSCRIBED AND SWORN TO
Before me this 8th day of
July, 2023 by Charles Engasser.

Notary Public

Nandi Nefertari Turner
ID NUMBER
132469112
COMMISSION EXPIRES
May 7, 2024

Notarized online using audio-video communication

END OF SECTION

Chaitanya N

263 Blackberry Dr, Bolingbrook,
248-954-452
nchaitu@umich.ec

PROFESSIONAL SUMMARY

Extremely seasoned and reliable Project Manager with proven ability to handle short- and long-term projects successfully. Able to bring most projects to completion under customer budget at or ahead of customer deadlines. Effective at managing both small and large technical project teams.

WORK EXPERIENCE

09/01/2020-Present

NSWRD HVAC Modifications
Project Manager, *Ogni Inc – Wood Dale, IL*

- Managed the execution of the equipment orders from order commitment through final payment interpreted engineering drawings and specifications to develop engineered equipment submittals i compliance with contract drawing, site coordination, and site installation requirements.
- Handle RFPs, RFIs, and RFQs to keep project planning moving smoothly.
- Challenging assignments that include the design of mechanical systems, and performing walk-downs, investigating, troubleshooting, and solving a wide variety of mechanical design issues
- Conduct field verification/observation and ability to lead project client meetings.
- Prepared construction budgets by analyzing building plans while updating specifications and projecting costs for each elevation.
- Reviewed project plans and proposals in collaboration with management to develop project objectives and distribute responsibilities to subcontractors.
- Managed fieldwork operations activities and the organization of subcontractors daily.
- Coordinating and managing engineering team overseas on task and project progress to meet deadlines.
- Negotiated with vendors and third-party suppliers to purchase and install the HVAC equipment in th district.

5/01/2019-08/31/2020

BAPS YAC PROJECT
Project Engineer, *Ogni Inc - Wood Dale, IL*

- Responsible for all the HVAC & Mechanical installation work.
- Monitored the installation of HVAC works (Ducting-Air Handling Units-Fan Coil Units-VAV System-Primary & Secondary-Pumps-Chillers)
- Attended project planning meetings to coordinate mechanical system designs with structural and architecture teams, mitigate design conflicts, and coordinate delivery timelines.
- Presented procedures, rules, and regulations to subcontractors involved in the project while maintaining a safe, clean, and productive environment.
- Put together job data including materials take-offs, pricing lists, and labor costs.
- Doing the necessary calculations, like and not limited to, CFM calculations to recheck the size of ducts for optimum airflow.
- Follow up the preparation of the HVAC & Mechanical shop drawings with the draftsman to assure that it is coordinated with the site conditions.
- Prepared as-built drawings, user manual, and project closeup to client's classification.
- Supported Project Manager and Superintendents with purchasing, RFIs, and submittals to increase productivity.

EDUCATION

09/01/2018 - 04/30/2020 **Mechanical Engineering,** *University of Michigan – Dearborn, MI*
06/01/2013-05/30/2017 **Mechanical Engineering,** *Jawaharlal Nehru Technological University – Hyderabad, India*

Ryan Buttner
Project Manager

EDUCATION

***Harper College**–General-Business Administration and Management*

EXPERIENCE

Ryan has 26 years of professional experience. Incorporated in American Mechanical Systems in 2014. Managed over 30 million in projects with and for other contractors like Ogni but not limited to AirMaker, Richardson Mechanical, 3G HVAC, Brian's heating and cooling and Airman Mechanical etc.

AREAS OF EXPERTISE

- *HVAC Installation*
- *Furnace Installation*
- *Heat Pump Installation*
- *Boiler Installation*

CAPABILITIES

- *Equipment safety verification*
- *Procedure planning*
- *Schedule determination*
- *Problem solving*
- *Blueprint and Schematic understanding*
- *Worker supervision*
- *Employee training*

PAST PROJECTS

- *Villa Park Lofts (30 units) 2013.*
- *Main Street Lofts (24 units 4 story) 2021.*
- *Beech Street Lofts (50 units in progress).*
- *Multiple Pilot Gas Stations, Loves Gas Station 2014-2018.*
- *Baps Temple*
- *North Shore Water Reclamation (in progress).*
- *Chase Bank*

PREVIOUS EMPLOYERS / AFFILIATES

- *American Mechanical Systems- Business Owner*
- *First Data Merchant Services- Independent Sales Agent*

SECTION 00 91 13.01

CITY OF GENEVA
Water Treatment Plant
HVAC System Rehabilitation & Modernization Project: RE-BID
BID DATE: July 10, 2023 at 10:00 am

ADDENDUM NO. 2

DATE: July 06, 2023
FROM: Edward Kalina and Larry McElheny
TO: All Plan Holders
 # PAGES: Pages

Please acknowledge receipt of this addendum by filling out the following and email a scanned copy to bvangyseghem@geneva.il.us immediately upon receipt of this addendum. Also acknowledge receipt on Section 00 41 00 - Bid Form, page 00 41 00-1.

COMPANY NAME: _____

SIGNATURE OF COMPANY REPRESENTATIVE: _____

DATE: _____

CITY OF GENEVA
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THIS ADDENDUM FORMS A PART OF THE CONTRACT DOCUMENTS AND MODIFIES THE ORIGINAL BIDDING DOCUMENTS AS NOTED BELOW.

TABLE OF CONTENTS

I. SECTION 230719 - HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulation for HVAC piping systems.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation system materials are to be delivered to the Project site in unopened containers. The packaging is to include name of manufacturer, fabricator, type, description, and size.

1.3 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," articles for where insulating materials are applied.

B. Products do not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come into contact with stainless steel have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.

D. Insulation materials for use on austenitic stainless steel are qualified as acceptable in accordance with ASTM C795.

E. Foam insulation materials do not use CFC or HCFC blowing agents in the manufacturing process.

F. Calcium Silicate: Preformed Pipe Sections: Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C533, Type I.

G. Glass-Fiber, Preformed Pipe: Glass fibers bonded with a thermosetting resin; suitable for maximum use temperature up to **850 deg F** in accordance with ASTM C411. Comply with ASTM C547.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Johns Manville; a Berkshire Hathaway company
    b. Knauf Insulation
    c. Manson Insulation Inc.
    d. Owens Corning

2. Preformed Pipe Insulation: Type I, Grade A with factory-applied ASJ.
3. Fabricated shapes in accordance with ASTM C450 and ASTM C585.

2.2 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.
2. ASJ+: Aluminum foil reinforced with glass scrim bonded to a kraft paper interleaving with an outer film leaving no paper exposed; complying with ASTM C1136, Types I, II, III, IV, and VII.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, compress, or otherwise damage insulation or jacket.

D. Install insulation with longitudinal seams at top and bottom (12 o'clock and 6 o'clock positions) of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet during storage or in the installation process before being properly covered and sealed in accordance with the Contract Documents.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth, but not to the extent of creating wrinkles or areas of compression in the insulation.
2. Overlap jacket longitudinal seams at least **1-1/2 inches**. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 2 inches o.c.
3. For below-ambient services, apply vapor-barrier mastic over staples.
4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.

3.4 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles below.

B. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

C. Install removable insulation covers. Installation conforms to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least 2 times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least **2 inches** over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.5 INSTALLATION OF GLASS-FIBER AND MINERAL WOOL INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with jackets on above-ambient surfaces, secure laps with outward-clinched staples at **6 inches** o.c.
4. For insulation with jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Fittings and Elbows:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

3.6 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system to match existing."

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

3.7 PIPING INSULATION SCHEDULE, GENERAL

A. Insulation conductivity and thickness per pipe size comply with schedules in this Section or with requirements of authorities having jurisdiction, whichever is more stringent.

B. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

C. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Underground piping.

3.8 INDOOR PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping:

1. All Pipe Sizes: Insulation is the following:

a. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

B. Refrigerant Suction and Hot-Gas Flexible Tubing:

1. All Pipe Sizes: Insulation is one of the following:

a. Flexible Elastomeric: 2 inches thick.

C. Refrigerant Liquid Piping:

1. All Pipe Sizes: Insulation is the following:

a. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

3.9 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping:

1. All Pipe Sizes: Insulation is the following:

a. Glass-Fiber, Preformed Pipe Insulation, Type I: 2 inches thick.

B. Refrigerant Suction and Hot-Gas Flexible Tubing:

1. All Pipe Sizes: Insulation is the following:

a. Flexible Elastomeric: 2 inches thick.

C. Refrigerant Liquid Piping:

1. All Pipe Sizes: Insulation is the following:

a. Flexible Elastomeric: 1 inch thick.

END OF SECTION 230719

II. SECTION 236200 - PACKAGED COMPRESSOR AND CONDENSER UNITS

PART 4 - GENERAL

4.1 SUMMARY

A. Section Includes:

1. Compressor and condenser units, air cooled, 1 to 5 tons (3.5 to 17.6 kW).
2. Compressor and condenser units, air cooled, 6 to 120 tons (21 to 422 kW).

4.2 ACTION SUBMITTALS

A. Product Data: For each compressor and condenser unit.

1. Include rated capacities, operating characteristics, and furnished specialties and accessories.
2. Include equipment dimensions, weights and structural loads, required clearances, method of field assembly, components, and location and size of each field connection.

B. Shop Drawings: For compressor and condenser units.

1. Include plans, elevations, sections, and attachment details.
2. Include diagrams for power, signal, and control wiring.

4.3 INFORMATIONAL SUBMITTALS

A. Startup service reports.

B. Field quality-control reports.

C. Warranty: For special warranty.

4.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For compressor and condenser units to include in emergency, operation, and maintenance manuals.

4.5 COORDINATION

A. Coordinate sizes and locations of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-In-Place Concrete."

B. Coordinate location of piping and electrical rough-ins.

4.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of compressor and condenser units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Compressor failure.
b. Condenser coil leak.

2. Warranty Period: 10 years from date of Substantial Completion.
3. Warranty Period (Compressor Only): 10 years from date of Substantial Completion.
4. Warranty Period (Components Other Than Compressor): 10 years from date of Substantial Completion.
5. Warranty Period (Condenser Coil Only): Five years from date of Substantial Completion.

PART 5 - PRODUCTS

5.1 PERFORMANCE REQUIREMENTS

A. Fabricate and label refrigeration system in accordance with ASHRAE 15 and ASHRAE 34.

B. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6, "Heating, Ventilating, and Air-Conditioning."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

5.2 COMPRESSOR AND CONDENSER UNITS, AIR COOLED, 1 TO 5 TONS (3.5 TO 17.6 kW)

A. Basis-of-Design Product: Subject to compliance with requirements, provide Carrier Global Corporation or comparable product by one of the following:

1. Lennox Industries, Inc.; Lennox International
2. YORK; brand of Johnson Controls International plc, Building Solutions North America
3. Daikin Applied
4. Commercial Aire Products

5.3 COMPRESSOR AND CONDENSER UNITS, AIR COOLED, 6 TO 120 TONS (21 TO 422 kW)

A. Basis-of-Design Product: Subject to compliance with requirements, provide Carrier Global Corporation or comparable product by one of the following:

1. Carrier Global Corporation
2. Daikin Applied
3. Lennox Industries, Inc.; Lennox International
4. YORK; brand of Johnson Controls International plc, Building Solutions North America
5. Commercial Aire Products

B. Description: Factory assembled and tested, air cooled; consisting of casing, compressors, condenser coils, condenser fans and motors, and unit controls.

C. Compressor:

1. Hermetic Scroll Compressor: Designed for service with crankcase sight glass, crankcase heater, and backseating service access valves on suction and discharge ports.

a. Capacity Control: On-off compressor cycling.

D. Refrigerant: R-410A.

E. Condenser Coil: Seamless copper-tube, aluminum-fin coil, including subcooling circuit and backseating liquid-line service access valve.

1. Factory pressure test coils, then dehydrate by drawing a vacuum and fill with a holding charge of nitrogen or refrigerant.
2. Provide factory-applied baked epoxy anti-corrosion coating to assembled coil.

F. Condenser Fans: Propeller-type vertical discharge; either directly or belt driven. Include the following:

1. Permanently lubricated, ball-bearing totally enclosed, air-over motors.
2. Separate motor for each fan.
3. Dynamically and statically balanced fan assemblies.

G. Operating and safety controls include the following:

1. Manual-reset, high-pressure cutout switches.
2. Automatic-reset, low-pressure cutout switches.
3. Low-oil-pressure cutout switch.
4. Compressor-winding thermostat cutout switch.
5. Three-leg, compressor-overload protection.
6. Control transformer.
7. Magnetic contactors for compressor and condenser fan motors.
8. Timer to prevent excessive compressor cycling.

H. Accessories:

1. to control compressor and condenser unit and its associated evaporator fan.
2. Low-Ambient Controller:

    a. Controls condenser fan speed to permit operation down to **minus 20 deg F** with time-delay relay to bypass low-pressure switch.

3. Gauge Panel: Package with refrigerant circuit suction and discharge gauges.
4. Hot-gas bypass kit.
5. Part-winding-start timing relay, circuit breakers, and contactors.
6. Reversing valve.
7. Non-fused disconnect switch, factory mounted and wired, for single external electrical power connection. See Section 262816 "Enclosed Switches and Circuit Breakers."
8. Low-noise fans.
9. 115 V ac convenience, ground-fault circuit interrupter receptacle in weatherproof enclosure.
10. Vibration isolation resilient mounts.
11. Security grilles.
12. See drawing schedule.

I. Unit Casings: Designed for outdoor installation with weather protection for components and controls and with removable panels for required access to compressors, controls, condenser fans, motors, and drives. Additional features include the following:

1. Steel, galvanized or zinc coated, for exposed casing surfaces; treated and finished with manufacturer's standard paint coating.

    a. Corrosion Resistance: 500-hour salt spray test, in accordance with ASTM B117.

2. Perimeter base rail with forklift slots and lifting holes to facilitate rigging.
3. Gasketed control panel door.
4. Condenser coil hail guard.

J. Capacities and Characteristics:

1. Compressor and Condenser Unit:

    a. Full-Load Cooling Capacity: See Schedule.
    b. Energy-Efficiency Ratio (EER): See Schedule.

c. Seasonal Energy-Efficiency Ratio (SEER): See Schedule.
d. Coefficient of Performance (COP): See Schedule.
e. Capacity Steps: See Schedule.

5.4 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

5.5 SOURCE QUALITY CONTROL

A. Performance Ratings: Certify capacity performance ratings of compressor and condenser units in accordance with AHRI 210/240.

B. Sound-Power Level Ratings: Factory test sound-power-level ratings in accordance with AHRI 270.

PART 6 - EXECUTION

6.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of compressor and condenser units.

B. Examine roughing-in for refrigerant piping systems to verify actual locations of piping connections before equipment installation.

C. Examine walls, floors, and roofs for suitable conditions where compressor and condenser units will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

6.2 INSTALLATION

A. Install units level and plumb, firmly anchored in locations indicated.

B. Equipment Mounting:

1. Install compressor and condenser units on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-In-Place Concrete."

C. Maintain manufacturer's recommended clearances for service and maintenance.

D. Loose Components: Install piping specialties, electrical components, devices, and accessories that are not factory mounted.

6.3 PIPING CONNECTIONS

A. Where installing piping adjacent to equipment, allow space for service and maintenance.

B. Connect refrigerant piping to air-cooled compressor and condenser units; maintain required access to unit. Install furnished field-mounted accessories. Refrigerant piping and specialties are specified in Section 232300 "Refrigerant Piping."

6.4 ELECTRICAL CONNECTIONS

A. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

B. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."
2. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least **1/2 inch** high.

6.5 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

6.6 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks in accordance with manufacturer's written instructions and perform the following:

    a. Inspect for physical damage to unit casing.
    b. Verify that access doors move freely and are weathertight.
    c. Clean units and inspect for construction debris.
    d. Verify that all bolts and screws are tight.
    e. Adjust vibration isolation and flexible connections.
    f. Verify that controls are connected and operational.

B. Start unit in accordance with manufacturer's written instructions and complete manufacturer's startup checklist.

C. Measure and record airflow and air temperature rise over coils.

D. Verify operation of condenser capacity control device.

E. Verify that vibration isolation and flexible connections prevent vibration transmission to structure.

6.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Perform each visual and mechanical inspection and electrical test. Certify compliance with test parameters.
2. Leak Test: After installation, charge system with refrigerant and oil and test for leaks. Repair leaks, replace lost refrigerant and oil, and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor operation and unit operation, product capability, and compliance with requirements.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
5. Verify manufacturer's required airflow over coils.

B. Verify that vibration isolation and flexible connections prevent vibration transmission to structure.

C. Compressor and condenser units will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

6.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain compressor and condenser units.

END OF SECTION 236200

III. SECTION 237313.16 - INDOOR, SEMI-CUSTOM AIR-HANDLING UNITS

PART 7 - GENERAL

7.1 SUMMARY

A. Section includes insulated, double-wall-casing, indoor, semi-custom air-handling units that are factory assembled using multiple section components, including the following:

1. Casings.
2. Fans, drives, and motors.
3. Coils.
4. Air filtration.
5. Dampers.

7.2 ACTION SUBMITTALS

A. Product Data: For each air-handling unit.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. Include unit dimensions and weight.
4. Include cabinet material, metal thickness, finishes, insulation, and accessories.
5. Fans:

    a. Include certified fan-performance curves with system operating conditions indicated.
    b. Include certified fan-sound power ratings.
    c. Include fan construction and accessories.
    d. Include motor ratings, electrical characteristics, and motor accessories.

6. Include certified coil-performance ratings with system operating conditions indicated.
7. Include filters with performance characteristics.

B. Shop Drawings: For each type and configuration of indoor, semi-custom air handling unit.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Detail fabrication and assembly of indoor, semi-custom air-handling units, as well as procedures and diagrams.
4. Include diagrams for power, signal, and control wiring.

7.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air-handling units to include in emergency, operation, and maintenance manuals.

7.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set(s) for each air-handling unit.
2. Gaskets: One set(s) for each access door.
3. Fan Belts: One set(s) for each air-handling unit fan.

7.5 WARRANTY

A. Warranty: Manufacturer agrees to repair or replace components of indoor, semi-custom air-handling units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 5 year(s) from date of Substantial Completion.

PART 8 - PRODUCTS

8.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of air-handling units and components.

C. ASHRAE 62.1 Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

8.2 INDOOR, SEMI-CUSTOM AIR-HANDLING UNITS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Carrier Global Corporation or comparable product by one of the following:

1. Carrier Global Corporation
2. Daikin Applied
3. YORK; brand of Johnson Controls International plc, Building Solutions North America
4. Commercial Aire Products

B. Unit Casings:

1. Frame: Modular and providing overall structural integrity without reliance on casing panels for structural support.
2. Base Rail:

    a. Material: Galvanized steel.
    b. Height: 6 inches.

3. Casing Joints: Hermetically sealed at each corner and around entire perimeter.
4. Airstream Surfaces: Surfaces in contact with airstream shall comply with requirements in ASHRAE 62.1.
5. Static-Pressure Classifications:

    a. For Unit Sections Upstream of Fans: Minus 2-inch wg.
    b. For Unit Sections Downstream and Including Fans: 2-inch wg.

6. Panels, Doors, and Windows:

    a. Panels:

        1) Fabrication: Formed and reinforced, double-wall and insulated panels of same materials and thicknesses as casing.
        2) Fasteners: Two or more camlock type for panel lift-out operation. Arrangement shall allow panels to be opened against airflow
        3) Gasket: Neoprene, applied around entire perimeters of panel frames.

    b. Doors:

        1) Fabrication: Formed and reinforced, double-wall and insulated panels of same materials and thicknesses as casing.
        2) Hinges: A minimum of two ball-bearing hinges or stainless-steel piano hinge and two wedge-lever latches, operable from inside and outside. Arrange doors to be opened against airflow. Provide safety latch retainers on doors so that doors do not open uncontrollably.
        3) Size: Large enough to allow for unobstructed access for inspection and maintenance of air-handling unit's internal components. At least 18 inches wide by full height of unit casing up to a maximum height of 60 inches.

    c. Locations and Applications:

        1) Fan Section: Doors.
        2) Coil Section: Panels.
        3) Access Section: Doors.
        4) Filter Section: Doors large enough to allow periodic removal and installation of filters.

7. Condensate Drain Pans:

    a. Construction:

        1) Single-wall, stainless-steel sheet.

b. Drain Connection:

1) Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on both ends of pan.
2) Minimum Connection Size: NPS 1.

c. Slope: Minimum [**0.125-in./ft.**] <**Insert value**> slope, to comply with ASHRAE 62.1, in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and from humidifiers and to direct water toward drain connection.
d. Length: Extend drain pan downstream from leaving face for distance to comply with ASHRAE 62.1.
e. Width: Entire width of water producing device.
f. Depth: A minimum of 2 inches deep.

C. Fan, Drive, and Motor Section:

1. Fan and Drive Assemblies: Statically and dynamically balanced and designed for continuous operation at maximum-rated fan speed and motor horsepower.
2. Fans: Centrifugal, galvanized steel; mounted on solid-steel shaft.

a. Shafts: With field-adjustable alignment.
b. Turned, ground, and polished hot-rolled steel with keyway.
c. Shaft Bearings:

1) Prelubricated and Sealed, Ball Bearings: Self-aligning, pillow-block type with an L-50 rated life of 200,000 hours according to ABMA 9.

d. Housings: Formed- and reinforced-steel panels to form curved scroll housings with shaped cutoff and spun-metal inlet bell.

1) Bracing: Steel angle or channel supports for mounting and supporting fan scroll, wheel, motor, and accessories.

e. Airfoil, Centrifugal Fan Wheels (Plenum Fan Wheels): Smooth-curved inlet flange, backplate, and hollow die-formed airfoil-shaped blades continuously welded at tip flange and backplate; steel hub riveted to backplate and fastened to shaft with setscrews.
f. Mounting: For internal vibration isolation[**and seismic control**]. Factory-mount fans with manufacturer's standard[**restrained**] vibration isolation mounting devices having a minimum static deflection of 1 inch.
g. Shaft Lubrication Lines: Extended to a location outside the casing.
h. Flexible Connector: Factory fabricated with a fabric strip minimum 3-1/2 inches wide, attached to two strips of minimum 2-3/4-inch- wide by [**0.028-inch- thick, galvanized-steel sheet**] [**0.032-inch- thick, aluminum sheets**].

1) Flexible Connector Fabric: Glass fabric, double coated with neoprene. Fabrics, coatings, and adhesives shall comply with UL 181, Class 1.

a) Fabric Minimum Weight: **26 oz./sq. yd.**.
b) Fabric Minimum Tensile Strength: **480 lbf/inch** in the warp and

360 lbf/inch in the filling.

c) Fabric Minimum Service Temperature Range: **Minus 40 to plus 200 deg F**.

3. Drive, Belt: Factory-mounted, V-belt drive, with adjustable alignment and belt tensioning, and with 1.5 service factor based on fan motor.

   a. Pulleys: Cast iron or cast steel with split, tapered bushing, dynamically balanced at the factory.
   b. Belts: Oil resistant, non-sparking and nonstatic; in matched sets for multiple-belt drives.
   c. Belt Guards: Comply with requirements specified by OSHA and fabricate according to SMACNA's "HVAC Duct Construction Standards"; 0.146-inch-thick, 3/4-inch diamond-mesh wire screen, welded to steel angle frame; prime coated

4. Motors:

   a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
   b. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
   c. Enclosure Type: Totally enclosed, fan cooled.
   d. Motor Bearings: <**Insert requirements**>.
   e. Unusual Service Conditions:

      1) High humidity.
      2) High Chlorine vapor content.

   f. Efficiency: Premium Efficient motors as defined in NEMA MG 1.
   g. Motor Pulleys: Adjustable pitch for use with 5-hp motors and smaller; fixed pitch for use with motors larger than 5 hp. Select pulley size so pitch adjustment is at the middle of adjustment range at fan design conditions.
   h. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
   i. Mount unit-mounted disconnect switches on exterior of unit.

D. Coil Section:

1. General Requirements for Coil Section:

   a. Comply with AHRI 410.
   b. Fabricate coil section to allow removal and replacement of coil for maintenance and to allow in-place access for service and maintenance of coil(s).
   c. For multizone units, provide air deflectors and air baffles to balance airflow across coils.
   d. Coils shall not act as structural component of unit.

2. Cooling Coils:

a. Refrigerant Coil:

1) Tubes: Copper.
2) Fins:

a) Material: Stainless Steel.
b) Fin Spacing: Maximum [**12**] [**10**] [**8**] <**Insert spacing**> fins per **inch**.

3) Fin and Tube Joints: Mechanical bond.
4) Headers: Seamless-copper headers with brazed connections.
5) Frames: Stainless steel.
6) Coatings: Corrosion-resistant coating.
7) Ratings: Designed, tested, and rated according to ASHRAE 33 and AHRI 410.

a) Working Pressure: Minimum **300 psig**.

E. Air Filtration Section:

1. Panel Filters:

a. Description: Pleated factory-fabricated, self-supported, disposable air filters with holding frames.
b. Filter Unit Class: UL 900.
c. Media: Interlaced glass, synthetic or cotton fibers coated with nonflammable adhesive.
d. Filter-Media Frame: Beverage board with perforated metal retainer, or metal grid, on outlet side.

2. Side-Access Filter Mounting Frames:

a. Particulate Air Filter Frames: Match inner casing and outer casing material, and insulation thickness. Aluminum track.

1) Prefilters: Incorporate an integral 2-inch- thick track with same access as primary filter.

F. Air Blenders:

1. Material: [**Galvanized steel**] [**Aluminum**] <**Insert material**>.
2. Coating: [**None**] [**Corrosion-resistant coating**].

8.3 MATERIALS

A. Stainless Steel:

1. Manufacturer's standard grade for casing.
2. Manufacturer's standard type, ASTM A240/A240M for bare steel exposed to airstream or moisture.

B. Corrosion-Resistant Coating: Coat with a corrosion-resistant coating capable of withstanding a 3000-hour salt-spray test according to ASTM B117.

1. Standards:

a. ASTM B117 for salt spray.
b. ASTM D2794 for minimum impact resistance of **100 in-lb**.
c. ASTM B3359 for cross hatch adhesion of 5B.

2. Application: Immersion.
3. Thickness: 1 mil.
4. Gloss: Minimum gloss of 60 on a 60-degree meter.

8.4 SOURCE QUALITY CONTROL

A. AHRI 430 Certification: Test, rate, and label air-handling units and their components in accordance with AHRI 430.

B. AHRI 260 or AMCA 311 Sound Performance Rating Certification: Test, rate, and label in accordance with AHRI 260 or AMCA 311.

C. Fan Aerodynamic Performance Rating: Factory test and rate fan performance for airflow, pressure, power, air density, rotation speed, and efficiency in accordance with AMCA 210.

D. Fan Operating Limits: Classify fans in accordance with AMCA 99, Section 14.

E. Refrigerant Coils: Factory tested to minimum **450-psig** internal pressure and to minimum **300-psig** internal pressure while underwater, according to AHRI 410 and ASHRAE 33.

PART 9 - EXECUTION

9.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine casing insulation materials and filter media before air-handling unit installation. Reject insulation materials and filter media that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for steam, hydronic, and condensate drainage piping systems and electrical services to verify actual locations of connections before installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

9.2 INSTALLATION, GENERAL

A. Equipment Mounting:

1. Install air-handling units on cast-in-place concrete equipment bases. Coordinate sizes and locations of concrete bases with actual equipment provided. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."

B. Arrange installation of units to provide access space around air-handling units for service and maintenance.

C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing, with new, clean filters.

D. Install filter-gauge, static-pressure taps upstream and downstream of filters. Mount filter gauges on outside of filter housing or filter plenum in accessible position. Provide filter gauges on filter banks, installed with separate static-pressure taps upstream and downstream of filters.

E. Connect duct to air-handling units with flexible connections. Comply with requirements in Section 233300 "Air Duct Accessories."

9.3 PIPING CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to air-handling unit, allow for service and maintenance.

C. Connect piping to air-handling units mounted on vibration isolators with flexible connectors.

D. Connect condensate drain pans using NPS 1-1/4, **ASTM B88, Type M** copper tubing. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.

E. Refrigerant Piping: Comply with applicable requirements in Section 232300 "Refrigerant Piping." Install shutoff valve and union or flange at each supply and return connection.

9.4 ELECTRICAL CONNECTIONS

A. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

B. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."

2. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least **1/2 inch** high.

9.5 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

9.6 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that shipping, blocking, and bracing are removed.
3. Verify that unit is secure on mountings and supporting devices and that connections to piping, ducts, and electrical systems are complete. Verify that proper thermal-overload protection is installed in motors, controllers, and switches.
4. Verify proper motor rotation direction, free fan wheel rotation, and smooth bearing operations. Reconnect fan drive system, align belts, and install belt guards.
5. Verify that bearings, pulleys, belts, and other moving parts are lubricated with factory-recommended lubricants.
6. Verify that zone dampers fully open and close for each zone.
7. Verify that face-and-bypass dampers provide full face flow.
8. Verify that outdoor- and return-air mixing dampers open and close, and maintain minimum outdoor-air setting.
9. Comb coil fins for parallel orientation.
10. Verify that proper thermal-overload protection is installed for electric coils.
11. Install new, clean filters.
12. Verify that manual and automatic volume control and fire and smoke dampers in connected duct systems are in fully open position.

B. Starting procedures for air-handling units include the following:

1. Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated rpm. Replace fan and motor pulleys as required to achieve design conditions.
2. Measure and record motor electrical values for voltage and amperage.
3. Manually operate dampers from fully closed to fully open position and record fan performance.

9.7 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for air-handling system testing, adjusting, and balancing.

C. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

9.8 CLEANING

A. After completing system installation and testing, adjusting, and balancing air-handling unit and air-distribution systems and after completing startup service, clean air-handling units internally to remove foreign material and construction dirt and dust. Clean fan wheels, cabinets, dampers, coils, and filter housings, and install new, clean filters.

9.9 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Leak Test: After installation, fill water and steam coils with water, and test coils and connections for leaks.
2. Charge refrigerant coils with refrigerant and test for leaks.
3. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Air-handling unit or components will be considered defective if unit or components do not pass tests and inspections.

E. Prepare test and inspection reports.

9.10 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air-handling units.

END OF SECTION 237313.16

IV. SECTION 238113.13 - PACKAGED TERMINAL AIR-CONDITIONERS, OUTDOOR, WALL-MOUNTED UNITS

PART 10 - GENERAL

10.1 SUMMARY

A. Section includes packaged, terminal, outdoor, wall-mounted air conditioners.

10.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For packaged, terminal air conditioners.

1. Include plans, elevations, sections, details for wall penetrations, and attachments to other work.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

10.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For packaged, terminal air conditioners to include in emergency, operation, and maintenance manuals.

10.4 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of packaged, terminal air conditioners that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Sealed Refrigeration System: Manufacturer's standard, but not less than five years from date of Substantial Completion, including components and labor.
2. Warranty Period for Nonsealed System Parts: Manufacturer's standard, but not less than five years from date of Substantial Completion, including only components and excluding labor.

PART 11 - PRODUCTS

11.1 PACKAGED TERMINAL AIR-CONDITIONERS, OUTDOOR, WALL-MOUNTED UNITS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Mitsubishi

1. Bard Manufacturing Company
2. Liebert; Vertiv Holdings Co.
3. Marvair
4. Mitsubishi
5. Gree

11.2 MANUFACTURED UNITS

A. Description: Factory-assembled and -tested, self-contained, packaged, terminal air conditioner with room cabinet, electric refrigeration system, and temperature controls; fully charged with refrigerant and filled with oil; with hardwired chassis and circuit breaker.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. ASHRAE Thermal Comfort: Applicable requirements in ASHRAE 55.

D. UL listed and ETL performance certified.

11.3 CHASSIS

A. Cabinet: Sloped top, 0.052-inch- thick steel with removable front panel with concealed latches.

1. Discharge Grille: Extruded-aluminum discharge grille.
2. Return Grille: Extruded-aluminum grille.
3. Louvers: Extruded aluminum with enamel finish; color.
4. Finish: Epoxy coating.
5. Access Door: Hinged door in top of cabinet for access to controls.
6. Cabinet Extension: Matching cabinet in construction and finish, allowing diversion of airflow to adjoining room; with grille.
7. Insulation: Cooling and heating sections fully insulated with **1-inch**-thick fiberglass insulation.

B. Refrigeration System: Direct-expansion indoor coil with capillary restrictor and hermetically sealed, soft-start scroll compressor with crankcase heater, liquid line filter dryer, externally equalized expansion valve, high-pressure switch, low-pressure switch, vibration isolation, and overload protection.

1. Indoor and Outdoor Coils: Seamless copper tubes mechanically expanded into aluminum fins.
2. Accumulator.

3. Constant-pressure expansion valve.
4. Reversing valve.
5. Charge: R-410A.

C. Indoor Fan: Forward curved, centrifugal; with variable-speed motor(s) and positive-pressure ventilation damper with concealed manual operator.

D. Filters: Washable polyurethane in molded plastic frame, serviceable from front of the unit.

E. Condensate Drain: Coated galvanized-steel drain pan and piping to direct condensate to building waste and vent piping.

F. Outdoor Fan: High-ambient type with separate, driven by indoor fan motor.

11.4 CONTROLS

A. Control Module: Unit-mounted digital panel with touchpad temperature control and with touchpad for heating, cooling, and fan operation. Include the following features:

1. Low-Ambient Lockout Control: Prevents cooling-cycle operation below **40 deg F** outdoor air temperature.
2. Heat-Pump Ambient Control: Field-adjustable switch changes to heat-pump heating operation above **40 deg F** and to supplemental heating below **plus 25 deg F**.
3. Temperature-Limit Control: Prevents occupant from exceeding preset setback or setup temperature.
4. Reverse-Cycle Defrost: Solid-state sensor monitors frost buildup on outdoor coil and reverses unit to melt frost.

B. Remote Control: Standard unit-mounted controls with remote-mounted, low-voltage, adjustable thermostat with heat anticipator; heat-off-cool-auto switch; and on-auto fan switch.

C. Three-Phase Power Rotation Monitor: Three-phase monitoring to protect compressor from reverse rotation and to protect the unit from phase failure. Monitor manually reset.

D. Dehumidification Circuit: Supply-air stream, independent heat exchanger using a separate humidistat, hot gas three-way valve, separate desuperheating condenser circuit, and back drain orifice inserted between the reheat coil and suction line.

11.5 SOURCE QUALITY CONTROL

A. Sound-Power Level Ratings: Factory test to comply with AHRI 300, "Sound Rating and Sound Transmission Loss of Packaged Terminal Equipment."

B. Unit Performance Ratings: Factory test to comply with AHRI 310/380/CSA C744, "Packaged Terminal Air-Conditioners and Heat Pumps."

PART 12 - EXECUTION

12.1 INSTALLATION

A. Install units level and plumb, maintaining manufacturer's recommended clearances and tolerances.

12.2 CONNECTIONS

A. Install piping adjacent to machine to allow service and maintenance.

12.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Inspect for and remove shipping bolts, blocks, and tie-down straps.
2. After installing packaged, terminal air conditioners and after electrical circuitry has been energized, test for compliance with requirements.
3. Unit is level on base and is flashed in exterior wall.
4. Unit casing has no visible damage.
5. Compressor, air-cooled condenser coil, and fans have no visible damage.
6. Labels are clearly visible.
7. Controls are connected and operable.
8. Shipping bolts, blocks, and tie-down straps are removed.
9. Filters are installed and clean.
10. Drain pan and drain line are installed correctly.
11. Electrical wiring installation complies with manufacturer's submittal and installation requirements in electrical Sections.
12. Installation: Perform startup checks according to manufacturer's written instructions, including the following:

    a. Lubricate bearings on fan.
    b. Check fan-wheel rotation for correct direction without vibration and binding.

13. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
14. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. After performance test, change filters.

C. Packaged, terminal air conditioners will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

12.4 ADJUSTING

A. Adjust initial temperature set points.

B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

12.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain packaged, terminal air conditioners.

END OF SECTION 238113.13

SECTION 00 91 13.01

CITY OF GENEVA
Water Treatment Plant
HVAC System Rehabilitation & Modernization Project: RE-BID
BID DATE: July 10, 2023 at 10:00 am

ADDENDUM NO. 1

DATE: Jun 26, 2023
FROM: Edward Kalina and Larry McElheny
TO: All Plan Holders
 # PAGES: Pages

Please acknowledge receipt of this addendum by filling out the following and email a scanned copy to bvangyseghem@geneva.il.us immediately upon receipt of this addendum. Also acknowledge receipt on Section 00 41 00 - Bid Form, page 00 41 00-1.

COMPANY NAME: _____

SIGNATURE OF COMPANY REPRESENTATIVE: _____

DATE: _____

CITY OF GENEVA
Water Treatment Plant
HVAC System Rehabilitation & Modernization Project: RE-BID
BID DATE: July 10, 2023 at 10:00 am

ADDENDUM NO. 1

DATE: June 26, 2023
FROM: Edward Kalina & Larry McElheny
TO: All Plan Holders

THIS ADDENDUM FORMS A PART OF THE CONTRACT DOCUMENTS AND MODIFIES THE ORIGINAL BIDDING DOCUMENTS AS NOTED BELOW.

TABLE OF CONTENTS

I. PRE-BID MEETING ATTENDANCE SHEETS

Attached for your use are the Attendance Sheets from the Pre-Bid Meeting conducted on June 22, 2023.

CITY OF GENEVA - 2023
WATER TREATMENT PLANT
HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT: RE-BID

PRE-BID MEETING
DATE: Thursday, June 22, 2023 TIME: 10:30 am
MEETING PLACE: The Water Treatment Plant

NAME / COMPANY	PHONE	E MAIL
Mike Anderson City of Geneva	630-232-1501	manderson@geneva.il.us
Larry McElheny Archer Engineering	815-588-3535	larry@archerce.com
Edward Kalina Engineering Solutions Team	630-796-2064	ejk@engineeringsolutionsteam.net
CHAY NARMATA/OGNI INC	248-954-4523	chay@ognigroup.com
Jerry Chrzeszczyk Integrated Demolition	708- 998-8386	Jerry@integrateddemolition.com
Andy Enright CCS (Comprehensive Construction solutions	708-825 5051	aenright@ccscolic.com
JEFF LEHMAN COMBINED ROOFING SERVICE	630-730 1516	JLEHMAN@COMBINEDROOFING.COM

engineering solutions team

NAME / COMPANY	PHONE	E MAIL
Mike Wygner Jr Complete Mechanical Services Inc	630 903 4015	mikesr@cmsHVAC.NET ~~Mike Jr@CMSHVAC.NET~~
Nick Messing / Air Comfort	708 408 1698	Nhacker8@yahoo.com (NHACKER8@yahoo.com)
David Dougherty / Helm Mech	708 856 6917	DDOUGHERTY@HelmGroup.com
Moin Islam / Air Comfort	(312) 505 -3641	ISLAMM@AIRCOMFORT.COM
Steve Strnic / Applied Controls	312-304-3914	SSTRNIC@ACICHICAGO.com
Ryan Buttner / American Mechanical Systems	630-930-7745	americanmechanicalsystems@omsil.com

NAME / COMPANY	PHONE	E MAIL
Terrence Tabel / Amber Mechanical	(708) 597-9700	estimating@ambermech.com

II. AS-BUILT PLAN DRAWINGS

Per request of some of the Attendees at the Pre-Bid Meeting, attached are the As-Built Drawings from the construction of the original System.

WTP HVAC SYSTEM.pdf

IV. As-Built Control diagrams/schematics for temperature control panels 1 and 2 (PDF)

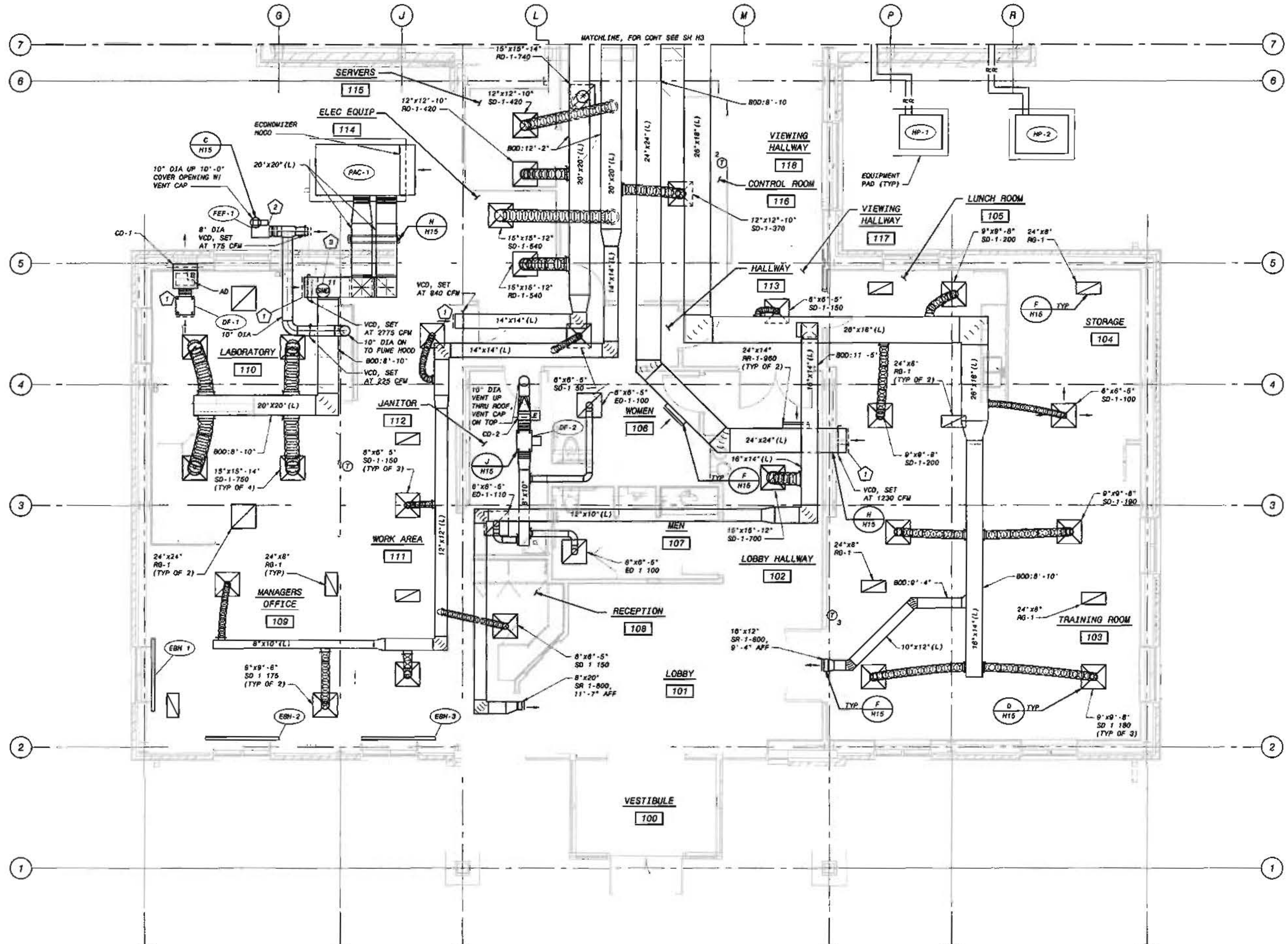
Per request of some of the Attendees at the Pre-Bid Meeting, attached are the As-Built Temperature Control Diagrams / Schematics from the construction of the original System.

Ex-TempControlPanel2_Schematics.pdf

Ex-TempControlPanel1_Schematics.pdf

Note: These files are also available for download at:
Addendum #1 Download Files

END OF SECTION



OPERATING FLOOR PLAN

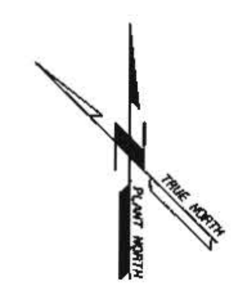
1/4" = 1'-0"

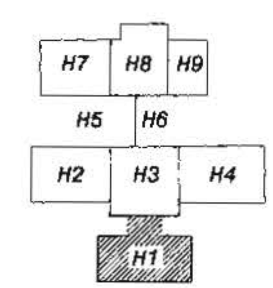
PLAN NOTES

1. COVER OPENING WITH 1/4" ALUM BIRDSCREEN.
2. REFER TO DWG A41 FOR MOUNTING DETAILS.
3. LOCATE SMD-11 IN RETURN DUCT.

NOTES

1. DUCTWORK SHALL NOT BE VISIBLE FROM LOBBY OR HALLWAYS.





KEY PLAN

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USER: CYGNETADMI
DWG VER: 1.28

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XREF3:Administration - Mezzanine.dwg
XREF4:Operation - Gambrel Shell.dwg
XREF5:Operation - Gambrel 1st Floor

BLACK & VEATCH

Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
ADMINISTRATION AREA - PLAN

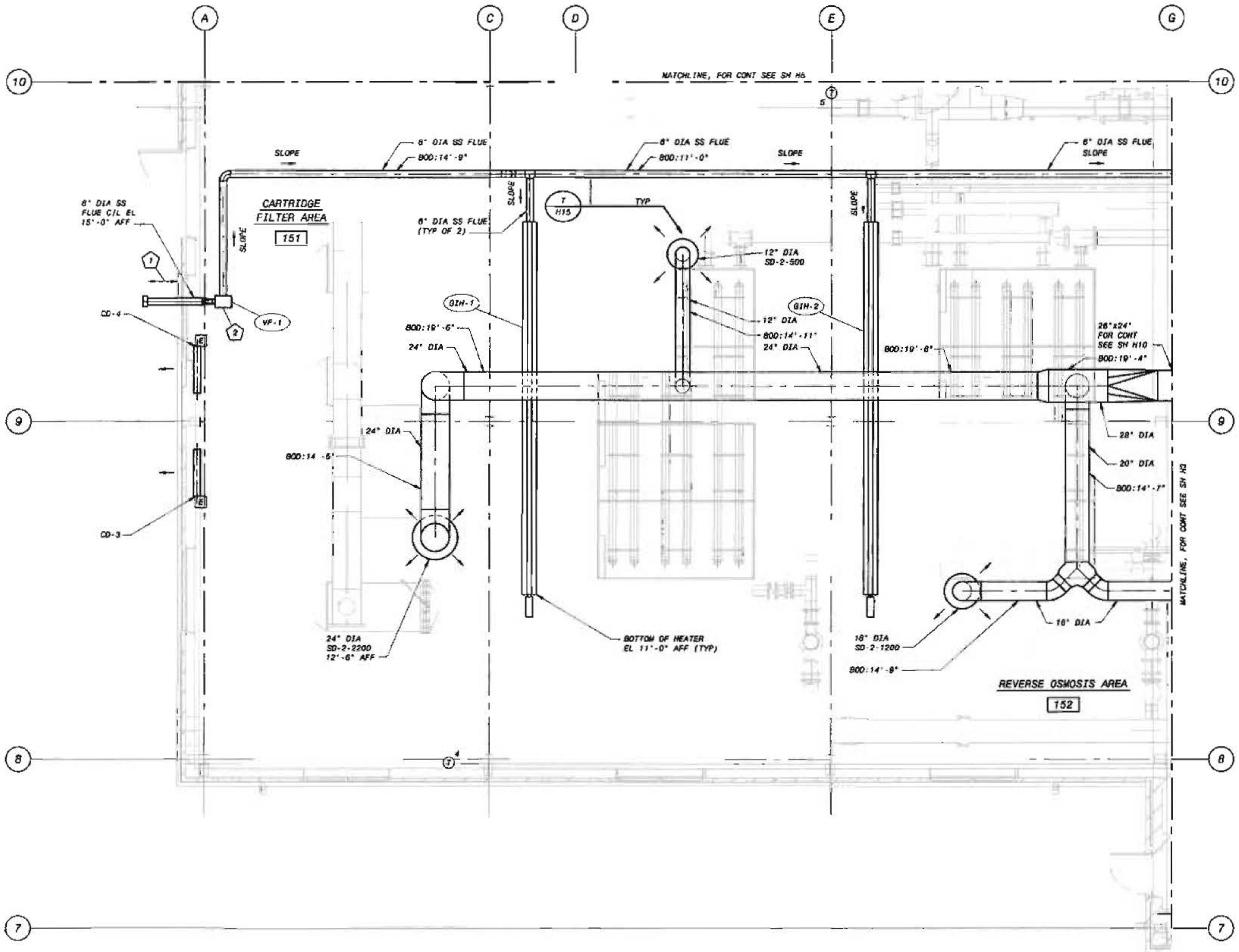
DESIGNED.	JAW
DETAILED.	JMC
CHECKED:	JEP
APPROVED.	DWH
DATE:	1/06/06

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

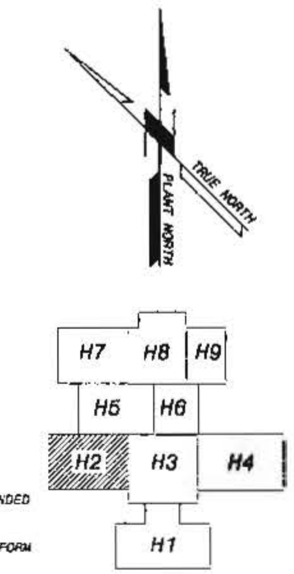
H1
SHEET
165 OF 267



OPERATING FLOOR PLAN
1/4" = 1'-0"

PLAN NOTES

1. TWO FEET OR AS RECOMMENDED BY MANUFACTURER.
2. SUPPORT VF-1 ON A PLATFORM SUPPORTED OFF THE WALL.



KEY PLAN
NO SCALE

BLACK & VEATCH
Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
RO AREA - PLAN

DESIGNED: JAM
DETAILED: JWC
CHECKED: JEP
APPROVED: DMH
DATE: 11/06/08

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137604

H2
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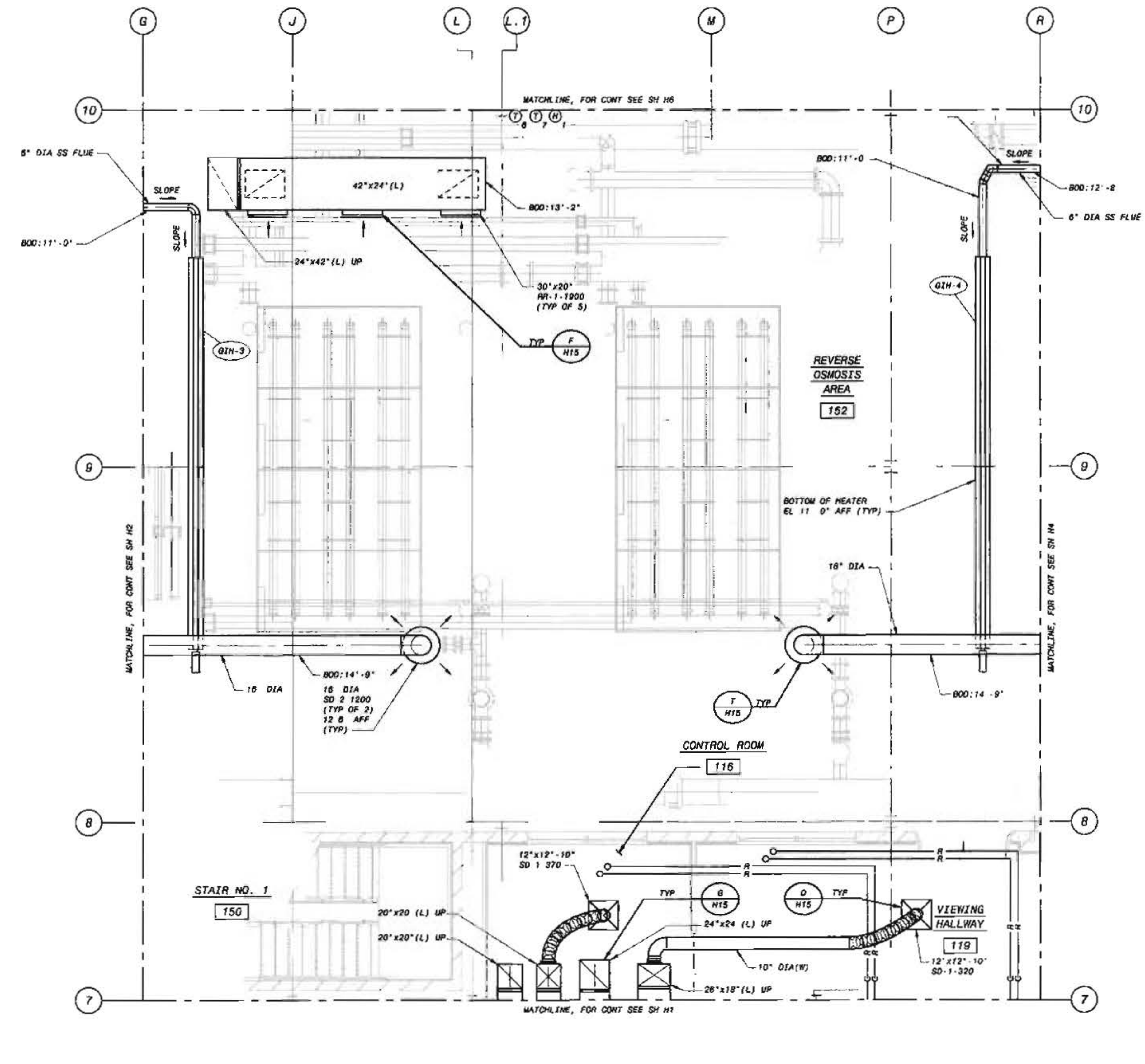
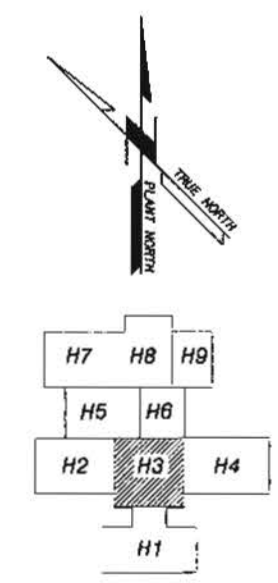
166 OF 267



OPERATING FLOOR PLAN
1/4" = 1'-0"



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XREF2: Administration - Interior.dwg
XREF3: Administration - Mezzanine.dwg
XREF4: Operation - Cambrel Shell.dwg
XREF5: Operation - Cambrel 1st Floor.dwg

BLACK & VEATCH
Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
RO / FILTER AREA - PLAN

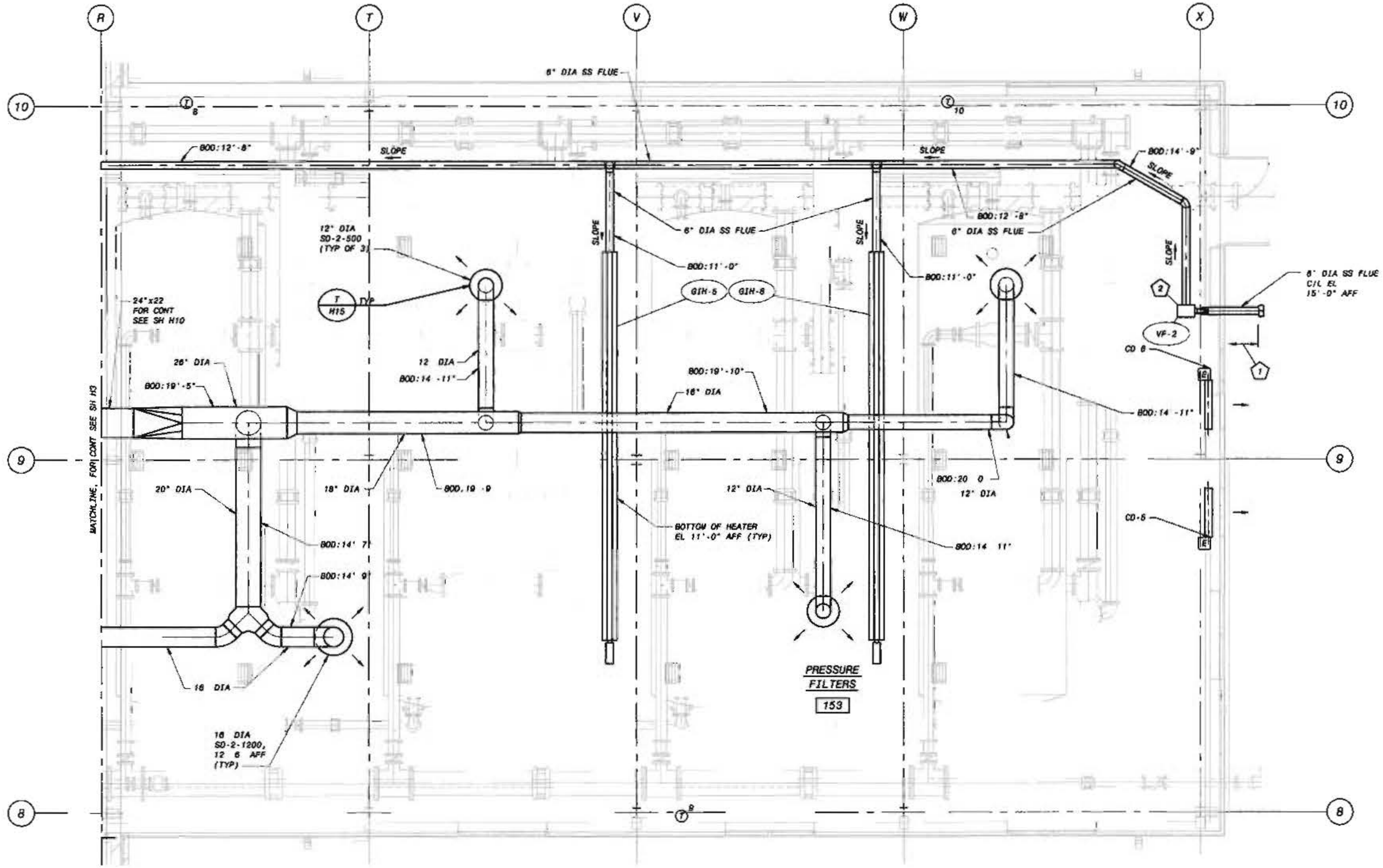
DESIGNED: JAM
DETAILED: JMC
CHECKED: JSP
APPROVED: DWH
DATE: 1/06/06

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

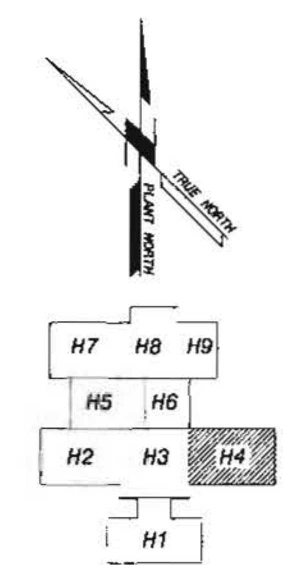
H3
SHEET
167 OF 267



OPERATING FLOOR PLAN
1/4" = 1'-0"

PLAN NOTES

1. TWO FEET OR AS RECOMMENDED BY MANUFACTURER
2. SUPPORT VF-2 ON A PLATFORM SUPPORTED OFF THE WALL.



KEY PLAN
NO SCALE

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP

CYGNET ID: 137804-300-232-H-T0000C005
WF: ACAD-2000i
SAVED: CHA34792, 1/4/2006 8:04:02 AM
PLOTTED: YEA11984, 6/22/2005 3:19:32 PM
USER: CYGNETADMI
DWG VER: 1.29
XREF1: Administration - Shell.dwg
XREF2: Administration - Interior.dwg
XREF3: Administration - Mezzanine.dwg
XREF4: Operation - General Shell.dwg
XREF5: Operation - General 1st Floor

BLACK & VEATCH
Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

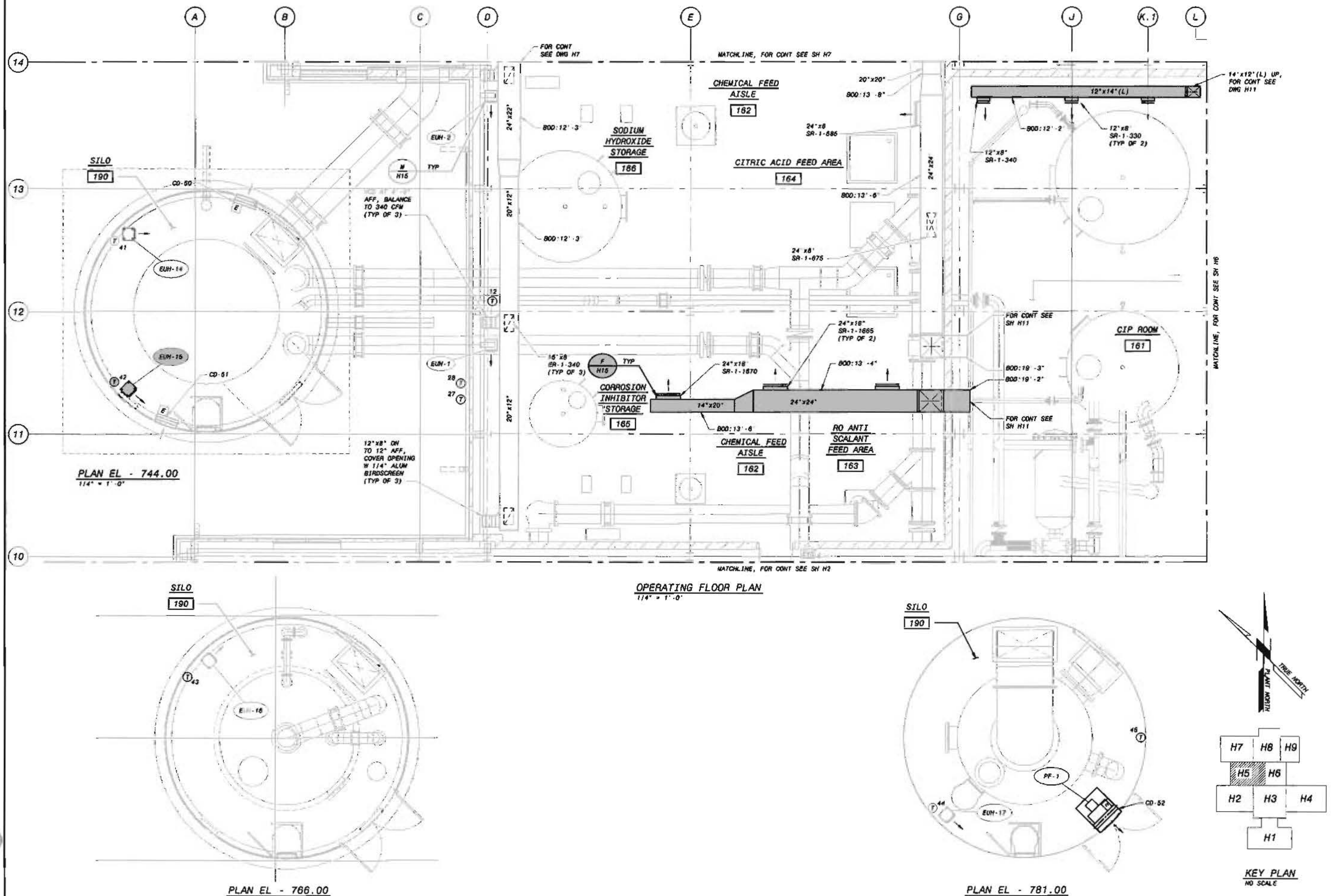
OPERATIONS BUILDING
HVAC
FILTER AREA - PLAN

DESIGNED. JAM
DETAILED. JMC
CHECKED: JDP
APPROVED. DWN
DATE: 1/06/06

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

H4
SHEET
168 OF 267



NO.	DATE	REVISIONS AND RECORD OF ISSUE	BY	CK	APP
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CYGNET ID: 137804-300-232-H-1000CS36
MF: ACAD-20001
SAVED: CHA34792, 1/4/2006 8:14:40 AM
PLOTTED: YEA11984, 8/25/2003 12:45:25 PM
USER: CYGNETADM1 DWG VER: 1.28
XREF1: Administration - Shell.dwg
XREF2: Administration - Interior.dwg
XREF3: Administration - Mezzanine.dwg
XREF4: Operation - Gambrel Shell.dwg
XREF5: Operation - Gambrel 1st Floor

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Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

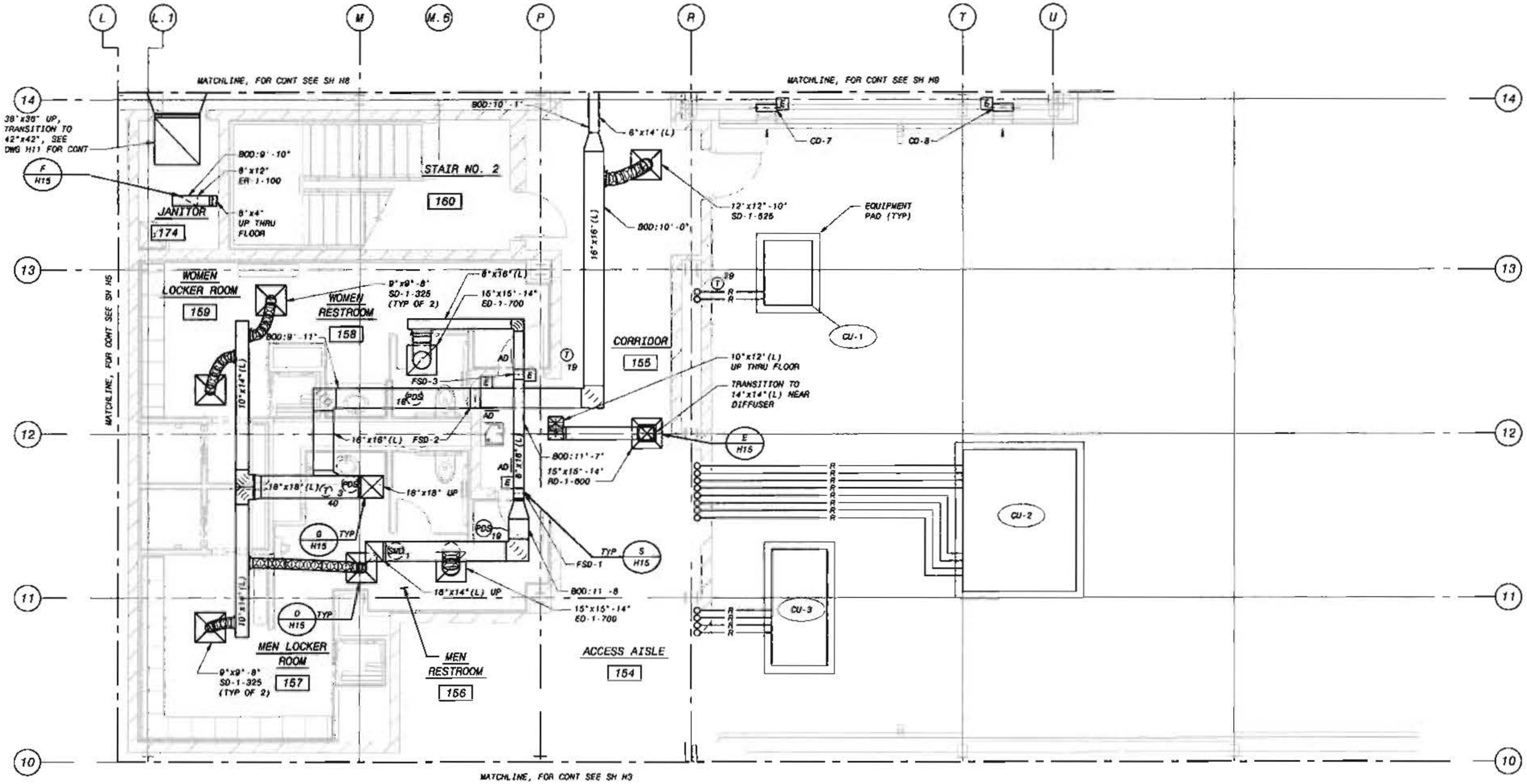
OPERATIONS BUILDING
HVAC
CHEMICAL FEED / CIP AREA - PLAN

DESIGNED: JAM
DETAILED: JWC
CHECKED: JEP
APPROVED: DWK
DATE: 1/06/06

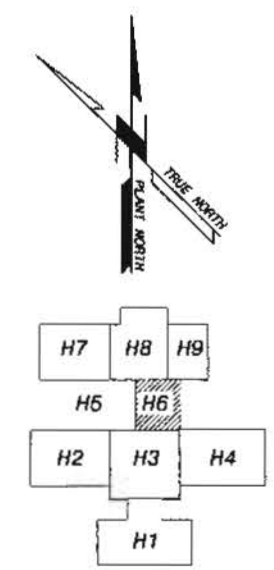
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

H5
SHEET
169 OF 267



OPERATING FLOOR PLAN
1/4" = 1'-0"



KEY PLAN
NO SCALE

NO.	BY	CK	APP	REVISIONS AND RECORD OF ISSUE

DATE

CYGNET ID: 137804-300-232-H-T000CS01
MF: ACAD 2000I
SAVED: CHA34799, 1/4/2006 9:20:10 AM
PLOTTED:
USER: CYGNETADMI
DWG VER: 1.26

XREF1: Administration - Shell.dwg
XREF2: Administration - Interior.dwg
XREF3: Administration - Mezzanine.dwg
XREF4: Operation - Gambrel Shell.dwg
XREF5: Operation - Gambrel 1st Floor

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Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

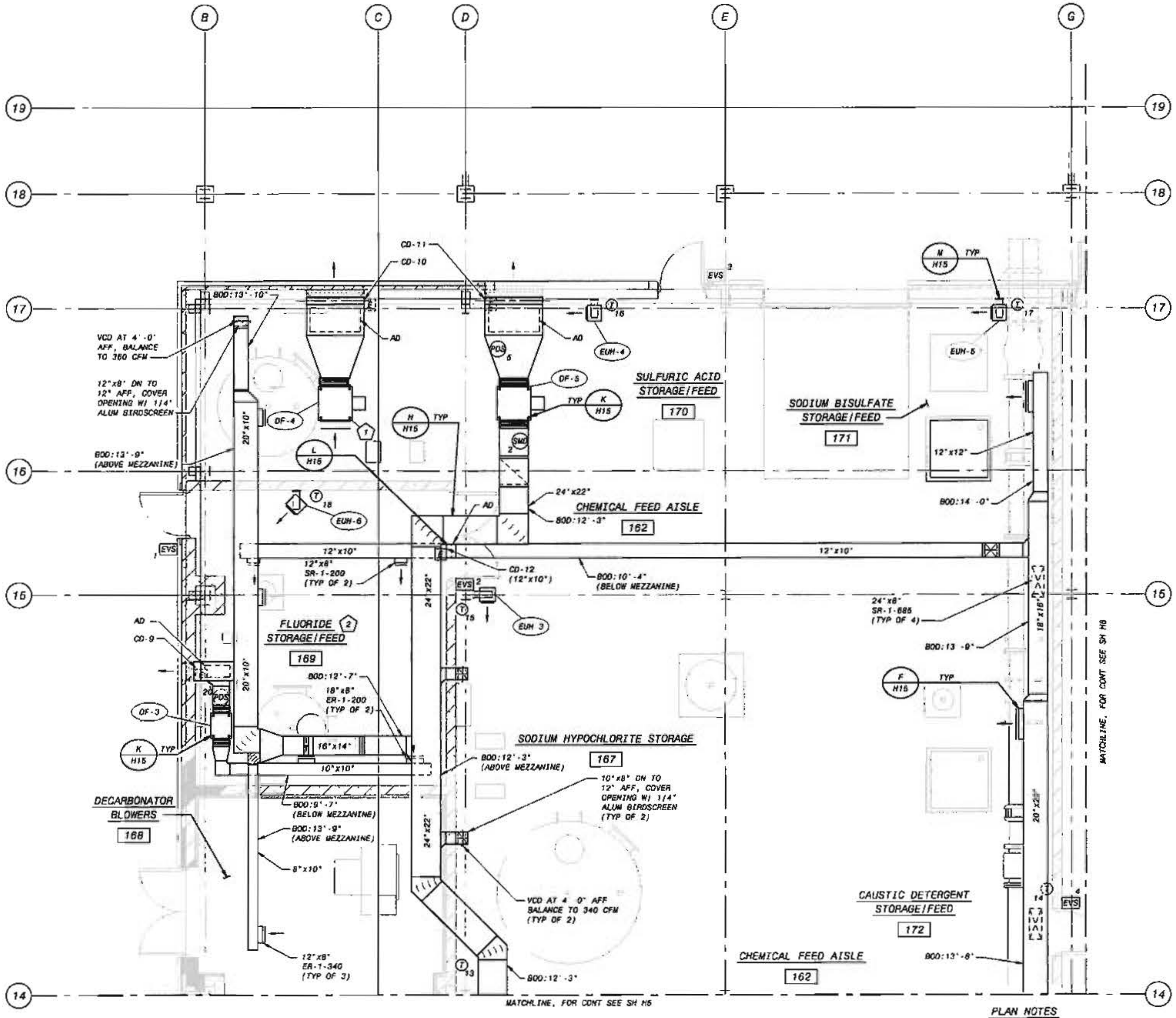
OPERATIONS BUILDING
HVAC
LOCKER ROOM AREA - PLAN

DESIGNED: JAW
DETAILED: JWC
CHECKED: JEP
APPROVED: DWN
DATE: 1/06/05

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

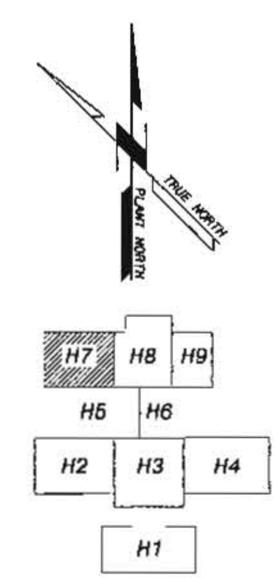
H6
SHEET
170 OF 267



OPERATING FLOOR PLAN
1/4" = 1'-0"

PLAN NOTES

1. COVER OPENING WITH 1/4" ALUM BIRDSCREEN.
2. DUCTWORK AND EQUIPMENT LOCATED IN ROOM 169 SHALL BE GIVEN A PROTECTIVE COATING SUITABLE FOR A HYDROFLUOROSILICIC ACID ENVIRONMENT. INSIDE AND OUTSIDE OF DUCTWORK SHALL BE COATED.



KEY PLAN
NO SCALE

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
CHEMICAL FEED / STORAGE AREA - PLAN

BLACK & VEATCH
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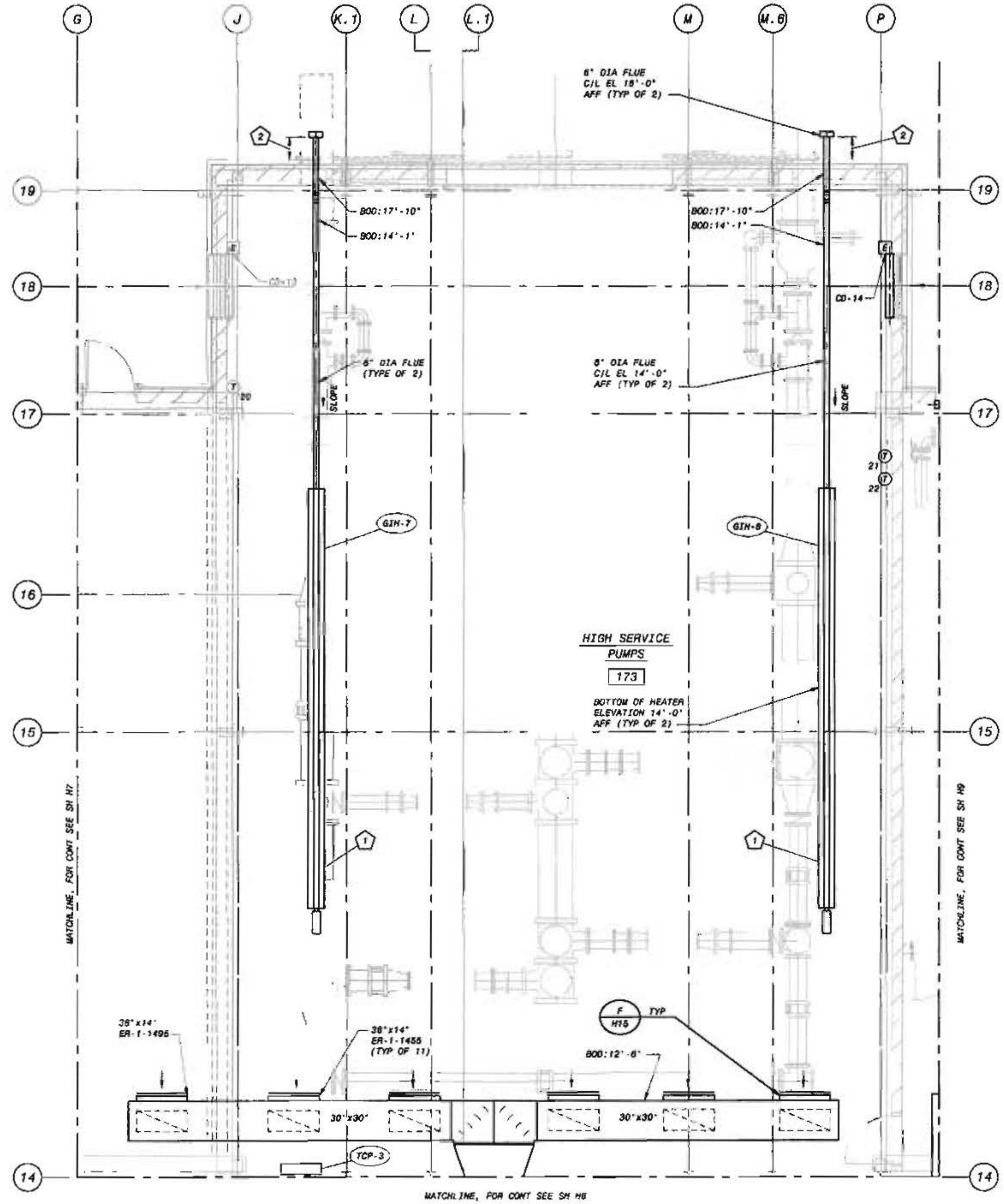
Chicago, Illinois

DESIGNED:	JAM
DETAILED:	JMC
CHECKED:	JEP
APPROVED:	DWM
DATE:	11/08/06

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

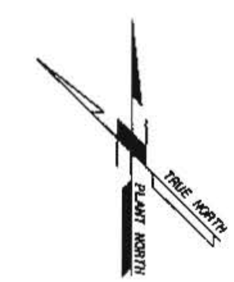
PROJECT NO.
137804

H7
SHEET
171 OF 267



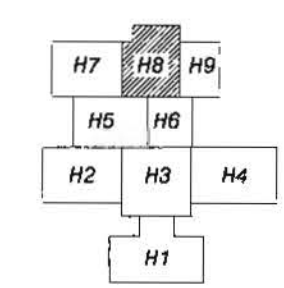
OPERATING FLOOR PLAN

1/4" = 1'-0"



PLAN NOTES

1. ANGLE HEATER APPROXIMATELY 45 DEG TOWARD OPPOSITE WALL.
2. TWO FEET OR AS RECOMMENDED BY MANUFACTURER.



KEY PLAN

NO SCALE

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP

CYGNET ID: 137804-300-232-H-T0000C509
WF: ACAD-2000I
SAVED: CHA34792, 1/4/2006 9:20:21 AM
PLOTTED:
USER: CYGNETADMI DWG VER: 1.23
XREF1: Administration - Shell.dwg
XREF2: Administration - Interior.dwg
XREF3: Administration - Mezzanine.dwg
XREF4: Operation - Gambrel Shell.dwg
XREF5: Operation - Gambrel 1st Floor

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Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
HIGH SERVICE PS AREA - PLAN

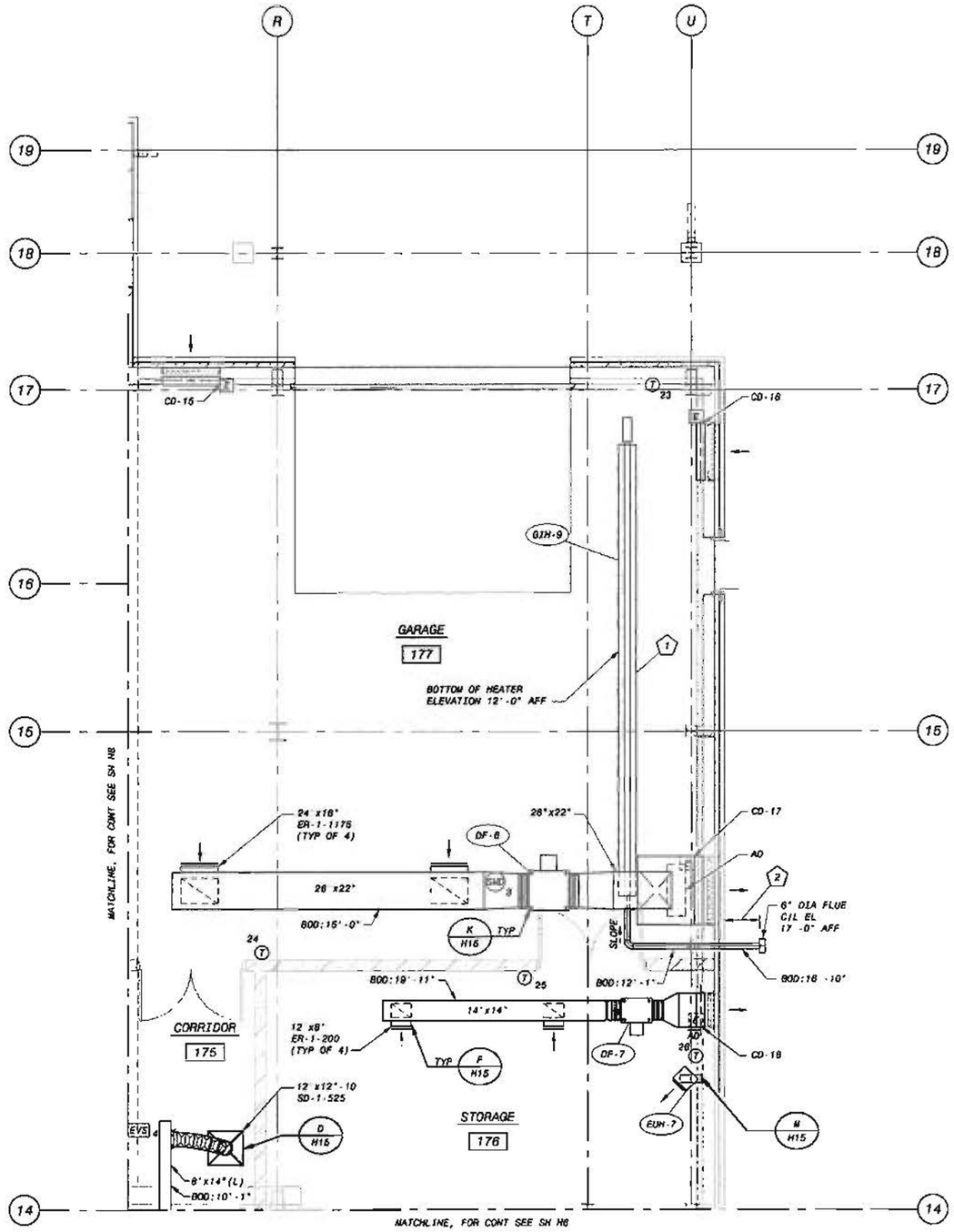
DESIGNED. JAM
DETAILED. JMC
CHECKED: JEP
APPROVED. DWN
DATE: 1/06/06

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

H8
SHEET
172 OF 267

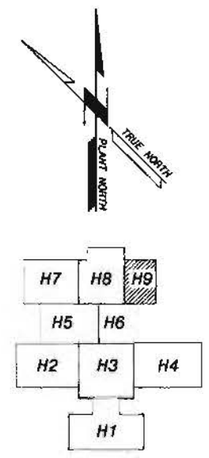


OPERATING FLOOR PLAN

1/4" = 1'-0"

PLAN NOTES

1. ANGLE HEATER APPROXIMATELY 45 DEG TOWARD OPPOSITE WALL.
2. TWO FEET OR AS RECOMMENDED PER MANUFACTURER.



KEY PLAN
NO SCALE

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE
					XREF1:Administration - Shell.dwg
					XREF2:Administration - Interior.dwg
					XREF3:Administration - Mezzanine.dwg
					XREF4:Operation - General Shell.dwg
					XREF5:Operation - Gallery 1st Floor.dwg

CYDWT ID: 137804-300-222-H-T0000C300
IF: ACAD-2000i
SAVED: CHAMTRI, 11/1/2006 8:28:55 AM
PLOTTED: TEATTON, 6/15/2005 12:39:26 PM
USER: CYDWT/ADM | DWG VER: 1.24

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Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
GARAGE AREA - PLAN

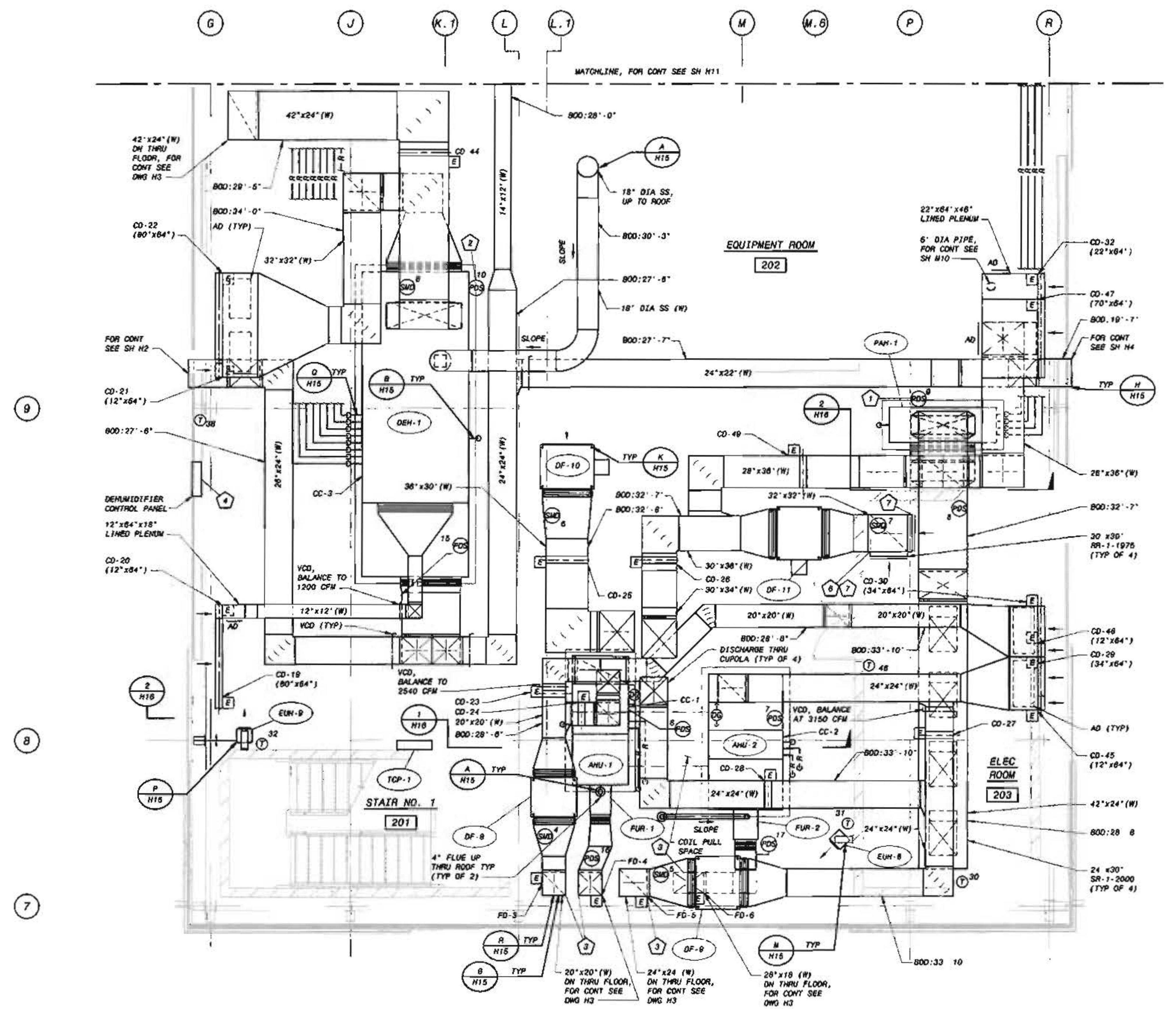
DESIGNED:	JAM
DETAILED:	JMC
CHECKED:	JSP
APPROVED:	DWH
DATE:	1/06/06

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

H9
SHEET
173 OF 267

137804
26754



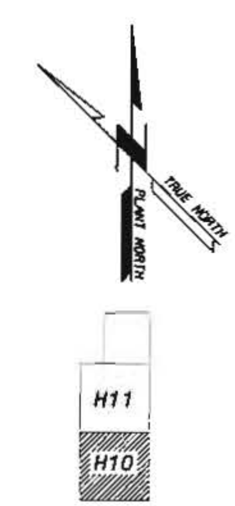
SECOND FLOOR PLAN
1/4" = 1'-0"

PLAN NOTES

1. PDS-9 IS LOCATED ACROSS PAH-1 FILTERS.
2. PDS-10 AND PDS-15 ARE LOCATED ACROSS DEH-1 FILTERS. PDS-10 AND PDS-15 ARE TO BE PROVIDED BY DEH-1 MANUFACTURER.
3. INSTALL ACCESS DOOR IN VERTICAL DUCT ABOVE FIRE DAMPERS FOR FIRE DAMPER MAINTENANCE ACCESS.
4. DEHUMIDIFIER CONTROL PANEL SHALL BE MANUFACTURER PROVIDED. PANEL MAY BE PROVIDED ON UNIT INSTEAD OF WALL MOUNTING.
5. A DRAFT GAUGE SHALL BE LOCATED ACROSS THE FILTERS FOR PAC-1 AND DEH-1.
6. DUCT IS LINED IN ROOM 203 AND WRAPPED IN ROOM 202.
7. ONE REGISTER, BOTTOM ELEV 6" AFF. SECOND REGISTER BOTTOM ELEV 4'6" AFF.

NOTES

1. CD-31 IS NOT USED
2. BOTTOM OF INTAKE LOUVER ELEVATION 780.87 (TYP).



KEY PLAN
NO SCALE

BLACK & VEATCH
Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

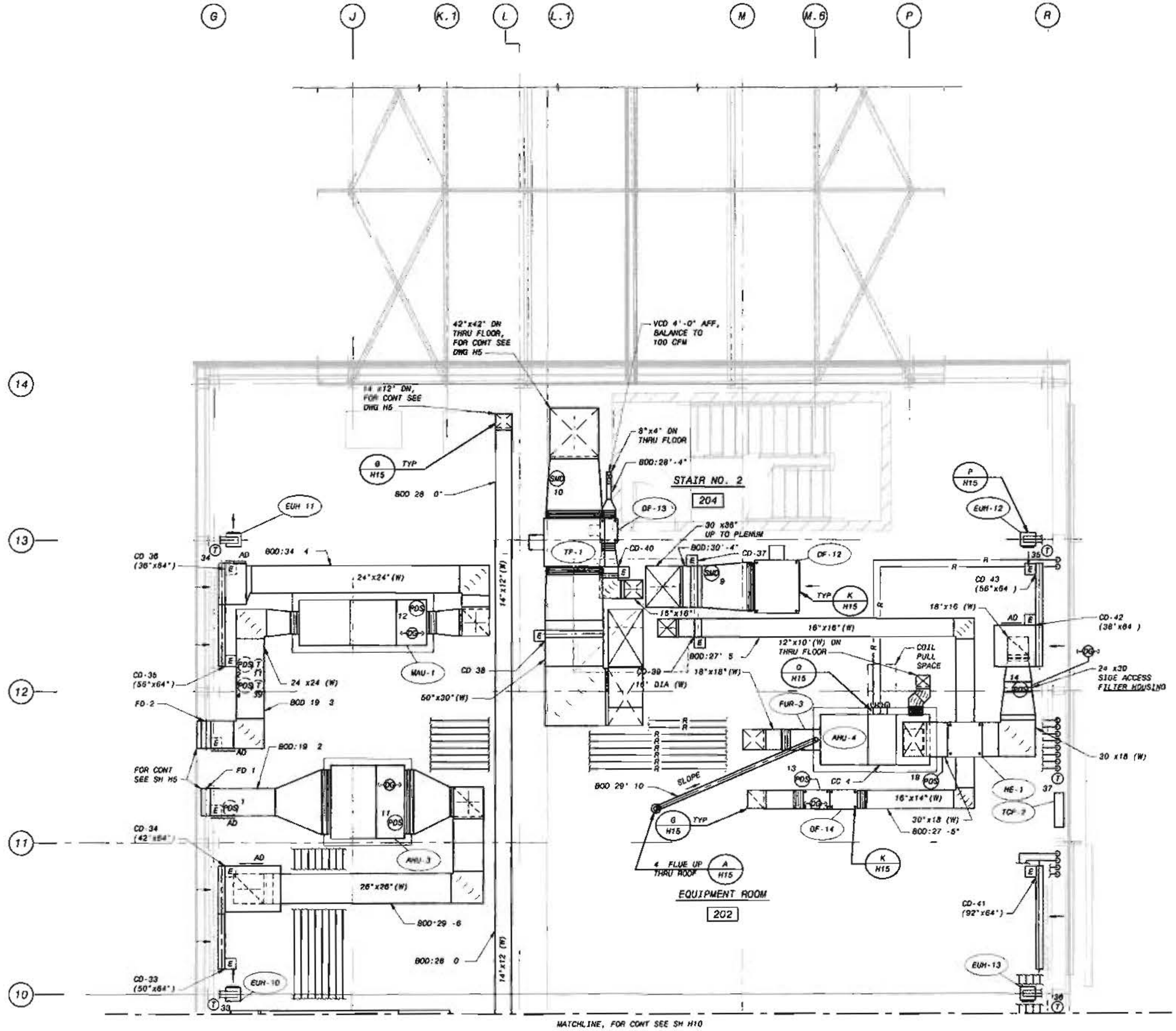
OPERATIONS BUILDING
HVAC
SECOND FLOOR SOUTH - PLAN

DESIGNED.	JAN
DETAILED.	JWC
CHECKED:	JEP
APPROVED.	DWH
DATE.	1/06/06

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

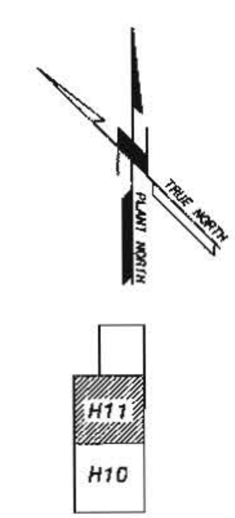
PROJECT NO.
137804

H10
SHEET
174 OF 267



NOTES

1. BOTTOM OF INTAKE LOUVER ELEVATION 780.67 (TYP).



KEY PLAN
NO SCALE

SECOND FLOOR PLAN
1/4" = 1'-0"

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP

CYGNET ID: 137804-300-222-H-T000007DY
MF: ACAD-20001
SAVED: CHA34792, 1/4/2006 3:37:23 PM
PLOTTED: YEA11994, 6/25/2005 12:36:26 PM
USER: CYGNETADMI   DWG VER. 1.28
XREF1: Administration - Shell.dwg
XREF2: Administration - Interior.dwg
XREF3: Administration - Mezzanine.dwg
XREF4: Operation - Gambrel Shell.dwg
XREF5: Operation - Gambrel 1st floor

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Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
SECOND FLOOR NORTH - PLAN

DESIGNED: JAM
DETAILED: JMC
CHECKED: JEP
APPROVED: DWN
DATE: 1/06/06

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

H11
SHEET
175 OF 267

CENTRAL STATION AIR HANDLING UNIT SCHEDULE

UNIT NUMBER	LOCATION	HEATING COIL NUMBER	COOLING COIL NUMBER	AIRFLOW (CFM)	ESP (IN WG)	MOTOR HP	POWER SUPPLY VOLTS/PHASE	MIN WHEEL DIA (IN)	WHEEL TYPE	APPROX WEIGHT (LBS)	UNIT CONFIGURATION	REMARKS
AHU-1	ROOM 202	-----	CC-1	2700	2.875	5	480/3	12	AF	---	F30,CC,FNH	1
AHU-2	ROOM 202	-----	CC-2	3600	2.25	5	480/3	12	AF	---	F30,CC,FNH	2
AHU-3	ROOM 202	-----	-----	6000	1.25	5	480/3	18	AF	1300	F30,FNH	
AHU-4	ROOM 202	-----	CC-4	2350	3.25	5	480/3	12	AF	1600	MB,CC,FNH	OA=1750 CFM

WHEEL TYPE NOTES:
FC - FORWARD CURVED   AF - AIRFOIL   BI - BACKWARD INCLINED

UNIT CONFIGURATION NOTES:
F30 - FILTER SECTION WITH 30% FILTERS   A12 - 12 INCH ACCESS SECTION   CC - COOLING COIL
F85 - FILTER SECTION WITH 85% FILTERS   A18 - 18 INCH ACCESS SECTION   MB - MIXING BOX
B - BLENDER SECTION   A24 - 24 INCH ACCESS SECTION   FNV - FAN SECTION, VERTICAL ARRANGEMENT
IFB - INTERNAL FACE AND BYPASS SECTION   A30 - 30 INCH ACCESS SECTION   FNH - FAN SECTION, HORIZONTAL ARRANGEMENT
EFB - EXTERNAL FACE AND BYPASS SECTION   HC - HEATING COIL

REMARKS:
1. OA = 160 CFM (MIN), 2700 CFM (MAX)
2. OA = 450 CFM (MIN), 3600 CFM (MAX)

AIR HANDLING UNIT (PACKAGED) / FURNACE SCHEDULE

UNIT NUMBER	LOCATION	AIRFLOW (CFM)	ESP (IN WG)	ORIENTATION	INDOOR FAN MOTOR HP	DRIVE	POWER SUPPLY VOLTS/PHASE	COOLING EAT (FDB)	COOLING EAT (FWB)	COOLING CAPACITY (BTUH) SENSIBLE	COOLING CAPACITY (BTUH) TOTAL	HEATING EAT (FDB)	HEATING TYPE	HEATING CAPACITY (BTUH OR (KW))	APPROX WEIGHT (LBS)	REMARKS
PAH-1	ROOM 202	8000	0.75	UP	7 1/2	B	480/3	80.6	83.4	189700	192700	59.1	E	(3)	1200	1B,2,7
FUR-1	ROOM 202	2700	1.2	H	---	---	120/1	---	---	---	---	65.8	NG	56000	200	3,6
FUR-2	ROOM 202	3600	.80	H	---	---	120/1	---	---	---	---	61.4	NG	131000	250	4,6
FUR-3	ROOM 202	2350	.40	H	---	---	120/1	---	---	---	---	48.4	NG	118000	250	5,6

HEATING TYPE NOTES:
E - ELECTRIC
NG - NATURAL GAS
AUX - AUXILIARY ELECTRIC

ORIENTATION NOTES:
UP - UPFLOW
DN - DOWNFLOW
H - HORIZONTAL

CAPACITY NOTE:
CAPACITIES LISTED IN PARENTHESES ARE IN UNITS OF "KW". CAPACITIES LISTED WITHOUT PARENTHESES ARE IN UNITS OF "BTUH"

REMARKS:
1 - FILTERS: A) 1 INCH PLEATED B) 2 INCH PLEATED
2 - MCA=24
3 - WORKS WITH AHU-1
4 WORKS WITH AHU-2
5 - WORKS WITH AHU-4
6 - TWO STAGE WITH 50% TURNDOWN
7 100 CFM OUTSIDE AIR (MIN) 8000 CFM OUTSIDE AIR (MAX)

SPLIT SYSTEM CONDENSING UNIT/HEAT PUMP SCHEDULE

UNIT NUMBER	LOCATION	CAPACITY (BTUH)	CAPACITY STEPS	SUCTION TEMPERATURE (F) MINIMUM	SUCTION TEMPERATURE (F) MAXIMUM	POWER SUPPLY VOLTS/PHASE	MINIMUM CIRCUIT AMPACITY	APPROX WEIGHT (LBS)	MATCHED WITH INDOOR UNIT	REMARKS
CU-1	AT GRADE	92900	1	41	47	480/3	18.1	500	AHU-4	1,3
CU-2	AT GRADE	598300	4	41	47	480/3	123	8000	DEH-1	1,3
CU-3	AT GRADE	192700	4	41	47	480/3	42.5	1200	PAH-1	1,2,3
HP-1	AT GRADE	81400	2	38	47	480/3	14	1000	AHU-1	3
HP-2	AT GRADE	111100	2	38	47	480/3	23.3	1000	AHU-2	3

REMARKS:
1 - HOT GAS BYPASS KIT
2 - 2 COMPRESSORS, 2 REFRIGERANT CIRCUITS
3 - LOW AMBIENT KIT

NOTES:
1. OUTDOOR COIL ENTERING AIR TEMPERATURE:
COOLING - 95 F DESIGN/ 50 F MIN
HEATING - 43 F (HEAT PUMP)

2. THE EQUIPMENT SHALL HAVE A MINIMUM EFFICIENCY AT THE ARI STANDARD RATING CONDITIONS OF NOT LESS THAN THE FOLLOWING:
<65,000 BTUH - 10 EER (CONDENSING UNITS AND HEAT PUMPS)
>65,000<135,000 BTUH - 10.3 SEER (CONDENSING UNITS). 10.1 EER (HEAT PUMPS)
>135,000<240,000 BTUH - 9.7 EER (CONDENSING UNITS)
>240,000<720,000 BTUH - 9.2 EER (CONDENSING UNITS)

DEHUMIDIFIER SCHEDULE - DESICCANT TYPE

UNIT NUMBER		DEH-1
LOCATION		MECHANICAL ROOM
AIRFLOW (CFM)	PROCESS	10000*
	REACTIVATION	1371
EXTERNAL STATIC PRESSURE (IN WC)	PROCESS	2
	REACTIVATION	0.75
MOTOR HORSEPOWER	PROCESS FAN	15
	REACTIVATION FAN	1.5
	COMPRESSOR MOTOR	---
DESIGN TEMPERATURES	ENTERING (FDB/FWB)	90.1/56.4
	SPACE (FDB/FWB)	80/66 5
	OUTDOOR (FDB/FWB)	92/77
REACTIVATION AIR HEATER TYPE		NG
MAX REACTIVATION HEAT INPUT (MBH OR (KW))		295.2
MIN MOISTURE REMOVAL CAPACITY (LBS/HR)		83
POWER SUPPLY (VOLTS/PHASE/HERTZ)		480/3
APPROXIMATE WEIGHT (LBS)		13000

REACTIVATION AIR HEATER TYPE NOTES:
ELEC - ELECTRIC   NG - NATURAL GAS   STM - STEAM
MAXIMUM REACTIVATION HEAT INPUT NOTES:
CAPACITIES LISTED IN PARENTHESES ARE IN UNITS OF "KW".
CAPACITIES LISTED WITHOUT PARENTHESES ARE IN UNITS OF "BTUH"

NOTES:
1. MANUFACTURER PROVIDED DEHUMIDIFIER CONTROL PANEL
2. 600 CFM OA (MIN), 10000 CFM OA (MAX)
3. DX COOLING COIL (CC-3

* 10000 CFM = (4114 CFM DEHUMIDIFIER + 5886 CFM BYPASSED

FAN SCHEDULE

UNIT NUMBER	LOCATION	TYPE	AIRFLOW (CFM)	ESP (IN WG)	MOTOR HP	POWER SUPPLY VOLTS/PHASE	MINIMUM WHEEL DIA (IN)	WHEEL TYPE	DRIVE	APPROX WEIGHT (LBS)	REMARKS
DF-1	ROOM 110	DF	225	.375	1/4	120/1	7	C	B	100	1E
DF-2	ROOM 112	DF	310	.625	1/4	120/1	8	C	B	100	1E
DF-3	ROOM 169	DF	400	.375	1/4	120/1	8	C	B	100	CORROSION RESISTANT,1E,2
DF-4	ROOM 170	DF	5080	.375	1	480/3	24	C	B	400	1E
DF-5	ROOM 176	DF	4100	.75	1.5	480/3	20	C	B	300	1E
DF-6	ROOM 177	DF	4700	.625	1	480/3	24	C	B	350	1E
DF-7	ROOM 178	DF	800	.5	1/3	480/3	9	C	B	100	1E
DF-8	ROOM 202	DF	2540	.625	3/4	480/3	16	C	B	200	1E
DF-9	ROOM 202	DF	3150	.625	1	480/3	18	C	B	250	1E
DF-10	ROOM 202	DF	11600	.625	3	480/3	36	C	B	650	1E
DF-11	ROOM 202	DF	7900	.75	3	480/3	30	C	B	500	1E
DF-12	ROOM 202	DF	11600	.625	3	480/3	36	C	B	650	1E
DF-13	ROOM 202	DF	100	.5	1/4	120/1	7	C	B	100	1E
DF-14	ROOM 202	DF	1400	2.125	1 1/2	480/3	13	C	B	150	1E,6
PF-1	ROOM 190	PF	2100	.375	1/2	480/3	20	P	B	200	
TF-1	ROOM 202	TF	17500	1.125	10	480/3	38	C	B	1600	1E
FEF-1	OUTSIDE LAB	FEF	400	.375	1/4	120/1	16	C	B	500	WALL MOUNTED,5
VF-1	ROOM 152	VF	*	*	1/2	120/1	*	*	D	100	7,8,STAINLESS STEEL
VF-2	ROOM 153	VF	*	*	1/2	120/1	*	*	D	100	7,8,STAINLESS STEEL

WHEEL TYPE NOTES:
A - AXIAL
C - CENTRIFUGAL
P - PROPELLER

DRIVE NOTES:
D - DIRECT
B - BELT

REMARKS:
1 - VIBRATION ISOLATOR A) RUBBER PAD B) RUBBER MOUNT C) RUBBER HANGER D) SPRING MOUNT E) SPRING HANGER F) RESTRAINED SPRING MOUNT
2 - PROTECTIVE COATING SUITABLE FOR A HYDROFLUROSILICIC ACID ATMOSPHERE
3 - WALL CAP
4 - BACKDRAFT DAMPER
5 - MANUFACTURER TO PROVIDE EXHAUST DUCT STACKHEAD ASSEMBLY AND RAIN CAP
6 - FILTER BOX
7 - PROVIDED BY RADIANT HEATER MANUFACTURER.
8 - CFM, WHEEL DIA, AND WHEEL TYPE TO BE DETERMINED BY MANUFACTURER.

PACKAGED AIR CONDITIONING UNIT/HEAT PUMP SCHEDULE

UNIT NUMBER	LOCATION	AIRFLOW (CFM)	ESP (IN WG)	INDOOR FAN MOTOR HP	POWER SUPPLY VOLTS/PHASE	MINIMUM CIRCUIT AMPACITY	COOLING EAT (FDB)	COOLING EAT (FWB)	COOLING CAPACITY (BTUH) SENSIBLE	COOLING CAPACITY (BTUH) TOTAL	HEATING EAT (FDB)	HEATING TYPE	HEATING CAPACITY (BTUH OR (KW))	OA (CFM)	APPROX WEIGHT (LBS)	REMARKS
PAC-1	AT GRADE	3000	0.875	2	480/3	46.1	74.4	81.2	63400	70800	61.9	E	(27)	225	1000	LAB UNIT,1A,2,3,4B,5,6,7

HEATING TYPE NOTES:
E - ELECTRIC
NG - NATURAL GAS
AUX - AUXILIARY ELECTRIC

CAPACITY NOTE:
CAPACITIES LISTED IN PARENTHESES ARE IN UNITS OF "KW". CAPACITIES LISTED WITHOUT PARENTHESES ARE IN UNITS OF "BTUH"

REMARKS:
1 - ECONOMIZER CONTROLS A) DRY BULB B) ENTHALPY C) DIFFERENTIAL ENTHALPY
2 - HOT GAS BYPASS KIT
3 POWER EXHAUST
4 - FILTERS A) 1 INCH PLEATED B) 2 INCH PLEATED
5 - FILTER VELOCITY SHALL NOT EXCEED 350 FEET PER MINUTE
6 - DUAL COMPRESSOR
7 - MANUFACTURER PROVIDED DIRTY FILTER PRESSURE DIFFERENTIAL SWITCH

NOTES:
1. OUTDOOR COIL ENTERING AIR TEMPERATURE:
COOLING - 95 F DESIGN/ 60 F MIN
HEATING - 43 F (HEAT PUMP)

2. THE EQUIPMENT SHALL HAVE A MINIMUM EFFICIENCY AT THE ARI STANDARD RATING CONDITIONS OF NOT LESS THAN THE FOLLOWING:
<65,000 BTUH - 9.7 SEER
>65,000<135,000 BTUH - 10.3 EER

3. THE FOLLOWING EQUIPMENT SHALL HAVE THE MINIMUM NUMBER OF CAPACITY STEP REDUCTIONS OR STAGES:
PAC-1 - 2 COOLING STEPS 2 HEATING STAGES

MAKEUP AIR UNIT SCHEDULE

UNIT NUMBER	LOCATION	HEATING TYPE	AIRFLOW (CFM)	ESP (IN WG)	MOTOR HP	POWER SUPPLY VOLTS/PHASE	OUTPUT CAPACITY (BTUH OR (KW))	MINIMUM WHEEL DIA (IN)	APPROX WEIGHT (LBS)	REMARKS
MAU-1	ROOM 202	DF	4500	1.25	3	480/3	353000	15	1000	

HEATING TYPE NOTES:
DF - DIRECT FIRED
IF - INDIRECT FIRED
E - ELECTRIC

CAPACITY NOTE:
CAPACITIES LISTED IN PARENTHESES ARE IN UNITS OF "KW". CAPACITIES LISTED WITHOUT PARENTHESES ARE IN UNITS OF "BTUH"

COIL SCHEDULE

UNIT NUMBER	SERVICE	AIRFLOW (CFM)	AIR PD (IN WG)	EAT (FDB)	EAT (FWB)	LAT (FDB)	CAPACITY (BTUH OR (KW)) SENSIBLE	CAPACITY (BTUH OR (KW)) TOTAL	EWT (F)	WATER FLOW (GPM)	WATER PD (FT)	REMARKS
CC-1	DX	2700	.37	81.24	65.3	61	57600	81400	-----	-----	-----	WORKS WITH AHU-1
CC-2	DX	3600	.43	80.56	65.5	57	88800	111100	-----	-----	-----	WORKS WITH AHU-2
CC-3	DX	10000	.50	105.44	68.5	50	598300	598300	-----	-----	-----	WORKS WITH DEH-1
CC-4	DX	2350	.44	91.57	69.7	56.5	58800	92900	-----	-----	-----	WORKS WITH AHU-4

CAPACITY NOTE:
CAPACITIES LISTED IN PARENTHESES ARE IN UNITS OF "KW". CAPACITIES LISTED WITHOUT PARENTHESES ARE IN UNITS OF "BTUH".

BLACK & VEATCH
Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
SCHEDULES

DESIGNED: JAM
DETAILED: JMC
CHECKED: JEP
APPROVED: DMW
DATE: 1/06/06

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

H12
SHEET
176 OF 267

ENERGY RECOVERY FLAT PLATE EXCHANGER SCHEDULE

UNIT NUMBER	LOCATION	AIRFLOW (CFM)		AIRSTREAM 1 INLET TEMPERATURE (DB° F/WB° F)		AIRSTREAM 1 OUTLET TEMPERATURE (DB° F/WB° F)		AIRSTREAM 2 INLET TEMPERATURE (DB° F/WB° F)		AIRSTREAM 2 OUTLET TEMPERATURE (DB° F/WB° F)		APPROX WEIGHT (LBS)	REMARKS
		AIRSTREAM 1	AIRSTREAM 2	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER		
HE-1	ROOM 202	1750	1400	88/73	-6/-7	82.6/71.4	40.3/27.7	78/63.5	72/56	84.6/65.6	25.6/25.6	150	1

REMARKS: 1 - SUPPORT WITH HANGERS

HEATER SCHEDULE

UNIT NUMBER	LOCATION	TYPE	UNIT ORIENTATION	AIRFLOW (CFM)	AIR PD (IN WG)	OUTPUT CAPACITY (BTUH)	OUTPUT CAPACITY (KW)	WATER FLOW (GPM)	WATER PD (FT)	MOTOR HP	POWER SUPPLY VOLTS/PHASE	APPROX WEIGHT (LBS)	REMARKS
EBH-1	ROOM 109	EBH	H	-----	-----	-----	1.5	-----	-----	-----	208/1	20	
EBH-2	ROOM 109	EBH	H	-----	-----	-----	1.5	-----	-----	-----	208/1	20	
EBH-3	ROOM 111	EBH	H	-----	-----	-----	3	-----	-----	-----	208/1	30	
EUH-1	ROOM 166	EUHCR	H	700	-----	-----	7.5	-----	-----	1/10	480/3	100	2
EUH-2	ROOM 165	EUHCR	H	700	-----	-----	7.5	-----	-----	1/10	480/3	100	2
EUH-3	ROOM 166	EUHCR	H	700	-----	-----	7.5	-----	-----	1/10	480/3	100	2
EUH-4	ROOM 171	EUHCR	H	700	-----	-----	7.5	-----	-----	1/10	480/3	100	2
EUH-5	ROOM 170	EUHCR	H	700	-----	-----	7.5	-----	-----	1/10	480/3	100	2
EUH-6	ROOM 169	EUHCR	H	700	-----	-----	5	-----	-----	1/10	480/3	100	2
EUH-7	ROOM 176	EUHSTD	H	310	-----	-----	4	-----	-----	1/10	480/3	50	
EUH-8	ROOM 202	EUHSTD	H	310	-----	-----	4	-----	-----	1/10	480/3	50	
EUH-9	ROOM 202	EUHSTD	H	310	-----	-----	4	-----	-----	1/10	480/3	50	
EUH-10	ROOM 202	EUHSTD	H	310	-----	-----	4	-----	-----	1/10	480/3	50	
EUH-11	ROOM 202	EUHSTD	H	310	-----	-----	4	-----	-----	1/10	480/3	50	
EUH-12	ROOM 202	EUHSTD	H	310	-----	-----	4	-----	-----	1/10	480/3	50	
EUH-13	ROOM 202	EUHSTD	H	310	-----	-----	4	-----	-----	1/10	480/3	50	
EUH-14	ROOM 190	EUHSTD	H	1350	-----	-----	25	-----	-----	1/10	480/3	100	
EUH-15	ROOM 190	EUHSTD	H	1350	-----	-----	25	-----	-----	1/10	480/3	100	
EUH-16	ROOM 190	EUHSTD	H	1350	-----	-----	25	-----	-----	1/10	480/3	100	
EUH-17	ROOM 190	EUHSTD	H	1350	-----	-----	25	-----	-----	1/10	480/3	100	
GIH-1	ROOM 151	GIH	H	-----	-----	-----	-----	-----	-----	-----	120/1	-----	4,6
GIH-2	ROOM 152	GIH	H	-----	-----	-----	-----	-----	-----	-----	120/1		4,6
GIH-3	ROOM 152	GIH	H	-----	-----	-----	-----	-----	-----	-----	120/1		4,6
GIH-4	ROOM 152	GIH	H	-----	-----	-----	-----	-----	-----	-----	120/1	-----	5,6
GIH-5	ROOM 152	GIH	H	-----	-----	-----	-----	-----	-----	-----	120/1	-----	5,6
GIH-6	ROOM 153	GIH	H	-----	-----	-----	-----	-----	-----	-----	120/1	-----	5,6
GIH-7	ROOM 173	GIH	H	-----	-----	-----	-----	-----	-----	1.4 AMPS	120/1	-----	6
GIH-8	ROOM 173	GIH	H	-----	-----	-----	-----	-----	-----	1.4 AMPS	120/1		6
GIH-9	ROOM 177	GIH	H	-----	-----	-----	-----	-----	-----	1.4 AMPS	120/1	---	6

TYPE NOTES:
- EBH - BASEBOARD HEATER
- GUH - GAS UNIT HEATER
- HUH - HEATING WATER UNIT HEATER
- WH - WALL HEATER
- EI - ELECTRIC INFRARED
- CH - CABINET HEATER
- C - HEATING WATER CONVECTOR
- EDH - ELECTRIC DUCT HEATER
- GIH - GAS INFRARED HEATER
- EUHSTD - STANDARD ELECTRIC UNIT HEATER
- EUHEXP - EXPLOSIONPROOF ELECTRIC UNIT HEATER
- EUHCR - CORROSION RESISTANT ELECTRIC UNIT HEATER

UNIT ORIENTATION NOTES:
- H - HORIZONTAL DISCHARGE
- V - VERTICAL DISCHARGE
- S - SURFACE MOUNT
- R - RECESSED MOUNT

REMARKS:
1 - EXPLOSION-PROOF
2 - CORROSION RESISTANT
3 - ELECTRIC HEATER ELEMENT TYPE A) FINNED TUBE B) OPEN COIL
4 - HEATERS GIH-1, GIH-2, AND GIH-3 SHARE VACUUM FAN VF-1, VF-1 IS 3/4 HP
5 - HEATERS GIH-4, GIH-5, AND GIH-6 SHARE VACUUM FAN VF-2, VF-2 IS 3/4 HP
6 - 50,000 BTUH INPUT CAPACITY

AIR DEVICE SCHEDULE

SYMBOL	MODEL	FRAME/BORDER	MATERIAL	FINISH	DAMPER TYPE	ACCESSORIES	REMARKS
EO-1	AMD	LAY-IN	ALUMINUM	BAKED WHITE ENAMEL	---	ROUND NECK ADAPTER	24"x24" FACE
EG-1	80	LAY-IN	ALUMINUM	BAKED WHITE ENAMEL	---	EGG CRATE FACE	
ER-1	60DAL	SURFACE MOUNT	ALUMINUM	ALUM PRIME COAT	OPPOSED BLADE	---	LOUVERED FACE
RO-1	AMD	LAY-IN	ALUMINUM	BAKED WHITE ENAMEL	---	ROUND NECK ADAPTER	24"x24" FACE
RR-1	60DAL	SURFACE MOUNT	ALUMINUM	ALUM PRIME COAT	OPPOSED BLADE	-----	LOUVERED FACE
SO-1	AMD	LAY-IN	ALUMINUM	BAKED WHITE ENAMEL	---	ROUND NECK ADAPTER	24"x24" FACE
SO-2	ARCD	EXPOSED DUCT	ALUMINUM	SPECIAL	---	---	TO BE SELECTED BY ENGINEER
SR-1	22DAL	SURFACE MOUNT	ALUMINUM	ALUM PRIME COAT	OPPOSED BLADE	---	LOUVERED FACE

NOTES:
1. ALL DIFFUSER CORE STYLES ARE 4-WAY UNLESS OTHERWISE INDICATED ON THE PLANS.
2. CORROSION RESISTANT COATING SUITABLE FOR A HYDROFLUROSILICIC ACID ENVIRONMENT WHERE INDICATED ON DRAWINGS

THERMOSTAT SCHEDULE

UNIT NUMBER	LOCATION	TYPE	SET POINT (F)	EQUIPMENT CONTROLLED	REMARKS
T-1	ROOM 110	D	72/68	PAC-1	
T-2	ROOM 116	E	78/72	AHU-1	
T-3	ROOM 103	E	78/72	AHU-2	
T-4	ROOM 151	A	60	GIH-1	
T-5	ROOM 151	A	60	GIH-2	
T-6	ROOM 152	A	90	DEH-[illegible]	
T-7	ROOM 152	A	60	GIH-3	
T-[illegible]	ROOM 152	A	60	GIH-4	
T-[illegible]	ROOM 153	A	60	GIH-5	
T-10	ROOM 153	A	60	GIH-6	
T-11	ROOM 161	---	60	MAU-1	2
T-12	ROOM 166	B	65	EUH-[illegible]	1
T-13	ROOM 165	B	65	EUH-2	1
T-14	ROOM 172	B	60	AHU-3	1
T-15	ROOM 167	B	65	EUH-3	1
T-16	ROOM 167	B	65	EUH-[illegible]	1
T-17	ROOM 171	B	65	EUH-5	1
T-18	ROOM 169	B	60	EUH-6	1
T-19	ROOM 155	E	78/72	AHU-4	
T-20	ROOM 173	A	60	GIH-7	
T-21	ROOM 173	A	60	GIH-8	
T-22	ROOM 173	A	100	TF-1	
T-23	ROOM 177	A	60	GIH-9	
T-24	ROOM 177	A	100	DF-6	
T-25	ROOM 176	A	100	DF-7	
T-26	ROOM 176	A	60	EUH-7	
T-27	OUTSIDE	F	---	AHU-1, 2	OUTSIDE AIR
T-28	OUTSIDE	F	53	DEH-1	OUTSIDE AIR
T-29	OUTSIDE	F	---	PAH-1	OUTSIDE AIR
T-30	ROOM 203	D	80/60	PAH-1	
T-31	ROOM 202	A	60	EUH-8	
T-32	ROOM 202	A	60	EUH-9	
T-33	ROOM 202	A	60	EUH-10	
T-34	ROOM 202	A	60	EUH-11	
T-35	ROOM 202	A	60	EUH-12	
T-36	ROOM 202	A	50	EUH-13	
T-37	ROOM 202	A	90	DF-12	
T-38	ROOM 202	A	90	DF-10	
T-39	ROOM 202	C	45	MAU-1	FREEZE PROT
T-40	ROOM 202	C	45	AHU-4	FREEZE PROT
T-41	ROOM 190	A	60	EUH-14	
T-42	ROOM 190	A	60	EUH-15	
T-43	ROOM 190	A	60	EUH-16	
T-44	ROOM 190	A	60	EUH-17	
T-45	ROOM 190	A	85	PF-1	
T-46	ROOM 203	A	95	---	PAH-1 ALARM

TYPE NOTES:
SEE SPECIFICATION FOR THERMOSTAT TYPE MODEL.

REMARKS:
1 - CORROSION RESISTANT
2 - PROVIDED BY MAU-1 MANUFACTURER

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP

CYGNET ID: 137804-300-247-H-7D0D087MM
WF: ACAD-2000i
SAVED: CHA34792, 1/5/2006 2:00:08 PM
PLOTTED: HMH2675, 2/24/2005 2:18:15 PM
USER: CYGNETADM1 DWG VER: 1.15
XREF1: A-MstrFL.dwg
XREF2: A_FL2.dwg
XREF3: ADM 2d_walls.dwg
XREF4: S-Grid.dwg
XREF5:

BLACK & VEATCH
Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
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0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

H13
SHEET
177 OF 267

HVAC SEQUENCE OF OPERATION

1. GENERAL SYSTEM OPERATIONS.

1.1. TEMPERATURE CONTROL PANELS. TEMPERATURE CONTROL PANELS IDENTIFIED IN THE SEQUENCE OF OPERATION SHALL BE PROVIDED WITH THE INDICATING LIGHTS, RUNNING LIGHTS, ALARM LIGHTS, AUDIBLE ALARMS, TIMERS, AND SELECTOR SWITCHES FOR CONTROL AND STATUS INDICATION OF THE EQUIPMENT SERVED. RUNNING LIGHTS SHALL BE PROVIDED TO INDICATE BOTH ENERGIZED AND DE-ENERGIZED STATUS FOR THE EQUIPMENT AND SHALL POSITIVELY INDICATE EQUIPMENT STATUS FROM THE MOTOR STARTER. INDICATING AND RUNNING LIGHTS SHALL BE LOCATED DIRECTLY ABOVE EACH RESPECTIVE SELECTOR SWITCH WITH LIGHT COLORS AS FOLLOWS:

RED	-	DE-ENERGIZED
GREEN	-	ENERGIZED
AMBER	-	ALARM
WHITE	-	STATUS

INDICATING LIGHTS AND SELECTOR SWITCHES SHALL BE LOCATED ON THE FACE OF THE TEMPERATURE CONTROL PANEL SERVING THE RESPECTIVE EQUIPMENT. IN ADDITION TO THE LIGHTS, TIMERS, AND SELECTOR SWITCHES DESCRIBED IN THE SEQUENCE OF OPERATION FOR THE INDIVIDUAL EQUIPMENT, EACH CONTROL PANEL SHALL BE PROVIDED WITH THE FOLLOWING:

'CONTROL POWER ON'	STATUS LIGHT
'INDICATING LIGHT TEST'	PUSHBUTTON
'ALARM RESET'	PUSHBUTTON (WHERE APPLICABLE)

TEMPERATURE CONTROL PANELS SPECIFIED TO BE PROVIDED WITH ALARM CONDITION INDICATING LIGHTS SHALL BE PROVIDED WITH AN ELECTRICALLY ISOLATED CONTACT TO PROVIDE REMOTE INDICATION OF THE ALARM TO THE PLANT CONTROL SYSTEM (PCS). EACH TEMPERATURE CONTROL PANEL SHALL BE PROVIDED WITH A MINIMUM OF ONE ALARM INPUT POINT TO THE PCS AND ADDITIONAL POINTS AS INDICATED BELOW.

1.2. SYSTEM INTERLOCKS AND ALARMS

ALL EQUIPMENT INTERLOCKING DEVICES AS DESCRIBED HEREIN SHALL BE PROVIDE WITHIN THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL (TCP/ECP).

1.2.1 SMOKE DETECTION. SMOKE DETECTORS SHALL BE LOCATED IN THE DUCT OF EQUIPMENT LISTED BELOW. IN THE EVENT SMOKE IS DETECTED BY A DETECTOR, A SMOKE DETECTED SIGNAL SHALL BE TRANSMITTED TO THE REMOTE TEST STATION AND FIRE ALARM PANEL OR PLANT CONTROL SYSTEM (PCS) WHEN A FIRE ALARM PANEL IS NOT PRESENT. A "SMOKE DETECTED" ALARM LIGHT ON THE RESPECTIVE REMOTE TEST STATION SHALL BE ILLUMINATED. WHERE A TEMPERATURE CONTROL PANEL IS PRESENT, THE REMOTE TEST STATION SHALL BE MOUNTED ON OR ADJACENT TO THE TEMPERATURE CONTROL PANEL. THE RESPECTIVE EQUIPMENT AND ANY INTERLOCKED EQUIPMENT SHALL BE DE-ENERGIZED AND OUTSIDE AIR DAMPERS ASSOCIATED WITH THE DE-ENERGIZED EQUIPMENT SHALL CLOSE.

IN THE EVENT A SMOKE DETECTOR MALFUNCTIONS, A MALFUNCTION SIGNAL SHALL BE TRANSMITTED TO THE REMOTE TEST STATION OR FIRE ALARM PANEL, ILLUMINATING A "SMOKE DETECTOR MALFUNCTION" INDICATING LIGHT.

EQUIPMENT	SMOKE DETECTOR
AHU-4	SMD-1
DF-5	SMD-2
DF-6	SMD-3
AHU-1	SMD-4
AHU-2	SMD-5
DF-10	SMD-6
PAH-1	SMD-7
DEH-1	SMD-8
DF-12	SMD-9
TF-1	SMD-10
PAC-1	SMD-11

1.2.2 FREEZE PROTECTION. LOW AIR TEMPERATURE THERMOSTATS SHALL BE LOCATED IN THE AIR DISTRIBUTION SYSTEMS LISTED BELOW. UPON DETECTION OF LOW AIR TEMPERATURE, THE THERMOSTAT SHALL DE-ENERGIZE THE RESPECTIVE EQUIPMENT AND ALL INTERLOCKED EQUIPMENT, CONTROL DAMPER(S) OF THE RESPECTIVE EQUIPMENT AND INTERLOCKED EQUIPMENT SHALL CLOSE, AND A "LOW AIR TEMPERATURE" ALARM LIGHT ON THE FACE OF THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL SHALL BE ILLUMINATED. AN ADJUSTABLE 0 TO 5 MINUTE TIME DELAY RELAY SHALL BE PROVIDED TO ALLOW FOR STARTING OF THE EQUIPMENT DURING COLD AMBIENT CONDITIONS.

EQUIPMENT	THERMOSTAT	TEMPERATURE/EQUIPMENT CONTROL PANEL
MAU-1	T-39	TCP-2
AHU-4	T-40	TCP-2

1.2.3. HIGH FILTER PRESSURE LOSS. A HIGH LIMIT PRESSURE DIFFERENTIAL FLOW SWITCH SHALL BE LOCATED ACROSS THE FILTER BANK OF THE EQUIPMENT INDICATED BELOW. IN THE EVENT THE PRESSURE DIFFERENTIAL ACROSS THE FILTER EXCEEDS THE PRESET VALUE, A "HIGH FILTER PRESSURE LOSS" ALARM LIGHT ON THE FACE OF THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL SHALL BE ILLUMINATED.

EQUIPMENT	PRESSURE SWITCH	TEMPERATURE/EQUIPMENT CONTROL PANEL
AHU-4	PDS-14	TCP-2
DEH-1	PDS-10, PDS-15	DEHUMIDIFIER CONTROL PANEL
AHU-1	PDS-6	TCP-1
AHU-2	PDS-7	TCP-1
AHU-3	PDS-11	TCP-2
MAU-1	PDS-12	TCP-2
PAH-1	PDS-9	TCP-1
DF-14	PDS-13	TCP-2

NOTE: HIGH LIMIT PRESSURE DIFFERENTIAL SWITCH FOR THE PAC-1 FILTER SHALL BE MANUFACTURER PROVIDED.

1.2.4. VENTILATION SYSTEM FAILURE. VENTILATION SYSTEM FAILURE PRESSURE DIFFERENTIAL SWITCHES SHALL BE LOCATED IN THE DUCT OF EQUIPMENT INDICATED BELOW. IN THE EVENT THAT AIRFLOW OF THE EQUIPMENT IS NOT ATTAINED OR LOST AS DETERMINED BY THE PRESSURE DIFFERENTIAL FLOW SWITCH, A "VENTILATION SYSTEM FAILURE" INDICATING LIGHT FOR THE RESPECTIVE EQUIPMENT SHALL BE ILLUMINATED ON THE FACE OF THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL. AN ADJUSTABLE 0 TO 5 MINUTE TIME DELAY RELAY SHALL BE PROVIDED AND SET TO ALLOW SUFFICIENT TIME FOR CONTROL DAMPERS TO OPEN BEFORE ALARMING VENTILATION SYSTEM FAILURE. A DRY CONTACT SHALL BE PROVIDED FOR VENTILATION SYSTEM FAILURE ALARM TO THE PLANT CONTROL SYSTEM (PCS). IN ADDITION, WHERE INDICATED ON THE DRAWINGS, A VISUAL ALARM SHALL ILLUMINATE AND AUDIBLE ALARM SHALL SOUND AT EACH ROOM ENTRANCE AND WITHIN THE ROOM.

EQUIPMENT	PRESSURE SWITCH	TEMPERATURE/EQUIPMENT CONTROL PANEL
AHU-4	PDS-3	TCP-2
DF-3	PDS-20	TCP-2
DF-5	PDS-5	TCP-2
MAU-1	PDS-2	TCP-2
PAH-1	PDS-8	TCP-1

1.2.5. HIGH/LOW DUCT PRESSURE. TO PROVIDE PROTECTION FOR THE AIR DISTRIBUTION SYSTEMS IN THE EVENT ONE OF THE FIRE OR COMBINATION SMOKE/FIRE DAMPERS SHOULD CLOSE, PRESSURE DIFFERENTIAL SWITCHES SHALL BE LOCATED IN THE DUCTWORK OF THE EQUIPMENT INDICATED BELOW. IN THE EVENT HIGH OR LOW DUCT STATIC PRESSURE EXCEEDS THE PRESET VALUE, A HIGH OR LOW PRESSURE INDICATING LIGHT ON THE FACE OF THE TEMPERATURE CONTROL PANEL SHALL BE ILLUMINATED, AND THE EQUIPMENT FAN DE-ENERGIZED. THE DE-ENERGIZED EQUIPMENT SHALL REQUIRE A MANUAL RESTART.

EQUIPMENT	PRESSURE SWITCH	TEMPERATURE/EQUIPMENT CONTROL PANEL
AHU-1	PDS-16	TCP-1
AHU-2	PDS-17	TCP-1
AHU-3	PDS-1	TCP-2
AHU-4	PDS-18	TCP-2
MAU-1	PDS-4	TCP-2
DF-14	PDS-19	TCP-2

1.2.6. EMERGENCY VENTILATION SHUTOFF. BREAK-TYPE GLASS TYPE EMERGENCY VENTILATION SHUTOFF SWITCHES SHALL BE PROVIDED FOR THE EQUIPMENT INDICATED BELOW. THE SWITCHES SHALL BE LOCATED AT EACH ROOM ENTRANCE. IN THE EVENT A SWITCH IS ACTIVATED, AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE LOCAL TEMPERATURE CONTROL PANEL AND RESPECTIVE EQUIPMENT OR NORMALLY OPEN CONTROL DAMPER SHALL BE DE-ENERGIZED. THE OUTSIDE AIR DAMPERS ASSOCIATED WITH THE DE-ENERGIZED EQUIPMENT SHALL CLOSE. A DRY ELECTRICALLY ISOLATED CONTACT SHALL BE PROVIDED FOR EMERGENCY VENTILATION SHUTOFF ALARM TO THE PLANT CONTROL SYSTEM (PCS).

EQUIPMENT	EVS SWITCHES	TEMPERATURE/EQUIPMENT CONTROL PANEL
DF-3, CD-12	EVS-01, 02	TCP-2
DF-4, DF-5, MAU-1, AHU-3	EVS-03, 04, 05	TCP-2, TCP-3

1.2.7. SMOKE AND COMBINATION SMOKE/FIRE DAMPERS. SMOKE AND COMBINATION SMOKE/FIRE DAMPERS SHALL BE CONTROLLED BY DUCT MOUNTED SMOKE DETECTORS. WHEN THE ASSOCIATED EQUIPMENT IS ENERGIZED, THE SMOKE OR COMBINATION SMOKE/FIRE DAMPER SHALL OPEN. WHEN SMOKE IS DETECTED BY THE DUCT MOUNTED SMOKE DETECTOR OR AREA DETECTION SYSTEM, THE SMOKE AND COMBINATION SMOKE/FIRE DAMPERS SHALL CLOSE AND THE ASSOCIATED EQUIPMENT SHALL BE DE-ENERGIZED.

SMOKE DETECTORS	SMOKE/FIRE DAMPERS	ASSOCIATED EQUIPMENT
SMD-1	FSD-1, 2, 3	AHU-4, DF-14
SMD-2	FD-1, 2	AHU-3, MAU-1
SMD-4	FD-3, 4	AHU-1
SMD-5	FD-5, 6	AHU-2

1.2.8 RESTART SWITCH. RESTART SWITCHES WITH BUILT-IN TIMERS SHALL BE LOCATED ON THE FACE OF THE TEMPERATURE PANEL FOR THE EQUIPMENT INDICATED ABOVE WITH SMOKE DETECTORS AND/OR FREEZE PROTECTION. THE TIMER SHALL BE ADJUSTABLE FOR 0 TO 30 MINUTES. RESTART MODE, THE LOW AIR TEMPERATURE AND/OR SMOKE DETECTOR INTERLOCKS SHALL BE IN THE BYPASSED TO START THE EQUIPMENT. IN THIS MODE, ALL COMPONENTS SHALL OPERATE IN THEIR NORMAL MODE UNLESS OTHERWISE INDICATED. AFTER THE PRESELECTED TIME HAS ELAPSED, THE UNIT SHALL AUTOMATICALLY RETURN TO NORMAL OPERATION.

1.2.9 AIR CONDITIONER FAILURE. IN THE EVENT THE TEMPERATURE IN ROOM 203 REACHES THE SET POINT TEMPERATURE (ADJ) OF THERMOSTAT T-46, AN ALARM SIGNAL SHALL BE ILLUMINATED ON THE FACE OF TCP-1 AND A SIGNAL SHALL BE SENT TO THE PLANT CONTROL SYSTEM (PCS).

2. HEATING SYSTEMS.

2.1. UNIT HEATERS. UNIT HEATERS SHALL BE CONTROLLED BY THEIR RESPECTIVE WALL-MOUNTED THERMOSTATS.

2.2. BASEBOARD HEATERS. BASEBOARD HEATERS SHALL BE CONTROLLED BY THEIR INTERNAL THERMOSTATS.

2.3. GAS INFRARED HEATERS. GAS INFRARED HEATERS SHALL BE CONTROLLED BY THEIR RESPECTIVE WALL-MOUNTED THERMOSTATS.

3. VENTILATING/EXHAUST SYSTEMS.

3.1. 'ON-OFF' EQUIPMENT CONTROL. EQUIPMENT INDICATED FOR 'ON-OFF' CONTROL SHALL EACH BE CONTROLLED BY AN INDIVIDUAL 'ON-OFF' FAN SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE 'ON' POSITION, THE RESPECTIVE EQUIPMENT FAN SHALL BE ENERGIZED. BEFORE THE FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHEN THE EQUIPMENT FAN IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL RETURN TO THE NORMAL (CLOSED) POSITION.

EQUIPMENT	CONTROL DAMPERS	SWITCH LOCATION
DF-13	CD-40	TCP-3
DF-2	CD-2	TCP-1
AHU-4	CD-42	TCP-2

3.2. 'ON-OFF/WINTER-SUMMER' EQUIPMENT CONTROL. EQUIPMENT INDICATED FOR 'ON-OFF' AND 'WINTER-SUMMER' CONTROL SHALL EACH BE CONTROLLED BY AN INDIVIDUAL 'ON-OFF' FAN SELECTOR SWITCH AND AN INDIVIDUAL 'WINTER-SUMMER' SYSTEM SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE 'ON' POSITION, THE RESPECTIVE EQUIPMENT FAN SHALL BE ENERGIZED. BEFORE THE FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHEN THE SWITCH IS PLACED IN THE 'WINTER' POSITION, THE SUPPLY AIR THERMOSTAT SHALL MODULATE THE HEATING OUTPUT OF THE UNIT TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE. WHEN THE SYSTEM SWITCH IS PLACED IN THE 'SUMMER' POSITION, THE HEATING SHALL BE LOCKED OUT. WHEN THE EQUIPMENT IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL RETURN TO THE NORMAL (CLOSED) POSITION.

EQUIPMENT	CONTROL DAMPERS	SUPPLY AIR THERMOSTAT	SWITCH LOCATION
MAU-1	CD-36	T-11	TCP-2

3.3. 'ON-OFF-AUTO' EQUIPMENT CONTROL. EQUIPMENT INDICATED FOR 'ON-OFF-AUTO' CONTROL SHALL EACH BE CONTROLLED BY AN INDIVIDUAL 'ON-OFF-AUTO' FAN SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE 'AUTO' POSITION, THE FAN SHALL BE INTERLOCKED AND CONTROLLED BY THE FAN INTERLOCK. WHEN THE SWITCH IS PLACED IN THE 'ON' POSITION, THE FAN SHALL BE ENERGIZED. BEFORE A FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHEN THE FAN IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL RETURN TO THE NORMALLY CLOSED POSITION UNLESS OTHERWISE INDICATED

EQUIPMENT	CONTROL DAMPERS	INTERLOCKED WITH	SWITCH LOCATION
AHU-3	CD-34	T-14	TCP-2
DF-3	CD-9	MAU-1	TCP-2
DF-4	CD-10	AHU-3	TCP-3
DF-5	CD-11	MAU-1	TCP-2
DF-6	CD-15, CD-16, CD-17	T-24	TCP-3
DF-7	CD-7, CD-8, CD-18	T-25	TCP-3
DF-8	...	AHU-1	TCP-1
DF-9	...	AHU-2	TCP-1
DF-10	CD-25, CD-19, CD-41	T-38	TCP-1
DF-11	...	PAH-1	TCP-1
DF-12	CD-37, CD-43, CD-33, CD-35	T-37	TCP-2
DF-14	CD-39	AHU-4	TCP-2
PF-1	CD-50, CD-51, CD-52	T-45	STARTER
TF-1	CD-13, CD-14, CD-38	T-22	TCP-2

3.4. LAB EXHAUST FAN. LAB EXHAUST FAN, DF-1, SHALL BE INTERLOCKED WITH THE FUME EXHAUST FAN FEF-1. WHEN FEF-1 IS ENERGIZED, DF-1 SHALL BE DE-ENERGIZED. WHEN FUME EXHAUST FAN FEF-1 IS DE-ENERGIZED, EXHASUT FAN DF-1 SHALL BE ENERGIZED. BEFORE DF-1 CAN OPERATE, CONTROL DAMPER CD-1 SHALL BE PROVEN OPEN. CD-1 SHALL CLOSE WHEN DF-1 IS DE-ENERGIZED.

3.6. VACUUM FANS VF-1 AND VF-2 SHALL BE CONTROLLED PER MANUFACTURER REQUIREMENTS.

3.5. FUME EXHAUST FAN. FUME EXHAUST FAN, FEF-1, SHALL BE CONTROLLED BY AN 'ON-OFF' SWITCH LOCATED ON THE FACE OF THE FUME HOOD OR ON THE WALL NEAR THE FUME HOOD. WHEN THE SWITCH IS PLACED IN THE 'ON' POSITION, FEF-1 SHALL BE ENERGIZED. WHEN THE SWITCH IS PLACED IN THE 'OFF' POSITION, FEF-1 SHALL BE DE-ENERGIZED.

4. AIR CONDITIONING SYSTEMS.

4.1 PACKAGED SYSTEMS. PACKAGED SYSTEMS SHALL BE CONTROLLED BY THEIR RESPECTIVE SPACE THERMOSTATS. THE THERMOSTAT SHALL HAVE A 'HEAT-OFF- COOL' SYSTEM SWITCH AND AN 'ON-AUTO' FAN SWITCH. WHEN IN THE 'AUTO' POSITION, THE SYSTEM FAN SHALL OPERATE INTERMITTENTLY AS DESCRIBED IN THE HEATING AND COOLING MODE PARAGRAPHS. WHEN IN THE 'ON' POSITION, THE AIR HANDLING UNIT FAN SHALL RUN CONTINUOUSLY. IT IS INTENDED THAT THE FAN SWITCH SHOULD NORMALLY BE IN THE 'ON' POSITION.

EQUIPMENT	SPACE THERMOSTAT
PAC-1	T-1

4.1.1. SYSTEM COOLING MODE. WHEN COOLING IS REQUIRED, THE COMPRESSOR SHALL BE ENERGIZED AND SHALL CYCLE TO MAINTAIN THE SUMMER SPACE TEMPERATURE SETPOINT.

4.1.2. SYSTEM HEATING MODE. IN THE HEATING MODE, THE ELECTRIC HEATING COIL SHALL OPERATE AS NECESSARY TO MAINTAIN THE SPACE TEMPERATURE. THE UNIT FAN SHALL CYCLE AS DETERMINED BY THE SPACE THERMOSTAT.

4.1.3. ECONOMIZER MODE. WHEN THE ENTHALPY OF THE OUTDOOR AIR IS LESS THAN THE ENTHALPY OF THE RETURN AIR, THE PACKAGED ECONOMIZER CONTROL SYSTEM SHALL POWER EXHAUST THE RETURN AIR AND SHALL ADMIT UP TO 100 PERCENT OUTSIDE AIR TO THE UNIT.

4.2 SINGLE ZONE CONSTANT VOLUME SYSTEMS. SINGLE ZONE CONSTANT VOLUME SYSTEMS SHALL BE CONTROLLED BY THEIR RESPECTIVE THERMOSTAT. SYSTEM OPERATION SHALL BE CONTROLLED BY A 'HEAT-OFF-COOL' (MANUAL CHANGEOVER) OR AN "OFF-HEAT-AUTO-COOL" (AUTOMATIC CHANGEOVER, PROGRAMMABLE) SYSTEM SWITCH AND AN 'AUTO-ON' FAN SWITCH LOCATED ON THE THERMOSTAT SUB-BASE. HEAT PUMPS SHALL ALSO HAVE AN "EMERGENCY HEAT" SYSTEM SWITCH POSITION TO ENERGIZE THE GAS FURNACES WITH THEIR TWO STAGES OF HEATING AND DE-ENERGIZE THE COMPRESSORS. WHEN THE FAN SWITCH IS PLACED IN THE 'AUTO' POSITION, THE RESPECTIVE EQUIPMENT FAN SHALL BE ENERGIZED UPON A CALL FOR COOLING OR HEATING AS REQUIRED TO MAINTAIN THE DESIRED ROOM TEMPERATURE. WHEN THE FAN SWITCH IS PLACED IN THE 'ON' POSITION, THE FAN SHALL BE ENERGIZED. BEFORE THE FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHEN THE FAN IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL CLOSE.

EQUIPMENT	THERMOSTAT
AHU-1	T-2
AHU-2	T-3

EACH SYSTEM SHALL BE IN THE OCCUPIED MODE WHEN THE AREA SERVED IS OCCUPIED. IN THIS MODE, THE FAN SHALL OPERATE CONTINUOUSLY AND THE OUTSIDE AIR CONTROLS SHALL BE SET AT THE MINIMUM OUTSIDE AIR POSITION OR BE UNDER THE MIXED AIR/ECONOMIZER CONTROL (IF EQUIPPED) AS DESCRIBED IN THE MIXED AIR/ECONOMIZER PARAGRAPH. WHEN THE AREA SERVED IS UNOCCUPIED, THE FAN SHALL BE DE-ENERGIZED AND ONLY OPERATE WHEN HEATING OR COOLING IS REQUIRED TO MAINTAIN THE SETBACK TEMPERATURES. WHEN THE THERMOSTAT IS CAPABLE OF PROVIDING AUTOMATIC OCCUPIED/UNOCCUPIED CONTROL, THE FAN SHALL OPERATE AS DESCRIBED IN THE UNOCCUPIED - NIGHT SETBACK CONTROL PARAGRAPH. IN ALL CASES, THE FAN SHALL OPERATE CONTINUOUSLY WHEN THE SPACE IS OCCUPIED AND CYCLE ON AND OFF TO MEET THE HEATING OR COOLING LOADS WHEN THE SPACE IS UNOCCUPIED.

4.2.1. COOLING CONTROL. THE SYSTEM SHALL BE IN THE MECHANICAL COOLING MODE WHEN COOLING IS REQUIRED AND THE SYSTEM IS NOT OPERATING IN THE ECONOMIZER MODE. IN THIS MODE, THE OUTSIDE AIR CONTROLS SHALL BE SET TO THE MINIMUM OUTSIDE AIR POSITION, THE RETURN AIR CONTROLS (IF EQUIPPED) SET TO THE MAXIMUM RETURN AIR POSITION, AND RELIEF AIR CONTROLS (IF EQUIPPED) SET TO FULLY CLOSED. THE HEATING CONTROLS SHALL BE LOCKED. UPON A CALL FOR COOLING, THE COMPRESSORS SHALL BE STAGED ON TO SATISFY THE ZONE THERMOSTAT/SENSOR.

4.2.2. HEATING CONTROL. THE SYSTEM SHALL BE IN THE HEATING MODE WHEN HEATING IS REQUIRED. IN THIS MODE, THE OUTSIDE AIR CONTROLS SHALL BE SET TO THE MINIMUM OUTSIDE AIR POSITION, THE RETURN AIR CONTROLS (IF EQUIPPED) SET TO THE MAXIMUM RETURN AIR POSITION, AND RELIEF AIR CONTROLS (IF EQUIPPED) SET FULLY CLOSED. THE COOLING CONTROLS SHALL BE LOCKED OUT. UPON A CALL FOR HEATING, THE HEATING CAPACITY SHALL BE MODULATED TO SATISFY THE THERMOSTAT.

4.2.3. MIXED AIR/ECONOMIZER. THE SYSTEM SHALL BE IN THE ECONOMIZER MODE WHEN THE SYSTEM IS IN THE OCCUPIED MODE, COOLING IS REQUIRED, AND THE OUTSIDE AIR IS SUITABLE FOR COOLING. OUTSIDE AIR IS SUITABLE FOR COOLING WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW THE CHANGEOVER TEMPERATURE ON SYSTEMS EQUIPPED WITH DRY BULB TEMPERATURE CONTROL. IN THIS MODE, THE OUTSIDE AIR CONTROLS SHALL MODULATE THE OUTSIDE AIR, RETURN AIR, AND RELIEF AIR DAMPERS TO SATISFY THE MIXED AIR THERMOSTAT/SENSOR SETPOINT. THE COOLING CONTROLS SHALL BE LOCKED OUT. THE HEATING CONTROLS SHALL BE LOCKED OUT.

4.2.4. UNOCCUPIED - NIGHT SETBACK CONTROL. THE SYSTEM SHALL BE IN THE UNOCCUPIED MODE WHEN THE BUILDING IS SCHEDULED TO BE UNOCCUPIED THROUGH THE SYSTEM TIME CLOCK. IN THIS MODE, THE OUTSIDE AIR AND RELIEF AIR (IF EQUIPPED) SHALL BE CLOSED AND THE FAN(S) SHALL BE CYCLED BY THE SYSTEM NIGHT SETBACK THERMOSTAT(S) TO MAINTAIN THE SETBACK TEMPERATURE SETPOINT.

THE SYSTEM SHALL OPERATE IN THE HEATING UNOCCUPIED - NIGHT SETBACK MODE WHEN THE TEMPERATURE FALLS BELOW THE HEATING NIGHT SETBACK THERMOSTAT SETPOINT. IN THIS MODE, THE AIR HANDLING SYSTEM AND HEATING COIL OR FAN SHALL CYCLE TO MAINTAIN THE SETBACK TEMPERATURE.

THE SYSTEM SHALL OPERATE IN THE COOLING UNOCCUPIED - NIGHT SETBACK MODE WHEN THE TEMPERATURE RISES ABOVE THE COOLING NIGHT SETBACK THERMOSTAT SETPOINT. IN THIS MODE, THE AIR HANDLING SYSTEM AND COMPRESSORS SHALL CYCLE TO MAINTAIN THE SETBACK TEMPERATURE.

WHEN THE UNOCCUPIED MODE IS OVERRIDDEN ON THERMOSTATS FURNISHED WITH OCCUPIED/UNOCCUPIED OVERRIDE, THE SYSTEM SHALL RETURN TO ITS OCCUPIED OPERATING MODE. AFTER THE PRESELECTED TIME PERIOD HAS ELAPSED FOR THE SETBACK OVERRIDE, THE SYSTEM SHALL RETURN TO THE UNOCCUPIED CONTROL.

4.2.5. VENTILATION DELAY. THE SYSTEM SHALL BE IN THE VENTILATION DELAY MODE TO MINIMIZE ENERGY USE AS THE SYSTEM TRANSITIONS FROM THE UNOCCUPIED - NIGHT SETBACK MODE TO THE OCCUPIED MODE. IN THIS MODE, THE OUTSIDE AIR DAMPER(S) SHALL BE CLOSED, RETURN AIR CONTROLS (IF EQUIPPED) SET TO THE MAXIMUM RETURN AIR POSITION, AND RELIEF AIR CONTROLS (IF EQUIPPED) SET FULLY CLOSED. THE FAN SHALL OPERATE CONTINUOUSLY AND THE HEATING AND COOLING CONTROLS SHALL OPERATE TO BRING THE BUILDING SPACES TO OCCUPIED SETPOINT.

4.2.6. OPTIMUM START. THE SYSTEM SHALL RETURN TO THE OCCUPIED TEMPERATURE SETPOINT AND THE RESPECTIVE AIR HANDLING UNIT SHALL BE ENERGIZED AT A TIME DETERMINED BY THE OPTIMUM START PROGRAM.

4.2.7. RETURN FAN. THE RETURN FAN SHALL BE CONTROLLED BY AN INDIVIDUAL 'ON-OFF-AUTO' SELECTOR SWITCH LOCATED ON TEMPERATURE CONTROL PANEL TCP-1 WHEN THE SWITCH IS PLACED IN THE 'AUTO' POSITION, THE RETURN FAN SHALL BE INTERLOCKED AND CONTROLLED WITH THE SUPPLY FAN. WHEN THE SWITCH IS PLACED IN THE 'ON' POSITION, THE FAN SHALL START.

EQUIPMENT	RELIEF CONTROL DAMPER	OUTSIDE AIR CONTROL DAMPERS MINIMUM	OUTSIDE AIR CONTROL DAMPERS MAXIMUM	RETURN CONTROL DAMPER	OUTSIDE AIR THERMOSTAT
AHU-1	CD-24	CD-46	CD-30	CD-23	T-27
AHU-2	CD-28	CD-45	CD-29	CD-27	T-27

4.3. ELECTRICAL ROOM SPLIT-SYSTEM AIR CONDITIONING SYSTEM. THE ELECTRICAL ROOM SPLIT SYSTEM AIR CONDITIONING SYSTEM SHALL BE CONTROLLED BY A SPACE THERMOSTAT AS INDICATED BELOW. THE THERMOSTAT SHALL HAVE A "HEAT-OFF-COOL" SYSTEM SWITCH, AND AN 'ON-AUTO' FAN SWITCH. WHEN IN THE 'AUTO' POSITION, THE SYSTEM FAN SHALL OPERATE INTERMITTENTLY AS DESCRIBED IN THE HEATING AND COOLING MODE PARAGRAPHS. WHEN IN THE 'ON' POSITION, THE AIR HANDLING UNIT FAN SHALL RUN CONTINUOUSLY. WHEN IN THE 'ON' POSITION, RETURN AIR DAMPER SHALL BE PROVEN OPEN AND THE OUTSIDE DAMPER AND EXHAUST AIR DAMPER SHALL BE PROVEN SHUT. WHEN THE FAN IS DE-ENERGIZED, THE DAMPERS SHALL RETURN TO THEIR NORMAL POSITIONS (OUTSIDE AND EXHAUST AIR DAMPER CLOSED AND RETURN AIR DAMPER OPEN).

4.3.1. SYSTEM COOLING MODE. WHEN THE SPACE THERMOSTAT CALLS FOR COOLING, THE AIR HANDLING UNIT FAN SHALL BE ENERGIZED, THE COMPRESSOR SHALL BE ENERGIZED, AND SHALL CYCLE TO MAINTAIN THE SUMMER SPACE TEMPERATURE SETPOINT. BEFORE THE FAN CAN OPERATE, THE RETURN AIR DAMPER SHALL BE PROVEN OPEN AND THE OUTSIDE AIR DAMPER AND EXHAUST AIR DAMPER SHALL BE PROVEN SHUT. FOR TWO STAGE UNITS, THE SECOND STAGE OF COOLING SHALL BE ENERGIZED IF THE SPACE TEMPERATURE RISES A FIXED AMOUNT ABOVE THE FIRST STAGE COOLING SETPOINT. WHEN THE SPACE THERMOSTAT IS SATISFIED, THE FAN AND COMPRESSOR SHALL BE DE-ENERGIZED, AND THE DAMPERS SHALL RETURN TO THEIR NORMAL (CLOSED) POSITION.

4.3.2. SYSTEM HEATING MODE. WHEN THE SPACE THERMOSTAT CALLS FOR HEAT, THE AIR HANDLING UNIT FAN SHALL BE ENERGIZED AND THE ELECTRIC HEAT SHALL BE ENERGIZED. BEFORE THE FAN CAN OPERATE, THE RETURN AIR DAMPER SHALL BE PROVEN OPEN AND THE OUTSIDE AIR DAMPER AND EXHAUST AIR DAMPER SHALL BE PROVEN SHUT. WHEN THE SPACE THERMOSTAT IS SATISFIED, THE FAN AND HEATER SHALL BE DE-ENERGIZED AND THE CONTROL DAMPERS SHALL RETURN TO THEIR NORMAL (CLOSED) POSITIONS.

4.3.1. ECONOMIZER MODE. WHEN THE SPACE THERMOSTAT CALLS FOR COOLING AND THE TEMPERATURE OF THE OUTSIDE AIR IS LESS THAN THE TEMPERATURE OF THE RETURN AIR AS DETERMINED BY THE PACKAGED ECONOMIZER CONTROL SYSTEM, THE OUTSIDE AIR DAMPER, EXHAUST AIR DAMPER, AND RETURN AIR DAMPER SHALL BE MODULATED (UP TO 100% OUTSIDE AIR) TO MAINTAIN THE SPACE DESIGN TEMPERATURE. WHEN THE SPACE THERMOSTAT IS SATISFIED, THE FAN SHALL BE DE-ENERGIZED AND THE CONTROL DAMPERS SHALL RETURN TO THEIR NORMAL (CLOSED) POSITIONS.

EQUIPMENT	THERMOSTATS ROOM	THERMOSTATS OUTSIDE AIR	OUTSIDE AIR DAMPER	RETURN DAMPER	EXHAUST DAMPER
PAH-1/CU-3	T-30	T-29	CD-47	CD-49	CD-26

4.4. LOCKER ROOM UNIT. LOCKER ROOM UNIT, AHU-4, SHALL BE CONTROLLED BY AN 'ON-OFF' SWITCH LOCATED ON TEMPERATURE CONTROL PANEL TCP-2. WHEN THE SWITCH IS IN THE 'ON' POSITION, THE UNIT SHALL BE ENERGIZED AND THE COOLING AND HEATING SHALL BE CONTROLLED BY SPACE THERMOSTAT T- 19. BEFORE THE UNIT FANS CAN ENERGIZE, OUTSIDE AIR CONTROL DAMPER CD 42 SHALL BE PROVEN OPEN. WHEN SWITCH IS IN THE 'OFF' POSITION, THE UNIT SHALL BE DE-ENERGIZED AND THE CONTROL DAMPERS SHALL CLOSE.

WHEN COOLING IS REQUIRED BY THERMOSTAT T-19, CONDENSING UNIT CU 1 SHALL BE ENERGIZED AND STAGED AS REQUIRED. WHEN THE COOLING IS SATISFIED, CU-1 SHALL BE DE-ENERGIZED. THE HEATING SHALL BE LOCKED OUT.

WHEN HEATING IS REQUIRED BY THERMOSTAT T-19, THE GAS HEATING SYSTEM, FUR-3, SHALL PROVIDE THE TWO STAGES OF HEAT REQUIRED. THE CONDENSING UNIT, CU-1, SHALL BE LOCKED OUT.

5. DEHUMIDIFICATION.

5.1. DEHUMIDIFIER DEH-1 SHALL BE CONTROLLED BY AN 'ON-OFF' SELECTOR SWITCH LOCATED ON THE FACE OF ITS DEHUMIDIFIER CONTROL PANEL. WHEN THE 'ON-OFF' SWITCH IS PLACED IN THE 'ON' POSITION, THE DEHUMIDIFIER FAN SHALL BE ENERGIZED.

UPON A CALL FOR DEHUMIDIFICATION FROM HUMIDISTAT H-1, THE FACE DAMPER SHALL OPEN AND THE BYPASS DAMPER SHALL RETURN TO ITS MINIMUM POSITION, AND THE DEHUMIDIFIER, INCLUDING REACTIVATION AIR HEATERS, REACTIVATION AIR FAN, DESICCANT WHEEL, AND PROCESS AIR FAN SHALL BE ENERGIZED. IF THERMOSTAT T-6 INDICATES THAT ROOM COOLING IS REQUIRED AS WELL AS DEHUMIDIFICATION, CONDENSING UNIT CU-2 SHALL BE STAGED ON AS REQUIRED TO SATISFY THE SPACE COOLING REQUIREMENTS. BEFORE THE REACTIVATION OR PROCESS AIR FANS ARE ENERGIZED, MINIMUM OUTSIDE AIR DAMPER CD-21, RETURN AIR DAMPER CD-44, AND REACTIVATION OUTSIDE AIR DAMPER CD-20 SHALL BE PROVEN OPEN AND MAXIMUM OUTSIDE AIR DAMPER CD-22 AND RELIEF CONTROL DAMPERS CD-3, CD-4, CD-5 AND CD-6 SHALL BE PROVEN SHUT.

IF DEHUMIDIFICATION IS NOT NEEDED BUT COOLING IS REQUIRED PER THERMOSTAT T-6, AND IF THE OUTSIDE AIR TEMPERATURE IS BELOW ITS SETPOINT PER THERMOSTAT T-28, THE FACE DAMPER SHALL CLOSE AND THE BYPASS DAMPER SHALL RETURN TO ITS MAXIMUM POSITION, THE DEHUMIDIFIER PROCESS AIR FAN SHALL BE ENERGIZED AND THE UNIT SHALL OPERATE IN ECONOMIZER MODE. BEFORE THE FAN CAN OPERATE, THE MINIMUM AND MAXIMUM OUTSIDE AIR CONTROL DAMPERS (CD-21 AND CD-22, RESPECTFULLY) AND RELIEF CONTROL DAMPERS CD-3, CD-4, CD-5, AND CD-6 SHALL BE PROVEN OPEN AND THE RETURN AIR CONTROL DAMPER CD-44 AND REACTIVATION OUTSIDE AIR CONTROL DAMPER CD-20 SHALL BE PROVEN SHUT. THE DEHUMIDIFIER WILL FUNCTION IN ECONOMIZER MODE COOLING THE SPACE WITH 100% OUTSIDE AIR. WHEN THE NEED FOR COOLING IS SATISFIED, THE UNIT SHALL BE DE-ENERGIZED AND THE CONTROL DAMPERS SHALL RETURN TO THEIR NORMAL POSITIONS.

IF DEHUMIDIFICATION IS NOT NEEDED BUT COOLING IS REQUIRED PER THERMOSTAT T-6 AND IF THE OUTSIDE AIR TEMPERATURE IS ABOVE THE SETPOINT PER OUTSIDE AIR THERMOSTAT T-28, THE FACE DAMPER SHALL CLOSE AND THE BYPASS DAMPER SHALL RETURN TO ITS MAXIMUM POSTION, THE DEHUMIDIFIER PROCESS AIR FAN SHALL BE ENERGIZED AND CONDENSING UNIT CU-2 SHALL BE STAGED ON AS NEEDED TO SATISFY THE SPACE TEMPERATURE REQUIREMENTS. BEFORE THE FAN CAN OPERATE, MINIMUM OUTSIDE AIR CONTROL DAMPER CD-21 AND RETURN AIR DAMPER CD-44 SHALL BE PROVEN OPEN AND MAXIMUM OUTSIDE AIR DAMPER CD-22 AND REACTIVATION AIR CONTROL DAMPER CD-20 AND RELIEF DAMPERS CD-3, CD-4, CD-5, AND CD-6 SHALL BE PROVEN CLOSED. WHEN THE NEED FOR COOLING IS SATISFIED, THE UNIT SHALL BE DE-ENERGIZED AND THE CONTROL DAMPERS SHALL RETURN TO THEIR NORMAL POSITIONS.

HIGH LIMIT DIFFERENTIAL PRESSURE SWITCHES SHALL BE LOCATED ACROSS THE PROCESS AND REACTIVATION FILTER BANKS. IN THE EVENT THE PRESSURE DIFFERENTIAL ACROSS EITHER FILTER EXCEEDS THE PRESET VALUE OF 0.5 INCH WATER COLUMN, THE RESPECTIVE "HIGH FILTER PRESSURE LOSS" ALARM LIGHTS ON THE FACE OF THE DEHUMIDIFIER CONTROL PANEL SHALL BE ILLUMINATED.

IN THE EVENT THE DEHUMIDIFIER PROCESS FAN, REACTIVATION FAN, OR DESICCANT WHEEL FAILS TO OPERATE WHEN ENERGIZED, A "DEHUMIDIFIER MALFUNCTION" ALARM LIGHT LOCATED ON THE FACE OF THE DEHUMIDIFIER CONTROL PANEL SHALL BE ENERGIZED, AND AN ALARM SIGNAL SHALL ALSO BE SENT TO THE PCS.

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP

CYGNET ID: 137804-300-247-H-T00000810 | XREF1: A-MstrFL.dwg
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PLOTTED: MAR42575, 2/24/2005 2:19:15 PM | XREF4: S-Grid.dwg
USER: CYGNETADMIN | DWG VER: 1.12 | XREF5:

BLACK & VEATCH
Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
SEQUENCE OF OPERATIONS

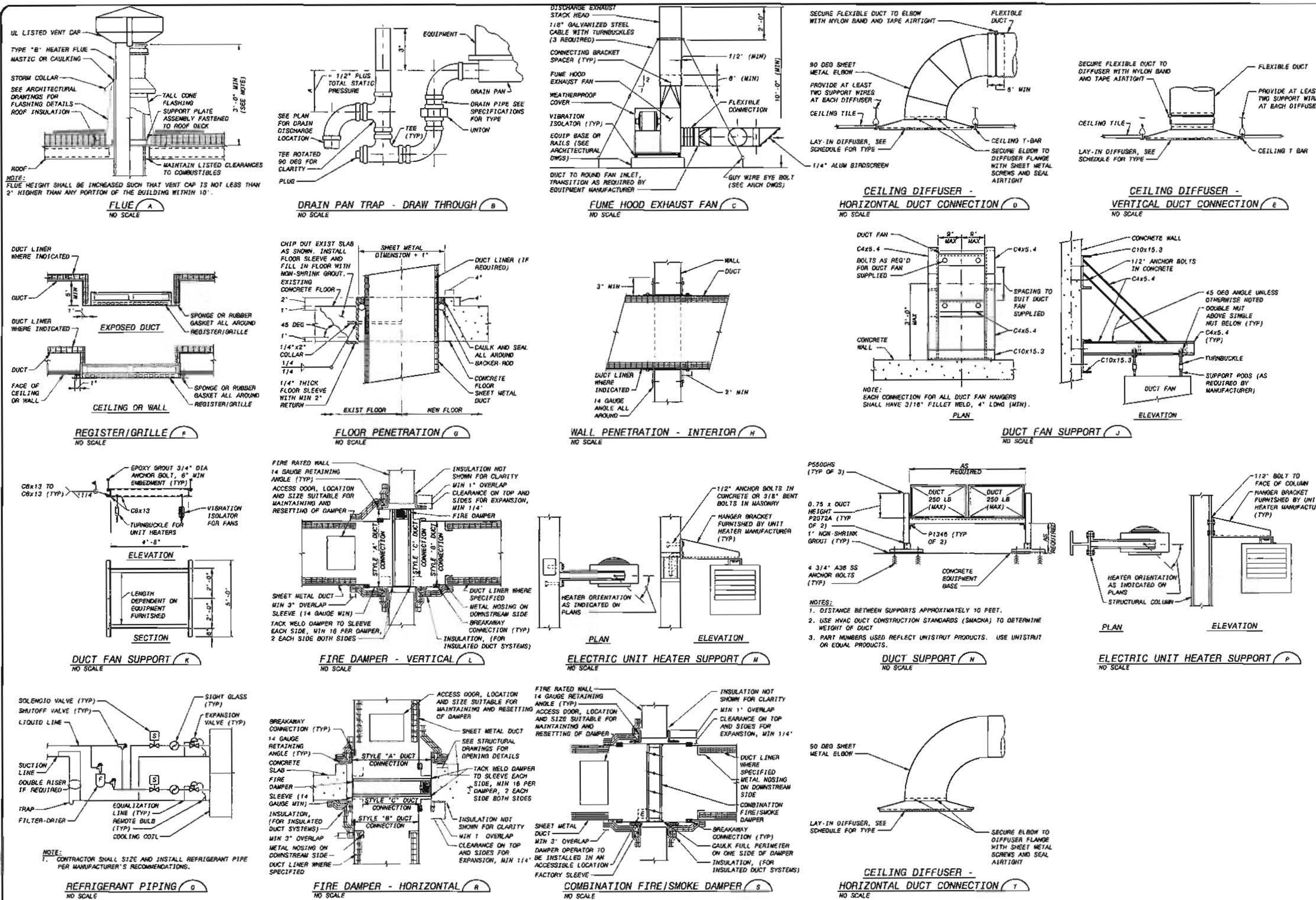
DESIGNED:	JAM
DETAILED:	JMC
CHECKED:	JEP
APPROVED:	DWH
DATE:	1/06/08

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

H14
SHEET
178 OF 267

F08000
D8054



BLACK & VEATCH
Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
DETAILS

DESIGNED:	JAW
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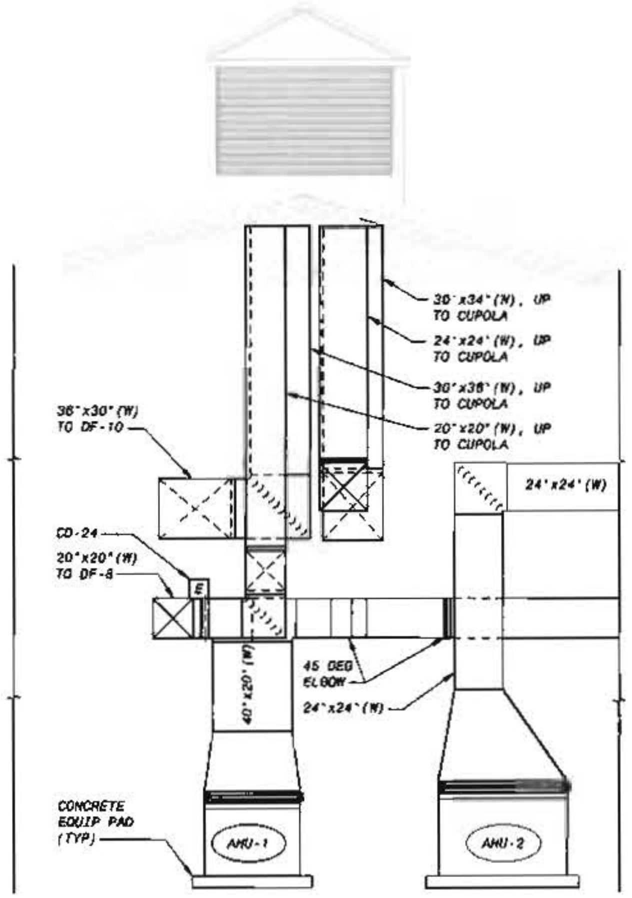
APPROVED:	DWH
DATE:	1/06/06

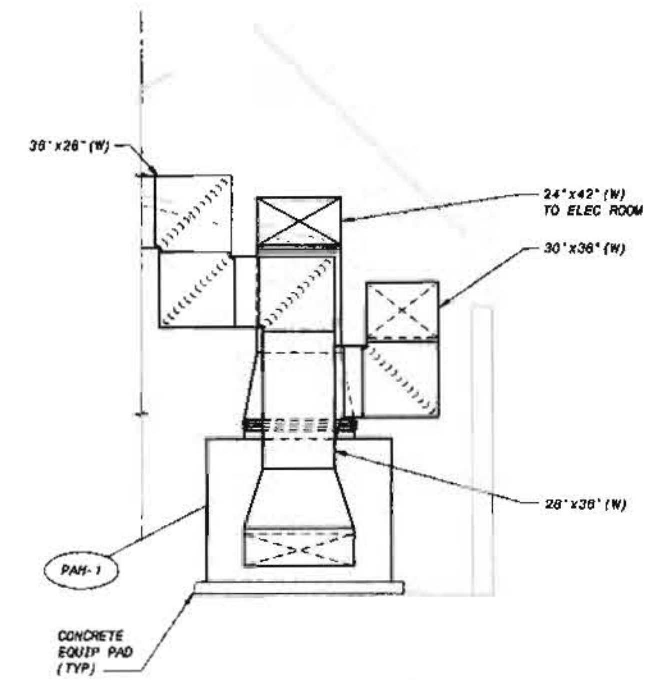
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

H15
SHEET
179 OF 267



SECTION 1/H10
1/4" = 1'-0"



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1/4" = 1'-0"

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP

CYGNET ID: 137804-300-247-H-TR000ZMG
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XREF5:

BLACK & VEATCH
Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

OPERATIONS BUILDING
HVAC
SECTIONS

DESIGNED: JAH
DETAILED: JMC
CHECKED: JEP
APPROVED: DRW
DATE: 1/05/06

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IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
137804

H16
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ONE-LINE DIAGRAM LEGEND

1500KVA 2.4KVD-480Y/277 3Ø, 60HZ — TRANSFORMER WITH PRIMARY AND SECONDARY VOLTAGE, AND KVA RATING AS NOTED

20 — 22: 3#8,#10G,2" — CIRCUIT NO. 22 WITH #8 INSULATED CONDUCTORS, 1#10 BARE GROUND WIRE ALL IN 2" CONDUIT TO 20 HP MOTOR

AUXILIARY ITEMS MAY NOT BE SHOWN COMPLETELY — 15 — ONE-LINE SHOWING POWER AND CONTROL TO A PACKAGE UNIT, AS FOR EXAMPLE A STEAM GENERATOR OR AN AIR HANDLING UNIT, SHALL IMPLY THAT ANY AND ALL ASSOCIATED EQUIPMENT SHALL ALSO BE INSTALLED AND WIRED AS REQUIRED BY THE EQUIPMENT FURNISHED.

INDICATES THAT ALL OR PART OF CIRCUIT MAY BE ROUTED IN DUCT BANK OR UNDERGROUND. CONDUIT SIZE SHOWN ON ONE-LINE IS ABOVE GROUND AND/OR INSIDE OF STRUCTURE. SEE DUCT BANK SCHEDULE AND SECTIONS FOR CONDUIT SIZE OF UNDERGROUND PORTION OF CIRCUIT.

HIGH VOLTAGE DRAWOUT AIR OR VACUUM CIRCUIT BREAKER

3P-20 — LOW VOLTAGE AIR CIRCUIT BREAKER, 3 POLE, 20 AMPERE

S4 — SIZE 4 COMBINATION MAGNETIC MOTOR STARTER

LOW VOLTAGE DRAWOUT AIR CIRCUIT BREAKER

HIGH VOLTAGE DRAWOUT CONTACTOR

FUSE AND DISCONNECT SWITCH

S2 — SIZE 2 COMBINATION MAGNETIC MOTOR STARTER, REVERSING OR 2 SPEED

S1 — SIZE 1 COMBINATION REDUCED VOLTAGE STARTER

POTENTIAL TRANSFORMER

CURRENT TRANSFORMER

CONDUIT & WIRING INSTALLATION LEGEND

CONDUIT EXPOSED

CONDUIT CONCEALED

CONDUIT TURNING UP. CONDUIT TURNING DOWN.

CONDUIT PLUGGED FLUSH. CONDUIT CAPPED

L2-5 — TYPICAL FOR HOME RUN TO BE ROUTED TO LIGHTING PANEL L2 & CONNECTED TO CIRCUIT #5 (MINIMUM NO. 12 AWG CONDUCTORS AND 3/4" CONDUIT)

A — LIGHTING FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE

11 — FLUORESCENT FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE.

LP1-3 — RECEPTACLE POWERED FROM LIGHTING PANEL LP1, CIRCUIT 3

A LP2-2 — LIGHTING FIXTURE POWERED FROM LIGHTING PANEL LP2, CIRCUIT 2 (NON-SWITCHED)

LPA-4 A 11 — LIGHTING FIXTURE POWERED FROM LIGHTING PANEL LPA, CIRCUIT 4, VIA SWITCH A

E — UNDERGROUND CONCRETE ENCASED ELECTRICAL DUCT BANK

UNDERGROUND CONCRETE ENCASED ELECTRICAL BANK ROUTED BENEATH SLAB-ON-GRADE

EE — DIRECT BURIED CONDUIT

FO — DIRECT BURIED CONDUIT FOR FIBER OPTIC CABLES

GROUND CONDUCTOR

SCHEMATIC SYMBOLS

- WIRE CONNECTION POINT
- EXTERNAL CONNECTION POINT
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- STARTER, CONTACTOR OR RELAY COIL
- NORMALLY OPEN PUSH BUTTON
- NORMALLY CLOSED PUSH BUTTON
- MAINTAINED PUSH BUTTON
- NORMALLY CLOSED GEARED LIMIT SWITCH
- NORMALLY OPEN GEARED LIMIT SWITCH
- INDICATING LIGHT
- FUSE
- POTENTIOMETER
- CAPACITOR
- DIODE
- RESISTOR
- CONTROL POWER TRANSFORMER
- SWITCH
- MS — MANUAL STARTER
- OL — OVERLOAD
- ELECTRODE
- FLOAT SWITCH (CLOSING ON RISING LEVEL)
- FLOAT SWITCH (OPENING ON RISING LEVEL)
- PRESSURE SWITCH (CLOSING ON RISING PRESSURE)
- P — PRESSURE SWITCH (OPENING ON RISING PRESSURE)
- V — VACUUM SWITCH (CLOSING ON INCREASING VACUUM)
- V — VACUUM SWITCH OPENING ON INCREASING VACUUM)
- TEMPERATURE SWITCH (CLOSING ON RISING TEMPERATURE)
- TEMPERATURE SWITCH (OPENING ON RISING TEMPERATURE)
- FLOW ACTUATED SWITCH (CLOSING ON INCREASE IN FLOW)
- FLOW ACTUATED SWITCH (OPENING ON INCREASE IN FLOW)
- ON TIME DELAY CONTACT (NORMALLY OPEN, WHEN THE COIL IS ENERGIZED THE CONTACT WILL CLOSE AFTER A TIME DELAY)
- ON TIME DELAY CONTACT (NORMALLY CLOSED, WHEN THE COIL IS ENERGIZED THE CONTACT WILL OPEN AFTER A TIME DELAY)
- OFF TIME DELAY CONTACT (NORMALLY OPEN, WHEN THE COIL IS DE-ENERGIZED THE CONTACT WILL OPEN AFTER A TIME DELAY)
- OFF TIME DELAY CONTACT (NORMALLY CLOSED, WHEN THE COIL IS DE-ENERGIZED THE CONTACT WILL CLOSE AFTER A TIME DELAY)
- TORQUE SWITCH (NORMALLY OPEN)
- TORQUE SWITCH (NORMALLY CLOSED)
- LIMIT SWITCH (NORMALLY OPEN)
- LIMIT SWITCH (NORMALLY OPEN, HELD CLOSED)
- LIMIT SWITCH (NORMALLY CLOSED)
- LIMIT SWITCH (NORMALLY CLOSED, HELD OPEN)
- DIFFERENTIAL PRESSURE SWITCH (NORMALLY OPEN, CLOSING ON INCREASING DIFF.)
- DIFFERENTIAL PRESSURE SWITCH (NORMALLY CLOSED, OPENING ON INCREASING DIFF.)

MISCELLANEOUS SYMBOLS

- BELL
- HORN
- T — THERMOSTAT
- JB — JUNCTION BOX
- GROUND ROD
- GROUND ROD WITH TEST WELL
- GROUND CONNECTION
- DISCONNECT SWITCH
- COMBINATION STARTER
- POWER PANEL
- LIGHTING PANEL
- MISCELLANEOUS PANEL
- LIGHTING CONTACTOR
- ZPS — DOOR POSITION SWITCH
- GBS — GLASS BREAK SWITCH
- CAM — CAMERA

COMMUNICATION SYMBOLS

- HORN SPEAKER
- DUAL HORN SPEAKER
- WALL MOUNTED CONE SPEAKER
- SK — CEILING MOUNTED CONE SPEAKER
- WS WP — WALL STATION
- DS — DESK TOP STATION
- RH WP — REMOTE HANDSET
- SA — SPEAKER AMPLIFIER
- LB — LINE BALANCE ASSEMBLY
- TG — TONE GENERATOR
- TI — TELEPHONE INTERFACE
- IA — INTERFACE AMPLIFIER
- IJB — INTERCOM JUNCTION BOX

NOTE: WP=WEATHERPROOF H=HAZARDOUS AREA

SWITCH & OUTLET SYMBOLS

S	SINGLE POLE SWITCH	S_{PL}	SWITCH WITH PILOT LIGHT		DUPLEX RECEPTACLE 120 VOLT		120 VOLT DUPLEX RECEPTACLE (UPS)
S_2	TWO POLE SWITCH	S_{KO}	KEY OPERATED SWITCH		SIMPLEX RECEPTACLE		DUPLEX FLOOR OUTLET
S_3	THREE-WAY SWITCH	S_{XP}	EXPLOSION PROOF SWITCH		RANGE RECEPTACLE		COMMUNICATION OUTLET
S_4	FOUR-WAY SWITCH	S_{DM}	DIMMER SWITCH		TWISTLOCK RECEPTACLE		COMMUNICATION FLOOR OUTLET
S_{C1}^{1}	MOMENTARY SWITCH CONTROLLING CONTACTOR C1	S_{3A}	THREE-WAY SWITCH CONTROLLING LIGHTS WITH "A" DESIGNATION	30	240V, 1Ø RECEPTACLE, TYPICAL AMPERE RATING NOTED	CX	COAXIAL CABLE OUTLET
S_{WP}	WEATHERPROOF SWITCH			60	480V, 3Ø WELDING RECEPTACLE, TYPICAL AMPERE RATING NOTED		

ABBREVIATIONS

A	AMBER, AMPERE, ALARM
AC	ALTERNATING CURRENT
ACB	AIR CIRCUIT BREAKER
AF	AMPERE FRAME
AFD	ADJUSTABLE FREQUENCY DRIVE
AM	AMMETER
ANN	ANNUNCIATOR
AR	ALARM RELAY
AS	AMMETER SWITCH
AT	AMPERE TRIP
AWG	AMERICAN WIRE GAGE
BC	BATTERY CHARGER
BR	BRAKE
BT	BEARING TEMPERATURE
C	CLOSE, COUNTER OR CONTACTOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CB"A"	CIRCUIT BREAKER AUXILIARY CONTACT (OPEN WHEN BREAKER IS OPEN OR TRIPPED CLOSED WHEN BREAKER IS CLOSED)
CB"B"	CIRCUIT BREAKER AUXILIARY CONTACT (CLOSED WHEN BREAKER IS OPEN OR TRIPPED OPEN WHEN BREAKER IS CLOSED)
CD	CONTROL DAMPER
CI	CELL INTERLOCK
CKT	CIRCUIT
CL2	CHLORINE
COS	CABLE OPERATED SWITCH
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CR	CURRENT OR CONTROL RELAY
CS	CONTROL STATION
CT	CYCLE TIMER OR CURRENT TRANSFORMER
CTC	CYCLE TIMER CLUTCH
CTM	CYCLE TIMER MOTOR
2/C	2 CONDUCTOR
4"C	4" CONDUIT
DC	DIRECT CURRENT
DI	DOOR INTERLOCK
DM	DAMPER MOTOR OR DEMAND METER
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DPR	DIFFERENTIAL PRESSURE REGULATOR
DPS	DIFFERENTIAL PRESSURE SWITCH
DS	DISCONNECT SWITCH
DVLS	DISCHARGE VALVE LIMIT SWITCH
E	ELECTRIC OPERATOR FOR CONTROL DAMPER OR VALVE
EC	EMPTY CONDUIT
EL	ELEVATION OR EMERGENCY LIGHT
EMH	ELECTRICAL MANHOLE
ER	ELECTRODE RELAY
ES	END SWITCH
ETM	ELAPSED TIME METER
EX	EXISTING
F	FORWARD
FS	FLOW SWITCH
G	GREEN OR GROUND
GD	GROUND DETECTOR
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
GLS	GEARED LIMIT SWITCH
#8G	#8 GROUND WIRE
H	HIGH OR HUMIDISTAT
HC	HOT CIRCUIT
HH	HANDHOLE
HMT	HIGH MOTOR TEMPERATURE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF REMOTE
HP	HORSEPOWER
HWCO	HIGH WATER CUTOFF
HZ	HERTZ (CYCLE)
I/O	INPUT/OUTPUT
INST	INSTANTANEOUS
J	JUNCTION BOX
JB	JUNCTION BOX
K	KEY INTERLOCK
KCMIL	THOUSAND CIRCULAR MIL
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAR	KILOVAR
KW	KILOWATT
KWH	KILOWATT HOUR
L	LOW, LEVEL
LA	LIGHTNING ARRESTER
LAN	LOCAL AREA NETWORK
LC	LIGHTING CONTACTOR
LOA	LOCAL-OFF-AUTO
LOR	LOCAL-OFF-REMOTE
LP	LIGHTING PANEL
LS	LIMIT OR LEVEL SWITCH
LWCO	LOW WATER CUTOFF
LCP	LOCAL CONTROL PANEL
1-1PR#16S	ONE, SINGLE PAIR, TWISTED, SHIELDED #16 CABLE
3-7/C#14	THREE, SINGLE, SEVEN CONDUCTOR #14 MULTICONDUCTOR CONTROL CABLES
M	MAGNETIC MOTOR STARTER
MA	MILLIAMPERE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCLU	MOTOR CONTROL LINEUP
MD	MOISTURE DETECTOR
MFM	MAGNETIC FLOW METER
MFR	MANUFACTURER
MH	MANHOLE OR MOUNTING HEIGHT
MOV	MOTOR OPERATED VALVE
MPR	MOTOR PROTECTION RELAY
MS	MANUAL MOTOR STARTER
MSH	MOTOR SPACE HEATER
MV	MILLIVOLT
MVA	MEGA VOLT AMPERE
N	NEUTRAL
NC	NORMALLY CLOSED
NO	NORMALLY OPEN, NUMBER
O	OPEN
OCB	OIL CIRCUIT BREAKER
OL	OVERLOAD
OOA	ON-OFF AUTO
OOR	ON-OFF-REMOTE
P	PRIMARY
PCS	PLANT CONTROL SYSTEM
PB	PUSH BUTTON OR PULL BOX
PF	POWER FACTOR METER
PH	PHASE, CHEMICAL TERM
PLC	PROGRAMMABLE LOGIC CONTROLLER
PP	POWER PANEL
PRS	PROXIMITY SWITCH
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER, PROGRAM TIMER
2P	2 POLE
R	RED, RAISE, RELAY OR REVERSE
RECP	RECEPTACLE
RES	RESISTOR
RT	REPEATING TIMER
RTD	RESISTANCE TYPE TEMP DETECTOR
RTU	REMOTE TERMINAL UNIT
RVSS	REDUCED VOLTAGE SOLID STATE STARTER
S2	SIZE 2 STARTER
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SH	SPACE HEATER
SN	SOLID NEUTRAL
SO	SOLENOID OILER
SP	SINGLE POLE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SS	SELECTOR SWITCH
SSS	SOLID STATE STARTER
SUPV	SUPERVISORY CONTROL
SV	SOLENOID VALVE
SWB	SWITCHBOARD
SWGR	SWITCHGEAR
T	THERMOSTAT, TIMER, OR TOTALIZER
TACH	TACHOMETER
TB	TERMINAL BLOCK, TAP BOX FROM BUS DUCT
TC	TIMER CLUTCH
TD	TIME DELAY RELAY
TEMP	TEMPERATURE
TM	TIMER MOTOR
TQ	TORQUE
TS	TEMPERATURE SWITCH
TTB	TELEPHONE TERMINAL BOX
UG	UNDERGROUND
UV	UNDER VOLTAGE
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
VA	VOLT AMPERE
VAR	VARMETER
VLS	VALVE LIMIT SWITCH
VM	VOLTMETER
VPI	VALVE POSITION INDICATOR
VS	VOLTMETER SWITCH
W	WHITE OR WATTS
WH	WATTHOUR METER
WM	WATT METER
WP	WEATHERPROOF
WPI	WEATHERPROOF IN-USE
X	AUXILIARY RELAY
XFMR	TRANSFORMER
XP	EXPLOSION PROOF
Y	YELLOW
Z	AUXILIARY RELAY
ZS	POSITION SWITCH
ZSS	ZERO SPEED SWITCH
ZSD	DOOR INTRUSION SWITCH

AREA DESIGNATIONS

THE SPECIAL AREA DESIGNATION BOXES, AS DEFINED BELOW, ARE LOCATED ON THE PLAN DRAWINGS TO DEFINE ELECTRICAL INSTALLATION REQUIREMENTS. DESIGNATION BOXES ARE LOCATED WITHIN ROOM OR BELOW ROOM NUMBER. ALL INDOOR AREAS NOT INDICATED OTHERWISE ARE AREA TYPE 1 AND MINIMUM NEMA TYPE 1 ENCLOSURES.

AREA TYPE 1A	CORROSIVE CHEMICAL FEED AND STORAGE ROOMS. CONDUIT SYSTEM SHALL BE EXPOSED PVC RIGID NON-METALLIC CONDUIT WITH PVC FITTINGS, BOXES, AND ACCESSORIES.
AREA TYPE 4	INDOOR WET LOCATIONS SUCH AS VAULTS, HOSEDOWN AREAS, BASEMENTS, ETC. MINIMUM NEMA TYPE 4 ENCLOSURE FOR EQUIPMENT AND GASKETED FITTINGS IN A CONDUIT SYSTEM.
AREA TYPE 7A	CLASS I, DIVISION 1 AREA AS DEFINED BY NEC. ALL EQUIPMENT AND CONDUIT SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.
AREA TYPE 7B	CLASS I, DIVISION 2, GROUP C AND D (METHANE, GASOLINE) AS DEFINED BY NEC. EQUIPMENT AND CONDUITS SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.
AREA TYPE 12	INDOOR, DRY, DIRTY AREA. REQUIRES MINIMUM NEMA TYPE 12 GASKETED ENCLOSURES FOR ALL EQUIPMENT AND GASKETED FITTINGS IN CONDUIT SYSTEMS.

GENERAL REQUIREMENTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING ALL CONDUITS NOT SHOWN ON THE PLANS. THIS SHALL INCLUDE ALL CONDUITS SHOWN ON THE ONE-LINES AND HOME-RUNS SHOWN ON THE PLAN DRAWINGS. CONDUITS SHALL BE ROUTED AS DEFINED IN THE SPECIFICATIONS.
2. SPARE WIRES SHALL BE TAPED AND COILED.
3. IF EQUIPMENT SUPPLIED BY MANUFACTURER HAS A LARGER LOAD THAN VALUE SHOWN, THE CABLE CONDUIT AND ELECTRICAL EQUIPMENT SHALL BE ENLARGED, AS REQUIRED, TO ACCOMMODATE THE HIGHER VALUE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING PROPERLY SIZED STARTER OVERLOADS FOR EQUIPMENT FURNISHED.
5. LIGHTING AND RECEPTACLE CIRCUITS DESIGNATED ON THE FLOOR PLANS ARE NOT SHOWN ON THE ONE-LINES. CONDUCTORS FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM NO. 12 AWG. CONDUIT FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM 3/4".
6. IN AREAS WHERE THERE ARE OVERHEAD BRIDGE CRANES, HOISTS, ETC., NO CONDUITS SHALL BE RUN OVERHEAD THAT WILL INTERFERE WITH THE OPERATION OF THE EQUIPMENT.

GENERAL NOTES

1. SOLID LINES (———) INDICATE NEW WORK OR EQUIPMENT.
2. SCREENED LINES (———) INDICATE EXISTING WORK OR EQUIPMENT.
3. DASHED LINES (– – – –) INDICATE FUTURE WORK OR EQUIPMENT.
4. REFER TO THE FOLLOWING DRAWING(S) FOR INSTRUMENTATION LEGEND:
5. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
6. INFORMATION RELATED TO CIRCUIT IDENTIFICATION, WIRE & CONDUIT SIZES, AND ROUTING, IS ON THE FOLLOWING DRAWING TYPES.
   A. ONE-LINE DIAGRAMS SHOW CIRCUIT IDENTIFICATION, WIRE QUANTITY AND SIZES, AND CONDUIT SIZE WITHIN STRUCTURES. ONE-LINE DIAGRAMS ALSO INDICATE ORIGIN AND DESTINATION OF CIRCUITS, AND IDENTIFY CIRCUITS ROUTED UNDERGROUND.
   B. FOR CIRCUITS WITHOUT UNDERGROUND PORTIONS, BUILDING FLOOR PLANS SHOW LOCATION OF EQUIPMENT FOR DETERMINING CIRCUIT LENGTH WITHIN THE STRUCTURE. FOR CIRCUITS WITH UNDERGROUND PORTIONS, ANTICIPATED PENETRATION OF UNDERGROUND CONDUITS ARE SHOWN ON STRUCTURE PLANS FOR DETERMINING THE LENGTH OF THE IN-STRUCTURE PORTIONS OF CIRCUITS. BUILDING FLOOR PLANS MAY ALSO SHOW HOME RUNS FOR LIGHTING, RECEPTACLE, AND OTHER MISCELLANEOUS EQUIPMENT CIRCUITS.
   C. SITE PLANS INDICATE THE GENERAL ROUTING OF UNDERGROUND CONDUITS AND DUCT BANKS. CIRCUITS ROUTED IN UNDERGROUND CONDUITS OR DUCT BANKS ARE INDICATED IN DUCT BANK SECTIONS REFERENCED ON THE SITE PLAN.
   D. DUCT BANK SECTIONS AND SCHEDULES IDENTIFY CONDUIT SIZE CONDUIT MATERIAL, ARRANGEMENT OF THE UNDERGROUND CONDUITS, AND CIRCUITS ROUTED IN EACH UNDERGROUND CONDUIT.

BLACK & VEATCH
Black & Veatch Corporation
Chicago, Illinois

CITY OF GENEVA, ILLINOIS
WATER TREATMENT PLANT

GENERAL ELECTRICAL LEGEND AND ABBREVIATIONS

NO. | BY | CK | APP | DATE | REVISIONS AND RECORD OF ISSUE

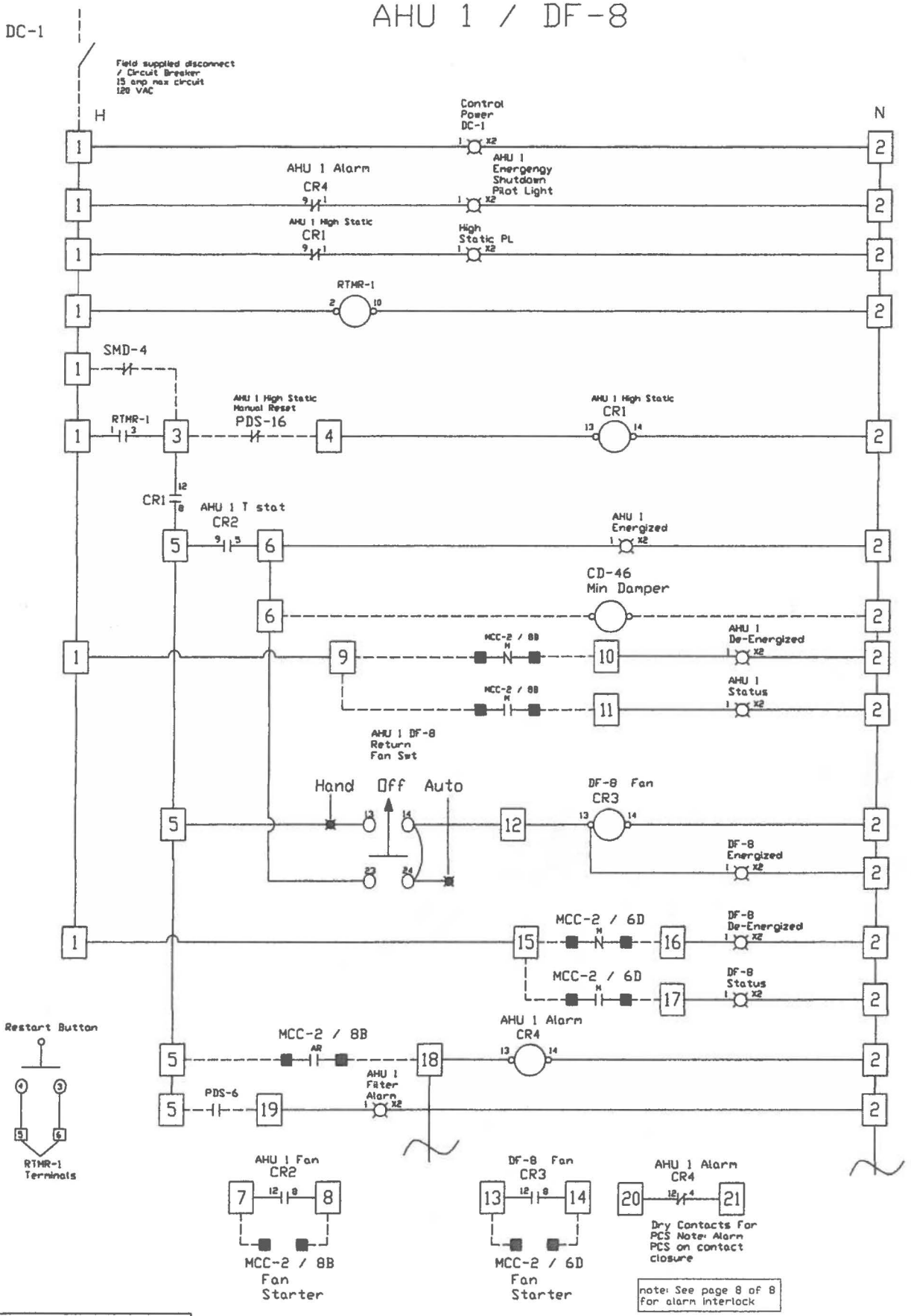
DESIGNED: SFP
DETAILED: SFP
CHECKED: SDS
APPROVED: SDS
DATE: 1/06/08

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 137804

E1
SHEET 181 OF 267

AHU 1 / DF-8

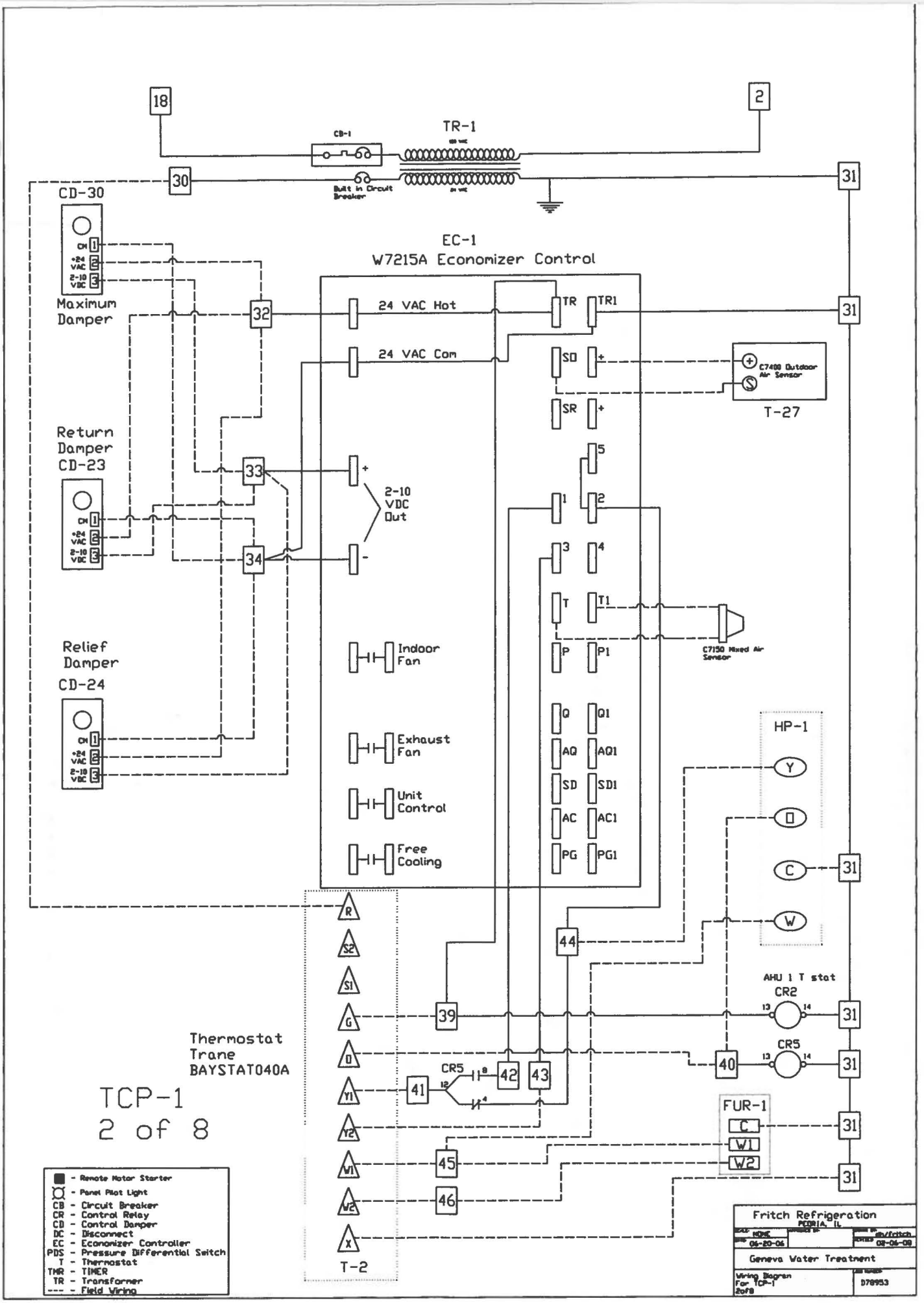


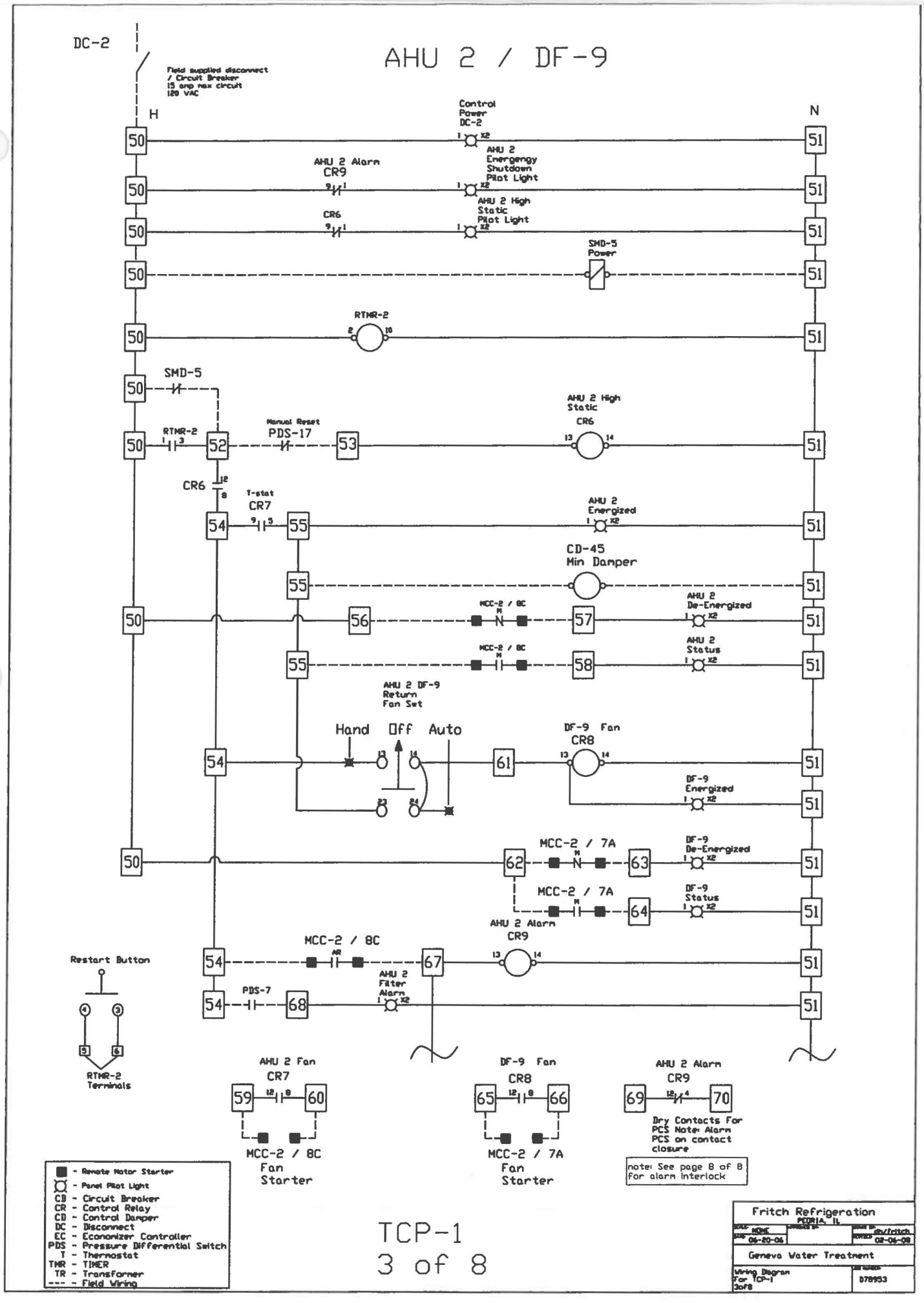
- Remote Motor Starter
- Panel Pilot Light

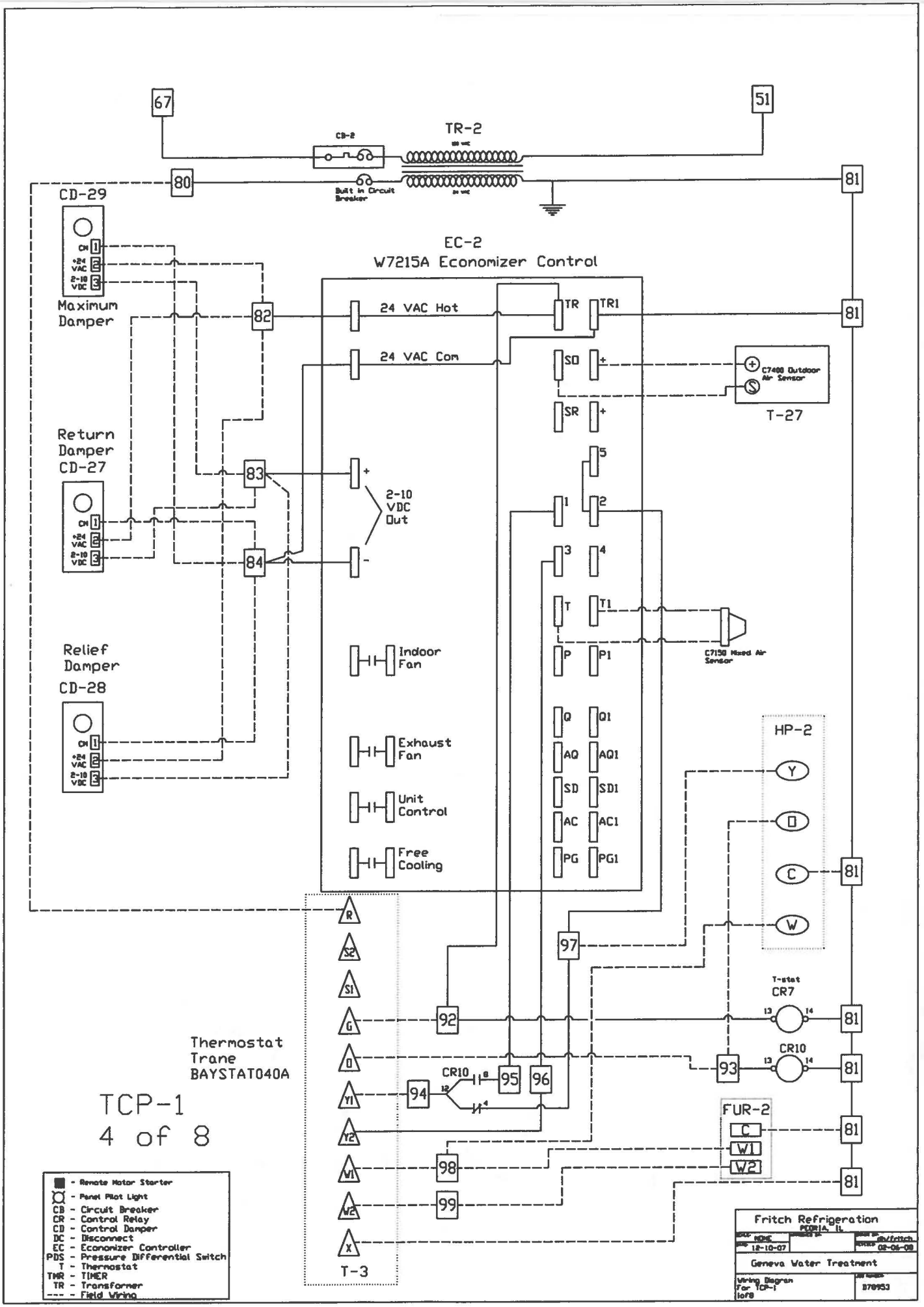
CB - Circuit Breaker
CR - Control Relay
CD - Control Damper
DC - Disconnect
EC - Economizer Controller
PDS - Pressure Differential Switch
T - Thermostat
TMR - TIMER
TR - Transformer
--- - Field Wiring

TCP-1
1 of 8

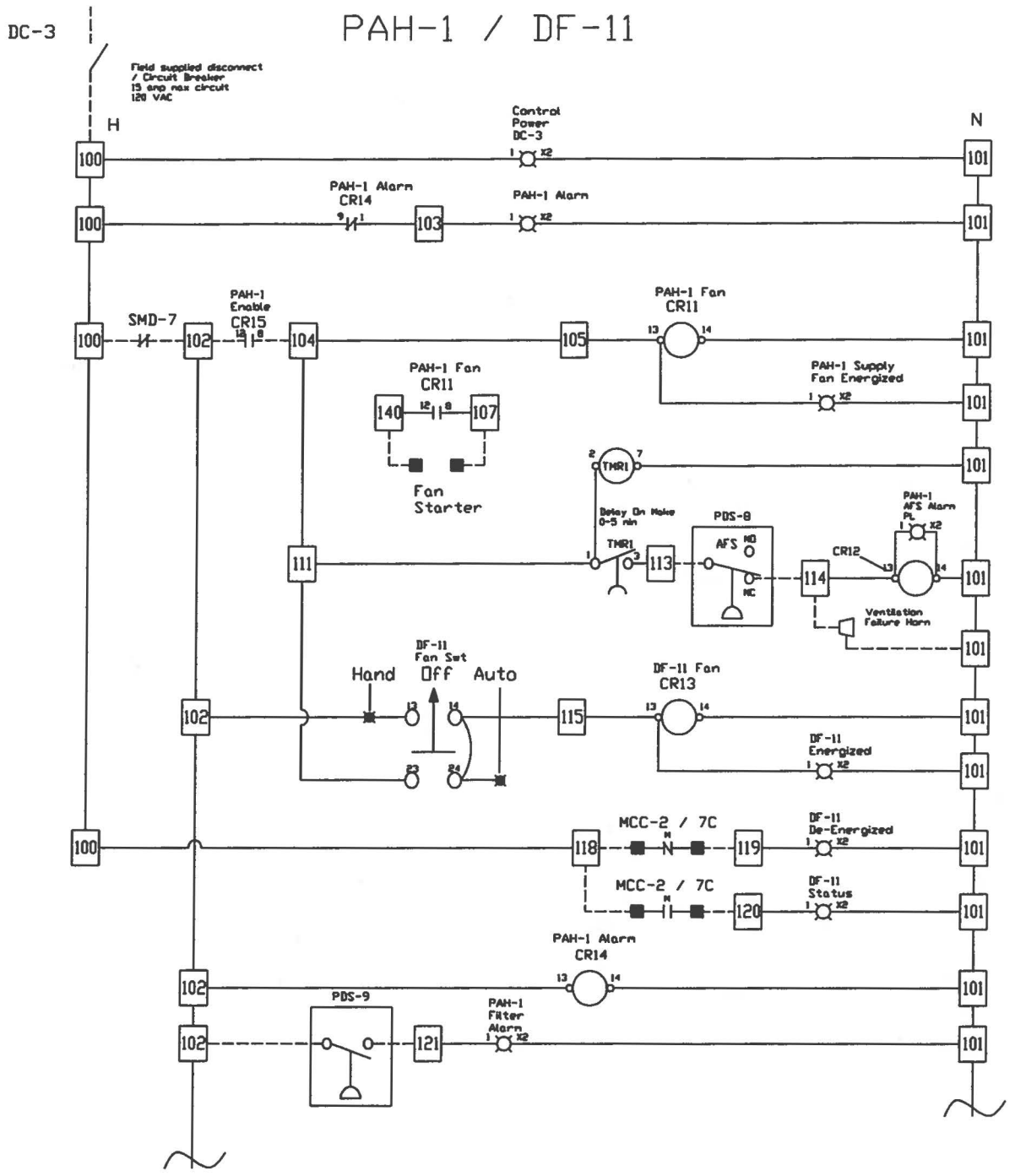
Fritch Refrigeration	PEORIA, IL
SCALE: NONE	DRAWN BY: sb/fritch
DATE: 06-20-06	REVISED: 02-06-09
Geneva Water Treatment	
Wiring Diagram for TCP-1 1of8	JOB NUMBER: 078953

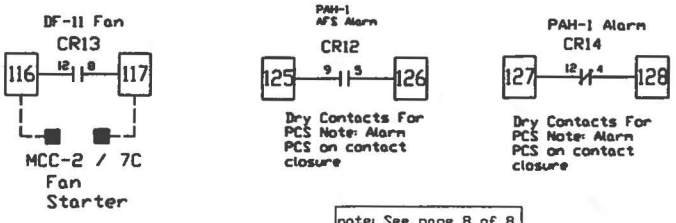

18
2
TR-1
CB-1
Built in Circuit Breaker
30
31
CD-30
EC-1
W7215A Economizer Control
Maximum Damper
32
24 VAC Hot
24 VAC Com
TR
TR1
SD
SR
C7400 Outdoor Air Sensor
T-27
Return Damper CD-23
33
34
2-10 VDC Out
5
1
2
3
4
T
T1
P
P1
C7150 Mixed Air Sensor
Relief Damper CD-24
Indoor Fan
Exhaust Fan
Unit Control
Free Cooling
Q
Q1
AQ
AQ1
SD
SD1
AC
AC1
PG
PG1
HP-1
Y
O
C
W
R
S2
S1
G
O
Y1
Y2
W1
W2
X
T-2
44
39
40
41
42
43
45
46
CR5
AHU 1 T stat
CR2
FUR-1
W1
W2
Thermostat Trane BAYSTAT040A
TCP-1
2 of 8
■ - Remote Motor Starter
- Panel Pilot Light
CB - Circuit Breaker
CR - Control Relay
CD - Control Damper
DC - Disconnect
EC - Economizer Controller
PDS - Pressure Differential Switch
T - Thermostat
TMR - TIMER
TR - Transformer
--- - Field Wiring
Fritch Refrigeration
PEORIA, IL
06-20-06
Geneva Water Treatment
Wiring Diagram For TCP-1 2of8
D78953


DC-2
AHU 2 / DF-9
Field supplied disconnect / Circuit Breaker 15 amp max circuit 120 VAC
H
N
Control Power DC-2
AHU 2 Alarm CR9
AHU 2 Emergency Shutdown Pilot Light
CR6
AHU 2 High Static Pilot Light
SMD-5 Power
RTMR-2
SMD-5
Manual Reset PDS-17
AHU 2 High Static CR6
T-stat CR7
AHU 2 Energized
CD-45 Min Damper
MCC-2 / 8C
AHU 2 De-Energized
AHU 2 Status
AHU 2 DF-9 Return Fan Set
Hand Off Auto
DF-9 Fan CR8
DF-9 Energized
MCC-2 / 7A
DF-9 De-Energized
DF-9 Status
AHU 2 Alarm CR9
MCC-2 / 8C
Restart Button
PDS-7
AHU 2 Filter Alarm
RTMR-2 Terminals
AHU 2 Fan CR7
MCC-2 / 8C Fan Starter
DF-9 Fan CR8
MCC-2 / 7A Fan Starter
AHU 2 Alarm CR9
Dry Contacts For PCS Note Alarm PCS on contact closure
note: See page 8 of 8 for alarm interlock
■ - Remote Motor Starter
- Panel Pilot Light
CB - Circuit Breaker
CR - Control Relay
CD - Control Damper
DC - Disconnect
EC - Economizer Controller
PDS - Pressure Differential Switch
T - Thermostat
TMR - TIMER
TR - Transformer
--- - Field Wiring
TCP-1
3 of 8
Fritch Refrigeration
PEORIA, IL
06-20-06
02-06-08
Geneva Water Treatment
Wiring Diagram For TCP-1 3of8
078953


67
51
TR-2
CB-2
80
Built in Circuit Breaker
81
CD-29
Maximum Damper
EC-2
W7215A Economizer Control
82
24 VAC Hot
TR
TR1
24 VAC Com
SD
SR
C7400 Outdoor Air Sensor
T-27
Return Damper CD-27
83
2-10 VDC Out
84
Relief Damper CD-28
Indoor Fan
Exhaust Fan
Unit Control
Free Cooling
T
T1
P
P1
C7150 Mixed Air Sensor
Q
Q1
AQ
AQ1
SD
SD1
AC
AC1
PG
PG1
HP-2
Y
O
C
W
97
R
S2
S1
G
92
O
Y1
94
CR10
95
96
Y2
W1
98
W2
99
X
T-3
T-stat CR7
93
FUR-2
Thermostat Trane BAYSTAT040A
TCP-1
4 of 8
■ - Remote Motor Starter
- Panel Pilot Light
CB - Circuit Breaker
CR - Control Relay
CD - Control Damper
DC - Disconnect
EC - Economizer Controller
PDS - Pressure Differential Switch
T - Thermostat
TMR - TIMER
TR - Transformer
--- - Field Wiring
Fritch Refrigeration
PEORIA, IL
12-10-07
Geneva Water Treatment
Wiring Diagram For TCP-1 1of8
178953

PAH-1 / DF-11





note: See page 8 of 8 for alarm interlock

■ - Remote Motor Starter
⊗ - Panel Pilot Light
CB - Circuit Breaker
CR - Control Relay
CD - Control Damper
DC - Disconnect
EC - Economizer Controller
PDS - Pressure Differential Switch
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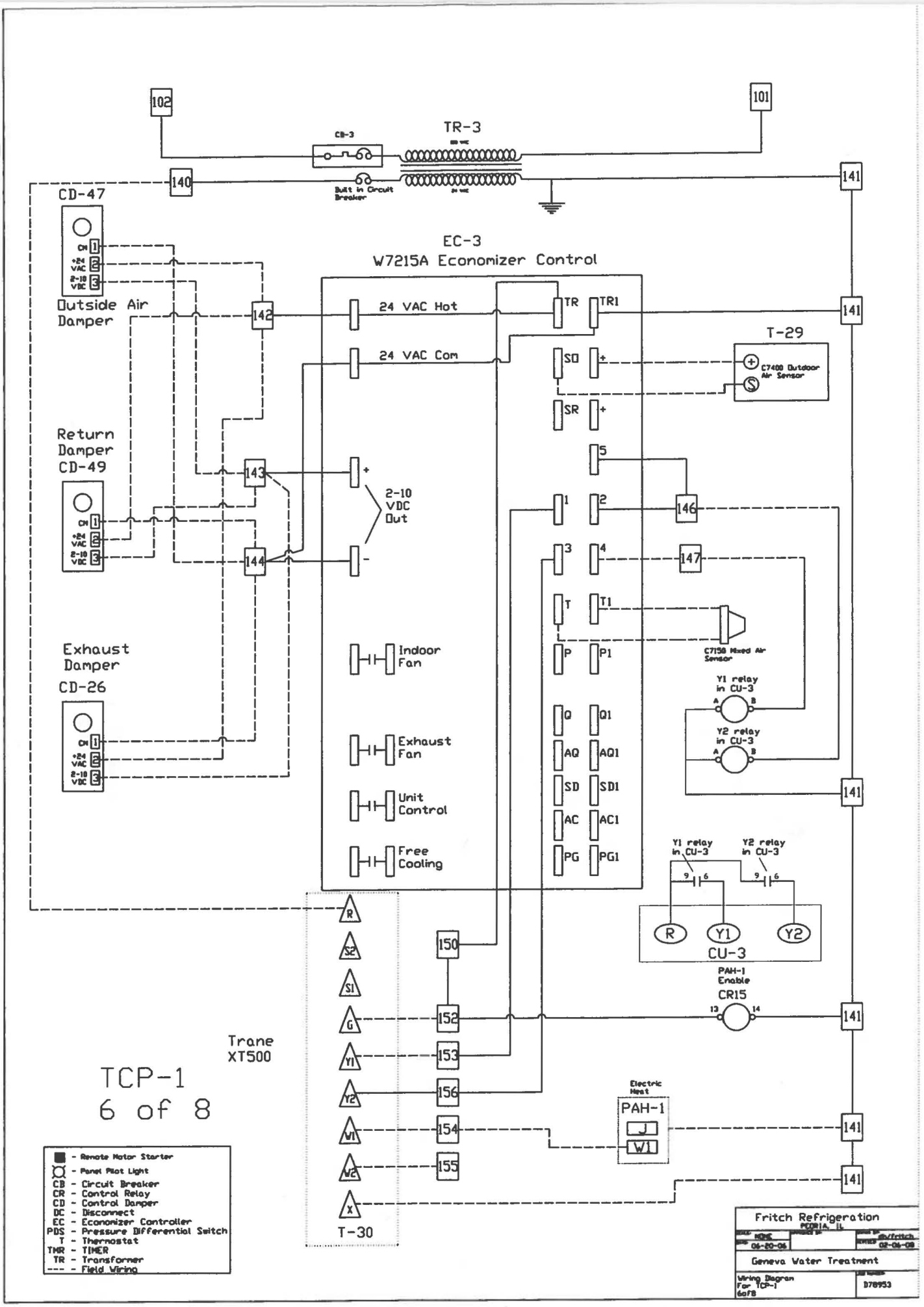
TMR - TIMER
TR - Transformer
---- - Field Wiring

TCP-1
5 of 8

Fritch Refrigeration
PEORIA, IL
HDMC
06-20-06
dlv/fritch
02-06-08
Geneva Water Treatment
Wiring Diagram For TCP-1 5of8
D78953


102
101
TR-3
CB-3
Built in Circuit Breaker
140
141
CD-47
EC-3
W7215A Economizer Control
Outside Air Damper
142
24 VAC Hot
24 VAC Com
TR
TR1
T-29
C7400 Outdoor Air Sensor
SD
SR
Return Damper CD-49
143
144
2-10 VDC Out
5
1
2
146
3
4
147
T
T1
C7150 Mixed Air Sensor
P
P1
Exhaust Damper
CD-26
Indoor Fan
Exhaust Fan
Unit Control
Free Cooling
Q
Q1
AQ
AQ1
SD
SD1
AC
AC1
PG
PG1
Y1 relay in CU-3
Y2 relay in CU-3
CU-3
R
Y1
Y2
PAH-1 Enable
CR15
150
152
153
156
154
155
S2
S1
G
W1
W2
X
T-30
Trane XT500
TCP-1
6 of 8
Electric Heat
PAH-1
J
W1
■ - Remote Motor Starter
- Panel Pilot Light
CB - Circuit Breaker
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CD - Control Damper
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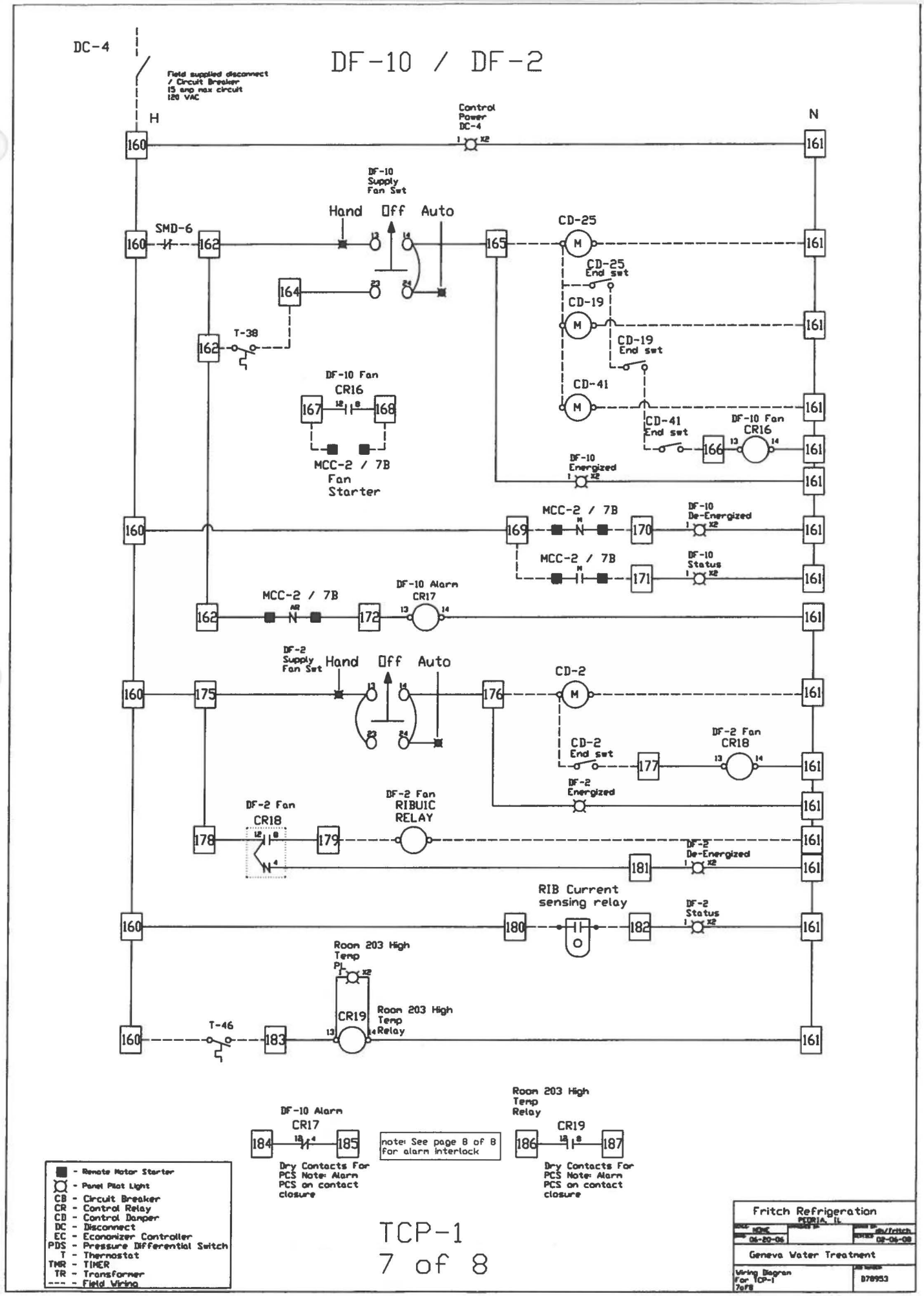
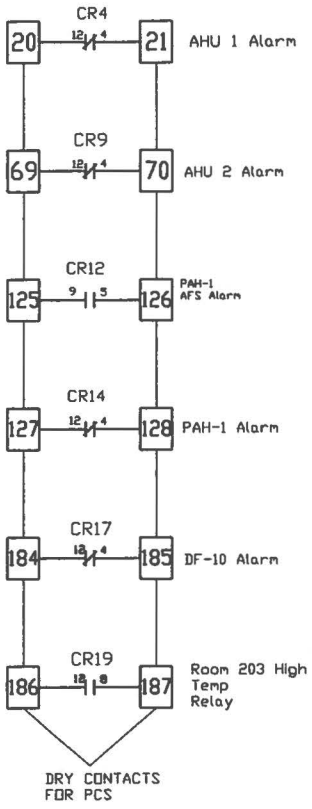
--- - Field Wiring
Fritch Refrigeration
PEORIA, IL
06-20-06
02-06-08
Geneva Water Treatment
Wiring Diagram For TCP-1 6of8
D78953

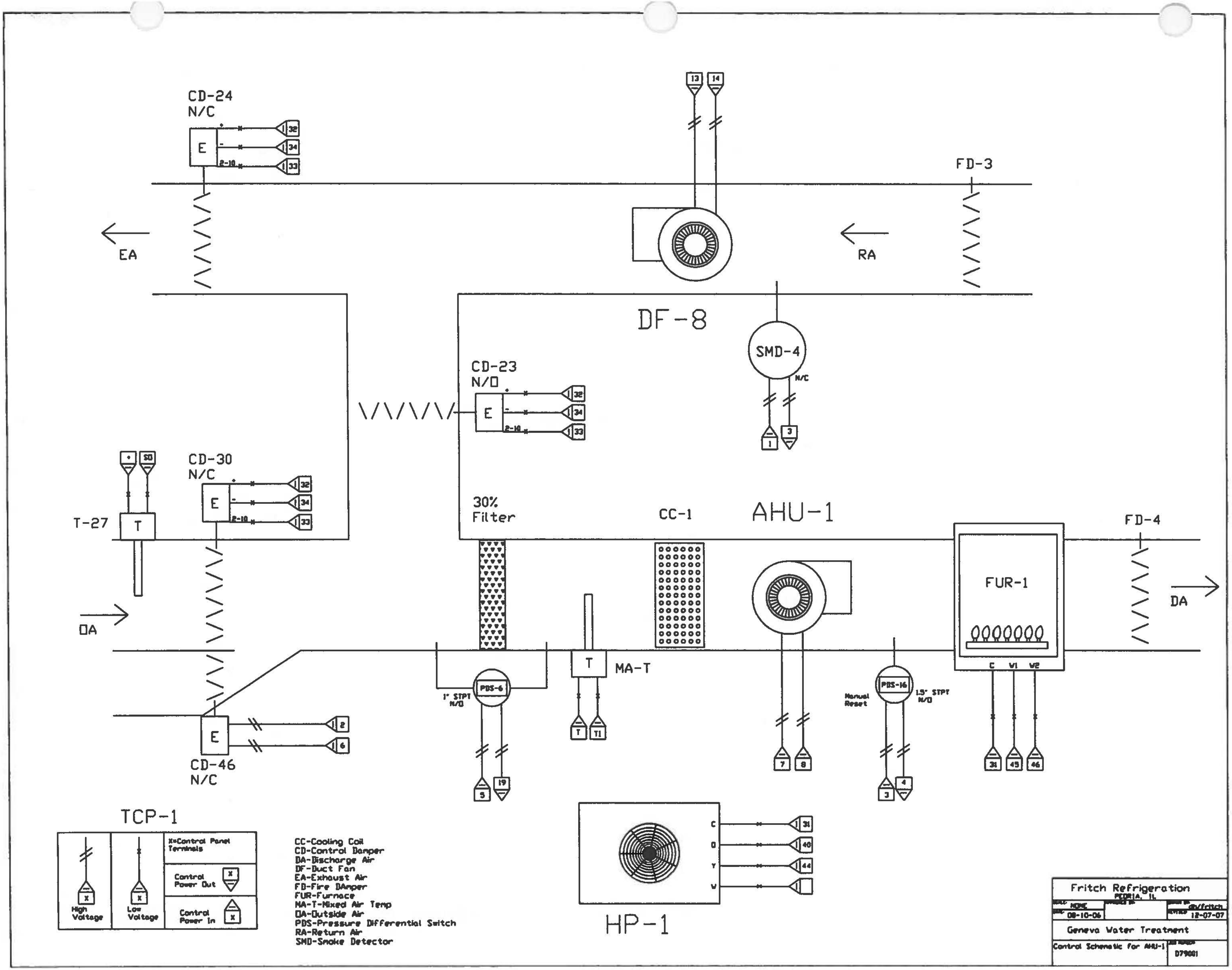

DF-10 / DF-2
DC-4
Field supplied disconnect / Circuit Breaker 15 amp max circuit 120 VAC
H
N
Control Power DC-4
DF-10 Supply Fan Swt
Hand
Off
Auto
SMD-6
CD-25
CD-25 End swt
CD-19
CD-19 End swt
CD-41
CD-41 End swt
T-38
DF-10 Fan CR16
MCC-2 / 7B Fan Starter
DF-10 Energized
MCC-2 / 7B
DF-10 De-Energized
DF-10 Status
DF-10 Alarm CR17
DF-2 Supply Fan Swt
CD-2
CD-2 End swt
DF-2 Fan CR18
DF-2 Energized
DF-2 Fan RIBUIC RELAY
DF-2 De-Energized
RIB Current sensing relay
DF-2 Status
Room 203 High Temp PI
CR19
Room 203 High Temp Relay
T-46
DF-10 Alarm CR17
Dry Contacts For PCS Note: Alarm PCS on contact closure
note: See page 8 of 8 for alarm interlock
Room 203 High Temp Relay
CR19
Dry Contacts For PCS Note: Alarm PCS on contact closure
■ - Remote Motor Starter
- Panel Pilot Light
CB - Circuit Breaker
CR - Control Relay
CD - Control Damper
DC - Disconnect
EC - Economizer Controller
PDS - Pressure Differential Switch
T - Thermostat
TMR - TIMER
TR - Transformer
--- - Field Wiring
TCP-1
7 of 8
Fritch Refrigeration
PEORIA, IL
Geneva Water Treatment
Wiring Diagram For TCP-1 7of8
B78953

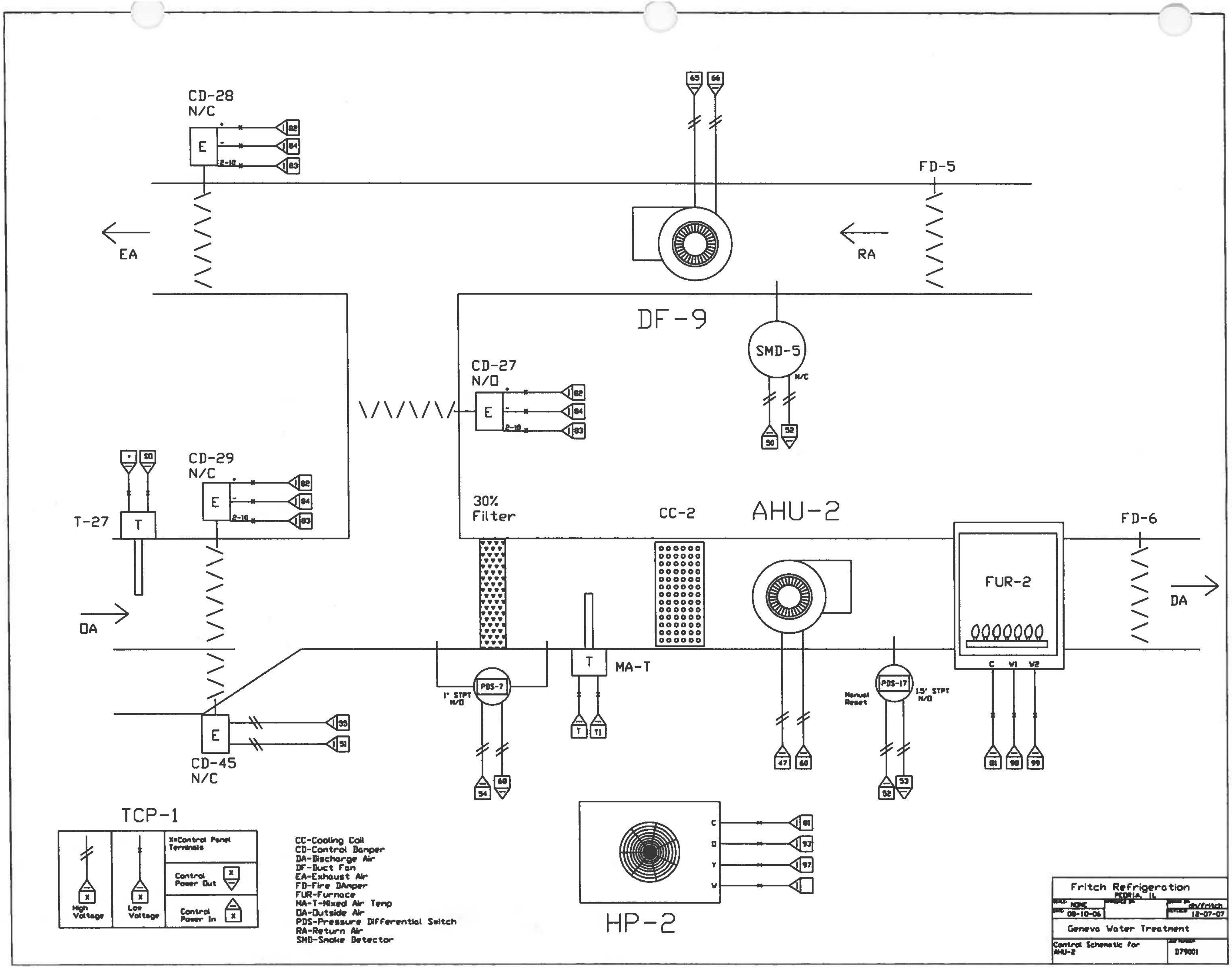
PCS ALARM PAGE

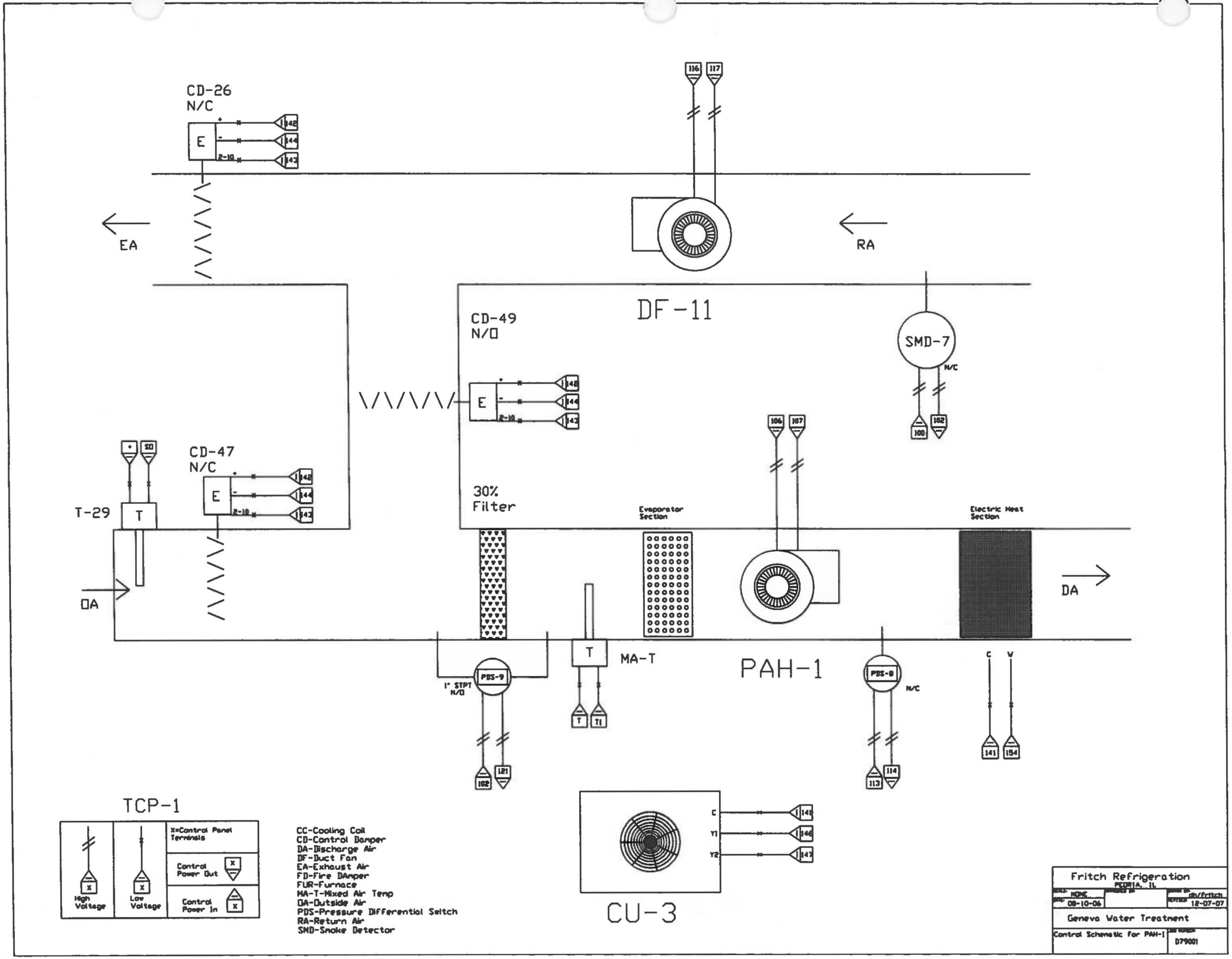


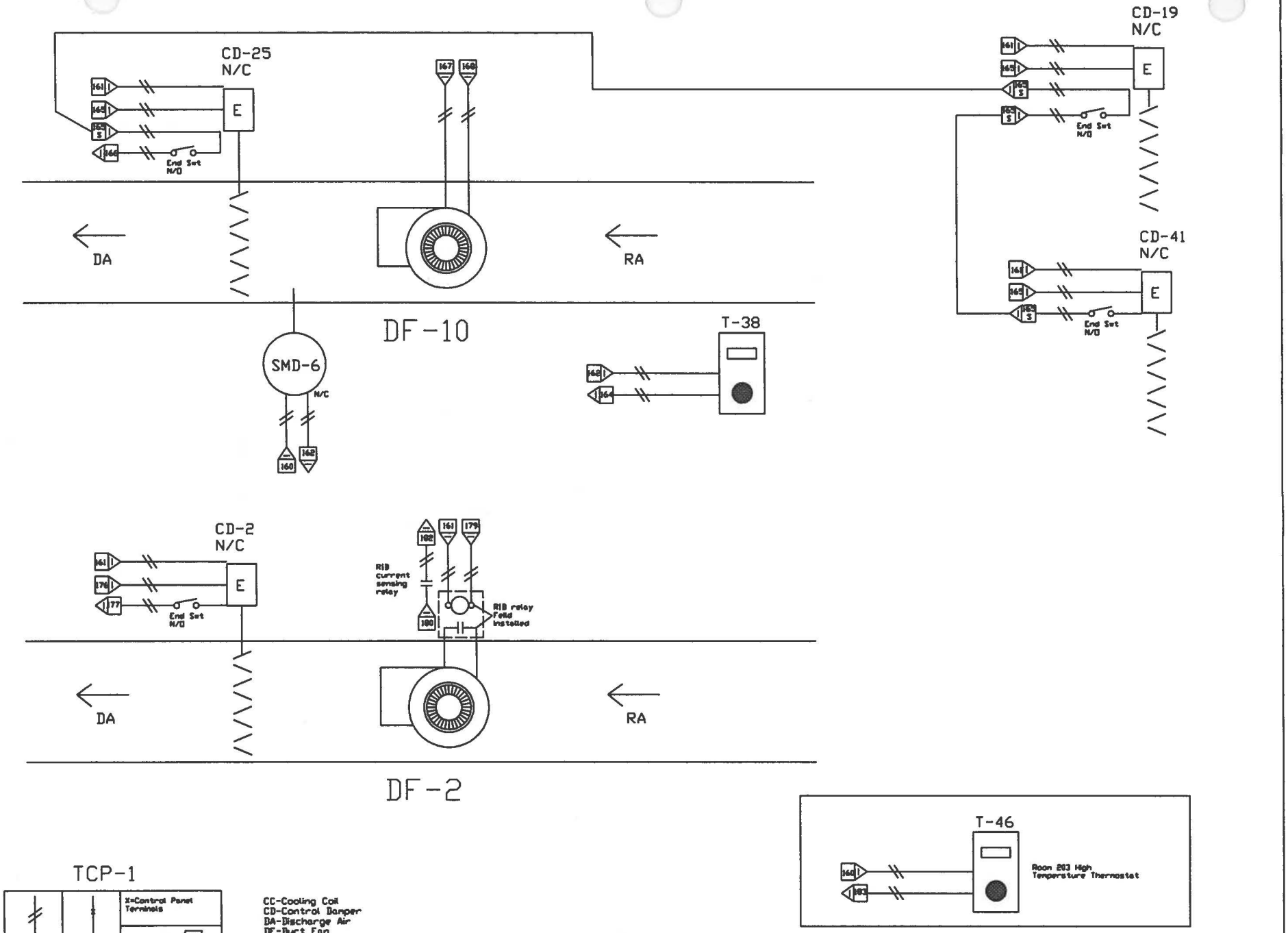
TCP-1
8 of 8

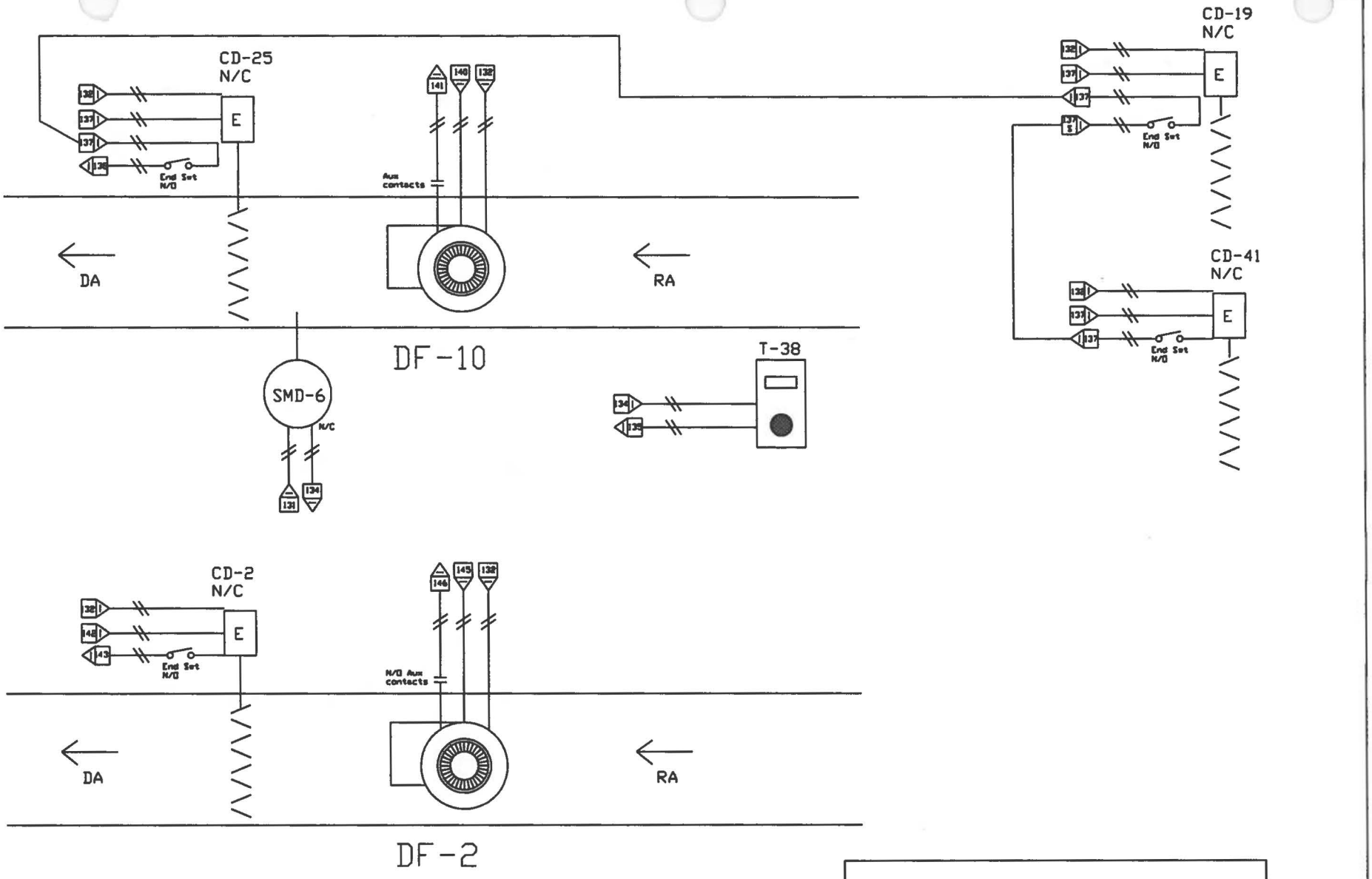
Fritch Refrigeration		
PEORIA, IL		
SCALE: NONE	APPROVED BY:	DRAWN BY: sh/fritch
DATE: 06-20-06		REVISED: 02-06-08
Geneva Water Treatment		
Wiring Diagram For TCP-1 7of8		JOB NUMBER: D78954


CD-24
N/C
E
2-10
32
34
33
13
14
FD-3
EA
RA
DF-8
SMD-4
N/C
1
3
CD-23
N/O
E
2-10
32
34
33
CD-30
N/C
E
2-10
32
34
33
+
50
T-27
T
30%
Filter
CC-1
AHU-1
FD-4
FUR-1
C
W1
W2
31
45
46
DA
OA
PDS-6
1" STPT
N/O
5
19
T
MA-T
T
T1
7
8
PDS-16
Manual
Reset
1.5" STPT
N/O
3
4
E
2
6
CD-46
N/C
TCP-1
High
Voltage
Low
Voltage
X=Control Panel
Terminals
Control
Power Out
Control
Power In
X
CC-Cooling Coil
CD-Control Damper
DA-Discharge Air
DF-Duct Fan
EA-Exhaust Air
FD-Fire DAmper
FUR-Furnace
MA-T-Mixed Air Temp
OA-Outside Air
PDS-Pressure Differential Switch
RA-Return Air
SMD-Smoke Detector
HP-1
C
O
Y
W
31
40
44
Fritch Refrigeration
PEORIA, IL
NONE
08-10-06
dh/fritch
12-07-07
Geneva Water Treatment
Control Schematic for AHU-1
D79081


CD-28
N/C
FD-5
EA
RA
DF-9
SMD-5
N/C
CD-27
N/O
CD-29
N/C
T-27
30%
Filter
CC-2
AHU-2
FD-6
FUR-2
DA
OA
MA-T
PDS-7
1" STPT
N/O
PDS-17
Manual
Reset
1.5" STPT
N/O
CD-45
N/C
TCP-1
X=Control Panel Terminals
Control Power Out
Control Power In
High Voltage
Low Voltage
CC-Cooling Coil
CD-Control Damper
DA-Discharge Air
DF-Duct Fan
EA-Exhaust Air
FD-Fire DAmper
FUR-Furnace
MA-T-Mixed Air Temp
OA-Outside Air
PDS-Pressure Differential Switch
RA-Return Air
SMD-Smoke Detector
HP-2
Fritch Refrigeration
PEORIA, IL
NONE
08-10-06
dh/fritch
12-07-07
Geneva Water Treatment
Control Schematic for
AHU-2
D79001


CD-26
N/C
EA
RA
DF-11
CD-49
N/O
SMD-7
CD-47
N/C
T-29
30%
Filter
Evaporator Section
Electric Heat Section
OA
DA
MA-T
PAH-1
TCP-1
X=Control Panel Terminals
Control Power Out
Control Power In
High Voltage
Low Voltage
CC-Cooling Coil
CD-Control Damper
DA-Discharge Air
DF-Duct Fan
EA-Exhaust Air
FD-Fire DAmper
FUR-Furnace
MA-T-Mixed Air Temp
OA-Outside Air
PDS-Pressure Differential Switch
RA-Return Air
SMD-Smoke Detector
CU-3
Fritch Refrigeration
08-10-06
12-07-07
Geneva Water Treatment
Control Schematic for PAH-1
D79001


CD-25
N/C
E
End Swt
N/C
DA
RA
DF-10
SMD-6
N/C
CD-19
N/C
CD-41
N/C
T-38
CD-2
N/C
RIB
current
sensing
relay
RIB relay
Field
installed
DF-2
T-46
Room 203 High
Temperature Thermostat
TCP-1
X=Control Panel
Terminals
High
Voltage
Low
Voltage
Control
Power Out
Control
Power In
CC-Cooling Coil
CD-Control Damper
DA-Discharge Air
DF-Duct Fan
EA-Exhaust Air
FD-Fire DAmper
FUR-Furnace
MA-T-Mixed Air Temp
OA-Outside Air
PDS-Pressure Differential Switch
RA-Return Air
SMD-Smoke Detector
Fritch Refrigeration
PEORIA, IL
SCALE NONE
DRAWN BY
CHECKED BY
DRAWN BY dh/fritch
DATE 08-10-06
REVISED 12-07-07
Geneva Water Treatment
Control Schematic for
DF-10/ DF-2/ Rm 206
JOB NUMBER
D79001



Fritch Refrigeration
PEORIA, IL

SCALE: NONE	DRAWN BY:	CHECKED BY: dh/fritch
DATE: 08-10-06		REVISED:

Geneva Water Treatment

Control Schematic for DF-10/ DF-2/ Rm 206

JOB NUMBER: 079001

Sequence of Operation
AHU 1 / DF-8

Unoccupied Mode

Outside air (CD-46 and CD-30), relief damper (CD-24) are closed return damper (CD-23) is open. Supply (AHU-1) and return fan (DF-8) cycle on a call for heating or cooling to satisfy unoccupied set point.

Occupied Mode

Supply fan (AHU-1) and return fan (DF-8 if in auto mode) starts and runs continuous, minimum air damper (CD-46) opens. On a call for cooling and outside air temperature is above 60 degrees, compressor is started to satisfy cooling demand. If outside air temperature is below 58 degrees and there is a call for cooling maximum damper (CD_30), return air damper (CD-23), and relief damper (CD-24) modulate to maintain 55 degree mixed air temperature. If zone temperature continues to rise and there is a call for 2nd stage cooling then compressor is brought on to satisfy the cooling demand. On a call for heat, heat pump will start in heat mode. If the zone temperature continues to fall then the duct heater will stages on to satisfy heating demand.

Morning warm up / Cool down

On a transition from unoccupied to occupied mode, outside air and relief damper remain closed for 30 minutes to allow zone to reach set point efficiently.

Optimum Start

The system shall be activated at a time determined by the thermostat's optimum start program calculation to have zone at occupied set point at the scheduled occupied time.

Alarms

In the event of high duct static pressure due to fire damper closure, in areas which equipment serves high static duct sensor (PDS-16) will open and de-energize AHU 1 and DF-8. A high static alarm light will illuminate on the face of TCP 1 and a contact closure will be made for PCS. A manual reset of the high static switch must be made in order for system to operate again.
In the event of SMD-4 alarm for areas the AHU-1 serves, AHU-1 and DF-8 will be de-energized. An alarm light will illuminate on the remote test station located adjacent to TCP 1 and a contact closure will be made for PCS. A restart timer (0-30 min.) on the face of TCP 1 for AHU-1 can be set to by pass alarm and allow unit to operate normally until time runs out or alarm is cleared.
In the event the pressure differential across the air filters (PDS-6) exceeds the preset value, a filter alarm light will illuminate on the face of TCP 1.

Return Fan operation DF-8

When hand off auto switch located on TCP 1 is in the auto position DF-8 will cycle on and off with AHU-1 supply via interlock circuit 6 in TCP 1. When in the on position the return fan will run continuously unless the SMD-4 is activated in which case DF-8 will be de-energized. When in the off position the fan will not start under any condition.

Sequence of Operation
AHU 2 / DF-9

Unoccupied Mode

Outside air (CD-45 and CD-29), relief damper (CD-28) are closed return damper (CD-27) is open. Supply (AHU-2) and return fan (DF-9) cycle on a call for heating or cooling to satisfy unoccupied set point.

Occupied Mode

Supply fan (AHU-2) and return fan (DF-9 if in auto mode) starts and runs continuous, minimum air damper (CD-45) opens. On a call for cooling and outside air temperature is above 60 degrees, compressor is started to satisfy cooling demand. If outside air temperature is below 58 degrees and there is a call for cooling maximum damper (CD-29), return air damper (CD-27), and relief damper (CD-28) modulate to maintain 55 degree mixed air temperature. If zone temperature continues to rise and there is a call for 2nd stage cooling then compressor is brought on to satisfy the cooling demand. On a call for heat, heat pump will start in heat mode. If the zone temperature continues to fall then the duct heater will stages on to satisfy heating demand.

Morning warm up / Cool down

On a transition from unoccupied to occupied mode, outside air and relief damper remain closed for 30 minutes to allow zone to reach set point efficiently.

Optimum Start

The system shall be activated at a time determined by the thermostat's optimum start program calculation to have zone at occupied set point at the scheduled occupied time.

Alarms

In the event of high duct static pressure due to fire damper closure, in areas which equipment serves high static duct sensor (PDS-17) will open and de-energize AHU 2 and DF-9. A high static alarm light will illuminate on the face of TCP 1 and a contact closure will be made for PCS. A manual reset of the high static switch must be made in order for system to operate again.
In the event of SMD-5 alarm for areas the AHU-2 serves, AHU-2 and DF-9 will be de-energized. An alarm light will illuminate on the remote test station located adjacent to TCP 1 and a contact closure will be made for PCS. A restart timer (0-30 min.) on the face of TCP 1 for AHU-2 can be set to by pass alarm and allow unit to operate normally until time runs out or alarm is cleared.
In the event the pressure differential across the air filters (PDS-7) exceeds the preset value, a filter alarm light will illuminate on the face of TCP 1.

Return Fan operation DF-9

When hand off auto switch located on TCP 1 is in the auto position DF-9 will cycle on and off with AHU-2 supply via interlock circuit 46 in TCP 1. When in the on position the return fan will run continuously unless the SMD-5 is activated in which case DF-9 will be de-energized. When in the off position the fan will not start under any condition.

Sequence of Operation
PAH 1 / DF -11

Control

A heat-cool-off system switch and an on-auto fan switch thermostat (T-30) control PAH-1.

Cooling Mode

On a call for cooling, supply fan (PAH-1) and return fan (DF-11) are energized, if the outside air temperature is above return air temperature, return air damper (CD-49) is open, outside (CD-47) and exhaust (CD-26) dampers are closed, compressors (CU-3) stage on to satisfy cooling demand. If outside air temperature is below return air temperature and there is a call for cooling OA dampers, return air dampers, and relief dampers modulate to maintain 55 degree mixed air temperature. If zone temperature continues to rise and there is a call for 2nd stage cooling then first stage compressor is brought on to satisfy the cooling demand. After cooling demand is satisfied supply and return fans are de-energized and dampers go to there normally close positions.

Heating Mode

On a call for heat, supply fan and return fan are energized, electric heat stages on to satisfy heating demand. After demand is satisfied supply and return fans are de-energized.

Alarms

In the event of airflow loss while supply fan is running. An airflow alarm light will illuminate on the face of TCP 1 and a contact closure will be made for PCS. A 0-5 minute time delay is used to allow sufficient time for dampers to open and airflow to be established. In the event SMD-7 is in alarm, PAH 1 and DF-11 will be de-energized. An alarm light will illuminate on the remote test station located adjacent to TCP 1 and a contact closure will be made for PCS.

In the event the pressure differential (PDS-9) across the air filters exceeds the preset value, a filter alarm light will illuminate on the face of TCP 1.

In the event that airflow of the equipment is not attained or is loss as determined by pressure differential flow switch (PDS-8) after a 0- 5 min. delay on start up start up, than a air flow alarm light will illuminate on the face of TCP 1, a contact closure will be made for PCS and an audible alarm will sound at each room entrance where applicable.

Return Fan operation DF-11

When hand off auto switch located on the face of TCP 1 is in the auto position DF-11 will cycle on and off via interlock circuit 47 from PAH-1 in TCP 1. When in the on position the return fan will run continuously and ignore interlock circuit but will be de-energized if SMD-7 is activated. When in the off position fan will not start under any condition.

Sequence of Operation
DF-10 / DF -2 / Room 203

DF-10 Control

Fan controlled by a hand-off-auto switch located on the face of TCP-1 and a cooling only thermostat (T-38) located in associated zone.

If hand-off-auto switch is in auto position and zone temperature is above T-38 set point CD-19, 25 and 41 open and prove (via end switches in series) and energizes DF-10 fan relay. When the zone cooling demand is satisfied dampers spring closed and fan is de-energized.

If hand-off-auto switch is in on position fan starts using the same sequence as auto mode except ignores T-38 and runs continuously.

If hand-off-auto switch is in off position fan does not run under any circumstances.

Alarms

In the event SMD-6 is in alarm, DF-10 fan will be de-energized and dampers will shut. An alarm light will illuminate on the remote test station located adjacent to TCP 1 and a contact closure will be made for PCS.

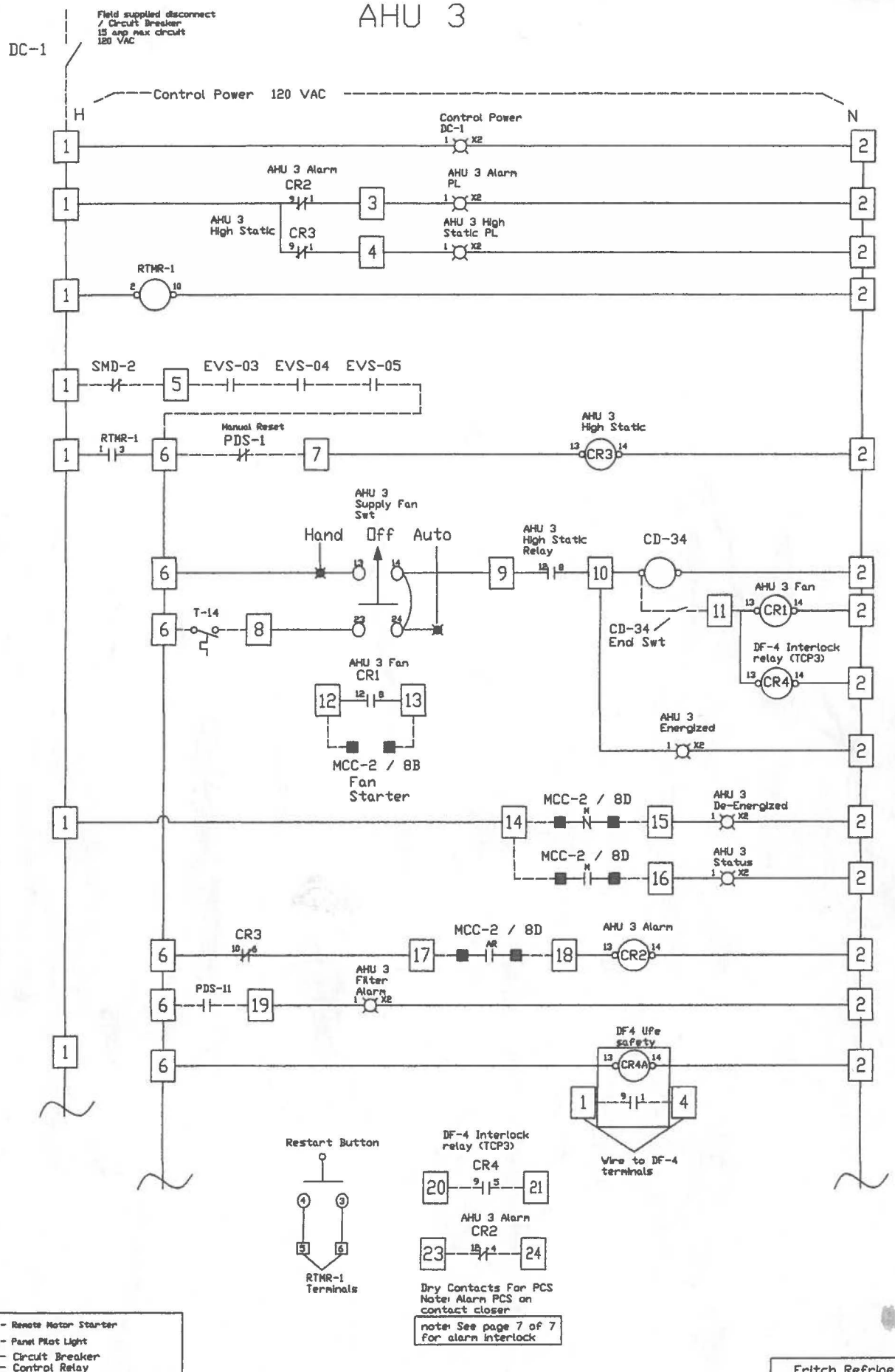
DF-2 Control

Fan controlled by an off-on switch located on the face of TCP-1
When on - off switch is in the on position CD-2 will open and prove (via end switch) and energize DF-2 fan relay.
When in the off position damper will spring closed and fan relay de-energized.

Room 203 Control

Room has a cooling only thermostat (T-46) for alarm purposes only.
In the event room reaches set point, an alarm light will illuminate on the face of TCP 1 and a contact closure will be made for PCS.

AHU 3

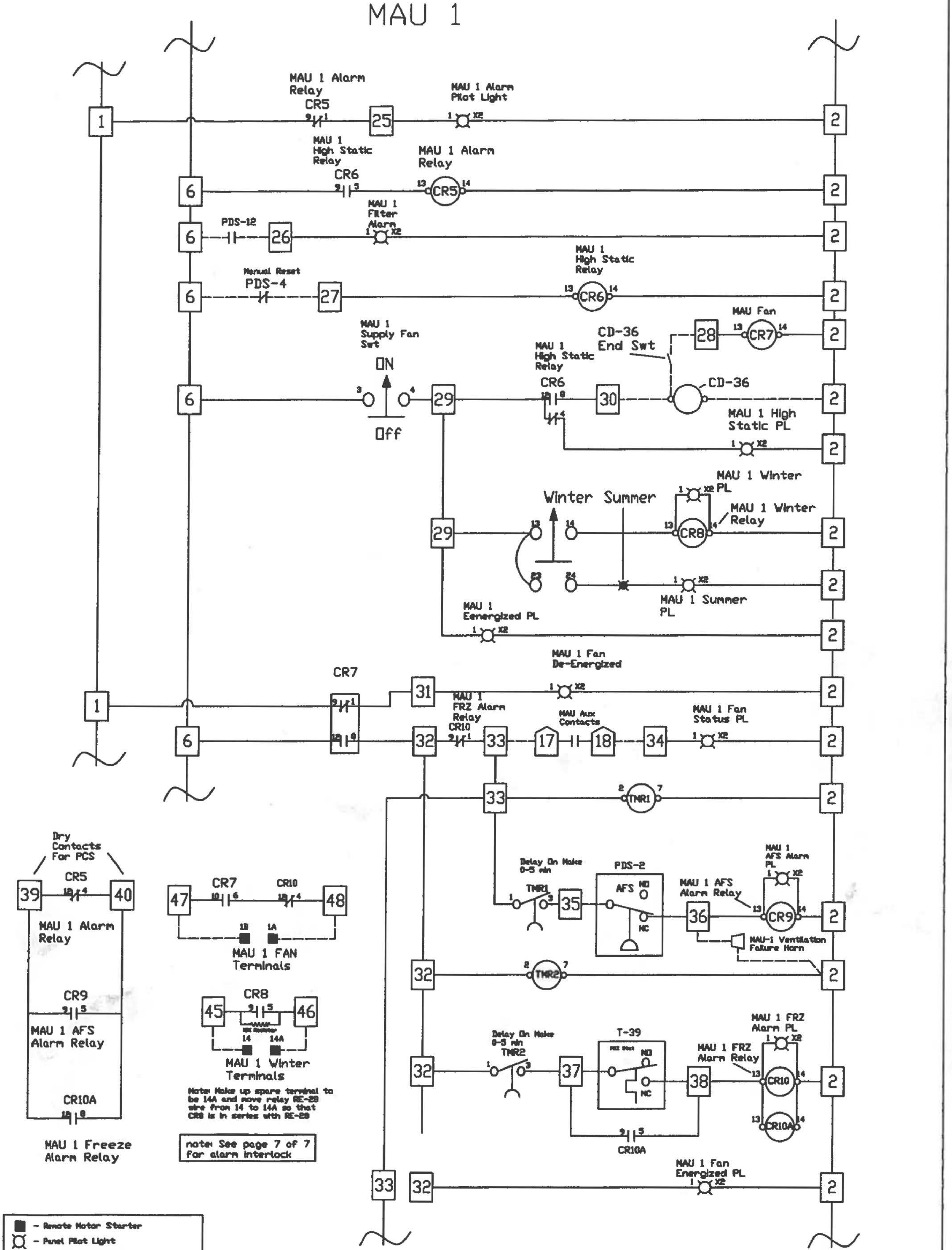


■ - Remote Motor Starter
⊗ - Panel Pilot Light
CB - Circuit Breaker
CR - Control Relay
CD - Control Damper
DC - Disconnect
EC - Economizer Controller
PDS - Pressure Differential Switch
T - Thermostat
TMR - TIMER
TR - Transformer
—— - Field Wiring

TCP-2
1 of 7

Fritch Refrigeration PEORIA, IL	
SCALE: NONE	DRAWN BY: db/Fritch
DATE: 06-22-06	REVISED: 02-06-08
Geneva Water Treatment	
Wiring Diagram For TCP-2 1of7	JOB NUMBER: D76953

MAU 1



- ■ – Remote Motor Starter
- ⊗ – Panel Pilot Light
- CB – Circuit Breaker
- CR – Control Relay
- CD – Control Damper
- DC – Disconnect
- EC – Economizer Controller
- PDS – Pressure Differential Switch
- T – Thermostat
- TMR – TIMER
- TR – Transformer
- —— – Field Wiring

TCP-2

2 of 7

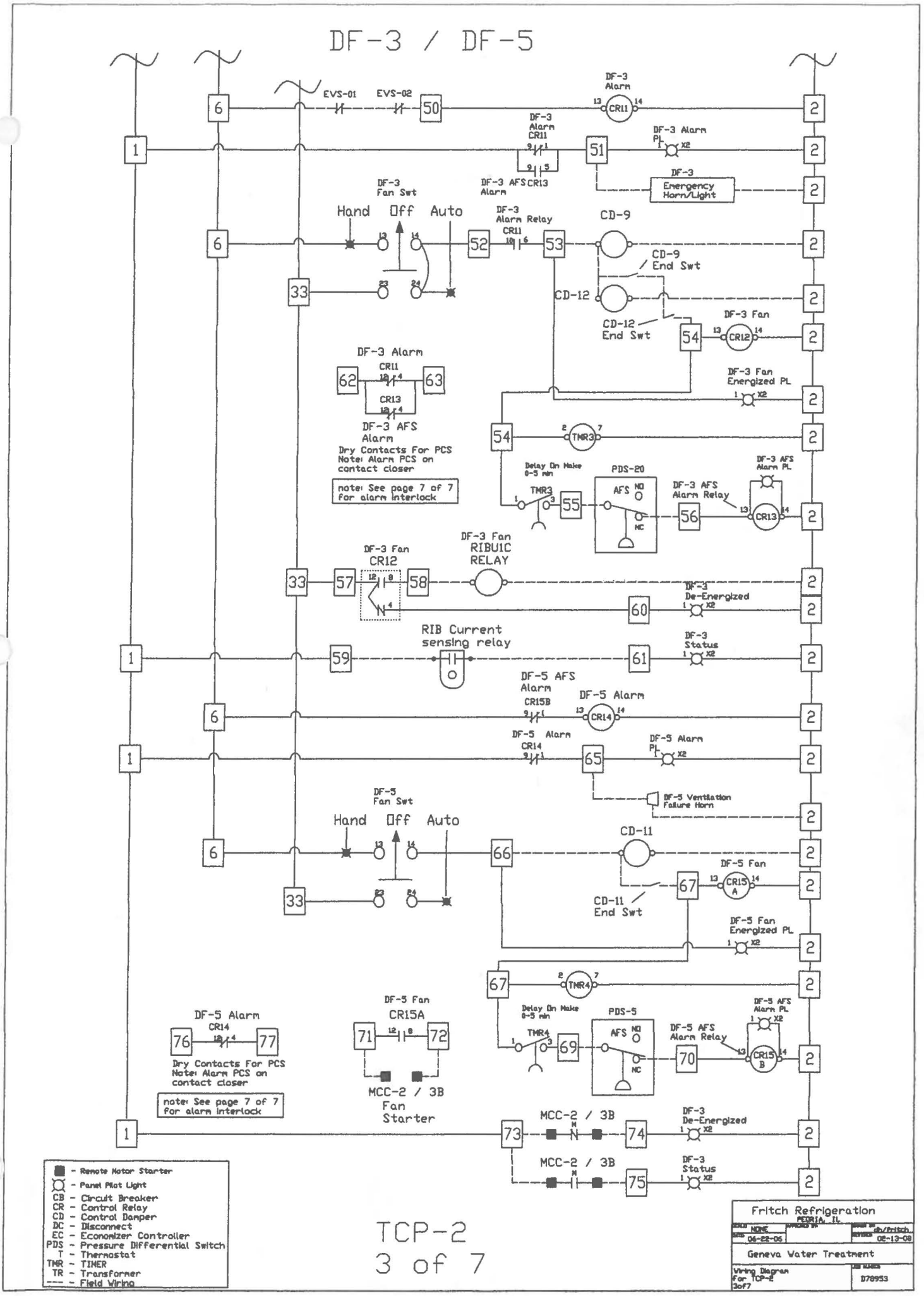
Fritch Refrigeration
PEORIA, IL

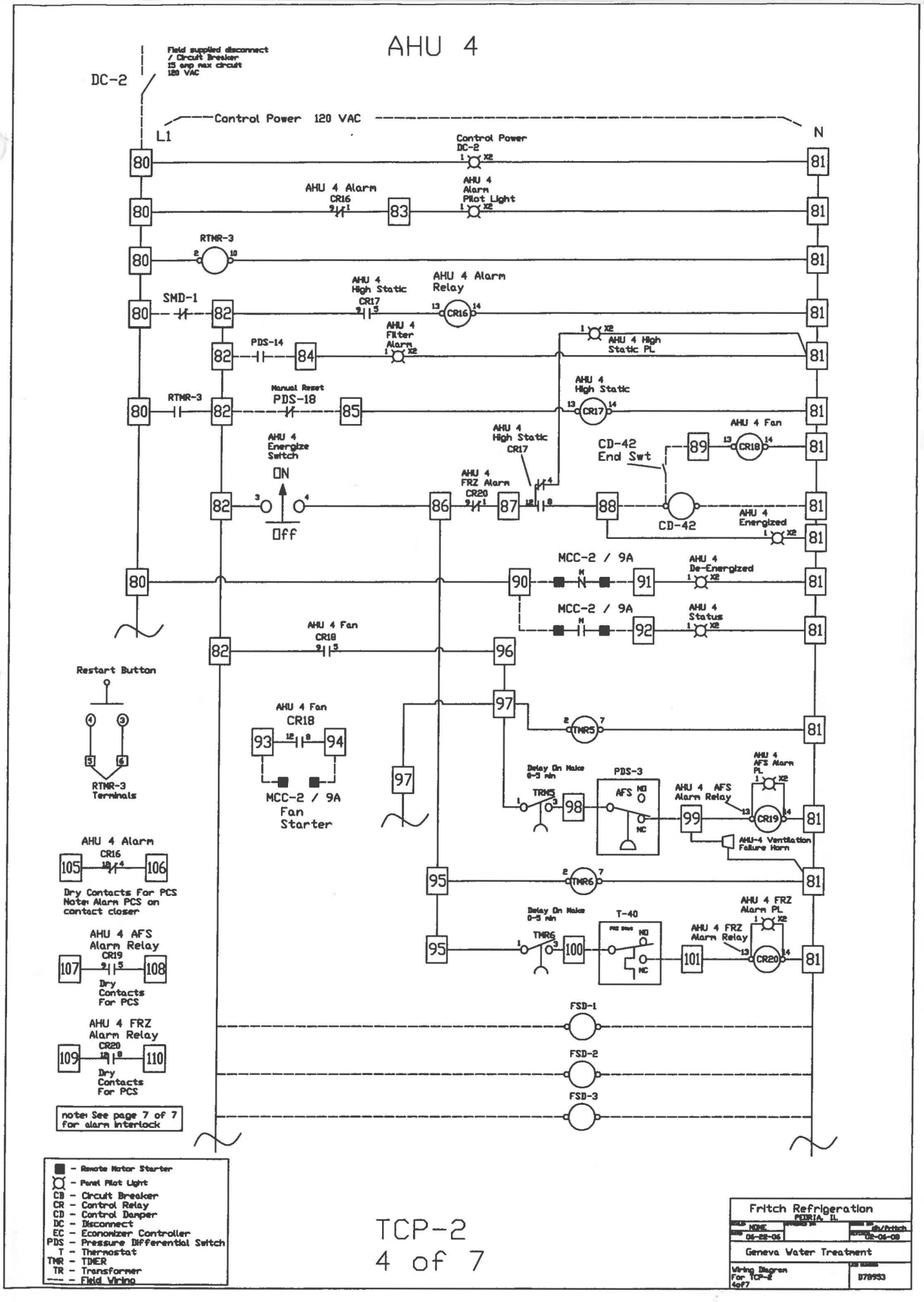
NONE | 06-22-06 | db/Fritch | 02-06-08

Geneva Water Treatment

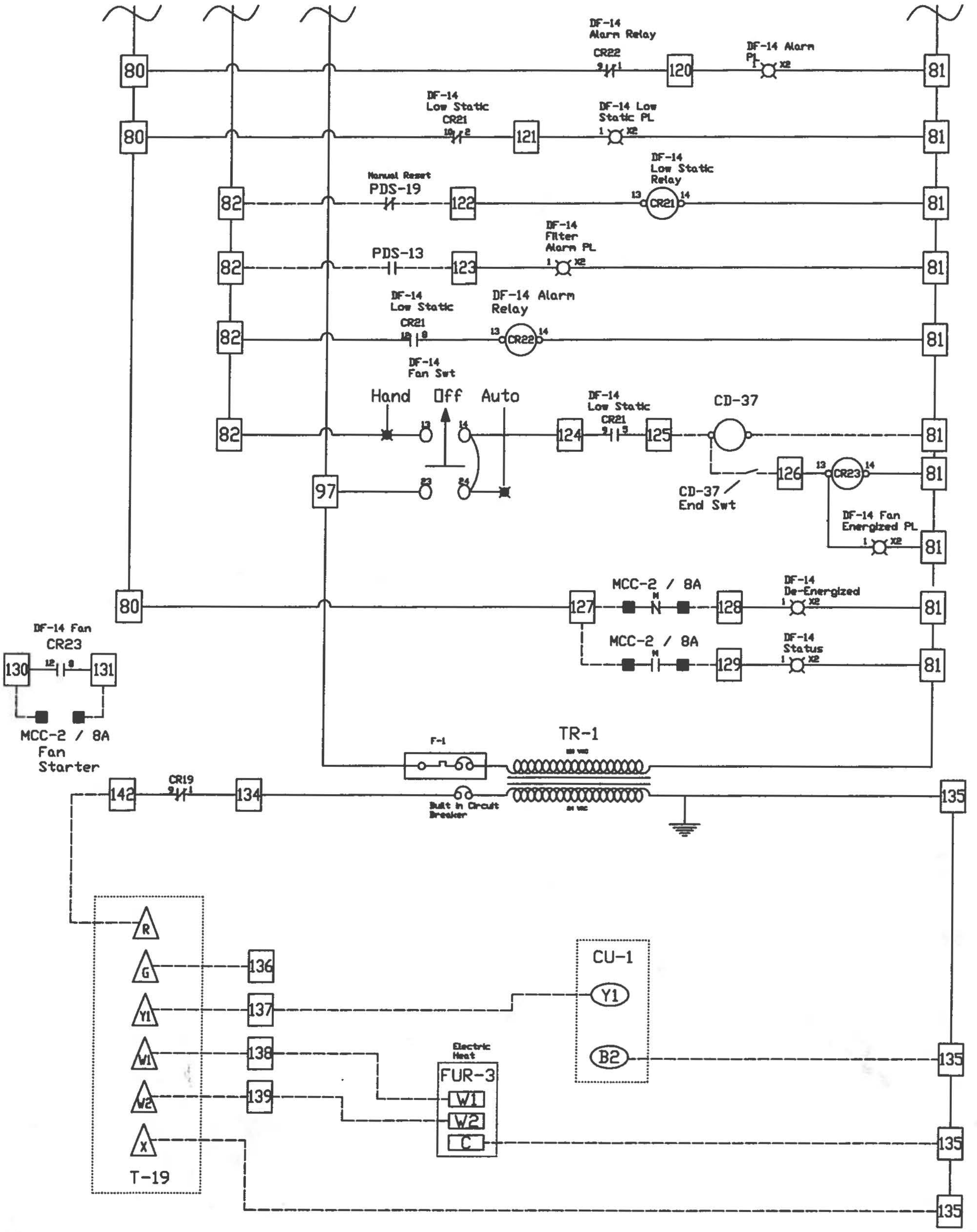
Wiring Diagram For TCP-2 2of7

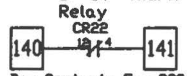
D78953


DF-3 / DF-5
EVS-01
EVS-02
DF-3 Alarm
CR11
DF-3 Alarm CR11
DF-3 Alarm PL
DF-3 AFS Alarm CR13
DF-3 Emergency Horn/Light
DF-3 Fan Swt
Hand
Off
Auto
DF-3 Alarm Relay CR11
CD-9
CD-9 End Swt
CD-12
CD-12 End Swt
DF-3 Fan
CR12
DF-3 Fan Energized PL
TMR3
Delay On Make 0-5 min
PDS-20
AFS
NO
NC
DF-3 AFS Alarm Relay
DF-3 AFS Alarm PL
DF-3 Alarm CR11 CR13
DF-3 AFS Alarm
Dry Contacts For PCS
Note: Alarm PCS on contact closer
note: See page 7 of 7 for alarm interlock
DF-3 Fan CR12
DF-3 Fan RIBUIC RELAY
DF-3 De-Energized
RIB Current sensing relay
DF-3 Status
DF-5 AFS Alarm CR15B
DF-5 Alarm
CR14
DF-5 Alarm PL
DF-5 Ventilation Failure Horn
DF-5 Fan Swt
CD-11
CD-11 End Swt
DF-5 Fan
CR15A
DF-5 Fan Energized PL
TMR4
PDS-5
DF-5 AFS Alarm Relay
DF-5 AFS Alarm PL
MCC-2 / 3B Fan Starter
MCC-2 / 3B
DF-3 De-Energized
DF-3 Status
■ - Remote Motor Starter
- Panel Pilot Light
CB - Circuit Breaker
CR - Control Relay
CD - Control Damper
DC - Disconnect
EC - Economizer Controller
PDS - Pressure Differential Switch
T - Thermostat
TMR - TIMER
TR - Transformer
--- - Field Wiring
TCP-2
3 of 7
Fritch Refrigeration
PEORIA, IL
SCALE NONE
DRAWN BY sb/Fritch
DATE 06-22-06
REVISED 02-13-08
Geneva Water Treatment
Wiring Diagram For TCP-2 3of7
JOB NUMBER D78953


AHU 4
Field supplied disconnect / Circuit Breaker 15 amp max circuit 120 VAC
DC-2
Control Power 120 VAC
L1
N
Control Power DC-2
AHU 4 Alarm CR16
AHU 4 Alarm Pilot Light
RTMR-3
SMD-1
AHU 4 High Static CR17
AHU 4 Alarm Relay
CR16
AHU 4 Filter Alarm
PDS-14
AHU 4 High Static PL
Manual Reset
PDS-18
AHU 4 High Static
CR17
AHU 4 Fan
CR18
AHU 4 Energize Switch
ON
Off
AHU 4 FRZ Alarm CR20
CD-42 End Swt
CD-42
AHU 4 Energized
MCC-2 / 9A
AHU 4 De-Energized
AHU 4 Status
AHU 4 Fan CR18
Restart Button
RTMR-3 Terminals
MCC-2 / 9A Fan Starter
Delay On Make 0-5 min
TMR5
PDS-3
AFS NO NC
AHU 4 AFS Alarm Relay
CR19
AHU 4 AFS Alarm PL
AHU-4 Ventilation Failure Horn
TMR6
T-40
AHU 4 FRZ Alarm Relay
AHU 4 FRZ Alarm PL
CR20
AHU 4 Alarm
Dry Contacts For PCS Note: Alarm PCS on contact closer
AHU 4 AFS Alarm Relay
Dry Contacts For PCS
AHU 4 FRZ Alarm Relay
Dry Contacts For PCS
FSD-1
FSD-2
FSD-3
note: See page 7 of 7 for alarm interlock
■ - Remote Motor Starter
- Panel Pilot Light
CB - Circuit Breaker
CR - Control Relay
CD - Control Damper
DC - Disconnect
EC - Economizer Controller
PDS - Pressure Differential Switch
T - Thermostat
TMR - TIMER
TR - Transformer
---- - Field Wiring
TCP-2
4 of 7
Fritch Refrigeration
PEORIA, IL
Geneva Water Treatment
Wiring Diagram For TCP-2 4of7
D789953

DF-14





Dry Contacts For PCS
Note: Alarm PCS on contact closer

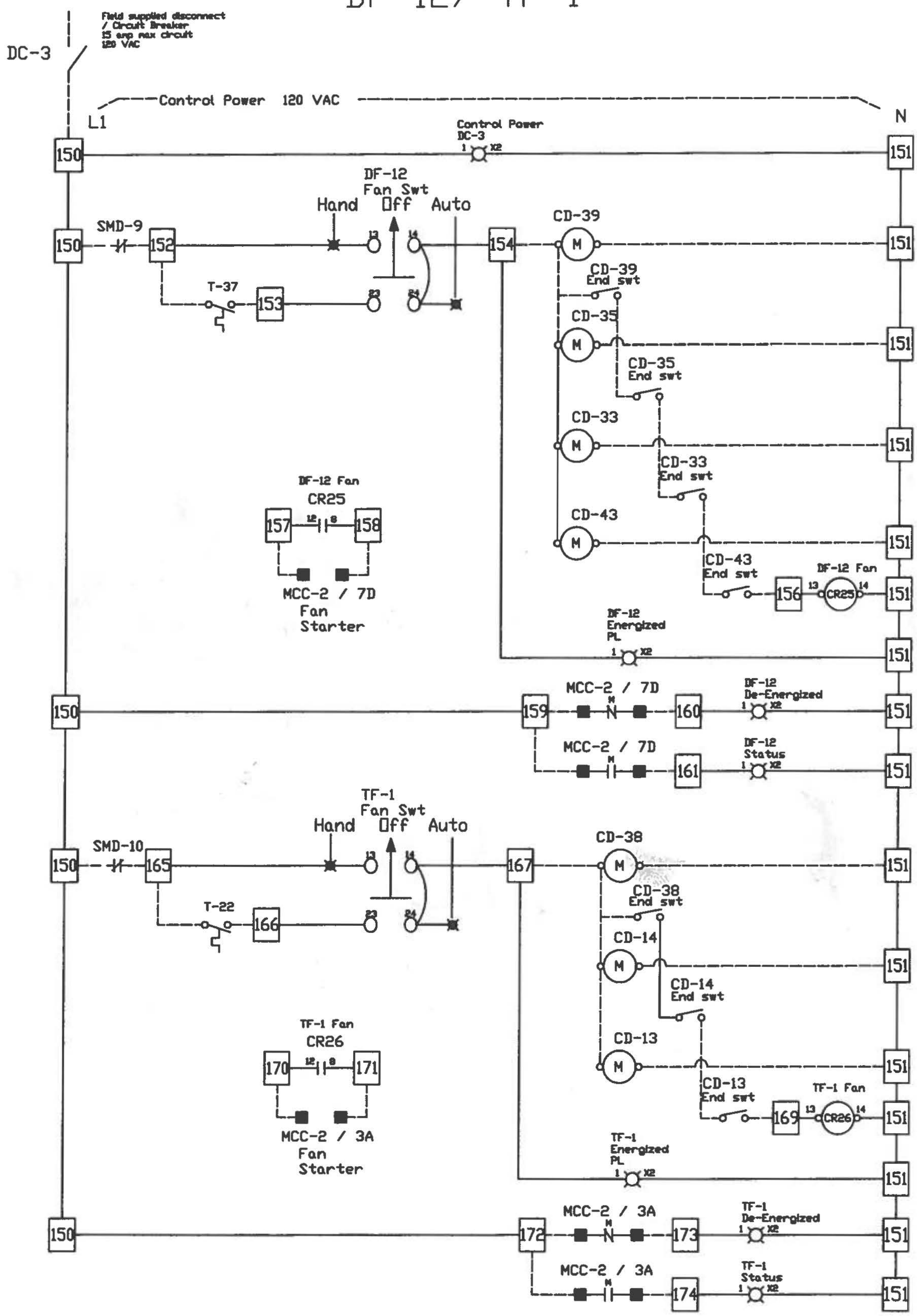
note: See page 7 of 7 for alarm interlock

- ■ - Remote Motor Starter
- ⌛ - Panel Pilot Light
- CB - Circuit Breaker
- CR - Control Relay
- CD - Control Damper
- DC - Disconnect
- EC - Economizer Controller
- PDS - Pressure Differential Switch
- T - Thermostat
- TMR - TIMER
- TR - Transformer
- ---- - Field Wiring

TCP-2
5 of 7

Fritch Refrigeration
PEORIA, IL
NONE
06-22-06
08-06-08
Geneva Water Treatment
Wiring Diagram For TCP-2 5of7
978953

DF-12/ TF-1

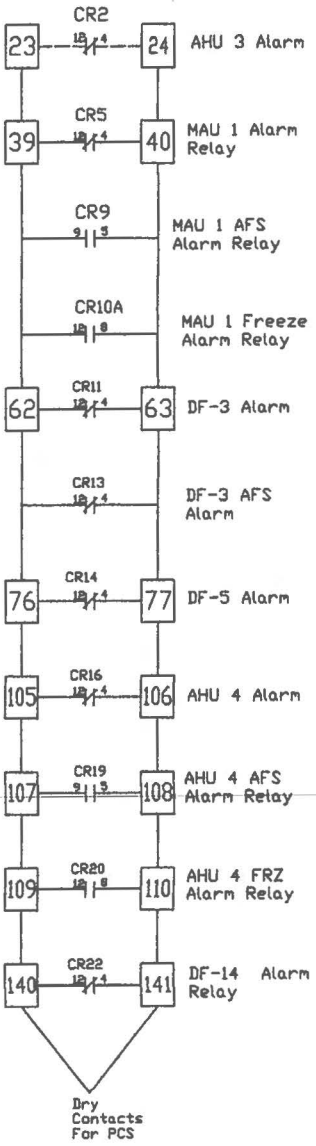


- ■ - Remote Motor Starter
- ⊠ - Panel Pilot Light
- CB - Circuit Breaker
- CR - Control Relay
- CD - Control Damper
- DC - Disconnect
- EC - Economizer Controller
- PDS - Pressure Differential Switch
- T - Thermostat
- TMR - TIMER
- TR - Transformer
- ---- - Field Wiring

TCP-2
6 of 7

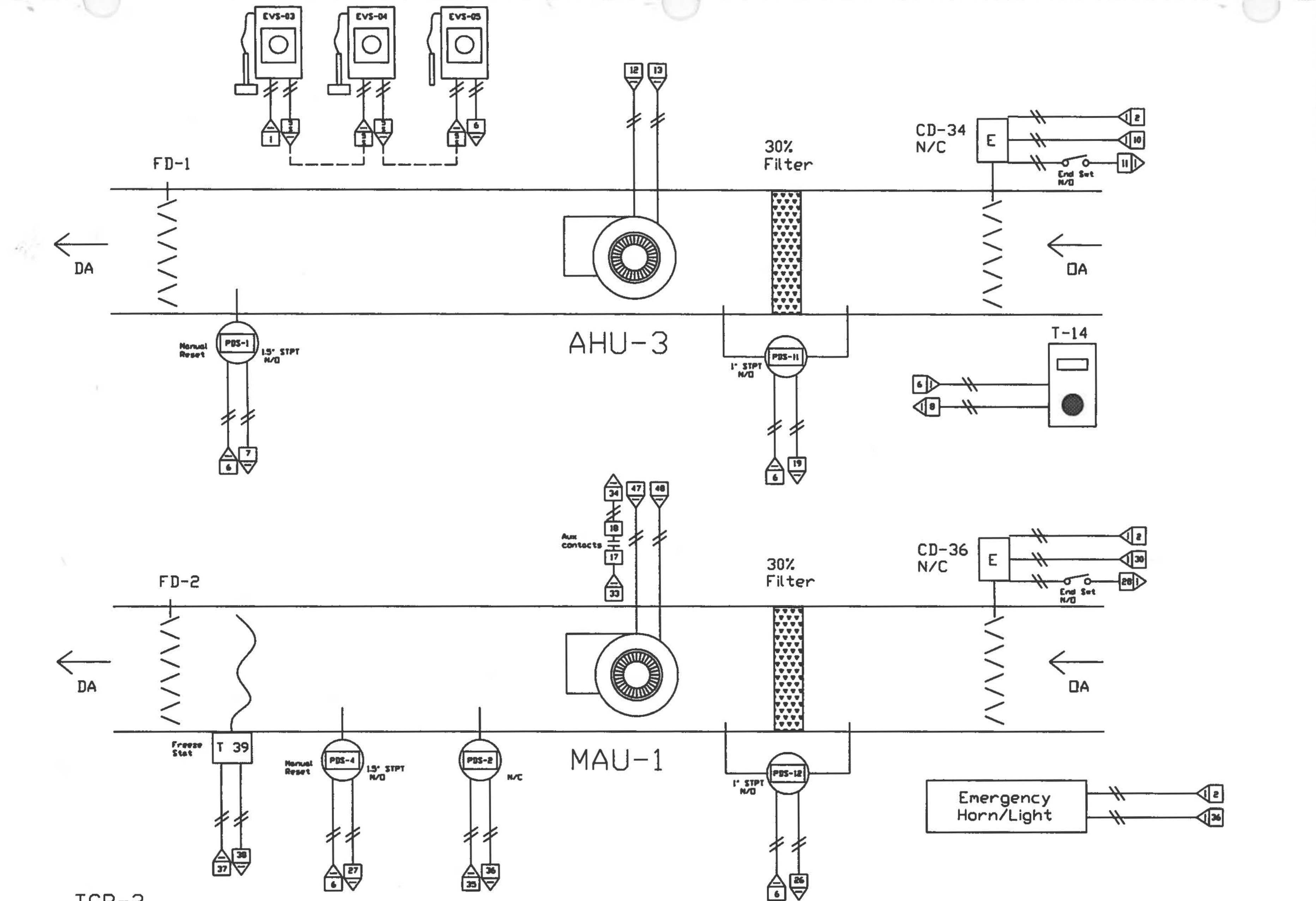
Fritch Refrigeration
PEORIA, IL
NONE
06-22-06
dh/Fritch
02-06-08
Geneva Water Treatment
Wiring Diagram
For TCP-2
6of7
D78953

PCS ALARM PAGE

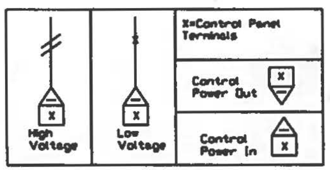


TCP-2
7 of 7

Fritch Refrigeration PEORIA, IL		
DRAWN BY: MDMS	APPROVED BY:	DRAWN ON: dh/fritch
DATE: 06-22-06		DATE REVISED: 06-13-08
Geneva Water Treatment		
Wiring Diagram For TCP-2 6of7		JOB NUMBER: D78954

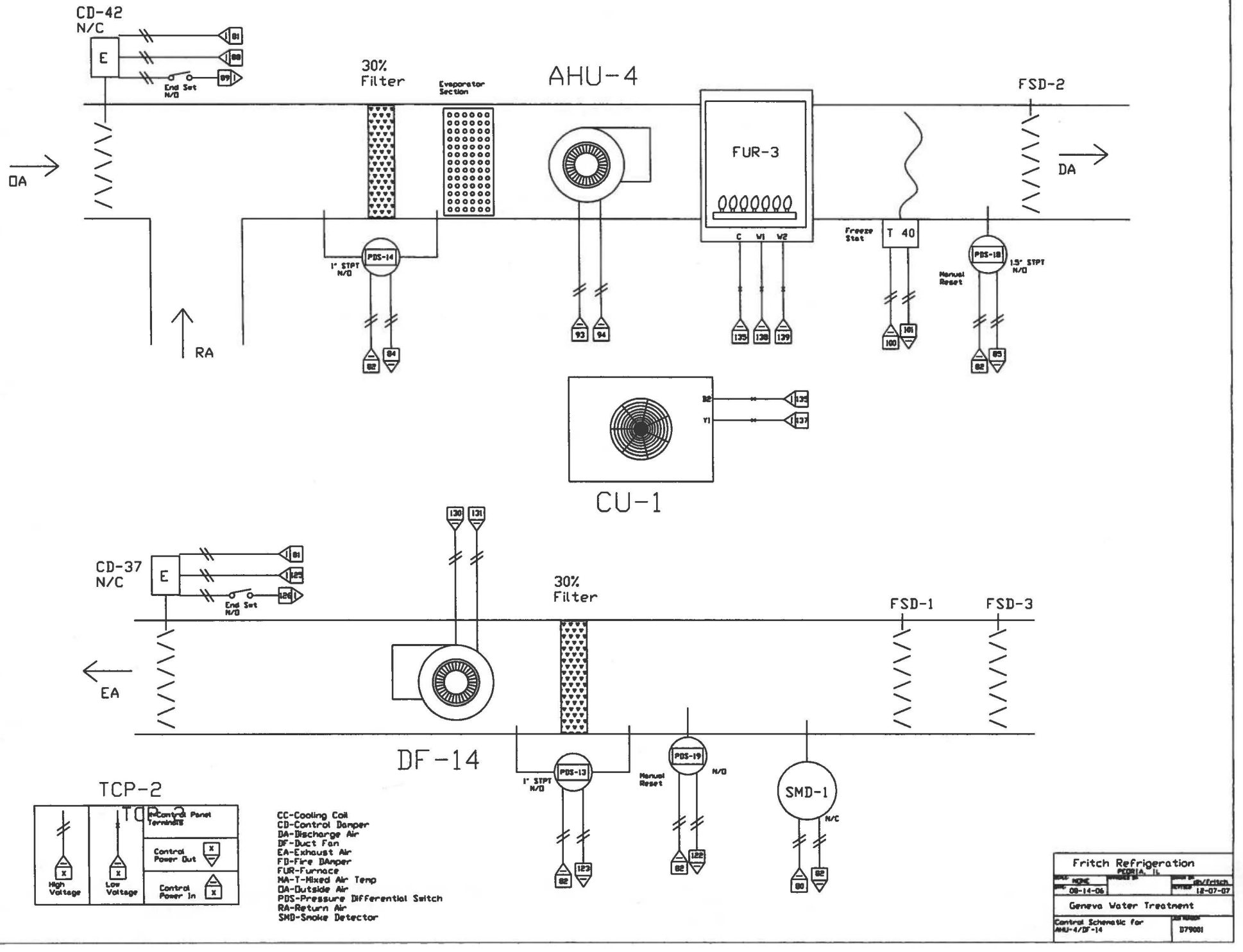


TCP-2



CC-Cooling Coil
CD-Control Damper
DA-Discharge Air
DF-Duct Fan
EA-Exhaust Air
FD-Fire DAmper
FUR-Furnace
MA-T-Mixed Air Temp
OA-Outside Air
PDS-Pressure Differential Switch
RA-Return Air
SMD-Smoke Detector

Fritch Refrigeration PEORIA, IL		
NONE 08-10-06		dh/Fritch 12-07-07
Geneva Water Treatment		
Control Schematic for AHU-3/ MAU-1		D79001


CD-42
N/C
E
End Set
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30%
Filter
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AHU-4
FSD-2
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W1
W2
Freeze
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T 40
DA
PDS-14
1" STPT
N/O
PDS-18
1.5" STPT
N/O
Manual
Reset
RA
CU-1
CD-37
N/C
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Filter
FSD-1
FSD-3
EA
DF-14
PDS-13
1" STPT
N/O
Manual
Reset
PDS-19
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SMD-1
N/C
TCP-2
Control Panel
Terminals
Control
Power Out
Control
Power In
High
Voltage
Low
Voltage
CC-Cooling Coil
CD-Control Damper
DA-Discharge Air
DF-Duct Fan
EA-Exhaust Air
FD-Fire DAmper
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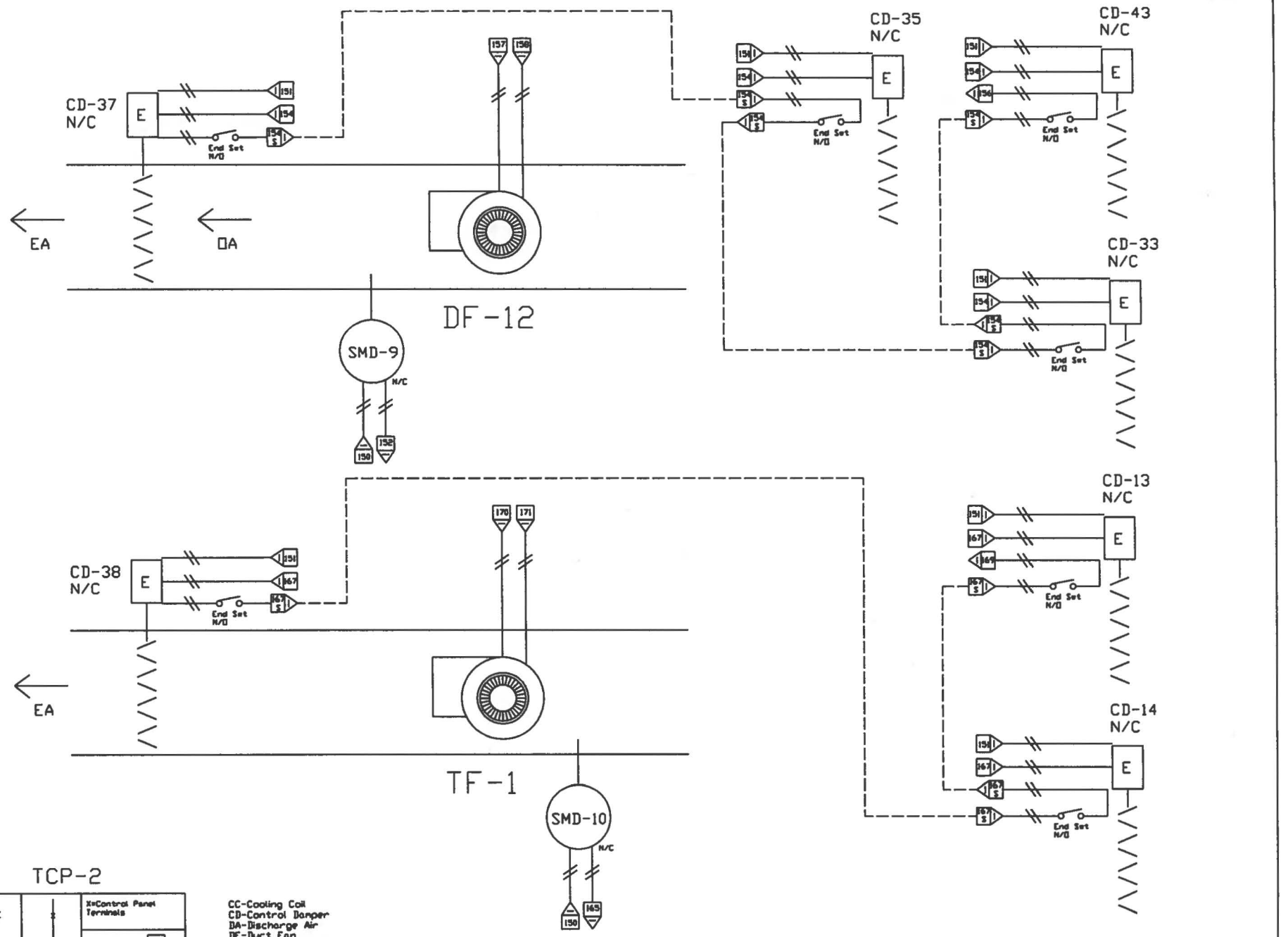
SMD-Smoke Detector
Fritch Refrigeration
PEORIA, IL
08-14-06
12-07-07
Geneva Water Treatment
Control Schematic for
AHU-4/DF-14
D79001


CD-37
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CD-35
N/C
CD-43
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CD-33
N/C
CD-38
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CD-13
N/C
CD-14
N/C
End Set
N/O
EA
OA
DF-12
SMD-9
N/C
TF-1
SMD-10
N/C
TCP-2
X=Control Panel Terminals
Control Power Out
Control Power In
High Voltage
Low Voltage
CC-Cooling Coil
CD-Control Damper
DA-Discharge Air
DF-Duct Fan
EA-Exhaust Air
FD-Fire DAmper
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08-14-06
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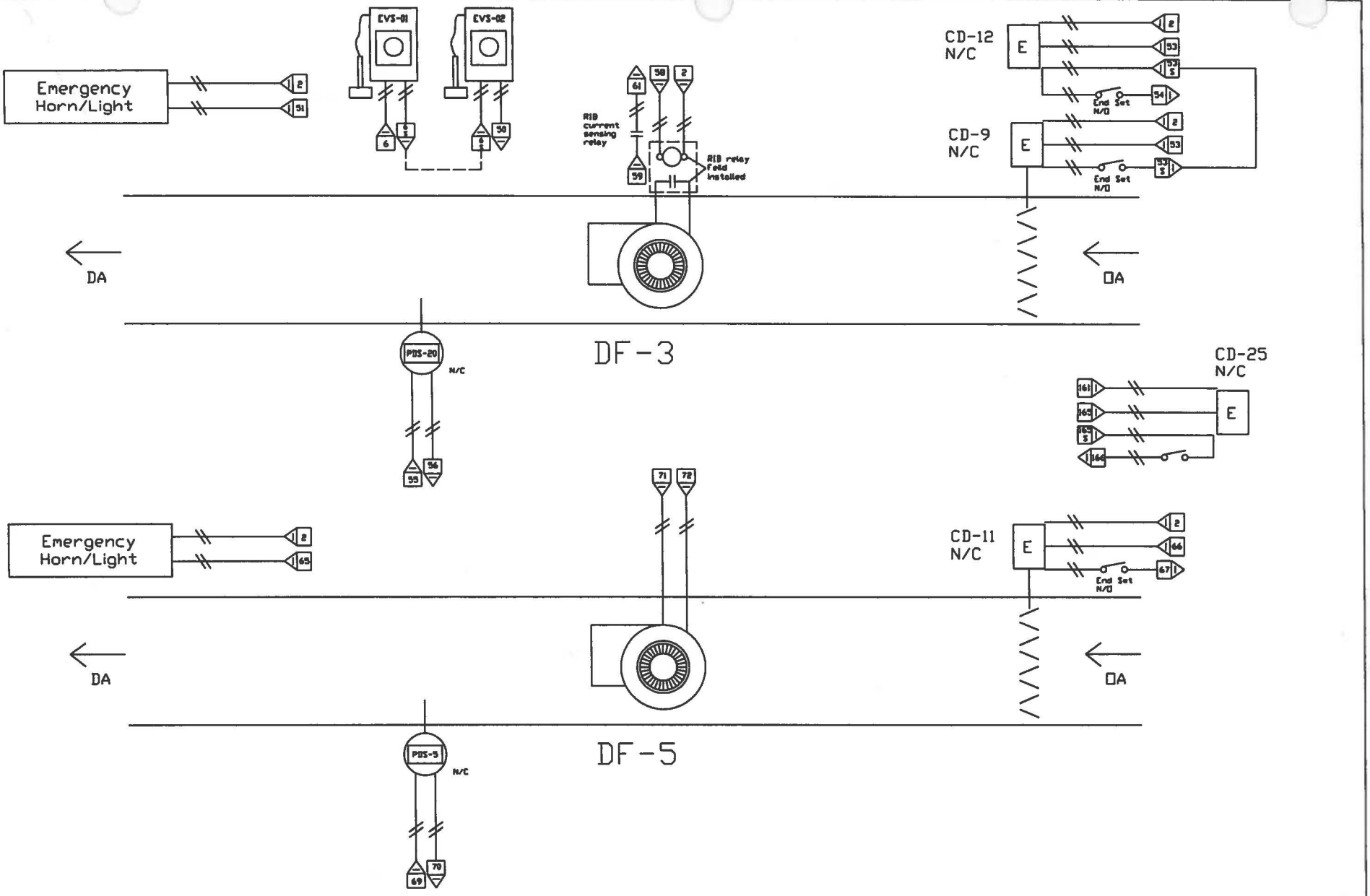
Geneva Water Treatment
Control Schematic for DF-12/TF-1
D79001



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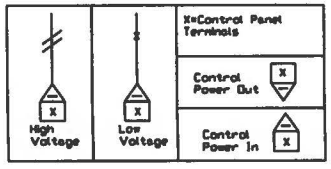

CC-Cooling Coil
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PDS-Pressure Differential Switch
RA-Return Air
SMD-Smoke Detector

Fritch Refrigeration	
SCALE: NONE	DRAWN BY: dlv/fritch
DATE: 08-14-06	REVISED: 12-07-07
Geneva Water Treatment	
Control Schematic for DF-3/DF-5	DWG NUMBER: D79001

Sequence of Operation
AHU 3

Control

Fan is controlled by a hand-off-auto switch located on the face of TCP-2 and a cooling only thermostat (T-14) located in associated zone.

If hand-off-auto switch is in auto position and zone temperature is above T-14 set point CD-34 open and proves, (via end switch) which energizes CR1 fan relay and DF-4 interlock relay. When zone-cooling demand is satisfied CD-34 springs closed and fans are de-energize.

If hand-off-auto switch is in on position fan is energized using the same sequence as auto mode except ignores T-14 and runs continuously.

If hand-off-auto switch is in off position fan does not run under any circumstances.

Alarms

In the event SMD-2 is in alarm AHU 3, DF-4, MAU 1, DF-3 and DF-5 fans will be de-energized and associated dampers will spring closed. An alarm light will illuminate on the remote test station located adjacent to TCP 2 and a contact closures will be made for PCS. A restart timer TMR-1(0-30 min.) on the face of TCP 2 for each AHU can be set to by pass alarm and allow unit to operate normally until time runs out or alarm is cleared.

In the event any of the emergency ventilation switches EVS-03, EVS-04 or EVS-05 are activated, AHU 3, DF-4, MAU 1, DF-3 and DF-5 fans will be de-energized and associated dampers will spring closed. An alarm light will illuminate on the face of TCP 2 and a contact closures will be made for PCS.

In the event high static differential switch (PDS-1) is trips. AHU 3 and DF-4 will be de-energizes and there associated dampers will spring closed. A manual reset at PDS-1 will need to be made after problem is resolved to put equipment back in service.

In the event dirty filter switch (PDS-11) exceeds its preset value, an alarm light on the face of TCP 2 will illuminate.

Sequence of Operation
AHU 4

Control

An on-off switch located on the face of TCP-2 controls fan and a heat-cool thermostat (T-19) located in associated zone.

When on-off switch is in the on position unit shall be energized and control damper CD-42 opens and proves, (via end switch) which energizes CR5 fan relay. DF-14 interlock circuit 88 is also energized at this time.
T-19 is above cooling set point CU-1 is energized. When cooling demand is satisfied, CU-1 is de-energized. Fan continuous until on-off switch is turned to the off position or there is an alarm present.
T-19 is below heating set point, and the on off switch is in the on position, FUR-3 shall be energized and staged on as required. When heat demand is satisfied FUR-3 will be de-energized. Fan continues to run.

Alarms

In the event SMD-1 is in alarm AHU 4 and DF-14 fans will be de-energized and associated dampers will spring closed, in addition fire dampers FSD-1, FSD-2 and FSD-3 will be de-energized and spring closed. An alarm light will illuminate on the remote test station located adjacent to TCP 2 and a contact closure will be made for PCS. A restart timer (TMR-3) on the face of TCP 2 can be set to by pass alarm and allow unit to operate normally until time runs out or alarm is cleared.

In the event high static differential switch (PDS-18) is trips. AHU 4 and DF-14 will be de-energizes and there associated dampers will spring closed. A manual reset at PDS-18 will need to be made after problem is resolved to put equipment back in service.

In the event that airflow of the equipment is not attained or is loss as determined by pressure differential flow switch (PDS-3) after a 0- 5 min. delay on start up start up, than a air flow alarm light will illuminate on the face of TCP 2, a contact closure will be made for PCS and an audible alarm will sound at each room entrance where applicable.

In the event dirty filter switch (PDS-14) exceeds its preset value, an alarm light on the face of TCP 2 will illuminate.

In the event the freeze stat (T-40) falls below its set point 3 minutes after supply fan starts, AHU 4 and DF-14 will be de-energizes and there associated dampers will spring closed. An alarm light will illuminate on the face of TCP 2 and a contact closure will be made for PCS. Control switch on face of panel must be turned off then on again to clear the alarm for retry.

Sequence of Operation
MAU 1

Control

Unit is controlled by, On-Off / Winter-Summer switch located on the face of TCP 2.

When the switch is placed in the on position, control damper (CD-36) opens and proves position (via end switch) which energizes CR2 relay to start fan. In addition DF-3 and DF-5 will be energized if there control switches are in auto position.

When in the off position CD-36 will spring closed, supply fan and auto circuit to DF-3 and DF-5 will be de-energized.

When the summer-winter switch is placed in winter position, the supply air thermostat (T-11) shall modulate the burner to maintain a 60 degree supply air set point.

When in the summer position the heating shall be locked out.

Alarms

In the event SMD-2 is in alarm AHU 3, DF-4, MAU 1, DF-3 and DF-5 fans will be de-energized and associated dampers will spring closed. An alarm light will illuminate on the remote test station located adjacent to TCP 2 and a contact closures will be made for PCS. A restart timer (0-30 min.) on the face of TCP 1 for each AHU can be set to by pass alarm and allow unit to operate normally until time runs out or alarm is cleared.

In the event any of the emergency ventilation switches EVS-03, EVS-04 or EVS-05 are activated, AHU 3, DF-4, MAU 1, DF-3 and DF-5 fans will be de-energized and associated dampers will spring closed. An alarm light will illuminate on the face of TCP 2 and a contact closures will be made for PCS.

In the event high static differential switch (PDS-4) exceeds its set point. MAU 1, DF-3 and DF-5 will be de-energizes and there associated dampers will spring closed. A manual reset at PDS-4 will need to be made after problem is resolved to put equipment back in service.

In the event dirty filter switch (PDS-12) exceeds its preset value, an alarm light on the face of TCP 2 will illuminate.

In event air flow is not proven (PDS-2) with in 3 minutes after supply fan is energized, an alarm light will illuminate on the face of TCP 2 and a contact closures will be made for PCS.
In addition a visual alarm will illuminate and audible alarm will sound as indicated on drawing. Fan will continue to run and try for airflow. If airflow is established alarm will clear automatically. To manually clear airflow alarm system switch must be turned off and then on again to retry.

In the event the freeze stat (T-39) falls below its set point 3 minutes after supply fan starts. MAU 1, DF-3 and DF-5 will be de-energizes and there associated dampers will spring closed. An alarm light will illuminate on the face of TCP 2 and a contact closures will be made for PCS. Control switch on face of panel must be turned off then on again to clear the alarm for retry.

Sequence of Operation
DF-3 / DF -5

DF-3 Control

Fan is controlled by a hand-off-auto switch located on the face of TCP-2

If hand-off-auto switch is in auto position and MAU 1 interlock circuit 33 in TCP-2 is energized, CD-9 opens and proves (via end switch) and energizes CR3 fan relay to start supply fan.

If hand-off-auto switch is in on position fan starts using the same sequence as auto mode, but ignores MAU-1 interlock signal and runs continuously.

If hand-off-auto switch is in off position fan does not run under any circumstances.

Alarms

In the event any of the emergency ventilation switches EVS-01 or EVS-02 are activated, DF 3, supply fan will be de-energized and associated dampers will spring closed. In addition a visual alarm will illuminate and audible alarm will sound as indicated on drawing.

In event airflow is not proven (PDS-20) with in 3 minutes after supply fan is energized, an alarm light will illuminate on the face of TCP 2 and a contact closures will be made for PCS.
In addition a visual alarm will illuminate and audible alarm will sound as indicated on drawing. Fan will continue to run and try for airflow. If airflow is established alarm will clear automatically. To manually clear airflow alarm system switch must be turned off and then on again to retry.

DF-5 Control

Fan is controlled by a hand-off-auto switch located on the face of TCP-2

If hand-off-auto switch is in auto position and MAU 1 interlock circuit 33 in TCP-2 is energized, CD-11 open and prove (via end switch) and energizes CR3 fan relay to start supply fan.

If hand-off-auto switch is in on position fan starts using the same sequence as auto mode, but ignores MAU-1 interlock signal and runs continuously.

If hand-off-auto switch is in off position fan does not run under any circumstances.

Alarms

In event airflow is not proven via PDS-5 with in 3 minutes after supply fan is energized, an alarm light will illuminate on the face of TCP 2 and a contact closures will be made for PCS.
In addition a visual alarm will illuminate and audible alarm will sound as indicated on drawing. Fan will continue to run and try for airflow. If airflow is established alarm will clear automatically. To manually clear airflow alarm system switch must be turned off and then on again to retry.

Sequence of Operation
DF-12 / TF -1

DF-12 Control

Fan is controlled by a hand-off-auto switch located on the face of TCP-2 and a cooling only thermostat (T-37) located in associated zone.

If hand-off-auto switch is in auto position and zone temperature is above T-37 set point CD-33, 35, 37 and 43 open and prove (via end switches in series) and energizes CR7 fan relay. When zone cooling demand is satisfied dampers spring closed and fan is de-energized.

If hand-off-auto switch is in on position fan starts using the same sequence as auto mode except ignores T-37 and runs continuously.

If hand-off-auto switch is in off position fan does not run under any circumstances.

In the event of SMD-9 alarm for areas the DF-12 servers, DF-12 will be de-energized and an alarm light will illuminate on the remote test station located adjacent to TCP-2.

TF-1 Control

Fan is controlled by a hand-off-auto switch located on the face of TCP-2 and a cooling only thermostat (T-22) located in associated zone.

If hand-off-auto switch is in auto position and zone temperature is above T-22 set point CD-13, 14 and 38 open and prove (via end switches in series) and energizes CR8 fan relay. When zone cooling demand is satisfied dampers spring closed and fan is de-energized.

If hand-off-auto switch is in on position fan starts using the same sequence as auto mode except ignores T-22 and runs continuously.

If hand-off-auto switch is in off position fan does not run under any circumstances.

In the event of SMD-10 alarm for areas the TF-1 servers, TF-1 will be de-energized and an alarm light will illuminate on the remote test station located adjacent to TCP-2.

Sequence of Operation
DF-14

Control

A hand-off-auto switch located on the face of TCP-2 controls DF-14 fan.

When hand-off-auto switch is in auto position DF-14 will cycle on and off with AHU-4 supply fan via 88 interlock circuit in TCP2. Before fan is energized CD-39 opens and proves (via end switch) and energizes CR6 fan relay to start supply fan.

If hand-off-auto switch is in on position fan starts using the same sequence as auto mode and runs continuously.

If hand-off-auto switch is in off position fan does not run under any circumstances.

Alarms

In the event SMD-1 is in alarm AHU 4 and DF-14 fans will be de-energized and associated dampers will spring closed, in addition fire dampers FSD-1, FSD-2 and FSD-2 will be de-energized and spring closed. An alarm light will illuminate on the remote test station located adjacent to TCP 2 and a contact closure will be made for PCS. A restart timer TMR-3 (0-30 min.) on the face of TCP 2 can be set to by pass alarm and allow unit to operate normally until time runs out or alarm is cleared.

In the event high static differential switch (PDS-19) exceeds its preset value. DF-14 will be de-energizes and its associated damper will spring closed. A manual reset at PDS-19 will need to be made after problem is resolved to put equipment back in service.

In the event dirty filter switch (PDS-13) exceeds its preset value, an alarm light on the face of TCP 2 will illuminate.

INSTRUCTIONS TO BIDDERS, GENERAL CONDITIONS

AND SPECIAL PROVISIONS

CITY OF GENEVA - 2023

WATER TREATMENT PLANT

HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT

RE-BID

Date: June 7, 2023

Name of Company: _____

Bid Opening Date: Monday, July 10, 2023

Location and Address: Ms. Stephanie Dawkins
City Administrator
City of Geneva
22 South First Street
Geneva, IL 60134

Time: 10:00 am

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SECTION 00020

ADVERTISEMENT FOR BIDS

Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID CITY OF GENEVA 2023

Sealed **Bids** submitted in duplicate in a sealed envelope with the words "Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID" clearly marked on it, will be received by the City of Geneva, Illinois until **10:00 A.M. Monday July 10, 2023** at the office of the City Administrator, 22 South First Street, Geneva, IL, 60134 and will be publicly opened and read aloud at that time. The proposed project consists of Supply and Installation of HVAC Equipment at the Water Treatment Plant. Additionally, On-Site Training and Future Maintenance Plan is included in this request. All appurtenant construction in accordance with the Plans and Specifications for said work is included.

A Non-Mandatory [but Highly-Recommended] Pre-Bid Meeting will conducted at the Water Treatment Plant on Thursday, June 22, 2023 at 10:30 am. The Water Treatment Plant is located at 4000 Keslinger Road, Geneva, IL 60134.
All Attendees should be sure to sign the sign-in sheet for this Pre-Bid Meeting.

The Contractor and sub-Contractors shall pay not less than the current prevailing wages at the time of the signing of the contract as found by the Department of Labor or as determined by the Court of Appeal, to all his/her employees performing work under the Contract. A signed certification stating the above as well as the fact that the bidder is not barred from bidding as a result of a violation of either Section 33E-3 or 33E-4 of Chapter 38, Illinois Revised Statues, 1987 (as amended) must be submitted by the successful bidder as part of this contract.
Further, the City is interested in retaining a General Contractor who has a working office within a 50-mile radius of the project site.

The Plan and Project Specifications and Contract Document are available on-line at www.questcdn.com Project # 8551120. All interested contractors will be required to pay $35.00 to purchase these project documents.

All **Bids** shall be submitted in accordance with the Instructions for Bidders and shall be accompanied by a **10% Bid** guarantee consisting of a bid bond, as provided for under terms of said Instructions for Bidders and Specifications. Complete instructions for filing Bids are included in the Instructions for Bidders.

The City reserves the right to reject any or all **Bids** and waive technicalities.

City of Geneva, Illinois
Stephanie Dawkins
City Administrator

Dated this 07 day of June 2023

SECTION 00100

INSTRUCTIONS FOR BIDDERS

WATER TREATMENT PLANT HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT: RE-BID
CITY OF GENEVA
2023

Certain additional terms used in these Instructions for Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.

Bidder - one who submits a Bid directly to Owner as distinct from a sub-bidder, who submits a bid to a Bidder.

Issuing Office - the office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

Successful Bidder - the lowest, responsible and responsive Bidder to whom Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award.

Article 1. Qualifications of Bidders

1.1 To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit within five days after Bid opening, upon Owner's request, detailed written evidence such as financial data, previous experience, present commitments, and other such data as may be called for. **Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the contract.**
Further, the City of Geneva is interested in retaining a General Contractor who has a working office within a 100-mile radius of the project site. Training and Support with the newly installed HVAC System by the Selected Contractor is a High-Priority to the City of Geneva.

The investigation of a Bidder will seek to determine whether the organization is adequate in size, has had previous experience and whether available equipment and financial resources are adequate to assure Owner that the Work will be completed in accordance with the terms of the Agreement. The amount of other work to which the Bidder is committed may also be considered.

1.2 **Each Bid shall contain 5 similar recently completed projects with references. And Each Bid shall contain the resume of the proposed project manager and site superintendent.** In evaluating Bids, Owner will consider the qualifications of only those Bidders whose Bids are in compliance with the prescribed requirements.

1.3 Owner reserves the right to reject any Bid if the evidence submitted by, or the investigation of, such Bidder fails to satisfy Owner that such Bidder is properly qualified to carry out the obligations of the Contract Documents and to complete the Work contemplated therein.

1.4 Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the Work as to which the identity of Subcontractors and other persons and organizations must be submitted as described herein.

Article 2. Copies of Contract Documents

2.1 Complete sets of Contract Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

2.2 **Each Bidder shall submit two (2) copies of the Bid Documents**.

2.3 The Owner and Engineer, in making copies of Contact Documents available, do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

Article 3. Examination of Contract Documents and Site

3.1 Before submitting a Bid, each Bidder must (a) examine the Contract Documents, including Addenda, thoroughly, (b) visit the project sites to become familiar with local conditions that may in any manner affect cost, progress or performance of the work, (c) become familiar with Federal, State and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the Work, (d) study and carefully correlate Bidder's observations with the requirements of the Contract Documents, and (e) satisfy themselves of the accuracy of the estimated quantities in the Bid Schedule.

3.2 Before submitting a Bid, Bidders may, at their own expense, make such investigations and tests as they may deem necessary to determine their Bid for performance of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

3.3 ***A Non-Mandatory [Highly Recommended] Pre-Bid Meeting will be conducted at the Water Treatment Plant on Thursday, June 22, 2023 at 10:30 am.*** The Water Treatment Plant is located at 4000 Keslinger Road, Geneva, IL 60134. All attendees shall sign the sign-in sheet.

3.4 The lands upon which the work is to be performed, rights-of-way for access thereto and other lands designated for use by Contractor in performing the work are identified in the Specifications, Special Provisions or on the Drawings.

3.5 The submission of a Bid will constitute an incontrovertible representation that the Bidder has complied with every requirement of this Article 3 and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

Article 4. Interpretations

4.1 All questions about the meaning or intent of the Contract Documents shall be received in writing to Engineering Solutions Team, 4708 Main Street, Suite 202, Lisle, IL 60532 (630) 796-2064 www.engineeringsolutionsteam.net at least five (5) days before the date set herein for the opening of bids. Questions received by the Engineer less than five (5) business days prior to the date for opening of Bids will not be answered.

4.2 Written clarifications or interpretations will be issued by Addenda not later than two days before the bid opening date. Only questions answered by formal written Addenda will be binding. Oral and other clarifications or interpretations will be without legal effect. Addenda will be sent by delivery service with return receipt requested or by FAX, to all parties recorded as having received the Contract Documents.

4.3 Bidders are responsible for determining that they have received all Addenda issued.

Article 5. Bid Security

5.1 Each Bidder shall deposit with his Bid a Bid guarantee consisting of a **bid bond** executed by the Bidder in an amount not less than **10%** of the total amount of the Bid submitted. Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located. The bid security shall act as a guarantee that in case the Bidder's proposal is accepted, the Bidder shall within ten (10) days after the date of such acceptance and notification thereof, deliver to the Owner a contract signed and executed by the Contractor and a responsible bonding company acceptable to and written upon forms prepared or approved by the Owner.

Article 6. Bid Form

6.1 Each Bid shall be submitted on the Bid Form on the pages included in the Contract Documents. The Bid Form shall be removed and submitted separately. All blank spaces for Bid prices must be filled in with the unit price of the item or the lump sum for which the Bid is made.

6.2 Bid Forms shall be completed in ink or by typewriter. The Bid price of each item on the form shall be stated in figures.

6.3 Bids by corporations shall be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

6.4 Bids by partnership shall be executed in the partnership name and signed by a partner, whose title shall appear under the signature. The official address of the partnership shall be shown below the signature.

6.5 All names shall be typed or printed below the signature.

6.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form).

6.7 The address to which communications regarding the Bid are to be directed shall be shown.

6.8 A Bid which includes for any item a Bid Price that is abnormally low or high may be rejected as unbalanced.

6.9 A conditional or qualified Bid will not be accepted.

Article 7. Receipt of Bids

7.1 Sealed Bids will be received by the City of Geneva, Illinois, on the 10th day of July, 2023, up to the hour of 10:00 o'clock A.M., Prevailing Time, and then at said office PUBLICLY OPENED AND READ ALOUD.

7.2 Each Bid must be submitted in a sealed envelope addressed to Ms. Stephanie Dawkins, City Administrator, City of Geneva. Each sealed envelope containing a Bid must be plainly marked on the outside as "**Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID**", and the envelope should bear on the outside the name of the Bidder and their address. If forwarded by mail, the sealed envelope containing the Bid must be enclosed in another envelope, addressed to the City Administrator at 22 South First Street, Geneva, Illinois 60134.

7.3 Owner may consider informal any Bid not prepared and submitted in accordance with the provisions hereof.

7.4 Bidders are cautioned that it is the responsibility of each individual bidder to assure that their bid is in the possession of the responsible official, or the designated alternate, prior to the stated time and at the place of the Bid Opening. Owner is not responsible for bids delayed by mail and/or delivery services, of any nature.

Article 8. Modification and Withdrawal of Bids

8.1 Bids may be modified only by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

8.2 Bids may be withdrawn prior to the scheduled time (or authorized postponement thereof) for the opening of Bids.

8.3 Any Bid received after the time and date specified shall not be considered. No Bid may be withdrawn for a period of 90 days after the actual date of the opening of the Bids. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the Owner and the Bidder.

8.4 If the Bidder modifies, limits, restricts or subjects his Bid to conditions that would change the requirements of the Plans and Specifications, this would be considered a conditional or qualified bid and the Bid will not be accepted.

Article 9. Performance, Payment and Other Bonds

9.1 A Performance Bond and a Payment Bond, each in the amount of 100 percent of the Contract Price, with a corporate surety approved by the Owner will be required for the faithful performance of the contract.

9.2 All Bonds required as Contract Security shall be furnished with the executed Agreement.

9.3 Attorneys-in-fact who sign Payment Bonds and Performance Bonds must file with each Bond a certified and effective dated copy of their power of attorney.

Article 10. Award of Contract

10.1 The Contract will be awarded to the lowest responsive, responsible and eligible Bidder (Successful Bidder) for the project determined by the Owner to be in the Owner's best interest.

Responsive Bidders will provide bids for the unit or lump sum price for each item set forth on the Bid Form, and for each alternate project feature addition. Responsive Bidders may also provide bids for each alternate equipment manufacturer listed as described in the Bid Form and selected by the Bidder.

The term "lowest responsive, responsible and eligible Bidder" as used herein shall mean the Bidder whose Bid is the lowest of those Bidders possessing the skill, ability and integrity necessary to the faithful performance of the Work and submits a Bid meeting all requirements.

10.2 The Contract will be awarded on the basis of material and equipment described in the Contract Documents without consideration of possible substitute or "or equal" items. Whenever it is indicated in the Contract Documents that a substitute or "or equal" item of material or equipment may be furnished or used by the Bidder, if acceptable to the Engineer, application for such acceptance will not be considered by the Engineer until after the "effective date of the Agreement."

10.3 Owner reserves the right to reject any and all Bids, to waive any and all informalities if it is in Owner's best interest to do so, and the right to disregard all nonconforming, nonresponsive or conditional Bids.

10.4 Owner also reserves the right to reject the Bid of any Bidder that Owner considers to be unqualified relative to Article 1 above.

10.5 If the Contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within 5 days, after the actual date of the opening of the Bids.

10.6 The party to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond, Payment Bond, and required insurance within ten (10) calendar days from the date of when the Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Agreement and Bond forms.

Article 11. Execution of Agreement

11.1 When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by at least five unsigned copies of the Agreement and all other applicable Contract Documents. Within 5 days, excluding Saturdays, Sundays and legal holidays, after the date of receipt of such notification Contractor shall execute and return all copies of the Agreement and all other applicable Contract Documents to Owner.

11.2 The Owner within ten (10) days after receipt of acceptable Performance Bond, Payment Bond, required insurance, and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the Owner not execute the Agreement within such period, the Bidder may send Written Notice to withdraw their signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

11.3 The Notice to Proceed shall be issued within ten (10) days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the Owner and Contractor. If the Notice to Proceed has not been issued within the ten (10) day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

11.4 In case of failure of the Bidder to execute and provide all agreements, bonds and insurance as required by the Contract Documents, the Owner may at their option consider the Bidder in default, and the amount of the security submitted with the Bid shall be forfeited as liquidated damages. However, nothing shall be construed herein to prevent the Owner from electing to claim and prove damages in excess of the bid security.

11.5 Because time is of the essence regarding the work under this contract, the Contractor shall initiate work within 10 days of the receipt of the Notice to Proceed by the Contractor.

Article 12. Safety and Health Regulations

12.1 This project is subject to the Safety and Health Regulations (CFR 29, Part 1926 and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974 and CFR 29, Part 1910, General Industry Safety and Health Regulations Identified as Applicable to Construction.

12.2 The Successful Bidder shall comply with the Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL-91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL-91-54).

12.3 The Successful Bidder shall have a competent person or persons, as required under the Occupational Safety and Health Act on the Site to inspect the work and to supervise the conformance of the Work with the regulations of the Act.

Article 13. Prevailing Wages for Kane County

13.1 The prevailing wage rates from Kane County, Illinois shall apply.

Article 14. Nondiscrimination in Employment

14.1 Contracts for work under this Project will obligate the Contractor and Subcontractors not to discriminate in employment practices.

14.2 The Contractor assures the Owner that they are an "Equal Opportunity Employer" as defined by Federal and State laws and regulations and agrees to comply with the Illinois Employment Practice Commission Equal Opportunity Clause as required by Article II of the Illinois FEPC Rules and Regulations, which is considered to be part of any contract or purchase agreement.

14.3 The Contractor certifies that the firm has a written sexual harassment policy defining sexual harassment as required in Section 2-105 of the IL. Human Rights Act 775 ILCA 5/1-105 et.seq.

Article 15. State Sales Tax

15.1 Sales tax will not have to be paid on equipment and material purchased for this project. Tax Exempt Form can be obtained from the City of Geneva.

Article 16. Liquidated Damages

16.1 Provisions for Liquidated Damages are set forth in the Agreement

Article 17. General

17.1 The Contract Documents contain the provisions required for the construction of the Project. Information obtained from an officer, agent, employee of the Owner, or any other person shall not affect the risks or obligations assumed by the Contractor, or relieve them from fulfilling any of the conditions of the Contract.

17.2 The low Bidder shall submit the names of the major subcontractors (contracts in excess of $5,000). Failure to comply with this requirement may make the Bidder non-responsive as determined by the Owner. The Owner shall receive the list of the subcontractors by 2:00 P.M., prevailing time, on the day after Bids are received by the Owner, at City of Geneva Public Works, 1800 South Street, Geneva, IL60134 Attention Bob VanGyseghem. Office 630-232-1551 Fax 630-232 1503

17.3 Certification that Contractor is not barred from public contracting due to bid-rigging or bid rotation convictions must accompany the Bid.

17.4 The lands upon which the work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by the Contractor.

17.5 **The Interested Contractor's Bid shall include the following:**

- **Two [2] Complete Fully Executed Copies of the Bid and Proposal.**
- **10% Bid Bond.**
- **Evidence of the Contractor's Qualifications to work in Illinois. And evidence of a working office within a 100-mile radius of the Work Site.**
- **Five [5] similar recently completed projects with references.**
- **Resumes of the proposed Project Manager and Site Superintendent.**

AND,
The Following is a checklist of items that also must be submitted and included with the Bid.

Bidder's Checklist of Items to Assist with Bid Submittal

1. **Bid Security**: 10% of the Bid, attach to last page of Bid Form Section 00300

2. **Completed Bid Form**

1. All names filled in appropriate blanks.
2. Acknowledge receipt of Addenda.
3. Price Schedule filled out.
4. Bid Signed by Officers.

3. **Completed Sections 00310, 00315, 00320**

a. Drug Free Workplace Certification – Section 00310
b. Certification of Compliance with Safety Regulations – Section 00310
c. Certification of No Tax Delinquency and No Tax Default – Section 00310
d. Certification of Compliance with Sexual Harassment Policies – Section 00310
e. Certification of Non-Segregated Facilities – Section 00310
f. Anti-Bid Rigging Certification – Section 00315
g. Certification of Debarment, Suspension and Other Responsibility Matters – Section 00320

4. **Completed Affidavit of Experience Section 00330**

5. **List of Subcontractors by 2:00 p.m. the day after receipt of bids, Section 00300 - Page 6**

6. **Completed Affidavit of Litigation History Section 00335**

END OF SECTION

SECTION 00300

BID FORM

Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID CITY OF GENEVA 2023

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of Illinois, doing business as _____ (insert "A Corporation," "A Partnership," or "An Individual," as applicable) to the City of Geneva (hereinafter called "Owner").

I. The undersigned BIDDER proposes and agrees, if this bid is accepted, to enter into an agreement with the Owner in the form in the Bidding Documents to perform and furnish all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

II. BIDDER accepts all of the terms and conditions of the Advertisement for Bids and Instructions for Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that BIDDER may agree to in writing upon request of Owner.

III. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

A. BIDDER has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

B. BIDDER has visited the site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, performance, and furnishing of the Work.

C. BIDDER is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. BIDDER has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or

relating to existing surface or subsurface structures at or contiguous to the Site. BIDDER acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information or data shown or indicated in the Bidding Documents with respect to Underground Facilities at or contiguous to the Site.

E. BIDDER is aware of the general nature of Work to be performed by Owner and others at the site that relates to Work for which this Bid is submitted as indicated in the Bidding Documents.

F. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

G. BIDDER has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that BIDDER has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to BIDDER.

H. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.

IV. By submission of the bid, each BIDDER further certifies, and in the case of a joint bid each party thereto certifies as to his own organization, that in connection with the bid:

A. The prices in the bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

B. Unless otherwise required by law, the prices which have been quoted in the bid have not knowingly been disclosed by the bidder, prior to opening, directly or indirectly to any other bidder or competitor; and

C. No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition.

V. Each person signing the Bid certifies that:

A. They are the person in the BIDDER's organization responsible within that organization for the decision as to the prices being bid and that he has not participated, and will not participate, in any action contrary to (4) above; or

B. They are not the person in the BIDDER's organization responsible within that organization for the decision as to the prices being bid, but that they have been authorized to act as an agent for the persons responsible for such decision in certifying that such persons have not participated, and will not participate, in any action contrary to (4) above, and as their agent shall so certify; and shall also certify that he has not participated, and will not participate, in any action contrary to (4) above.

VI. BIDDER will complete the Work in accordance with the Bidding Documents for the following price(s):

ITEM NO	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
100.	MOBILIZATION	1	LS		
200.	DEMOLITION	1	LS		
300.	SUPPLY PROPOSED EQUIPMENT	1	LS		
400.	INSTALL PROPOSEED EQUIPMENT	1	LS		
500.	RESTORATION	1	LS		
600.	TRAINING	1	LS		
	TOTAL PROJECT COSTS				
1000.	MAINTENANCE PLAN				

NOTES:

1. OWNER RESERVES THE RIGHT TO DELETE ANY BID ITEMS WHICH ARE NOT IN THE BEST INTEREST OF THE OWNER. THE OWNER ALSO HAS THE RIGHT TO REDUCE ANY QUANTITIES IN ORDER TO KEEP THE PROJECT UNDER THE BUDGETED VALUE FOR THE FISCAL YEAR.

2. **BIDDER agrees that the Work will be Substantially Complete on October 27, 2023 and will meet Final Completion November 20, 2023.**

3. BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

4. The Owner reserves the right to reject all Bids.

5. Accompanying this Bid is a Bid Security in the amount of $ _____, which is hereby tendered in accordance with the requirements of the Instructions to Bidders and the Specifications.

6. In the event that this Bid is accepted and an award of contract is made to the undersigned BIDDER, the undersigned does hereby covenant and agree to deliver to the Owner the signed and executed Contract and Bonds as specified in the Instructions for Bidders and the Specifications.

VI. BIDDER will complete the Work in accordance with the Bidding Documents for the following price(s):

ITEM NO	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
100.	MOBILIZATION	1	LS		
200.	DEMOLITION	1	LS		
300.	SUPPLY PROPOSED EQUIPMENT	1	LS		
400.	INSTALL PROPOSEED EQUIPMENT	1	LS		
500.	RESTORATION	1	LS		
600.	TRAINING	1	LS		
	TOTAL PROJECT COSTS				
1000.	MAINTENANCE PLAN				

NOTES:

1. OWNER RESERVES THE RIGHT TO DELETE ANY BID ITEMS WHICH ARE NOT IN THE BEST INTEREST OF THE OWNER. THE OWNER ALSO HAS THE RIGHT TO REDUCE ANY QUANTITIES IN ORDER TO KEEP THE PROJECT UNDER THE BUDGETED VALUE FOR THE FISCAL YEAR.

2. **BIDDER agrees that the Work will be Substantially Complete on October 27, 2023 and will meet Final Completion November 20, 2023.**

3. BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

4. The Owner reserves the right to reject all Bids.

5. Accompanying this Bid is a Bid Security in the amount of $ _____, which is hereby tendered in accordance with the requirements of the Instructions to Bidders and the Specifications.

6. In the event that this Bid is accepted and an award of contract is made to the undersigned BIDDER, the undersigned does hereby covenant and agree to deliver to the Owner the signed and executed Contract and Bonds as specified in the Instructions for Bidders and the Specifications.

7. The undersigned further agrees to begin work within ten (10) days after the executions and acceptance of the Contract, and thereafter to carry on the work diligently and continuously in such manner as to insure final completion and delivery to the Owner of the entire work or equipment under contract in accordance with the provisions of the Contract.

Witness _____ Hand(s) and Seal _____ this _____ day of _____, 202__.

If an individual, sign and give address

_____

Address_____

If a partnership, sign all individual names and give address of each partner

_____

_____
Partnership Name

Address_____

Name and Addresses of Individual Partners

_____

_____

_____

_____

If a corporation, officers duly authorized should sign, attach corporate seal

Corporate Name

Address_____

_____

By_____

Attest:

_____
Secretary

Corporate Seal

Contact Phone Number of Bidder: _____

Subcontracted Work

To be submitted the day after Bids are received by 2:00 p.m., prevailing time, to Geneva Public Works 1800 South Street, Geneva, IL 60134 Attention Bob VanGyseghem

The following subcontractors will be utilized for portions of the project work. **Changes shall not be made subsequent to the Bid unless change(s) is approved by the Owner.**

Subcontractor	Work to be Performed	Estimated Dollar Amount

ATTACH BID SECURITY TO THIS PAGE

USING A PAPER CLIP

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SECTION 00310

GENERAL CERTIFICATIONS

The undersigned, as duly-authorized representative of the Contractor, hereby certifies to the City of Geneva, that regarding this project known as **Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID.**

The Following General Certifications are required:

- **Drug Free Workplace Certification**
- **Certification of Compliance with Safety Regulations**
- **Certification of No Tax Delinquency and No Tax Default**
- **Certification of Compliance with Sexual Harassment Policies**
- **Certification of Non-Segregated Facilities**
- **Certificate of Compliance with Prevailing Wage Rate Act**

---

1. DRUG FREE WORKPLACE CERTIFICATION

The Contractor ensures that they operate a drug free environment and that drugs are not allowed in the workplace or satellite locations as well as City of Geneva project locations in accordance with the Drug Free Workplace Act of January, 1992.

2. CERTIFICATION OF COMPLIANCE WITH SAFETY REGULATIONS

The Contractor is fully aware of and able to comply with all Local, State, and Federal Safety and other Laws, Codes, and Regulations applicable for the construction of the Project.

3. CERTIFICATION OF NO TAX DELIQUENCY AND NO TAX DEFAULT

The Contractor is not currently delinquent in the payment of any tax administered by or owed to the Illinois Department of Revenue, or otherwise in default upon any such tax as defined under 65 ILCS 5/11-42.1-1, or if it is:

a. It is contesting its liability for the tax or the amount of tax in accordance with procedures established by the appropriate Revenue Act; or

b. It has entered into an agreement with the Department of Revenue for payment of all taxes due and is currently in compliance with that agreement.

4. CERTIFICATION OF COMPLIANCE WITH SEXUAL HARASSMENT POLICIES

The Contractor has a written sexual harassment policy in place in full compliance with all applicable state and local laws and policies.

5. CERTIFICATION OF NON-SEGREGATED FACILITIES

The federally assisted construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term 'segregated facilities' means any waiting rooms, work areas, restrooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom or otherwise. The federally assisted construction contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that he will retain such certification in his files.

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Subscribed and sworn to:

_____
Notary Public

before me this _____ day of _____, 2023.

_____
Authorized Agent of Contractor

_____
Title

_____
Company

_____
Date

6. CERTIFICATE OF COMPLIANCE WITH PREVAILING WAGE RATE ACT

The undersigned, upon being first duly sworn, hereby certifies to the City of Geneva, Kane County, Illinois, that all work under this contract shall

comply with the Illinois Prevailing Wage Act, 820 ILCS 130/.01, et. seq, (the "Act") and

current City ordinance, to the extent required by law. Contractors shall submit monthly certified

payroll records to the City.

The undersigned, upon being first duly sworn, hereby certifies to the City of Geneva, Kane County, Illinois, that the bidder will file their substance

abuse prevention plan.

_____
Name of Contractor

By:

State of _____),
ss.
County of _____)

Subscribed and sworn to
before me this _____ day
of_____,_____.

Notary Public

END OF SECTION

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SECTION 00315

CERTIFICATION OF COMPLIANCE WITH CRIMINAL CODE OF 1961

WHEREAS, a conviction for the offense of bid-rigging or bid rotating bars a person or entity from bidding on public contracts (720 ILCS 5/33D-11), and

WHEREAS, Section 33E-11 of the Criminal Code (720 ILCS 5/33E-11) requires bidders and contractors to certify on a form provided by the unit of local government or school district that they are not barred from public contracting due to bid-rigging or bid rotating convictions.

I, _____, do hereby certify that:
Name

1. I am _____of the _____
Position Firm

and have authority to execute this certification on behalf of the firm;

2. This firm is not barred from bidding on or entering into public contracts due to having been convicted of bid-rigging or bid rotating under paragraphs 720 ILCS 5/33E-11 of the Illinois Criminal Code. The undersigned also certifies that no officers or employees of the bidder or contractor have been so convicted and that the bidder or contractor is not the successor company or a new company created by the offices or owners of one so convicted. It is further certified that any such conviction occurring after the date of this certification will be reported to the above named public body, in writing, with seven (7) days of such conviction, if it occurs during any bidding process, contract term or otherwise prior to entering into any contract therewith.

Name of Firm _____

Signature _____

Title _____

Date _____

Corporate Seal (where appropriate)

On this _____ day of _____, 20__, before me appeared (Name) _____ to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (Name of Firm)
to execute the affidavit and did so as his or her free act and deed.

Notary Public _____ Commission Expires

Notary Seal

END OF SECTION

SECTION 00330

AFFIDAVIT OF EXPERIENCE

Water Treatment Plant HVAC System Rehabilitation & Modernization Project:
RE-BID
CITY OF GENEVA
2023

STATE OF _____)
)SS
COUNTY OF _____)

_____, hereinafter called Principal, Corporation, Partnership or Individual and which has done work for the following parties of the general kind and approximate magnitude under this contract:

Name of Owner	**Phone #**	**Job Description**	**$ Amount**

and that _____ (Name of said Principal, Corporation, Partnership, or Individuals) available for immediate use on the proposed work the following plant and equipment:

CERTIFICATION:

CONTRACTOR

BY: _____

NAME: _____ **(PRINCIPAL)**

TITLE: _____

ADDRESS: _____

CONTRACTORS CORPORATE SEAL

ATTEST

BY: _____

NAME: _____ **(NOTARY PUBLIC)**

ADDRESS: _____

END OF SECTION

SECTION 00335
AFFIDAVIT OF LITIGATION HISTORY

WATER TREATMENT PLANT HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT: RE-BID
CITY OF GENEVA
2023

STATE OF _____)
)SS
COUNTY OF _____)

I,_____, on oath state that the information presented below is a complete accounting of the last ten years of litigation history for the Contractor:

YEAR	CASE/ DOCKET NUMBER	COURT OF JURISDICTION	INDICATE IF CONTRACTOR WAS PLAINTIFF OR DEFENDANT	INDICATE THE NAME OF THE OPPOSING PARTY Or PARTIES	DISPOSITION OF CASE INDICATE MONETARY AWARD TO PLAINTIFF/DEFENDANT/ OR SETTLEMENT OR CURRENTLY ONGOING

Add additional pages if necessary.

CERTIFICATION:

CONTRACTOR

BY: _____

(PRINCIPAL)

NAME: _____

TITLE: _____

ADDRESS _____

CONTRACTOR CORPORATE SEAL

ATTEST

BY: _____

(PRINCIPAL SECRETARY)

NAME: _____

TITLE: _____

ADDRESS: _____

SUBSCRIBED AND SWORN TO
Before me this _____ day of
_____, 202__.

_____
Notary Public

END OF SECTION

SECTION 00400

AGREEMENT

Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID
CITY OF GENEVA
2023

This Agreement, made this _____ day of _____, 2023 by and between the City of Geneva, hereinafter called "Owner", and _____, doing business as a Corporation, hereinafter called "Contractor."

Witnesseth: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The Contractor will commence and complete the construction of the **Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID.**

2. The Contractor will furnish all of the material, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the Project described herein.

3. The Contractor will commence the work required by the Contract Documents within ten (10) calendar days after the date of the Notice to Proceed. The Contractor will Substantially Complete the Work by **_____, 2023** and will meet Final Completion by **_____, 2023**, unless the period for completion is extended otherwise by the Contract Documents.

4. The Contractor agrees to perform all of the Work described in the Contract Documents and comply with the terms therein for the sum of $_____, as shown in the Bid Form - Section 00300.

5. The term "Contract Documents" means and includes the following:
   - A. Advertisement for Bids
   - A. Instructions for Bidders
   - B. Bid Form
   - C. This Agreement
   - D. Notice of Award
   - E. Notice to Proceed
   - F. Change Order Form
   - G. Performance Bond
   - H. Payment Bond
   - I. Certificates of Insurance
   - J. Certifications (various)
   - K. Specifications prepared or issued by Engineering Solutions Team.
   - L. Drawings prepared by Engineering Solutions Team.

   M. Addenda:

No. _____, dated_____, 2023
No. _____, dated_____, 2023
No. _____, dated_____, 2023

N. Any modification, including Change Orders, duly delivered after execution of Agreement.

6. The Owner will pay to the Contractor in the manner and at such times as set forth in the Special Provisions, such amounts as required by the Contract Documents.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

8. Owner and Contractor recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in paragraph 3 above, plus any extensions thereof allowed in accordance with the Contract Documents. The Contractor also recognizes the difficulties involved in proving the actual loss suffered by the Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Contractor shall pay the cost of engineering time, construction observation time, construction management time and any other costs associated with such delay for each day that expires after the time specified in paragraph 3 for Substantial Completion until the work is substantially complete. After Substantial Completion, if contractor shall neglect, refuse or fail to complete the remaining Work within the time specified in paragraph 3 for completion and readiness for final payment, contractor shall pay the cost of engineering time, construction observation time, construction management time and any other costs associated with such delay for each day that expires after the time specified in paragraph 3 for completion and readiness for final payment.

In witness whereof, the parties hereto have executed or caused to be executed by their duly authorized officials this Agreement in **quadruplicate** each of which shall be deemed an original on the date first above written.

Owner:

City of Geneva

By:_____
Name:_____

(Seal)

Title:_____

Attest:

Name:_____

Title:_____

Contractor:

_____

By:_____
Name:_____

(Seal)

Title:_____
_

Attest:

Name:_____

Title:_____

END OF SECTION

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SECTION 00410

NOTICE OF AWARD

Water Treatment Plant HVAC System Rehabilitation & Modernization Project:
RE-BID
CITY OF GENEVA
2023

To: _____
_____
_____

Date: _____, 2023

The Owner has considered the Bid submitted by you for the above described **WORK** in response to its Advertisement for Bids and Instructions for Bidders.

You are hereby notified that your Bid has been accepted in the amount of $_____.

You are required by the Instructions for Bidders to execute the Agreement and furnish the required Contractor's Performance Bond, Payment Bond, and certificates of insurance within ten (10) calendar days from the date of this Notice of Award to you.

If you fail to execute said Agreement and to furnish said Bonds and certificates of insurance within ten (10) days from the date of this Notice of Award, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Bid as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner.

City of Geneva

NAME: _____

TITLE: _____

DATE: _____

ACCEPTANCE OF NOTICE

Receipt of the above **NOTICE TO AWARD** is hereby acknowledged:

CONTRACTOR: _____

NAME: _____

TITLE: _____

DATE: _____

END OF SECTION

SECTION 00420

NOTICE TO PROCEED

It is anticipated that the Notice to Proceed will be issued to the Selected Contractor by the City of Geneva, on or around August 1, 2023.

Water Treatment Plant HVAC System Rehabilitation & Modernization Project: Re-BID
CITY OF GENEVA
2023

To:
_____
_____
_____

Date: _____, 2023

You are hereby notified to commence WORK in accordance with the Agreement dated _____and you are to have the WORK Substantially Complete by **_____2023** and meet Final Completion by **_____, 2023**.

City of Geneva

NAME: _____

TITLE: _____

DATE: _____

ACCEPTANCE OF NOTICE

Receipt of the above **NOTICE TO PROCEED** is hereby acknowledged:

CONTRACTOR: _____

NAME: _____

TITLE: _____

DATE: _____

END OF SECTION

SECTION 00530

CHANGE ORDER

Change Order No. _____

Date: _____

Agreement Date: _____

Name of Project: Water Treatment Plant HVAC System Rehab/Modernization Project: RE-BID

OWNER: CITY OF GENEVA

CONTRACTOR: _____

The following changes are hereby made to the CONTRACT DOCUMENTS:

Justification:

Change to the CONTRACT PRICE: $ _____

Original CONTRACT PRICE: $ _____

Current CONTRACT PRICE adjusted by previous CHANGE ORDER: $ _____

The CONTRACT PRICE due to this CHANGE ORDER will be

(Increased) (Decreased) By : $ _____

The new CONTRACT PRICE including this CHANGE ORDER will be $ _____

Change to CONTRACT TIME:

The CONTRACT TIME will be (Increased) (Decreased) by _____ Calendar Days.

The Date for Completion of all work will be (Date) _____

Approvals Required: To be effective this Order must be approved by the Federal Agency if it changes the scope or objective of the PROJECT.

Requested by: _____

Recommended by: _____

Ordered by: _____

Accepted by: _____

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SECTION 00605

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that:

NAME OF CONTRACTOR_____

ADDRESS OF CONTRACTOR_____

a Corporation, hereinafter called Principal, and

NAME OF SURETY _____

ADDRESS OF SURETY _____

_____

Hereinafter called Surety, are held and firmly bound unto the **CITY OF GENEVA**, hereinafter Called **OWNER**, in the penal sum of $_____, in lawful money of the United States, For the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the **OWNER**, dated the _____ day of_____, 2023, a copy of which is hereto attached and made a part hereof for the construction of the **Water Treatment Plant HVAC system Rehabilitation & Modernization Project: RE-BID.**

NOW, THEREFORE, if the Principal shall promptly make payment in all persons, firms, **SUBCONTRACTORS**, and corporations furnishing materials for or performing labor in the prosecution of the **WORK** provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such **WORK**, and all insurance premiums on said **WORK,** and for all labor performed in such **WORK** whether by **SUBCONTRACTOR** or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the **WORK** to be performed thereunder or the **SPECIFICATIONS** accompanying the same shall in any way affect its obligation on this **BOND**, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the **WORK** or to the **SPECIFICATIONS.**

PROVIDED, FURTHER, that no final settlement between the **OWNER** and the **CONTRACTOR** shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

In witness whereof, this instrument is executed in four [4] counterparts, each of which shall be deemed an original, this the _____ day of _____, 2023.

CONTRACTOR

BY: _____

NAME:_____

TITLE: _____

ADDRESS: _____

CONTRACTORS CORPORATE SEAL

ATTEST

BY: _____

NAME:_____

TITLE: _____

ADDRESS: _____

WITNESS AS TO PRINCIPAL

BY: _____

NAME:_____

TITLE: _____

ADDRESS: _____

SURETY

BY: _____

[ATTORNEY IN FACT]

NAME:_____

[ATTACH VERIFICATIONOF POWER OF ATTORNEY]

_____

ADDRESS: _____

SURETY CORPORATE SEAL

WITNESS AS TO SURETY

BY: _____

NAME:_____

ADDRESS: _____

NOTE: Date of BOND must not be prior to date of Contract. IF CONTRACTOR is Partnership, all Partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current line [Circular 570 as amended] and be authorized to transact business in the State where the PROJECT is located.

END OF SECTION

SECTION 00610

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that:

NAME OF
CONTRACTOR

ADDRESS OF
CONTRACTOR

a Corporation, hereinafter called Principal, and

NAME OF SURETY _____

ADDRESS OF SURETY _____
_____

Hereinafter called Surety, are held and firmly bound unto the **CITY OF GENEVA**, hereinafter Called **OWNER**, in the penal sum of $_____, in lawful money of the United States, For the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the **OWNER**, dated the _____ day of_____, 2023, a copy of which is hereto attached and made a part hereof for the construction of the **Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID.**

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the **OWNER**, with or without Notice of the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the **OWNER** from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the **OWNER** all outlay and expense which the **OWNER** may incur in making good any default, then his obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the **WORK** to be performed thereunder or the **SPECIFICATIONS** accompanying the same shall in any wise affect its obligation on this **BOND,** and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the **WORK** or to the **SPECIFICATIONS.**

PROVIDED, FURTHER, that no final settlement between the **OWNER** and the **CONTRACTOR** shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 4 counterparts, each of which shall be deemed an original, this the _____ day of _____, 2023.

Any suit under this bond must be instituted before the expiration of the Statute of Limitations applicable to any claim against the contractor named herein.

CONTRACTOR

BY: _____

NAME: _____

TITLE: _____

ADDRESS: _____

CONTRACTORS CORPORATE SEAL

ATTEST

BY: _____

[PRINCIPAL SECRETARY]

NAME:_____

TITLE: _____

ADDRESS: _____

WITNESS AS TO PRINCIPAL

BY: _____

NAME:_____

TITLE: _____

ADDRESS: _____

SURETY

BY: _____

[ATTORNEY IN FACT]

NAME:_____

[ATTACH VERIFICATIONOF POWER OF ATTORNEY]

_____

ADDRESS: _____

SURETY CORPORATE SEAL

WITNESS AS TO SURETY

BY: _____

NAME:_____

ADDRESS: _____

NOTE: Date of BOND must not be prior to date of Contract. IF CONTRACTOR is Partnership, all Partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current line [Circular 570 as amended] and be authorized to transact business in the State where the PROJECT is located.

END OF SECTION

Water Treatment Plant HVAC System Rehabilitation & Modernization Project:
RE-BID
City of Geneva

SPECIAL PROVISIONS

The following Special Provisions supplement the General Conditions, Supplementary Conditions, "Standard Specifications for Water and Sewer Construction in Illinois, 7th Edition" (hereinafter referred to as the "Standard Specifications"), the "Standard Specifications for Road and Bridge Construction", adopted April 1, 2016, and "Supplemental Specifications and Recurring Special Provisions", adopted January 1, 2021 by the Illinois Department of Transportation (hereinafter referred to as the "I.D.O.T. Specifications"), the "Manual on Uniform Traffic Control Devices", and the "Illinois Urban Manual", included herein by reference which apply to and govern the proposed improvement.

In case of conflict with any part or parts of said General Conditions, Supplementary Conditions, Standard Specifications and I.D.O.T. Specifications, these Special Provisions shall take precedence and shall govern. In case of conflict between the Standard Specifications and the I.D.O.T. Specifications, the Standard Specifications shall take precedence and shall govern.

SP-1 EXECUTION OF CONTRACT

1. Contractor warrants that it has reviewed the Contract Documents, including any plans, specifications and reports, has inspected the project site, and has satisfied itself as to the conditions under which the Work is to be performed, including any subsurface or otherwise latent conditions. Contractor understands that the conditions it encounters may differ from those anticipated and agrees to bear the risk of such difference in conditions. Neither the time in which the Work is to be performed, nor the cost of performing such Work, shall be increased because of unforeseen or unanticipated site or project conditions.

2. The procedures, methods, and materials agreed to in the Contract Documents shall not be deviated from without the written consent of the Owner.

3. The Owner reserves the right of approval over all procedures, methods, and materials to be employed by the Contractor or its subcontractors for this Work.

4. In performing the Work hereunder, it is understood that the Contractor is acting as an independent Contractor and that its employees, agents, and representatives and those of any and all subcontractors which it retains in the Work hereunder shall not be deemed, for any purpose, to be agents, servants, and/or employees of the Engineer or Owner.

   Contractor shall perform the Work as an independent Contractor and all of its employees engaged in the performance of the Work shall be supervised and controlled exclusively by the Contractor.

   Contractor shall not delegate or assign the obligation of this Contract without prior written approval of the Owner.

5. Contractor warrants that its Work shall be free from defects and shall be suitable for the use intended. In the event that any deficiencies in the Contractor's Work are discovered within one year after completion of the project, Contractor shall, at its sole cost, repair or replace any defective work, including repair of any portion of the project or property damaged by repair, replacement or repetition of defective work. This warranty is in addition to any other remedy which Engineer may have for any defective work of Contractor.

6. The individual or individuals signing this Contract on behalf of the Contractor warrants that they are authorized to bind Contractor to this Contract and guarantee Contractor's performance of the Work set forth under this Contract.

7. The Owner, without prejudice to any other remedy, may correct any defects or deficiencies in the Work of Contractor at the expense of Contractor. Should any tests not otherwise required by this Contract be necessary to inspect or test the Work of Contractor, Contractor shall pay for the cost of the tests if the Work is found not to be in accordance with the requirements of this Contractor, or is otherwise defective.

8. Time is of the essence. Contractor shall schedule its work and that of its Subcontractors to meet requirements of Owner.

9. Contractor shall not divulge information concerning any portion of the Work or the results of any tests, nor shall it provide copies of any reports made pursuant to this Contract, without prior written approval of the Owner, or as required by law.

10. This Contract may be terminated by Owner on fourteen days written notice to Contractor. Contractor shall be paid for all Work performed prior to termination, less the cost of remedying any defective work performed by Contractor. The indemnification, insurance liens, and job site safety obligations survive termination of this Contract.

11. Contractor agrees to defend, indemnify and hold harmless Owner, its officials, trustees, employees, Engineer, and agents from and against any and all claims, damages, liability, suits, actions and expenses, including reasonable attorney's fees, relating to any and all losses or damages sustained by or alleged to have been sustained by any person, including employees of parties hereto, and arising or allegedly arising from Contractor's performance or failure to perform the services set forth in this Agreement and/or the Work regardless of whether or not concurrently caused by the negligence of Owner, except that Contractor shall not be required to defend, indemnify and hold harmless and indemnified Party from claims, damages or liability caused by the sole negligence or willful misconduct of the indemnified Party. In the event that any such claim, action, cause of action or lawsuit is brought or filed, the indemnified Party and its officials, trustees, employees, Engineer and agents sued thereunder, shall have the right to determine the attorney of its, his, hers or their choice to present and defend their interests in any legal or administrative action, all at the Contractor's expense pursuant to this Contract. The duration of the indemnification hereunder shall be indefinite.

12. Contractor shall be solely responsible for the safety of persons or property on, or adjacent to, the job site. Contractor shall be responsible for his/her activity and that of any of its Subcontractors, employees or agents on the job site with respect to job site safety. Neither

the professional activities nor the presence of Engineer or its employees and Subcontractors shall be understood to control the operations of others.

The Contractor shall arrange for all of its employees who will be working on the site to take any appropriate safety and health training courses applicable for the site conditions. The costs and expenses of the employees taking such course shall be paid by Contractor.

Contractor is responsible for providing, at its own expense, all personal protective clothing and equipment required for its employees to perform their Work in a safe manner and in compliance with all applicable local, state, and federal laws and regulations including, but not limited to Occupational Safety and Health Administration (OSHA) standards. Contractor is responsible for ensuring that such equipment is in good condition and is properly inspected and maintained. In cases where a Job Safety Plan or equivalent document (e.g., Health and Safety Plan) has been prepared and adopted by the Owner, Contractor must, at a minimum, use the equipment and follow the procedures described in that plan. This does not relieve the Contractor of the responsibility to provide equipment and institute procedures affording a greater degree of protection than those specified in the Job Safety Plan, if such equipment and procedures are necessary for the Contractor to perform its tasks in a safe manner and in compliance with applicable local, state, and federal regulations.

13. Contractor shall discharge at once or bond otherwise secure against all liens and attachments which are filed in connection with the services, and Contractor shall indemnify and save Engineer, and the Owner of the premises on which the services are performed, or to which the services relate, harmless from and against any and all loss, damage, liability and claims thereof resulting from such liens and attachments.

14. This is the final and complete Contract Documents between Contractor and Owner and supersedes any prior Contract Documents, whether written or oral. Should any portion of these Contract Documents be held invalid, the remaining portions shall continue as if the invalid portions had not been part of these Contract Documents.

15. The Instructions to Bidders, the Specifications and amendments thereto, the Addenda, the Proposal as accepted by the Owner, the Special Provisions, the Project Plans or Drawings, Contract, Contractor's Bonds, Notice to Proceed, Notice of Award, Advertisement for Bids, Certificates of Insurance and all certifications of Contractor regarding eligibility to enter into public contracts, certifications regarding maintenance of sexual harassment policy and certifications regarding absences of tax delinquencies shall form part of this Contract and the provision thereof shall be as binding upon the parties as if they were fully set forth herein. The Index, titles, headings, running headlines and marginal notes contained herein and in said Contract Documents are solely to facilitate various provisions of the Contract Documents and in no way affect, limit or cast light upon the interpretations of the provisions to which they refer. Whenever the term "Contract Documents" is used, it shall mean and include this Contract, the Instructions to Bidders, the enumerated plans, specifications and amendments thereto, the Addenda, the Proposal, the Special Provisions, Insurance certificates, written Change Orders, and the Contractor's proposal incorporating all post-bid discussions and all other documents set forth herein and in the Specifications.

16. The Contract Documents are complementary, and any Work called for by any part thereof shall be executed as part of the Contract in the same manner as if called for in all parts. Therefore, all Work that may be called for in the Specifications and not shown on the Plans, shall be executed and furnished by the Contractor as if described in both of these documents. Should any work or material be required which are not denoted in the Plans, Specifications, or other Contract Documents either directly or indirectly, but which are necessary for the proper carrying out of the intent thereof, the Contractor shall perform all Work and furnish all materials as fully as if they were particularly described. Likewise, any contradictory clauses between any of the Contract Documents shall be resolved by the Engineer or Owner. The Engineer or Owner's interpretation of these contradictory clauses shall be final.

17. All work covered by the Contract is to be performed under the general direction, supervision, and responsibility of the Contractor but shall be subject to inspection and final acceptance by the Owner.

    The Contractor agrees that it shall carry on said Work at its own risk until the same is fully completed and accepted, and shall, in case of any accident, destruction, or injury to the Work and/or materials before its final completion and acceptance, repair, or replace forthwith the Work and/or materials so injured, damaged, or destroyed, at its own expense and to the satisfaction of the Owner.

18. Contractor shall not subcontract the whole or any part of said Work without the written consent of the Owner having been first obtained, which consent shall not be unreasonably withheld by the Owner.

19. Contractor shall cooperate with others performing services for the Owner in connection with any Work in the same location.

20. The Contractor shall be responsible for obtaining all permits necessary for moving equipment over the city or county streets and state highways. The Contractor shall pay all charges and fees, the cost of which will be included in the Contract price for the Work.

21. The Contractor shall comply with all laws, ordinances, rules, and regulations of governmental authorities affecting the conduct of the proposed Work. Before the completion of the Contract, the Contractor shall furnish to the Owner any and all certificates of approval resulting from required inspections.

22. Contractor shall warrant that all services under this Contract will be performed in accordance with the Contract Documents and in a professional manner with the skill and care which would be exercised by qualified contractors. Contractor will perform again, at its own cost and expense, any portion of the services provided herein that do not meet the standards set forth in this paragraph. Contractor warrants that all equipment it provides will be in good condition when consigned to the job and that its personnel will be capable of performing the tasks to which they are assigned. Contractor further warrants that it understands the risks of exposure to waste, which are presented to persons, property, and the environment by the tasks encompassed by the Contract and that it will fully comply with all applicable federal, state, and local laws.

23. The adequacy of all safeguards is the responsibility of the Contractor. All material and services furnished by the Contractor shall be in compliance with the provisions of the Federal Occupational Safety and Health Act (OSHA) and the regulations and standards promulgated by the Secretary of Labor thereunder.

24. The Contractor agrees that due care shall be used throughout the Work; and that whenever plans, drawings, or specifications, or any of them for any part of the Work, are in its opinion faulty or at variance with each other or with any applicable rules, regulations, or ordinances, or are such as will, if followed, result in construction which is or will be unsafe, imperfect, insecure, or violative of any applicable rules, regulations, or ordinances, the Contractor shall promptly stop Work on the part of the Work affected thereby and notify the Engineer in writing of such opinion and in what respect said plans, drawings, or specifications are insufficient or improper, and shall not proceed with the part of the Work so criticized until a written order has been received from the Engineer directing what is to be done and when to proceed. Additionally, the Contractor shall:

    A. Be responsible for repairing any damage to any man-made structure, walkway, etc. arising in connection with the Work performed.

    B. Bear the responsibility for repairing and/or replacing any equipment or materials damaged by the Contractor or any of its Subcontractors.

    C. Post warning signs adjacent to all Work areas indicating any hazards as the construction progresses.

    D. Provide necessary temporary lighting, wiring, globes, guard lights, barricades, or any other items required by regulations, standards, or laws established for public protection and safety or to facilitate the Work.

25. The Contractor shall be responsible for providing a level of security that will ensure control, accountability, and protection to the Work area, tools, materials, and equipment involved in the execution of this Contract.

26. The Contractor, its employees, agents, representatives, and Subcontractors shall not discuss, offer comment, or opinions concerning the Work, or disclose results without the consent of the Owner. This requirement shall apply to the Contractor with regard to disclosures to members of the general public and public and private media.

27. The Contractor shall not display any signs, posters, or other advertising matter in or on the Work or on or around the Site thereof without the specified approval in writing by the Owner.

28. In addition, no advertising copy mentioning the Owner or Engineer or quoting the opinions of any of its employees may be released unless such copy is approved by the Owner or Engineer before release.

29. Contractor in performing Work shall comply and shall require compliance by its Subcontractors with all applicable laws and regulations. Contractor shall not take and is not authorized to take any action in the name of or otherwise on behalf of the Owner which

would violate applicable laws or regulations. If Contractor or its Subcontractors perform any part of the Work contrary to applicable laws or regulations, any additional costs resulting therefrom shall be for Contractor's account.

30. Contractor shall make reasonable efforts to discover any conflicts between applicable laws or regulations and job specification and shall promptly notify the Engineer of any conflicts it discovers. Contractor shall not proceed with the part of the Work in conflict without prior written notice from the Engineer that (1) the job specification has been revised to comply with the applicable laws and regulations, or (2) the Contractor has negotiated an approval or variance in the law or regulation with the appropriate governmental authority or agency. Additional costs resulting from Contractor's proceedings without such notice shall be for the Contractor's account.

31. Contractor shall not enter into negotiations with any governmental authority or agency to develop variances or revisions to laws or regulations without the Owner's prior written approval.

32. Contractor shall defend the Engineer and Owner from all claims, suits, or proceedings brought against the Engineer or Owner and which arise or occur by reason of any alleged violation or violations of applicable law or regulation by Contractor or its Subcontractors in the performance of Work. Contractor shall indemnify and hold the Engineer and Owner harmless from liability or penalty imposed by reason of such alleged violation or violations of applicable law or regulation.

33. If there is a conflict between any provision of the Contract and applicable law, the latter shall prevail; but, in such event, the provisions of the Contract affected shall be curtailed and limited only to the extent necessary to conform with applicable law.

SP-2 GENERAL

All work shall conform to the Ordinances and Regulations of the City of Geneva, the Illinois Environmental Protection Agency, and other regulatory agencies having jurisdiction over this project, the Standard Specifications, and these Special Provisions. Copies of the plans and specifications must be kept on the job site. Failure to comply with this provision shall be considered cause to stop the job.

All materials used in construction shall be certified as to type and quantity by ticket, invoice, or other written means from the source of supply, except as otherwise provided for by these Special Provisions.

All work shall be constructed in accordance with the limits as shown on the drawings or as given by the Engineer. Responsibility for keeping alignment shall belong to the Contractor. Limits shall be set by the Engineer as construction progresses. The Contractor shall use limit references, as established by the Engineer, to establish his own working or construction limits as required at his own expense and shall be solely responsible for the accuracy thereof. The Contractor's work shall be subject to check and review of the Engineer. The Contractor shall safeguard all property corners, monuments, and bench marks adjacent to but not related to the work, and if required shall bear the cost of restoring these if damaged or moved during construction.

Specified coating products shall meet the minimum volatile organic compound (VOC) content limits for Architectural Coatings as specified by the Architectural Coatings Rule found at 40 CFR Part 59 (Table 1) published September 11, 1998 by the United States Environmental Protection Agency.

SP-3 PRECONSTRUCTION CONFERENCE

Following the award of the Contract, the Contractor will be required to attend a Preconstruction Conference prior to beginning work. At this time, the Contractor will be required to furnish and discuss the following:

- Written progress schedule and beginning of work
- Names of Project Manager and Field Superintendent including the name and phone number of a responsible individual who can be reached 24 hours a day
- Names of subcontractors and material suppliers
- Protection of pavement and property
- Phasing of the Work
- Location of construction trailer and materials.

SP-4 INCIDENTAL WORK

All work shown or called for on the Plans and in the Specifications shall be incidental to the various bid items in the Proposal even though a specific item is not shown, and no additional compensation shall be made to the Contractor, unless it is indicated in the Special Provisions that additional payment will be allowed, or a unit price is provided for said work in the Bid Proposal.

SP-5 SAFETY

Add the following paragraphs to Section 7.19 of the Standard Specifications:

> *"The general contractor, and all subcontractors employed on this project by the general contractor, shall at all times observe safe working conditions as outlined in the Safety and Health Regulations for Construction, Department of Labor, Bureau of Labor Standards, as published in Volume 36 Number 75 of the Federal Register dated Saturday, April 17, 1971; the Occupational Safety and Health Act of 1970 (PL 91-596) and the Rules and Regulations promulgated thereunder."*
>
> *"All subcontractors employed by the general contractor, shall also observe the provisions of the Illinois Occupational Safety and Health Laws."*
>
> *"The Contractor shall be responsible for the cost of any fines levied against the Owner or the Engineer due to the Contractor's failure to comply with any safety regulations."*

SP-6 FINAL COMPLETION

The completion date is specified on page 3 of the Bid Form (00300-03). The Contractor shall complete all Work on or before the stipulated completion date, otherwise the Owner may proceed to collect liquidated damages described herein, and as per Section 8.11 of the Standard Specifications.

When a delay occurs causing stoppage of the Work due to unforeseen causes beyond the control and without the fault or negligence of the Contractor, including, but not restricted to acts of the public enemy, governmental acts, fires, floods, epidemics, strike, extraordinary delays in delivery of materials caused by strikes, lockouts, wrecks, freight embargoes, governmental acts, or acts of God, the completion date may be extended by the Owner.

An "Act of God" means an earthquake, flood, cyclone, or other cataclysmic phenomena of nature beyond the power of the Contractor to foresee or make preparation in defense against. Storms or other natural phenomenon of normal intensity, based on U.S. Weather Bureau reports, for the particular locality and for the particular season of the year in which the Work is being prosecuted, shall not be construed as an "Act of God" and no extension of Contract time will be granted for the delays resulting therefrom.

It shall be the responsibility of the Contractor to request in writing an extension of time for each delay event. Contractor shall make no claim against Owner, and no claim shall be allowed, for any damages which may arise out of any delay caused by Owner, its agents, employees or other contractors or Subcontractors. Contractor's sole remedy for delay from Owner shall be an extension in the Contract Time.

SP-7 HOURS OF WORK

The regular 8-hour day shall be considered to begin at 7:00 A.M. and end at 3:30 P.M. with a one-half (½) hour lunch period, or such other 8-hour period as may be mutually agreed upon by the Owner and the Contractor. It is further agreed that the regular 8-hour day, as established, shall apply to all subcontractors employed on the project.

No work will be permitted to start prior to 7:00 A.M. or after 8:00 P.M. on any day including the start up of heavy equipment, without prior approval from the Owner. The normal working day shall be Monday through Friday. Work on Saturday will be allowed only after formal permission from the Owner is obtained.

No work will be permitted on Sundays and/or Holidays.

SP-9 DAMAGE TO PROPERTY & RESTORATION

The Contractor shall be responsible to take all necessary precautions to prevent damage. Any damage to public or private property caused by the Work shall be the sole responsibility of the Contractor. Any repairs, restoration, or cleaning that is necessitated by project shall be the sole responsibility of the Contractor and shall not be paid for separately.

The Contractor is also responsible for any damaged caused by their vehicles, including ruts in unpaved areas.

All restoration shall not be paid for separately, and is incidental to the contract.

SP-10 CONTRACTOR'S IN SURANCE REQUIREMENTS

Bidders shall maintain to the satisfaction of the City all necessary and proper insurance for the duration of the work to be performed, including Comprehensive General Liability Insurance and Property Damage Insurance and Workers Compensation Insurance. **Bidders further agree, to furnish certificates of any or all insurance policies listing the City of Geneva and Engineering Solutions Team as a co-insured within seven [7] calendar days following the award of the Contract.**

City of Geneva

Insurance Requirements for Contractor

Water Treatment Plant HVAC System Rehabilitation & Modernization Project: RE-BID

I. Commercial Automobile Liability

"Any Auto"

$1,000,000. Each Accident

$1,000,000. Uninsured Motorist & Underinsured Motorist

II. Workers' Compensation & Employers Liability

Statutory Coverage A

Employers Liability Coverage B

Bodily Injury by Accident	$1,000,000 each Accident
Bodily Injury by Disease	$1,000,000 Policy Limit
Bodily Injury by Disease	$1,000,000 each Employee

Waiver of Subrogation in favor of: City of Geneva, its Public Officials, Officers, Trustees, Employees, Agents, Assigns and Volunteers.

III. Commercial General Liability

$1,000,000* per Occurrence
$2,000,000 * Annual Aggregate
$2,000,000 Products/Completed Operations Annual Aggregate

Including: Blanket Contractual Liability; Personal Injury; Per Project Aggregate Limit of Liability.

Additional Insured Endorsement:
Primate and Non-Contributory basis in favor of:

- **City of Geneva,** Its Public Officials, Officers, Trustees, Employees, Agents, Assigns, and Volunteers.
- **Engineering Solutions Team**, its Officers, Employees and Agents.

A copy of the Additional Insured endorsement should be included with the Certificate of Insurance, and evidence coverage for both On-Going and Completed Operations.

Waiver of Subrogation in favor of: City of Geneva, Its Public Officials, Officers, Trustees, Employees, Agents, Assigns, and Volunteers.

IV. Excess/Umbrella Liability

$5,000,000* each Occurrence
$5,000,000* Annual Aggregate
*Total Limits of Insurance may be satisfied by a combination of "Primary" and "Excess/Umbrella" Limits, but in no case should total Limits of Liability be less than:

Commercial Automobile Liability:	$5,000,000 each Accident
Employers Liability:	$5,000,000 each Occurrence
Commercial General Liability:	$5,000,000 each Occurrence
	$5,000,000 Annual Aggregate

Carrier Ratings shall not be less than A-VII

Certificate Holder Address: City of Geneva
22 S. First Street
Geneva, IL 60134

ACORD	"SAMPLE" CERTIFICATE OF LIABILITY INSURANCE	Date (MM/DD/YY)

PRODUCER FULLY COMPLETED	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.
	INSURERS AFFORDING COVERAGE
	Insurer A: Name of Insurance Company
INSURED FULLY COMPLETED	Insurer B: Name of Insurance Company
	Insurer C: Name of Insurance Company
	Insurer D: Name of Insurance Company
	Insurer E: Name of Insurance Company

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAME ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INS LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE Date (MM/DD/YY)	POLICY EXPIRATION Date (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY CG0001 ■ COMMERCIAL GENERAL LIABILITY ☐☐ CLAIMS MADE ■ OCCUR ☐ GEN. AGGREGATE LIMIT APPLIES PER: ☐ POLICY ■ PROJECT ☐ LOC	POLICY NUMBER	POLICY START DATE	POLICY END DATE	EACH OCCURRENCE	$ 1,000,000.
					FIRE DAMAGE (Any one fire)	$ 100,000.
					MED EXP (Any one person)	$ 5,000.
					PERSONAL & ADV INJURY	$ 1,000,000.
					GENERAL AGGREGATE	$ 2,000,000.
					PRODUCT-COMP/OP AGG	$ 2,000,000.
	AUTOMOBILE LIABILITY CA0001 ■ ANY AUTO ■ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ■ HIRED AUTOS ■ NON-OWNED AUTOS ☐ _____ ☐	POLICY NUMBER	POLICY START DATE	POLICY END DATE	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000.
					BODILY INJURY (Per person)	$
					BODILY INJURY (Per accident)	$
					PROPERTY DAMAGE (Per accident)	$
	GARAGE LIABILITY ☐ ANY AUTO ☐ _____	POLICY NUMBER	POLICY START DATE	POLICY END DATE	AUTO ONLY–EA ACCIDENT	$
					OTHER THAN AUTO ONLY: EA ACC	$
					AGG	$
	EXCESS LIABILITY ■ UMBRELLA LIAB ■ OCCUR ☐ DEDUCTIBLE ☐ RETENTION $	POLICY NUMBER	POLICY START DATE	POLICY END DATE	EACH OCCURRENCE	$ 5,000,000.
					AGGREGATE	$ 5,000,000.
						$
	WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY	POLICY NUMBER	POLICY START DATE	POLICY END DATE	■ WC STATU-TORY LIMITS OTHER	
					EACH ACCIDENT	$ 1,000,000.
					DISEASE-POLICY LIMIT	$ 1,000,000.
					DISEASE-EA EMPLOYEE	$ 1,000,000.
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

OWNER: CITY OF GENEVA:
PROJECT DESCRIPTION: **THE WATER TREATMENT PLANT HVAC UPGRADE PROJECT: RE-BID = GENEVA, IL**
"Certificate Holders" are "Additional Insureds" on a Primary Non-Contributory Basis with respect to the General Liability only. "Waiver of Subrogation" is provided on the Workers' Compensation coverage in favor of the CERTIFICATE HOLDER(S). No endorsements or additional forms shall modify or limit the coverage provided to the "ADDITIONAL" INSURED(S).

CERTIFICATE HOLDER ■ Additional Insured, Insurer Letter: ___	CANCELLATION
CITY OF GENEVA: including its officials, employees and volunteers. And, ENGINEERING SOLUTIONS TEAM: including its agents and employees.	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT.
	AUTHORIZED REPRESENTATIVE Authorized Signature

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SP-13 DISPOSAL OF DEBRIS

The Contractor shall remove all material resulting from the Work.

SP-14 WORKSITE PROTECTION

The Contractor shall provide all temporary enclosures, coverings, etc. for protection of the work and workmen until completion of the work; and shall provide all barricades, guards, and overhead protection in connection with the work and maintain them in satisfactory condition so long as they shall be required.

The Contractor shall provide and install any other protection required to properly safeguard the Owner's property, equipment, employees and the public, including obstruction lights, as required by conditions, on equipment or structures in connection with this Contract.

At the preconstruction meeting the Contractor shall furnish the name of the individual in his direct employment who is to be responsible for the installation and maintenance of the traffic control for this project. If the actual installation and maintenance are to be accomplished by a subcontractor, approval of said subcontractor shall be obtained from the owner at the time of the preconstruction meeting. This shall not relieve the Contractor of the foregoing requirement for a responsible individual in his direct employ to supervise this work. The Contractor shall provide a manned telephone on a continuous 24-hour-a-day basis to receive notification of any deficiencies regarding traffic control and protection and shall dispatch men, materials and equipment to correct any such deficiencies. The Contractor shall respond to any call from the Owner concerning any request for improving or correcting traffic control devices and begin making the requested repairs within two hours from time of notification.

SP-15 PAY ITEM SPECIAL PROVISIONS

ITEM #100: MOBILIZATION

Description: This work shall consist of preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site for the establishment of offices, buildings, and other facilities necessary for work on the project and for all other work or operations which must be performed or costs incurred when beginning work on the project. All costs associated with Demobilization for removal of personnel, equipment, supplies, and incidentals will also be included to the unit cost for MOBILIZATION.
The required work for MOBILIZATION will include the development, submittal, and approval of all Shop Drawings, Catalogue Cuts, Work Plans, and Project Schedules. The required details for the submittal of these items is presented in the Work Item Specifications Section of this Document.

Pre-Construction Video: This Work Item shall also include that the Contractor create a Pre-Construction Video of all areas to be affected by this construction project. Copy of this Video will be provided to the Owner and the Engineer prior to the beginning of any Demolition Work.

Method of Measurement: **MOBILIZATION** shall be measured on a **LUMP SUM** basis.

Basis of Payment: The work under this item will be paid for at the applicable contract lump sum price for **MOBILIZATION**, which price shall be payment in full for all Shop Drawings, Work Plans, Schedules, labor, materials, equipment, transportation, handling and incidental work necessary to Mobilization, as described in these Specifications and approved by the Engineer and the Owner.

ITEM #200: DEMOLITION

Description: This work shall consist of the removal and proper disposal of all old HVAC Equipment and the clearing and preparation of the Site for all New HVAC Equipment.
Any Special Temporary Created Access that is required to remove the old HVAC Equipment shall be performed in accordance with the approved Shop Drawings and Work Plans.
No Demolition work shall be initiated until the New HVAC Equipment is On-Site and with the Approval of the Owner AND the Engineer.
All Demolition Work shall be performed in accordance with this Plan and these Project Specifications and AIA General Specifications and in accordance with sound professional construction methods and with the Approval of the Engineer and the Owner.

Method of Measurement: **DEMOLITION** shall be measured on a **LUMP SUM** basis.

Basis of Payment: The work under this item will be paid for at the applicable contract lump sum price for **DEMOLITION**, which price shall be payment in full for all Equipment Removal and Disposal and Site Preparation including all labor, materials, equipment, transportation, handling and incidental work necessary for **DEMOLITION**, as described in these Specifications and approved by the Engineer and the Owner.

ITEM #300: SUPPLY PROPOSED EQUIPMENT

Description: This work shall consist of the ordering and delivery of all equipment shown on the Plan and listed below:

- Air Handlers Units (AHU)
  AHU1, AHU2, AHU4
- Makeup Air Handler (MAU)
  MAU-1
- Air Cooled Condensing Units (CU)
  CU1, CU2, CU4
- Gas Fired Duct Heaters (GFDH's)
  GFDH-1, GFDH-2, GFDH-4
- Split System Air Source Heat Pump (HP)
  HP-03
- Fan Coil Units (FCU's)
  FCU-03

Warranties: The Contractor provided Warranties for all supplied equipment will be as follows:

- General warranty periods shall be three (3) years from the date of substantial completion unless noted otherwise on drawings or in specifications.

Method of Measurement: **SUPPLY OF PROPOSED EQUIPMENT** shall be measured on a **LUMP SUM** basis. This Item will be inspected and require the Approval of both the Engineer and the Owner.

Basis of Payment: The work under this item will be paid for at the applicable contract lump sum price for **SUPPLY OF PROPOSED EQUIPMENT**, which price shall be payment in full for all supplied and delivered Equipment in accordance with this Plan and these Specifications.
*Further, it is intended that the payment for **SUPPLY OF PROPOSED EQUIPMENT** will be made in two [2] equal installments. First installment will be made upon approval of the Proposed HVAC Equipment Shop Drawings. Second Installment* will *be made upon delivery of Proposed HVAC Equipment to the Site and Approval by the Owner and the Engineer.*

ITEM #400: INSTALL PROPOSED EQUIPMENT

Description: Upon completion and Approval of Demolition. And, upon completion and Approval of Supply Proposed Equipment. The Contractor may then proceed with the **INSTALL PROPOSED EQUIPMENT.**
The Contractor shall proceed with the Installation in a workmanlike and professional manner. The Contractor shall Install the Proposed Equipment in accordance with this Plan and These Specifications and General AIA Specifications and with the approval of the Engineer and the Owner. Upon completion of **INSTALL PROPOSED EQUIPMENT,** the Contractor will turn on and operate all the newly provided and installed equipment to ensure that all equipment is in proper working order. This turn on and operation will be inspected and approved by BOTH the Engineer AND the Owner.

Method of Measurement: **INSTALL PROPOSED EQUIPMENT** shall be measured on a **LUMP SUM** basis. This Item will be inspected and require the Approval of both the Engineer and the Owner.

Basis of Payment: The work under this item will be paid for at the applicable contract lump sum price for **INSTALL PROPOSED EQUIPMENT**, which price shall be payment in full for all approved and accepted installation of provided Equipment in accordance with this Plan and these Specifications.

ITEM #500: RESTORATION

Description: Upon project completion the Contractor is responsible to Restore the complete Project site to conditions equal to or better than prior to the initiation of this Construction Project.
RESTORATION includes with affected project areas both inside and outside of the Building.
The **RESTORATION** requires the approval of both the Engineer and the Owner.

Method of Measurement: **RESTORATION** shall be measured on a **LUMP SUM** basis. This Item will be inspected and require the Approval of both the Engineer and the Owner.

Basis of Payment: The work under this item will be paid for at the applicable contract lump sum price for **RESTORATION**, which price shall be payment in full for complete site clean-up and set-up for future operations.

ITEM #600: TRAINING

Description: Upon project completion the Contractor is responsible to provide **TRAINING** to the Owner, to facilitate his complete and proper understanding of al the newly supplied and installed HVAC Equipment.
TRAINING will proceed in accordance with the contractor's proposed plan presented in his Proposal and agreed upon with the Owner.

Method of Measurement: **TRAINING** shall be measured and paid for on a **LUMP SUM** basis and at the applicable payment schedule as presented in the Contractor's Proposal. This Item will require the approval of the Owner.

Basis of Payment: The work under this item will be paid for at the applicable contract price lump sum price and at the applicable payment schedule as presented in the Contractor's Proposal for **TRAINING**, and as proposed and provided in the Contractor's Proposal, which price shall be payment in full for complete **TRAINING** to ensure the proper understanding by the OWNER of all new systems.

ITEM #1000: MAINTENANCE PLAN

Description: Upon project completion the Contractor will present a **MAINTENANCE PLAN** for the Owner's review and approval and acceptance.
The Owner is interested in working with a Contractor who supplies and provides an Annual **MAINTENANCE PLAN** to ensure that the newly provided and installed HVAC is properly maintained and continues to properly operate as intended for the Equipment's Lifespan.

Evaluation: *The Owner will evaluate the proposed **MAINTENANCE PLAN** by the Contractor. It is a priority of the Owner to establish a Professional Relationship with a solid and reputable and local company who will continue to assist the Owner with the proper operations of the New HVAC System.*

SP-16 WORK ITEM SPECIFICATIONS

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

C. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager'sandother tenants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of

technician and date refrigerant was recovered.

D. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.6 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.7 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials:

1. It is not expected that hazardous materials will be encountered in the Work.

    a. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

1. Roof system.

1.9 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS
PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Survey of Existing Conditions: Record existing conditions by use of measured drawings preconstruction photographs or video and templates.

1. Inventory and record the condition of items to be removed and salvaged.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
b. Equipment to Be Removed: Disconnect and cap services and remove equipment.
c. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

3.3 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.

5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 4 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition **and cleaned** and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least **3/4 inch** at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete

between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

D. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Motors.
2. Alignment guides and anchors.
3. Sleeves without waterstop.
4. Grout.
5. Silicone sealants.
6. Thermometers, filled system.
7. Thermometers, liquid in glass.
8. Thermometers, light activated.
9. Duct-thermometer mounting brackets.
10. Pressure gauges, dial type.
11. Gauge attachments.

1.2 DEFINITIONS

A. Existing Piping To Remain: Existing piping that is not to be removed and that is not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 ACTION SUBMITTALS

A. Product Data:

1. For each type of product, excluding motors which are included in Part 1 of HVAC equipment Sections.

a. Include construction details, material descriptions, and dimensions of individual components, and finishes.
b. Include operating characteristics and furnished accessories.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of expansion joint,meter,, and, gauge to include in operation and maintenance manuals.

1.5 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.

3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 MOTORS

A. Motor Requirements, General:

1. Content includes motors for use on alternating-current power systems of up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.
2. Comply with requirements in this Section except when stricter requirements are specified in equipment schedules or Sections.
3. Comply with NEMA MG 1 unless otherwise indicated.

B. Motor Characteristics:

1. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 ft. above sea level.
2. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

C. Polyphase Motors:

1. Description: NEMA MG 1, Design B, medium induction motor.
2. Efficiency: Premium Efficient, as defined in NEMA MG 1.
3. Service Factor: 1.15.
4. Multispeed Motors: Variable torque.

    a. For motors with 2:1 speed ratio, consequent pole, single winding.
    b. For motors with other than 2:1 speed ratio, separate winding for each speed.

5. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
6. Temperature Rise: Match insulation rating.
7. Insulation: Class FInsert class.
8. Code Letter Designation:

    a. Motors 15 Hp and Larger: NEMA starting Code F or Code G.
    b. Motors Smaller Than 15 Hp: Manufacturer's standard starting characteristic.

9. Enclosure Material: Cast iron for motor frame sizes 324TInsert number and larger; rolled steel for motor frame sizes smaller than 324TInsert number.

D. Additional Requirements for Polyphase Motors:

1. Motors Used with Variable-Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

a. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time-rise pulses produced by pulse-width-modulated inverters.
b. Premium-Efficient Motors: Class B temperature rise; Class F insulation.
c. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
d. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

E. Single-Phase Motors:

1. Motors larger than 1/20 hp must be one of the following, to suit starting torque and requirements of specific motor application:

a. Permanent-split capacitor.
b. Split phase.
c. Capacitor start, inductor run.
d. Capacitor start, capacitor run.

2. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
3. Motors 1/20 hp and Smaller: Shaded-pole type.
4. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device will automatically reset when motor temperature returns to normal range.

2.2 METERS AND GAUGES FOR HVAC PIPING

A. Duct-Thermometer Mounting Brackets:

1. Description: Flanged bracket with screw holes, for attachment to air duct and made to hold thermometer stem.

PART 3 - EXECUTION

3.1 CONNECTIONS

A. Install meters and gauges adjacent to machines and equipment to allow space for service and maintenance of meters, gauges, machines, and equipment.

B. Connect flowmeter transmitters to meters.

3.2 ADJUSTING

A. After installation, calibrate meters according to manufacturer's written instructions.

B. Adjust faces of meters and gauges to proper angle for best visibility.

3.3 THERMOMETER APPLICATION

A. Thermometers at outside-, return-, supply-, and mixed-air ducts are to be the following:

1. Compact Industrial-style, liquid-in-glass type.

B. Thermometer stems are to be of length to match thermowell insertion length.

3.4 THERMOMETER SCALE-RANGE APPLICATION

A. Scale Range for Air Ducts:

1. Minus 40 to plus 110 deg F and minus 40 to plus 45 deg C.

END OF SECTION 230500

SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Equipment stands.
4. Equipment supports.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:

1. Equipment supports.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Nonmetallic Coatings: Plastic coated, or epoxy powder-coated.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steelstainless steelInsert material.

2.2 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.3 MATERIALS

A. Carbon Steel: ASTM A1011/A1011M.

B. Threaded Rods: Continuously threaded. Zinc-plated or galvanized steel for indoor applications and stainless steel for outdoor applications. Mating nuts and washers of similar materials as rods.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A36/A36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled strut systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install lateral bracing with pipe hangers and supports to prevent swaying.

J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

K. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

M. Insulated Piping:

1. Attach clamps and spacers to piping.

    a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

    a. Thermal-hanger shield inserts may be used as an option. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

    a. Thermal-hanger shield inserts may be used as an option. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 INSTALLATION OF EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot

be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

A. Touchup:

1. Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

   a. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

2. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.7 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports and attachments for general service applications.

F. Use copper-plated pipe hangers and copper, or, stainless steel attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal-hanger shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non insulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.

J. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

END OF SECTION 230529

SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Pipe labels.
3. Duct labels.
4. Stencils.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Equipment-Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Brady Corporation
b. Carlton Industries, LP
c. Champion America
d. Craftmark Pipe Markers
e. emedco
f. Kolbi Pipe Marker Co.
g. LEM Products Inc.
h. Marking Services Inc.
i. Pipemarker.com; Brimar Industries, Inc.
j. Seton Identification Products; a Brady Corporation company

2. Material and Thickness: Brass, 0.032-inchstainless steel, 0.025-inch aluminum, 0.032-inch anodized aluminum, 0.032-inch minimum thickness, with predrilled or stamped holes for attachment hardware.
3. Letter and Background Color: As indicated for specific application under Part 3.
4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24

inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

6. Fasteners: Stainless steel rivets or self-tapping screws.
7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

2.2 PIPE LABELS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
2. Brady Corporation
3. Carlton Industries, LP
4. Champion America
5. Craftmark Pipe Markers
6. emedco
7. Kolbi Pipe Marker Co.
8. LEM Products Inc.
9. Marking Services Inc.
10. Pipemarker.com; Brimar Industries, Inc.
11. Seton Identification Products; a Brady Corporation company

B. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.

C. Letter and Background Color: As indicated for specific application under Part 3.

D. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially covercover full circumference of pipe and to attach to pipe without fasteners or adhesive.

E. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

F. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include:

1. Pipe size.
2. Flow-Direction Arrows: Include flow-direction arrows on main distribution piping. Arrows may be either integral with label or applied separately.
3. Lettering Size: Size letters in accordance with ASME A13.1 for pipingAt least 1/2 inch for viewing distances of up to 72 inches and proportionately larger lettering for greater viewing distances.

2.3 DUCT LABELS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering

products that may be incorporated into the Work include, but are not limited to, the following:

1. Brady Corporation
2. Carlton Industries, LP
3. Champion America
4. Craftmark Pipe Markers
5. emedco
6. Kolbi Pipe Marker Co.
7. LEM Products Inc.
8. Marking Services Inc.
9. Pipemarker.com; Brimar Industries, Inc.
10. Seton Identification Products; a Brady Corporation company

B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch1/8 inch Insert dimension thick, and having predrilled holes for attachment hardware.

C. Letter and Background Color: As indicated for specific application under Part 3.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings. Also include the following:

1. Duct size.
2. Flow-Direction Arrows: Include flow-direction arrows on main distribution ducts. Arrows may be either integral with label or may be applied separately.
3. Lettering Size: Size letters in accordance with ASME A13.1 for piping At least 1/2 inch for viewing distances of up to 72 inches and proportionately larger lettering for greater viewing distances.

2.4 STENCILS

A. Stencils for Ducts:

1. Manufacturers: Subject to compliance with requirements, provide products by the following provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Craftmark Pipe Markers

b. Kolbi Pipe Marker Co.
c. Marking Services Inc.
d. Pipemarker.com; Brimar Industries, Inc.

2. Lettering Size: Minimum letter height of 1-1/4 inches for viewing distances of up to 15 ft. and proportionately larger lettering for greater viewing distances.
3. Stencil Material: AluminumBrassFiberboardFiberboard or metalInsert material.
4. Stencil Paint: Exterior, gloss, alkyd enamelacrylic enamelInsert paint type. Paint may be in pressurized spray-can form.
5. Identification Paint: Exterior, alkyd enamelacrylic enamelInsert paint type. Paint may be in pressurized spray-can form.
6. Letter and Background Color: Color as indicated for specific application under Part 3.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION, GENERAL REQUIREMENTS

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Locate identifying devices so that they are readily visible from the point of normal approach.

3.3 INSTALLATION OF EQUIPMENT LABELS, WARNING SIGNS, AND LABELS

A. Permanently fasten labels on each item of mechanical equipment.

B. Sign and Label Colors:

1. White letters on an ANSI Z535.1 safety-blue background.

C. Locate equipment labels where accessible and visible.

3.4 INSTALLATION OF PIPE LABELS

A. Install pipe labels showing service and flow direction with permanent adhesive on pipes.

B. Stenciled Pipe Label Option: Stenciled labels showing service and flow direction may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels, complying with ASME A13.1, with painted, color-coded bands or rectangles on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

C. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Within 3 ft. of each valve and control device.
2. At access doors, manholes, and similar access points that permit view of concealed piping.
3. Within 3 ft. of equipment items and other points of origination and termination.
4. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping, ductwork, and equipment.

D. Do not apply plastic pipe labels or plastic tapes directly to bare pipes conveying fluids at temperatures of 125 deg F or higher. Where these pipes are to remain uninsulated, use a short section of insulation or use stenciled labels.

E. Flow-Direction Arrows: Use arrows to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

F. Pipe-Label Color Schedule:

1. Refrigerant Piping: White letters on an ANSI Z535.1 safety-blue background.

3.5 INSTALLATION OF DUCT LABELS

A. Install plastic-laminatedself-adhesive duct labels showing service and flow direction with permanent adhesive on air ducts.

1. Provide labels in the following color codes:

a. For air supply ducts: White letters on blue backgroundInsert color.
b. For air return ducts: White letters on blue backgroundInsert color.
c. For exhaust-, outside-, relief-, return-, and mixed-air ducts: White letters on blue backgroundInsert color.

B. Stenciled Duct-Label Option: Stenciled labels showing service and flow direction may be provided instead of plastic-laminated duct labels, at Installer's option.

1. For all air ducts: Black letters on white background.

C. Locate label near each point where ducts enter into and exit from concealed spaces and at maximum intervals of 20 ft. where exposed or are concealed by removable ceiling system.

D. Stenciled Access Panels and Door Labels, Equipment Labels, and Similar Operational Instructions:

1. Black letters on White background.

END OF SECTION 230553

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Testing, Adjusting, and Balancing of Air Systems:

a. Constant-volume air systems.

2. Testing, adjusting, and balancing of equipment.
3. Testing, adjusting, and balancing of existing HVAC systems and equipment.
4. Duct leakage tests verification.
5. HVAC-control system verification.

1.2 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

E. TAB Specialist: An independent entity meeting qualifications to perform TAB work.

F. TDH: Total dynamic head.

G. UFAD: Underfloor air distribution.

1.3 INFORMATIONAL SUBMITTALS

A. Contract Documents Examination Report: Within 306090Insert number days of Contractor's Notice to Proceed, submit the Contract Documents review report, as specified in Part 3.

B. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists, as specified in "Preparation" Article.

C. Examination Report: Submit a summary report of the examination review required in "Examination" Article.

D. Certified TAB reports.

E. Sample report forms.

F. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.4 QUALITY ASSURANCE

A. TAB Specialists Qualifications, Certified by AABC:

1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
2. TAB Technician: Employee of the TAB specialist and certified by AABC.

B. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

C. Code and AHJ Compliance: TAB is required to comply with governing codes and requirements of authorities having jurisdiction.

1.5 FIELD CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)
PART 3 - EXECUTION

3.1 TAB SPECIALISTS

A. Subject to compliance with requirements, engage one of the followingavailable TAB specialists that may be engaged include, but are not limited to, the following:

3.2 EXAMINATION

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

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

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

D. Examine design data, including HVAC system descriptions, statements of design

assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.

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

F. Examine test reports specified in individual system and equipment Sections.

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

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

I. Examine operating safety interlocks and controls on HVAC equipment.

J. Examine control dampers for proper installation for their intended function of isolating, throttling, diverting, or mixing air flows.

K. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.3 PREPARATION

A. Prepare a TAB plan that includes the following:

1. Equipment and systems to be tested.
2. Strategies and step-by-step procedures for balancing the systems.
3. Instrumentation to be used.
4. Sample forms with specific identification for all equipment.

B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:

1. Airside:

a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
b. Duct systems are complete with terminals installed.
c. Volume, smoke, and fire dampers are open and functional.
d. Clean filters are installed.
e. Fans are operating, free of vibration, and rotating in correct direction.
f. Automatic temperature-control systems are operational.
g. Suitable access to balancing devices and equipment is provided.

3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Cut insulation, ducts, pipes, and equipment casings for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and

thickness as used to construct ducts.

2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish in accordance with Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."

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

C. Take and report testing and balancing measurements in inch-pound (IP)andmetric (SI) units.

3.5 TESTING, ADJUSTING, AND BALANCING OF HVAC EQUIPMENT

A. Test, adjust, and balance HVAC equipment indicated on Drawings, including, but not limited to, the following:

1. Motors.
2. Fans and ventilators.
3. Furnaces.
4. Heat exchangers.
5. Condensing units.
6. Air-handling units.
7. Heating-only makeup air units.
8. Split-system air conditioners.
9. Fan coil units.

3.6 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

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

C. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

D. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

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

F. Check dampers for proper position to achieve desired airflow path.

G. Check for airflow blockages.

H. Check condensate drains for proper connections and functioning.

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

3.7 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
b. Where duct conditions allow, measure airflow by main Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses close to the fan and prior to any outlets, to obtain total airflow.
c. Where duct conditions are unsuitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.

2. Measure fan static pressures as follows:

a. Measure static pressure directly at the fan outlet or through the flexible connection.
b. Measure static pressure directly at the fan inlet or through the flexible connection.
c. Measure static pressure across each component that makes up the air-handling system.
d. Report artificial loading of filters at the time static pressures are measured.

3. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.

1. Measure airflow of submain and branch ducts.
2. Adjust submain and branch duct volume dampers for specified airflow.
3. Re-measure each submain and branch duct after all have been adjusted.

C. Verify final system conditions.

1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
2. Re-measure and confirm that total airflow is within design.
3. Re-measure all final fan operating data, speed, volts, amps, and static profile.
4. Mark all final settings.
5. Test system in economizer mode. Verify proper operation and adjust if necessary.
6. Measure and record all operating data.
7. Record final fan-performance data.

3.8 PROCEDURES FOR MOTORS

A. Motors 1/2Insert value HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Phase and hertz.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter size and thermal-protection-element rating.
8. Service factor and frame size.

B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

3.9 PROCEDURES FOR AIR-COOLED CONDENSING UNITS

A. Verify proper rotation of fan(s).

B. Measure and record entering- and leaving-air temperatures.

C. Measure and record entering and leaving refrigerant pressures.

D. Measure and record operating data of compressor(s), fan(s), and motors.

3.10 HVAC CONTROLS VERIFICATION

A. In conjunction with system balancing, perform the following:

1. Verify HVAC control system is operating within the design limitations.
2. Confirm that the sequences of operation are in compliance with Contract Documents.
3. Verify that controllers are calibrated and function as intended.
4. Verify that controller set points are as indicated.
5. Verify the operation of lockout or interlock systems.
6. Verify the operation of valve and damper actuators.
7. Verify that controlled devices are properly installed and connected to correct controller.
8. Verify that controlled devices travel freely and are in position indicated by controller: open, closed, or modulating.
9. Verify location and installation of sensors to ensure that they sense only intended temperature, humidity, or pressure.

B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

3.11 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

A. Perform a preconstruction inspection of existing equipment that is to be removed.

1. Measure and record the operating speed, airflow, and static pressure of each fan and equipment with fan(s).
2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
3. Check the operation of the drain pan and condensate-drain trap.

4. Report on the operating condition of the equipment and the results of the measurements taken. Report deficiencies.

B. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.

1. Compare the indicated airflow of the renovated work to the measured fan airflows, and determine the new fan speed and the face velocity of filters and coils.
2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.
3. If calculations increase or decrease the airflow rates and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is **5** percent or less, equipment adjustments are not required.
4. Balance each air outlet.

3.12 TOLERANCES

A. Set HVAC system's airflow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent Plus 10 percent or minus 5 percent. If design value is less than 100 cfm, within 10 cfm.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.13 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.
3. Certify validity and accuracy of field data.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB specialist.
3. Project name.
4. Project location.
5. Engineer's name and address.

6. Contractor's name and address.
7. Report date.
8. Signature of TAB supervisor who certifies the report.
9. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
10. Summary of contents, including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.
    d. Compare original preconstruction values to new.

11. Nomenclature sheets for each item of equipment.
12. Data for terminal units, including manufacturer's name, type, size, and fittings.
13. Notes to explain why certain final data in the body of reports vary from indicated values.
14. Test conditions for fans performance forms, including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Heating coil, dry-bulb conditions.
    e. Face and bypass damper settings at coils.
    f. Fan drive settings, including settings and percentage of maximum pitch diameter.
    g. Variable-frequency controllerInlet vane settings for variable-air-volume systems.
    h. Settings for pressure controller(s).
    i. Other system operating conditions that affect performance.

D. Air-Handling-Unit Test Reports: For air-handling units, include the following:

1. Unit Data:

    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Unit arrangement and class.
    g. Discharge arrangement.
    h. Sheave make, size in inches, and bore.
    i. Center-to-center dimensions of sheave and amount of adjustments in inches.
    j. Number, make, and size of belts.
    k. Number, type, and size of filters.

2. Motor Data:

    a. Motor make, and frame type and size.
    b. Horsepower and speed.
    c. Volts, phase, and hertz.
    d. Full-load amperage and service factor.
    e. Sheave make, size in inches, and bore.
    f. Center-to-center dimensions of sheave and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):

    a. Total airflow rate in cfm.
    b. Total system static pressure in inches wg.
    c. Fan speed.
    d. Inlet and discharge static pressure in inches wg.
    e. For each filter bank, filter static-pressure differential in inches wg.
    f. Preheat-coil static-pressure differential in inches wg.
    g. Cooling-coil static-pressure differential in inches wg.
    h. Heating-coil static-pressure differential in inches wg.
    i. List for each internal component with pressure-drop, static-pressure differential in inches wg.
    j. Outdoor airflow in cfm.
    k. Return airflow in cfm.
    l. Outdoor-air damper position.
    m. Return-air damper position.
    n.

E. Apparatus-Coil Test Reports:

1. Coil Data:

    a. System identification.
    b. Location.
    c. Coil type.
    d. Number of rows.
    e. Fin spacing in fins per inch o.c.
    f. Make and model number.
    g. Face area in sq. ft..
    h. Tube size in NPS.
    i. Tube and fin materials.
    j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

    a. Airflow rate in cfm.
    b. Average face velocity in fpm.
    c. Air pressure drop in inches wg.
    d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
    e. Return-air, wet- and dry-bulb temperatures in deg F.
    f. Entering-air, wet- and dry-bulb temperatures in deg F.
    g. Leaving-air, wet- and dry-bulb temperatures in deg F.
    h. Refrigerant expansion valve and refrigerant types.
    i. Refrigerant suction pressure in psig.
    j. Refrigerant suction temperature in deg F.

F. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

    a. System identification.
    b. Location.
    c. Make and type.

d. Model number and unit size.
e. Manufacturer's serial number.
f. Fuel type in input data.
g. Output capacity in Btu/h.
h. Ignition type.
i. Burner-control types.
j. Motor horsepower and speed.
k. Motor volts, phase, and hertz.
l. Motor full-load amperage and service factor.
m. Sheave make, size in inches, and bore.
n. Center-to-center dimensions of sheave and amount of adjustments in inches.

2. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Entering-air temperature in deg F.
c. Leaving-air temperature in deg F.
d. Air temperature differential in deg F.
e. Entering-air static pressure in inches wg.
f. Leaving-air static pressure in inches wg.
g. Air static-pressure differential in inches wg.
h. Low-fire fuel input in Btu/h.
i. High-fire fuel input in Btu/h.
j. Manifold pressure in psig.
k. High-temperature-limit setting in deg F.
l. Operating set point in Btu/h.
m. Motor voltage at each connection.
n. Motor amperage for each phase.
o. Heating value of fuel in Btu/h.

G. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.14 VERIFICATION OF TAB REPORT

A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of ArchitectOwnerConstruction ManagerCommissioning Authority.

B. ArchitectOwnerConstruction ManagerCommissioning Authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to the lesser of either 10Insert number percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business dayInsert value.

C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as

"FAILED."

D. If the number of "FAILED" measurements is greater than 1020Insert number percent of the total measurements checked during the final inspection, the TAB shall be considered incomplete and shall be rejected.

E. If recheck measurements find the number of failed measurements noncompliant with requirements indicated, proceed as follows:

1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection. All changes shall be tracked to show changes made to previous report.
2. If the second final inspection also fails, Owner may pursue others Contract options to complete TAB work.

F. Prepare test and inspection reports.

3.15 ADDITIONAL TESTS

A. Within 90Insert number days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230593

SECTION 235513 - GAS-FIRED DUCT HEATERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes gas-fired duct heaters.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of gas-fired duct heater.

1. Include rated capacities, operating characteristics, and accessories.

B. Shop Drawings: For gas-fired duct heaters. Include plans, elevations, sections, and attachment details.

1. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Include diagrams for signal and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For gas-fired duct heaters to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace heat exchanger of gas-fired duct heater that fails in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GAS-FIRED DUCT HEATERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Reznor or comparable product by one of the following:

1. Modine Manufacturing Company
2. Sterling HVAC Products; a Mestek company

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Capacities and Characteristics:

1. Heat Exchanger: Stainless steel.
2. Burner Material: Stainless steel.
3. Venting:

    a. Power vented.
    b. Indoor, separated combustion, power vented.
    c. Concentric, Terminal Vent Assembly: Combined combustion-air inlet and power-vent outlet with wall or roof caps. Include adapter assembly for connection to inlet and outlet pipes, and flashing for wall or roof penetration.

4. Gas Output: See drawings.

2.3 MANUFACTURED UNITS

A. Description: Factory assembled, piped, and wired; and complying with ANSI Z83.8/CSA 2.6.

B. Fuel Type: Design burner for natural gas having characteristics same as those of gas available at Project site.

C. Indoor External Housing: Steel cabinet with integral support inserts and removable bottom arranged to serve as drain pan.

1. External Casings and Cabinets: Baked enamel over corrosion-resistant-treated surface.

D. Internal Casing: Aluminized steel, arranged to contain airflow, with duct flanges at inlet and outlet.

E. Power Venter: Integral, motorized centrifugal fan interlocked with gas valve.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install and connect gas-fired duct heaters and associated fuel and vent features and systems according to NFPA 54, applicable local codes and regulations, and manufacturer's written instructions.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to gas-fired duct heaters, allow space for service and maintenance.

C. Gas Piping: Comply with Connect gas piping to gas train inlet; provide union with enough clearance for burner removal and service.

D. Vent Connections: Comply with Section 235123 "Gas Vents."

E. Duct Connections: Comply with Section 233113 "Metal Ducts."

F. Electrical Connections: Comply with applicable requirements in electrical Sections.

1. Install electrical devices furnished with heaters but not specified to be factory mounted.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
2. Verify bearing lubrication.
3. Verify proper motor rotation.
4. Test Reports: Prepare a written report to record the following:

    a. Test procedures used.
    b. Test results that comply with requirements.
    c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

C. Gas-fired duct heater will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust initial temperature and humidity set points.

B. Adjust burner and other unit components for optimum heating performance and efficiency.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gas-fired duct heaters.

END OF SECTION 235513

SECTION 236200 - PACKAGED COMPRESSOR AND CONDENSER UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Compressor and condenser units, air cooled, 1 to 5 tons (3.5 to 17.6 kW).
2. Compressor and condenser units, air cooled, 6 to 120 tons (21 to 422 kW).

1.2 ACTION SUBMITTALS

A. Product Data: For each compressor and condenser unit.

1. Include rated capacities, operating characteristics, and furnished specialties and accessories.
2. Include equipment dimensions, weights and structural loads, required clearances, method of field assembly, components, and location and size of each field connection.

B. Shop Drawings: For compressor and condenser units.

1. Include plans, elevations, sections, and attachment details.
2. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Startup service reports.

B. Field quality-control reports.

C. Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For compressor and condenser units to include in emergency, operation, and maintenance manuals.

1.5 COORDINATION

A. Coordinate sizes and locations of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-In-Place Concrete."

B. Coordinate location of piping and electrical rough-ins.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of compressor and condenser units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Compressor failure.
b. Condenser coil leak.

2. Warranty Period (Compressor Only): 10 years from date of Substantial Completion.
3. Warranty Period (Components Other Than Compressor): 10 years from date of Substantial Completion.
4. Warranty Period (Condenser Coil Only): Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fabricate and label refrigeration system in accordance with ASHRAE 15 and ASHRAE 34.

B. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6, "Heating, Ventilating, and Air-Conditioning."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 COMPRESSOR AND CONDENSER UNITS, AIR COOLED, 1 TO 5 TONS (3.5 TO 17.6 kW)

A. Basis-of-Design Product: Subject to compliance with requirements, provide Carrier Global Corporation or comparable product by one of the following:

1. Lennox Industries, Inc.; Lennox International
2. YORK; brand of Johnson Controls International plc, Building Solutions North America

2.3 COMPRESSOR AND CONDENSER UNITS, AIR COOLED, 6 TO 120 TONS (21 TO 422 kW)

A. Basis-of-Design Product: Subject to compliance with requirements, provide Carrier Global Corporation or comparable product by one of the following:

1. Carrier Global Corporation
2. Lennox Industries, Inc.; Lennox International
3. YORK; brand of Johnson Controls International plc, Building Solutions North America

B. Description: Factory assembled and tested, air cooled; consisting of casing, compressors, condenser coils, condenser fans and motors, and unit controls.

C. Compressor:

1. Hermetic Scroll Compressor: Designed for service with crankcase sight glass, crankcase heater, and backseating service access valves on suction and discharge ports.

    a. Capacity Control: On-off compressor cycling.

D. Refrigerant: R-410A.

E. Condenser Coil: Seamless copper-tube, aluminum-fin coil, including subcooling circuit and backseating liquid-line service access valve.

1. Factory pressure test coils, then dehydrate by drawing a vacuum and fill with a holding charge of nitrogen or refrigerant.
2. Provide factory-applied baked epoxy anti-corrosion coating to assembled coil.

F. Condenser Fans: Propeller-type vertical discharge; either directly or belt driven. Include the following:

1. Permanently lubricated, ball-bearing totally enclosed, air-over motors.
2. Separate motor for each fan.
3. Dynamically and statically balanced fan assemblies.

G. Operating and safety controls include the following:

1. Manual-reset, high-pressure cutout switches.
2. Automatic-reset, low-pressure cutout switches.
3. Low-oil-pressure cutout switch.
4. Compressor-winding thermostat cutout switch.
5. Three-leg, compressor-overload protection.
6. Control transformer.
7. Magnetic contactors for compressor and condenser fan motors.
8. Timer to prevent excessive compressor cycling.

H. Accessories:

1. to control compressor and condenser unit and its associated evaporator fan.
2. Low-Ambient Controller:

    a. Controls condenser fan speed to permit operation down to minus 20 deg F with time-delay relay to bypass low-pressure switch.

3. Gauge Panel: Package with refrigerant circuit suction and discharge gauges.
4. Hot-gas bypass kit.
5. Part-winding-start timing relay, circuit breakers, and contactors.
6. Reversing valve.
7. Non-fused disconnect switch, factory mounted and wired, for single external electrical power connection. See Section 262816 "Enclosed Switches and Circuit Breakers."
8. Low-noise fans.
9. 115 V ac convenience, ground-fault circuit interrupter receptacle in weatherproof enclosure.
10. Vibration isolation resilient mounts.
11. Security grilles.
12. See drawing schedule.

I. Unit Casings: Designed for outdoor installation with weather protection for components and controls and with removable panels for required access to compressors, controls, condenser fans, motors, and drives. Additional features include the following:

1. Steel, galvanized or zinc coated, for exposed casing surfaces; treated and finished with manufacturer's standard paint coating.

a. Corrosion Resistance: 500-hour salt spray test, in accordance with ASTM B117.

2. Perimeter base rail with forklift slots and lifting holes to facilitate rigging.
3. Gasketed control panel door.
4. Condenser coil hail guard.

J. Capacities and Characteristics:

1. Compressor and Condenser Unit:

a. Full-Load Cooling Capacity: See Schedule.
b. Energy-Efficiency Ratio (EER): See Schedule.
c. Seasonal Energy-Efficiency Ratio (SEER): See Schedule.
d. Coefficient of Performance (COP): See Schedule.
e. Capacity Steps: See Schedule.

2.4 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.5 SOURCE QUALITY CONTROL

A. Performance Ratings: Certify capacity performance ratings of compressor and condenser units in accordance with AHRI 210/240.

B. Sound-Power Level Ratings: Factory test sound-power-level ratings in accordance with AHRI 270.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of compressor and condenser units.

B. Examine roughing-in for refrigerant piping systems to verify actual locations of piping connections before equipment installation.

C. Examine walls, floors, and roofs for suitable conditions where compressor and condenser units will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install units level and plumb, firmly anchored in locations indicated.

B. Equipment Mounting:

1. Install compressor and condenser units on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-In-Place Concrete."

C. Maintain manufacturer's recommended clearances for service and maintenance.

D. Loose Components: Install piping specialties, electrical components, devices, and accessories that are not factory mounted.

3.3 PIPING CONNECTIONS

A. Where installing piping adjacent to equipment, allow space for service and maintenance.

B. Connect refrigerant piping to air-cooled compressor and condenser units; maintain required access to unit. Install furnished field-mounted accessories. Refrigerant piping and specialties are specified in Section 232300 "Refrigerant Piping."

3.4 ELECTRICAL CONNECTIONS

A. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

B. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."
2. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.5 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

3.6 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks in accordance with manufacturer's written instructions and perform the following:

a. Inspect for physical damage to unit casing.
b. Verify that access doors move freely and are weathertight.
c. Clean units and inspect for construction debris.
d. Verify that all bolts and screws are tight.
e. Adjust vibration isolation and flexible connections.
f. Verify that controls are connected and operational.

B. Start unit in accordance with manufacturer's written instructions and complete manufacturer's startup checklist.

C. Measure and record airflow and air temperature rise over coils.

D. Verify operation of condenser capacity control device.

E. Verify that vibration isolation and flexible connections prevent vibration transmission to structure.

3.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Perform each visual and mechanical inspection and electrical test. Certify compliance with test parameters.
2. Leak Test: After installation, charge system with refrigerant and oil and test for leaks. Repair leaks, replace lost refrigerant and oil, and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor operation and unit operation, product capability, and compliance with requirements.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
5. Verify manufacturer's required airflow over coils.

B. Verify that vibration isolation and flexible connections prevent vibration transmission to structure.

C. Compressor and condenser units will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain compressor and condenser units.

END OF SECTION 236200

SECTION 237313 - INDOOR, SEMI-CUSTOM AIR-HANDLING UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulated, double-wall-casing, indoor, semi-custom air-handling units that are factory assembled using multiple section components, including the following:

1. Casings.
2. Fans, drives, and motors.
3. Coils.
4. Air filtration.
5. Dampers.

1.2 ACTION SUBMITTALS

A. Product Data: For each air-handling unit.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. Include unit dimensions and weight.
4. Include cabinet material, metal thickness, finishes, insulation, and accessories.
5. Fans:

    a. Include certified fan-performance curves with system operating conditions indicated.
    b. Include certified fan-sound power ratings.
    c. Include fan construction and accessories.
    d. Include motor ratings, electrical characteristics, and motor accessories.

6. Include certified coil-performance ratings with system operating conditions indicated.
7. Include filters with performance characteristics.

B. Shop Drawings: For each type and configuration of indoor, semi-custom air handling unit.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Detail fabrication and assembly of indoor, semi-custom air-handling units, as well as procedures and diagrams.
4. Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air-handling units to include in emergency,

operation, and maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set(s) for each air-handling unit.
2. Gaskets: One set(s) for each access door.
3. Fan Belts: One set(s) for each air-handling unit fan.

1.5 WARRANTY

A. Warranty: Manufacturer agrees to repair or replace components of indoor, semi-custom air-handling units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 5 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of air-handling units and components.

C. ASHRAE 62.1 Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

2.2 INDOOR, SEMI-CUSTOM AIR-HANDLING UNITS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Carrier Global Corporation or comparable product by one of the following:

1. Carrier Global Corporation
2. Daikin Applied
3. YORK; brand of Johnson Controls International plc, Building Solutions North America

B. Unit Casings:

1. Frame: Modular and providing overall structural integrity without reliance on casing panels for structural support.
2. Base Rail:

a. Material: Galvanized steel.

b. Height: 6 inches.

3. Casing Joints: Hermetically sealed at each corner and around entire perimeter.
4. Airstream Surfaces: Surfaces in contact with airstream shall comply with requirements in ASHRAE 62.1.
5. Static-Pressure Classifications:

   a. For Unit Sections Upstream of Fans: Minus 2-inch wg.
   b. For Unit Sections Downstream and Including Fans: 2-inch wg.

6. Panels, Doors, and Windows:

   a. Panels:

      1) Fabrication: Formed and reinforced, double-wall and insulated panels of same materials and thicknesses as casing.
      2) Fasteners: Two or more camlock type for panel lift-out operation. Arrangement shall allow panels to be opened against airflow
      3) Gasket: Neoprene, applied around entire perimeters of panel frames.

   b. Doors:

      1) Fabrication: Formed and reinforced, double-wall and insulated panels of same materials and thicknesses as casing.
      2) Hinges: A minimum of two ball-bearing hinges or stainless-steel piano hinge and two wedge-lever latches, operable from inside and outside. Arrange doors to be opened against airflow. Provide safety latch retainers on doors so that doors do not open uncontrollably.
      3) Size: Large enough to allow for unobstructed access for inspection and maintenance of air-handling unit's internal components. At least 18 inches wide by full height of unit casing up to a maximum height of 60 inches.

   c. Locations and Applications:

      1) Fan Section: Doors.
      2) Coil Section: Panels.
      3) Access Section: Doors.
      4) Filter Section: Doors large enough to allow periodic removal and installation of filters.

7. Condensate Drain Pans:

   a. Construction:

      1) Single-wall, stainless-steel sheet.

   b. Drain Connection:

      1) Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on both ends of pan.
      2) Minimum Connection Size: NPS 1.

   c. Slope: Minimum 0.125-in./ft. slope, to comply with ASHRAE 62.1, in at least two

planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and from humidifiers and to direct water toward drain connection.

d. Length: Extend drain pan downstream from leaving face for distance to comply with ASHRAE 62.1.
e. Width: Entire width of water producing device.
f. Depth: A minimum of 2 inches deep.

C. Fan, Drive, and Motor Section:

1. Fan and Drive Assemblies: Statically and dynamically balanced and designed for continuous operation at maximum-rated fan speed and motor horsepower.
2. Fans: Centrifugal, galvanized steel; mounted on solid-steel shaft.

a. Shafts: With field-adjustable alignment.
b. Turned, ground, and polished hot-rolled steel with keyway.
c. Shaft Bearings:

1) Prelubricated and Sealed, Ball Bearings: Self-aligning, pillow-block type with an L-50 rated life of 200,000 hours according to ABMA 9.

d. Housings: Formed- and reinforced-steel panels to form curved scroll housings with shaped cutoff and spun-metal inlet bell.

1) Bracing: Steel angle or channel supports for mounting and supporting fan scroll, wheel, motor, and accessories.

e. Airfoil, Centrifugal Fan Wheels (Plenum Fan Wheels): Smooth-curved inlet flange, backplate, and hollow die-formed airfoil-shaped blades continuously welded at tip flange and backplate; steel hub riveted to backplate and fastened to shaft with setscrews.
f. Mounting: For internal vibration isolation. Factory-mount fans with manufacturer's standard vibration isolation mounting devices having a minimum static deflection of 1 inch.
g. Shaft Lubrication Lines: Extended to a location outside the casing.
h. Flexible Connector: Factory fabricated with a fabric strip minimum 3-1/2 inches wide, attached to two strips of minimum 2-3/4-inch- wide by 0.028-inch- thick, galvanized-steel sheet.

1) Flexible Connector Fabric: Glass fabric, double coated with neoprene. Fabrics, coatings, and adhesives shall comply with UL 181, Class 1.

a) Fabric Minimum Weight: 26 oz./sq. yd..
b) Fabric Minimum Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
c) Fabric Minimum Service Temperature Range: Minus 40 to plus 200 deg F.

3. Drive, Belt: Factory-mounted, V-belt drive, with adjustable alignment and belt tensioning, and with 1.5 service factor based on fan motor.

a. Pulleys: Cast iron or cast steel with split, tapered bushing, dynamically balanced at the factory.
b. Belts: Oil resistant, non-sparking and nonstatic; in matched sets for multiple-belt

drives.

c. Belt Guards: Comply with requirements specified by OSHA and fabricate according to SMACNA's "HVAC Duct Construction Standards"; 0.146-inch-thick, 3/4-inch diamond-mesh wire screen, welded to steel angle frame; prime coated

4. Motors:

a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
b. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
c. Enclosure Type: Totally enclosed, fan cooled.
d. Unusual Service Conditions:

1) High humidity.
2) High Chlorine vapor content.

e. Efficiency: Premium Efficient motors as defined in NEMA MG 1.
f. Motor Pulleys: Adjustable pitch for use with 5-hp motors and smaller; fixed pitch for use with motors larger than 5 hp. Select pulley size so pitch adjustment is at the middle of adjustment range at fan design conditions.
g. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
h. Mount unit-mounted disconnect switches on exterior of unit.

D. Coil Section:

1. General Requirements for Coil Section:

a. Comply with AHRI 410.
b. Fabricate coil section to allow removal and replacement of coil for maintenance and to allow in-place access for service and maintenance of coil(s).
c. For multizone units, provide air deflectors and air baffles to balance airflow across coils.
d. Coils shall not act as structural component of unit.

2. Cooling Coils:

a. Refrigerant Coil:

1) Tubes: Copper.
2) Fins:

a) Material: Stainless Steel.
b) Fin Spacing: Maximum 10 fins per inch.

3) Fin and Tube Joints: Mechanical bond.
4) Headers: Seamless-copper headers with brazed connections.
5) Frames: Stainless steel.
6) Coatings: Corrosion-resistant coating.
7) Ratings: Designed, tested, and rated according to ASHRAE 33 and AHRI 410.

a) Working Pressure: Minimum 300 psig.

E. Air Filtration Section:

1. Panel Filters:

a. Description: Pleated factory-fabricated, self-supported, disposable air filters with holding frames.
b. Filter Unit Class: UL 900.
c. Media: Interlaced glass, synthetic or cotton fibers coated with nonflammable adhesive.
d. Filter-Media Frame: Beverage board with perforated metal retainer, or metal grid, on outlet side.

2. Side-Access Filter Mounting Frames:

a. Particulate Air Filter Frames: Match inner casing and outer casing material, and insulation thickness. Aluminum track.

1) Prefilters: Incorporate an integral 2-inch- thick track with same access as primary filter.

2.3 MATERIALS

A. Stainless Steel:

1. Manufacturer's standard grade for casing.
2. Manufacturer's standard type, ASTM A240/A240M for bare steel exposed to airstream or moisture.

B. Corrosion-Resistant Coating: Coat with a corrosion-resistant coating capable of withstanding a 3000-hour salt-spray test according to ASTM B117.

1. Standards:

a. ASTM B117 for salt spray.
b. ASTM D2794 for minimum impact resistance of 100 in-lb.
c. ASTM B3359 for cross hatch adhesion of 5B.

2. Application: Immersion.
3. Thickness: 1 mil.
4. Gloss: Minimum gloss of 60 on a 60-degree meter.

2.4 SOURCE QUALITY CONTROL

A. AHRI 430 Certification: Test, rate, and label air-handling units and their components in accordance with AHRI 430.

B. AHRI 260 or AMCA 311 Sound Performance Rating Certification: Test, rate, and label in accordance with AHRI 260 or AMCA 311.

C. Fan Aerodynamic Performance Rating: Factory test and rate fan performance for airflow,

pressure, power, air density, rotation speed, and efficiency in accordance with AMCA 210.

D. Fan Operating Limits: Classify fans in accordance with AMCA 99, Section 14.

E. Refrigerant Coils: Factory tested to minimum 450-psig internal pressure and to minimum 300-psig internal pressure while underwater, according to AHRI 410 and ASHRAE 33.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine casing insulation materials and filter media before air-handling unit installation. Reject insulation materials and filter media that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for steam, hydronic, and condensate drainage piping systems and electrical services to verify actual locations of connections before installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Equipment Mounting:

1. Install air-handling units on cast-in-place concrete equipment bases. Coordinate sizes and locations of concrete bases with actual equipment provided. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."

B. Arrange installation of units to provide access space around air-handling units for service and maintenance.

C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing, with new, clean filters.

D. Install filter-gauge, static-pressure taps upstream and downstream of filters. Mount filter gauges on outside of filter housing or filter plenum in accessible position. Provide filter gauges on filter banks, installed with separate static-pressure taps upstream and downstream of filters.

E. Connect duct to air-handling units with flexible connections. Comply with requirements in Section 233300 "Air Duct Accessories."

3.3 PIPING CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to air-handling unit, allow for service and maintenance.

C. Connect piping to air-handling units mounted on vibration isolators with flexible connectors.

D. Connect condensate drain pans using NPS 1-1/4, ASTM B88, Type M copper tubing. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.

E. Refrigerant Piping: Comply with applicable requirements in Section 232300 "Refrigerant Piping." Install shutoff valve and union or flange at each supply and return connection.

3.4 ELECTRICAL CONNECTIONS

A. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

B. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.5 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

3.6 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that shipping, blocking, and bracing are removed.
3. Verify that unit is secure on mountings and supporting devices and that connections to piping, ducts, and electrical systems are complete. Verify that proper thermal-overload protection is installed in motors, controllers, and switches.
4. Verify proper motor rotation direction, free fan wheel rotation, and smooth bearing operations. Reconnect fan drive system, align belts, and install belt guards.
5. Verify that bearings, pulleys, belts, and other moving parts are lubricated with factory-recommended lubricants.
6. Verify that zone dampers fully open and close for each zone.
7. Verify that face-and-bypass dampers provide full face flow.
8. Verify that outdoor- and return-air mixing dampers open and close, and maintain minimum outdoor-air setting.
9. Comb coil fins for parallel orientation.
10. Verify that proper thermal-overload protection is installed for electric coils.
11. Install new, clean filters.
12. Verify that manual and automatic volume control and fire and smoke dampers in connected duct systems are in fully open position.

B. Starting procedures for air-handling units include the following:

1. Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated rpm. Replace fan and motor pulleys as required to achieve design conditions.
2. Measure and record motor electrical values for voltage and amperage.
3. Manually operate dampers from fully closed to fully open position and record fan performance.

3.7 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for air-handling system testing, adjusting, and balancing.

C. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.8 CLEANING

A. After completing system installation and testing, adjusting, and balancing air-handling unit and air-distribution systems and after completing startup service, clean air-handling units internally to remove foreign material and construction dirt and dust. Clean fan wheels, cabinets, dampers, coils, and filter housings, and install new, clean filters.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Leak Test: After installation, fill water and steam coils with water, and test coils and connections for leaks.
2. Charge refrigerant coils with refrigerant and test for leaks.
3. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Air-handling unit or components will be considered defective if unit or components do not pass tests and inspections.

E. Prepare test and inspection reports.

3.10 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air-handling units.

END OF SECTION 237313

SECTION 238113 - PACKAGED TERMINAL AIR-CONDITIONERS, OUTDOOR, WALL-MOUNTED UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes packaged, terminal, outdoor, wall-mounted air conditioners.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For packaged, terminal air conditioners.

1. Include plans, elevations, sections, details for wall penetrations,and attachments to other work.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For packaged, terminal air conditioners to include in emergency, operation, and maintenance manuals.

1.4 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of packaged, terminal air conditioners that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Sealed Refrigeration System: Manufacturer's standard, but not less than five years from date of Substantial Completion, including components and labor.
2. Warranty Period for Nonsealed System Parts: Manufacturer's standard, but not less than five years from date of Substantial Completion, including only components and excluding labor.

PART 2 - PRODUCTS

2.1 PACKAGED TERMINAL AIR-CONDITIONERS, OUTDOOR, WALL-MOUNTED UNITS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Mitsubishi:

1. Bard Manufacturing Company
2. Liebert; Vertiv Holdings Co.
3. Marvair
4. Mitsubishi

2.2 MANUFACTURED UNITS

A. Description: Factory-assembled and -tested, self-contained, packaged, terminal air conditioner with room cabinet, electric refrigeration system, and temperature controls; fully charged with refrigerant and filled with oil; with hardwired chassis and circuit breaker.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. ASHRAE Thermal Comfort: Applicable requirements in ASHRAE 55.

D. UL listed and ETL performance certified.

2.3 CHASSIS

A. Cabinet: Sloped top, 0.052-inch- thick steel with removable front panel with concealed latches.

1. Discharge Grille: Extruded-aluminum discharge grille.
2. Return Grille: Extruded-aluminum grille.
3. Louvers: Extruded aluminum with enamel finish; color.
4. Finish: Epoxy coating.
5. Access Door: Hinged door in top of cabinet for access to controls.
6. Cabinet Extension: Matching cabinet in construction and finish, allowing diversion of airflow to adjoining room; with grille.
7. Insulation: Cooling and heating sections fully insulated with 1-inch-thick fiberglass insulation.

B. Refrigeration System: Direct-expansion indoor coil with capillary restrictor and hermetically sealed, soft-start scroll compressor with crankcase heater, liquid line filter dryer, externally equalized expansion valve, high-pressure switch, low-pressure switch, vibration isolation, and overload protection.

1. Indoor and Outdoor Coils: Seamless copper tubes mechanically expanded into aluminum fins.
2. Accumulator.
3. Constant-pressure expansion valve.
4. Reversing valve.
5. Charge: R-410A.

C. Indoor Fan: Forward curved, centrifugal; with variable-speed motor(s) and positive-pressure ventilation damper with concealed manual operator.

D. Filters: Washable polyurethane in molded plastic frame, serviceable from front of the unit.

E. Condensate Drain: Coated galvanized-steel drain pan and piping to direct condensate to building waste and vent piping.

F. Outdoor Fan: High-ambient type with separate driven by indoor fan motor.

2.4 CONTROLS

A. Control Module: Unit-mounted digital panel with touchpad temperature control and with touchpad for heating, cooling, and fan operation. Include the following features:

1. Low-Ambient Lockout Control: Prevents cooling-cycle operation below 40 deg F outdoor air temperature.
2. Heat-Pump Ambient Control: Field-adjustable switch changes to heat-pump heating operation above 40 deg F and to supplemental heating below plus 25 deg F.
3. Temperature-Limit Control: Prevents occupant from exceeding preset setback or setup temperature.
4. Reverse-Cycle Defrost: Solid-state sensor monitors frost buildup on outdoor coil and reverses unit to melt frost.

B. Remote Control: Standard unit-mounted controls with remote-mounted, low-voltage, adjustable thermostat with heat anticipator; heat-off-cool-auto switch; and on-auto fan switch.

C. Three-Phase Power Rotation Monitor: Three-phase monitoring to protect compressor from reverse rotation and to protect the unit from phase failure. Monitor manually reset.

D. Dehumidification Circuit: Supply-air stream, independent heat exchanger using a separate humidistat, hot gas three-way valve, separate desuperheating condenser circuit, and back drain orifice inserted between the reheat coil and suction line.

2.5 SOURCE QUALITY CONTROL

A. Sound-Power Level Ratings: Factory test to comply with AHRI 300, "Sound Rating and Sound Transmission Loss of Packaged Terminal Equipment."

B. Unit Performance Ratings: Factory test to comply with AHRI 310/380/CSA C744, "Packaged Terminal Air-Conditioners and Heat Pumps."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb, maintaining manufacturer's recommended clearances and tolerances.

3.2 CONNECTIONS

A. Install piping adjacent to machine to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Inspect for and remove shipping bolts, blocks, and tie-down straps.
2. After installing packaged, terminal air conditioners and after electrical circuitry has been energized, test for compliance with requirements.
3. Unit is level on base and is flashed in exterior wall.
4. Unit casing has no visible damage.
5. Compressor, air-cooled condenser coil, and fans have no visible damage.
6. Labels are clearly visible.
7. Controls are connected and operable.
8. Shipping bolts, blocks, and tie-down straps are removed.
9. Filters are installed and clean.
10. Drain pan and drain line are installed correctly.
11. Electrical wiring installation complies with manufacturer's submittal and installation requirements in electrical Sections.
12. Installation: Perform startup checks according to manufacturer's written instructions, including the following:

    a. Lubricate bearings on fan.
    b. Check fan-wheel rotation for correct direction without vibration and binding.

13. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
14. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. After performance test, change filters.

C. Packaged, terminal air conditioners will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust initial temperature set points.

B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain packaged, terminal air conditioners.

END OF SECTION 238113

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Control cable.
2. Control-circuit conductors.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Flame Travel and Smoke Density in Plenums: As determined by testing identical products according to NFPA 262, by a qualified testing agency. Identify products for installation in plenums with appropriate markings of applicable testing agency.

1. Flame Travel Distance: 60 inch or less.
2. Peak Optical Smoke Density: 0.5 or less.
3. Average Optical Smoke Density: 0.15 or less.

C. Flame Travel and Smoke Density for Riser Cables in Non-Plenum Building Spaces: As determined by testing identical products according to UL 1666.

D. Flame Travel and Smoke Density for Cables in Non-Riser Applications and Non-Plenum Building Spaces: As determined by testing identical products according to UL 1685.

2.2 CONTROL CABLE

A. Paired Cable: NFPA 70, Type CMG.

1. Multi-pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1685.

B. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.

1. One pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with NFPA 262.

2.3 CONTROL-CIRCUIT CONDUCTORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Encore Wire Corporation
2. General Cable; Prysmian Group North America
3. Service Wire Co.
4. Southwire Company, LLC

B. Class 1 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

C. Class 2 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

D. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

E. Class 2 Control Circuits and Class 3 Remote-Control and Signal Circuits That Supply Critical Circuits: Circuit Integrity (CI) cable.

1. Smoke control signaling and control circuits.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Test cables on receipt at Project site.

1. Test each pair of twisted pair cable for open and short circuits.

3.2 INSTALLATION OF RACEWAYS AND BOXES

A. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.

B. Install manufactured conduit sweeps and long-radius elbows if possible.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with TIA-568-C Series of standards.
2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems."
3. Terminate all conductors; cable must not contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
4. Cables may not be spliced and must be continuous from terminal to terminal. Do not splice cable between termination, tap, or junction points.
5. Cables serving a common system may be grouped in a common raceway. Install

network cabling and control wiring and cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.

6. Secure and support cables at intervals not exceeding 30 inch and not more than 6 inch from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
8. Support: Do not allow cables to lie on removable ceiling tiles.
9. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
10. Provide strain relief.
11. Keep runs short. Allow extra length for connecting to terminals. Do not bend cables in a radius less than 10 times the cable OD. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
12. Ground wire must be copper, and grounding methods must comply with IEEE C2. Demonstrate ground resistance.

C. Installation of Control-Circuit Conductors:

1. Install wiring in raceways.
2. Use insulated spade lugs for wire and cable connection to screw terminals.

3.4 CONTROL-CIRCUIT CONDUCTORS

A. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits; No 14 AWG.
2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

3.5 GROUNDING

A. For data communication wiring, comply with TIA-607-B and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.

B. For control-voltage wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.6 IDENTIFICATION

A. Identify data and communications system components, wiring, and cabling according to TIA-606-B; label printers must use label stocks, laminating adhesives, and inks complying with UL 969.

B. Identify each wire on each end and at each terminal with a number-coded identification tag. Each wire must have a unique tag.

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

END OF SECTION 260523

BACK COVER

WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID

INDEX OF SHEETS

Project Sheet Order & Discipline

Sheet No.	Sheet Name	Sheet Discipline	Rebid
C-0.0	COVER SHEET	Common	X
M-0.1	HVAC Title Sheet	Mechanical	X
MD1.1	Level 1 Mechanical Demolition Plan	Mechanical	X
MD1.6	Level 1 Mechanical Demolition Plan	Mechanical	X
MD2.0	Level 2 Mechanical Demolition Plan	Mechanical	X
MD2.1	Level 2 Mechanical Demolition Plan	Mechanical	X
M-1.1	Level 1 HVAC Plan	Mechanical	X
M-1.6	Level 1 HVAC Plan	Mechanical	X
M-2.0	Level 2 HVAC Plan	Mechanical	X
M-2.1	Level 2 HVAC Plan	Mechanical	X
M-3.0	Mechanical Schedules	Mechanical	X
M-3.1	Ductwork & Equipment Details	Mechanical	X

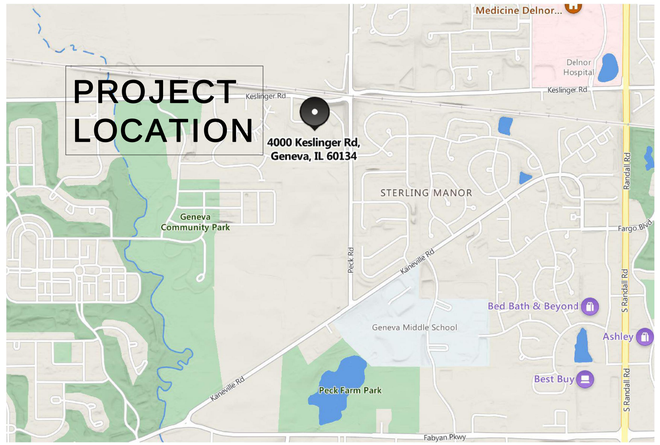
Grand total: 12

CITY GOVERNMENT:

CITY COUNCIL	
MAYOR:	Kevin Burns
1ST WARD:	Tara Burghart Mike Bruno
2ND WARD:	Richard Marks Brad Kosirog
3RD WARD:	Becky Hruby Dean Kilburg
4RD WARD:	Gabriel Kaven Amy Mayer
5TH WARD:	Craig Maladra Robert C. Swanson
CITY CLERK:	Vicki Kellick
CITY TREASURER	Jennifer Milewski

CITY CONTACT INFORMATION:

DEPARTMENT OF PUBLIC WORKS	
Public Works Director:	Rich Babica
City Engineering:	Brian Davids
Water Division Superintendent:	Bob VanGyseghem
Water Supply & Treatment Supervisor :	Mike Anderson



LOCATION MAP

NO SCALE

PROJECT ADDRESS:

4000 Keslinger Rd.
Geneva, IL 60134

EDWARD J. KALINA
062-041447
REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS

6.5.2023
EDWARD J. KALINA
ILLINOIS REGISTERED PROFESSIONAL ENGINEER
NO. 062-041447 EXPIRES 11-30-23

REGISTERED PROFESSIONAL ENGINEER
LAWRENCE J. McELHENY
062-051700
STATE OF ILLINOIS

DATE: 6.5.2023
EXP: 11.30.23

J.U.L.I.E.
Joint Utility Locating Information for Excavators
CALL 811
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JULIE

THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AS WELL AS SUPERVISION/DIRECTION AND MEANS/METHODS OF CONSTRUCTION

ARCHER CONSULTING ENGINEERS

IL DESIGN NUMBER: 184003430-0002
15534 Hawkhaven Rd.
Suite B
Homer Glen, IL 60491
United States

Tel 815.588.3535

Ace Proj Num: 22013-00

THIS SQUARE APPEARS 1/2"x1/2" ON FULL SIZE SHEETS

This drawing shall not be used nor reproduced either wholly or in part except when authorized by the engineer- Engineering Solutions Team

ACTION	NAME
Design	ACE/LJM
Drawn	ACE
Checked	E.K.

engineering solutions team

NO	DATE	REVISION	BY
	6.1.2023	Owner Review	
	6.7.2023	Rebid	

CITY OF GENEVA
1800 South Street
Geneva, IL 60134

PROJECT	SHEET TITLE	SCALE	PROJECT NO.	SHEET
WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID	COVER SHEET	AS SHOWN	BB-02 DATE APR. 2023	No. C-0.0 Of 12

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6/5/2023 9:55:28 AM

General Plan Symbols

- Plan Revision Number
- Detail Number on Sheet / Sheet Number Where Detail is Placed
- (1) Keynote Symbol
- Continuation Symbol
- Point Where New Connects To Existing
- Room 1 — Room Name / Number
- Area Being Demolished
- Area Not In Contract

Abbreviations

Ø	ROUND	LVR	LOUVER
ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE
AC	AIR CONDITIONING	M/A	MIXED AIR
AD	AREA DRAIN	MAX	MAXIMUM
ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER
ALT	ALTERNATE	MECH	MECHANICAL
AP	ACCESS PANEL	MFR	MANUFACTURER
ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM
BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS
BLW	BELOW	MTR	MOTOR
BTU	BRITISH THERMAL UNITS	MU/A	MAKE-UP/AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NOISE CRITERIA
CAP	CAPACITY	NC	NORMALLY CLOSED
CB	CATCH BASIN	NIC	NOT IN CONTRACT
CFM	CUBIC FEET PER MINUTE	NO	NUMBER
CLG	CEILING	NO	NORMALLY OPEN
CO	CLEAN OUT	NTS	NOT TO SCALE
CW	COLD WATER	O	OXYGEN
D	DEGREE	O/A	OUTSIDE AIR
DB	DRY BULB	ORD	OVERFLOW ROOF DRAIN
DIA	DIAMETER	PD	PRESSURE DROP
DN	DOWN	PIV	POST INDICATOR VALVE
DW	DISTILLED WATER	PLBG	PLUMBING
EA	EACH	PRESS	PRESSURE
EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE REDUCING VALVE
ELEC	ELECTRICAL	PSI	POUNDS PER SQUARE INCH
EQUIP	EQUIPMENT	PSIG	POUNDS PER SQUARE INCH GAUGE
EWC	ELECTRIC WATER COOLER	PWR	POWER
EWT	ENTERING WATER TEMPERATURE	R	DUCT RISER
E/A	EXHAUST AIR	R/A	RETURN AIR
EX	EXISTING	RCP	RADIANT CEILING PANEL
F	DEGREES FAHRENHEIT	RD	ROOF DRAIN
FCO	FLOOR CLEAN OUT	REC	RECESSED
FD	FLOOR DRAIN	RED	REDUCER
FDC	FIRE DEPARTMENT CONNECTION	RH	RELATIVE HUMIDITY
FL	FLOOR	RL/A	RELIEF AIR
FO	FUEL OIL	RM	ROOM
FOV	FUEL OIL VENT	RPM	REVOLUTIONS PER MINUTE
FOR	FUEL OIL RETURN	RW	RAIN WATER
FOS	FUEL OIL SUPPLY	SF	SQUARE FOOT
FPM	FEET PER MINUTE	S/A	SUPPLY AIR
FS	FLOOR SINK	SAN	SANITARY
FT	FOOT/FEET	SF	SQUARE FOOT
FTR	FIN TUBE RADIATION	SD	SMOKE DAMPER
GAL	GALLON	SM	SURFACE MOUNT
GF	GAS-FIRED	SP	STANDPIPE
GC	GENERAL CONTRACTOR	SP	STATIC PRESSURE
GPM	GALLONS PER MINUTE	STM	STEAM
GW	GREASE WASTE	T	THERMOSTAT
HB	HOSE BIB	TD	TEMPERATURE DROP
HP	HORSE POWER	TDR	TRENCH DRAIN
HTG	HEATING	TEMP	TEMPERATURE
HTR	HEATER	TYP	TYPICAL
HW	HOT WATER	UG	UNDERGROUND
HYD	HYDRANT	VAC	VACUUM
ID	INDIRECT	V	VENT
IN	INCH	VAV	VARIABLE AIR VOLUME
INV	INVERT	VENT	VENTILATION
LB	POUND	VTR	VENT THROUGH ROOF
LB/HR	POUNDS PER HOUR	W	WASTE
LAT	LEAVING AIR TEMPERATURE	WB	WET BULB
LP	LOW PRESSURE	WCO	WALL CLEAN OUT
LPG	LIQUEFIED PETROLEUM GAS	WH	WALL HYDRANT
		XR	EXISTING TO BE REMOVED
		XRL	EXISTING TO BE RELOCATED
		XRN	EXISTING TO BE REPLACED W/ NEW

Equipment Abbreviations

AC	AIR CONDITIONING UNIT	ET	EXPANSION TANK
ACCU	AIR COOLING CONDENSING UNIT	EWH	ELECTRIC WATER HEATER
AHU	AIR HANDLING UNIT	FCU	FAN COIL UNIT
AS	AIR SEPARATOR	FP	FIRE PUMP
B	BOILER	GI	GREASE INTERCEPTOR
CH	CHILLER	GRV	GRAVITY ROOF VENTILATOR
CT	COOLING TOWER	HWP	HEATING WATER PUMP
CUH	CABINET UNIT HEATER	HRU	HEAT RECOVERY UNIT
CHWP	CHILLED WATER PUMP	PRV	POWER ROOF VENTILATOR
DBP	DOMESTIC WATER BOOSTER PUMP	RE	RETURN/EXHAUST FAN
DC	DUCT MOUNTED COIL	RTU	ROOFTOP UNIT
DCP	DOMESTIC WATER CIRCULATING PUMP	SP	SUMP PUMP
EF	EXHAUST FAN	UH	UNIT HEATER
EDC	ELECTRIC DUCT COIL	WH	WATER HEATER

* NOTE *
ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET.THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

HVAC Symbols

- 24"x12" — Sq. Duct Size (Width x Height)
- 24"/12" — Oval Duct Size (Width / Height)
- 18"Ø — Round Duct Size (Diameter)
- (E) — Existing Duct To Remain
- Duct To Be Demolished
- S/A — Supply Air
- V/A — Ventilation Air
- O/A — Outdoor Air
- R/A — Return Air
- T/A — Transfer Air
- L/A — Building Relief Air
- E/A — General Exhaust Air
- KED — Kitchen Exhaust Duct
- LH — Laboratory Hood
- ETS — Env. Tobacco Smoke
- FLUE — Flue Gas Vent
- C/A — Combustion Air
- Rect. Supply Duct Rise / Drop
- Round Supply Duct Rise / Drop
- Rect. Return Duct Rise / Drop
- Round Return Duct Rise / Drop
- Rect. Exhaust Duct Rise / Drop
- Round Exhaust Duct Rise / Drop

Grille, Register, Diffusers

- Ceiling Diffuser: SD-4 | 500 — Type (See Schedule); Airflow; 10"Ø/24x24 — Neck Size / Module Size; 29 | H9/9/17 — Catalog Throw Performance; Throw Pattern; Max NC Rating
- Round Diffuser: SD9 | 100 — Airflow; 6"Ø — Neck Size; TYP. X 4 — Type Count for Space
- Sidewall Register: SG5 | 500 — Airflow; 18"x10" — Nominal Duct Size; AFF:9'-0" — Mounting Elevation (Centerline)
- Linear Diffuser: LD-1 | 120 — Airflow; 6"Ø/1s/48"L — Neck Size/ Slot(s)/ Active Length
- Sidewall Grille: RG11 | 800 — Airflow; 16"x16" — Nominal Duct Size; AFF:9'-0" — Mounting Elevation (Centerline)
- Ceiling Return: RG1 | 2000 — Airflow; 22"x22"/24x24 — Neck Size / Module Size; 25 — Max NC Rating

Mechanical Equipment

- RTU-1 — Unit Identity
- 4.0 ton — Nominal Cooling Capacity
- RTU-1 — Unit Identity
- 72,000 Btu/h — Heating Capacity
- 72 CFH — Gas Supply Input Rate
- ET-1 — Unit Identity
- 379 lb — Operating Weight
- TF-1 — Unit Identity
- 500 CFM — Design Airflow Rate
- VAV 1-2 — Unit Identity
- 3.7 GPM — Design Water Flow
- AC-1 — Unit Identity
- AFF:7'-0" — Bottom of Equipment Height
- (E)AHU-2 — Existing to Remain Equipment
- (R)AHU-3 — Existing Relocated Equipment
- Equipment By Others (Refer To Other Disciplines)

Damper Types

- (B) Manual Damper
- (M) Motorized Damper
- (D) Backdraft Damper
- (S) Smoke Damper
- Fire Damper
- (C) Comb. Fire/ Smoke Damper

Mechanical Piping Symbols

- 2" — Nominal Pipe Size
- Above Ground Piping
- Below Ground Piping
- 1/8" / 12" SLOPE — Pipe Slope (When Applicable)
- (E) — Existing Pipe To Remain
- Pipe To Be Demolished
- CHWR — Chilled-Water Return
- CHWS — Chilled-Water Supply
- CD — Condensate Drain
- CWR — Condenser-Water Return
- CWS — Condenser-Water Supply
- GWR — Geothermal-Water Return
- GWS — Geothermal-Water Supply
- HWR — Hot-Water Return
- HWS — Hot-Water Supply
- G — Natural Gas
- LP — Liquid Propane
- RL — Refrigerant Liquid
- RS — Refrigerant Gas
- RD — Refrigerant Discharge
- STM — Steam Supply
- CDR — Steam Condensate Return
- Pipe Rise / Drop

Valve Types

- 2" SHUTOFF — Ball Valve
- 2" BAL — Balancing Valve
- 2" BFV — Butterfly Valve
- 2" CHECK — Check Valve
- 2" CHECK — Alternate Check Valve
- 3" CIRC — Circuit Setter
- 2" GATE — Gate Valve
- 2" GLOBE — Globe Valve
- 2" LOCK — Locked Shield Valve
- 2" PRV — Pressure Reducing Valve
- 2" QUICK — Quick Opening Valve
- 2" STRAIN — Fluid Strainer
- 2" M-CNTRL — Elec. Control Valve
- 4" 3-WAY CNTRL — 3-Way Elec. Valve
- 1" GAS-CNTRL — Emergency Gas Shutoff
- 1" PLUG — Plug Valve
- 1" GAS COCK — Gas Shutoff Cock
- 1" REG — Gas Regulator

Mechanical Devices

AHU-1 — Unit Identity

- (TS) Temperature Sensor
- (TH) Temp/ Humidity Sensor
- (TC) Temp/ CO2 Sensor
- (T) Thermostat
- (H) Humidistat
- (HS) Humidity Sensor
- (CO2) Carbon Dioxide Detector
- (CO) Carbon Monoxide Detector
- (H2) Hydrogen Gas Detector
- (HZG) Hazardous Gas Detector
- (NO2) Nitrogen Dioxide Detector
- (O2) Oxygen Gas Detector

Project Requirements

A. REMOVE ALL UNUSED PIPING, DUCTWORK AND ACCESSORIES.

B. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING, PRIOR TO FINAL BID, ALL EXISTING CONDITIONS FOR PLUMBING AND MECHANICAL SYSTEMS WITHIN TENANT SPACE AND WITHIN CLOSE PROXIMITY OF TENANT SPACE.

C. THE MECHANICAL CONTRACTOR SHALL PERFORM SERVICE AND REPAIR ON THE EXISTING EQUIPMENT AND ITS ACCESSORIES AS FOLLOWS: CLEAN ALL COILS, REPLACE THE FILTERS AND BELTS, INSPECT, REPAIR, OR REPLACE THE ECONOMIZERS, DRIVES AND FAN BEARINGS, MOTORS, CONTROL COMPONENTS, VALVES AND ANY OTHER ITEM NECESSARY FOR A COMPLETE AND PROPER OPERATING SYSTEM. THIS CONTRACTOR SHALL ALSO VISIT THE SITE, PRIOR TO FINAL BIDDING, AND VERIFY ALL EXISTING SITE CONDITIONS. PROVIDE ALL MATERIAL AND COMPONENTS AS NEEDED TO BRING THE UNITS TO FULL COMPLIANCE OF THE LANDLORD'S CRITERIA AND LOCAL AUTHORITY HAVING JURISDICTION.

D. WHERE FLOOR DRAINS OCCUR WITHIN THE LIMITS OF CONSTRUCTION, PREVENT CONSTRUCTION DEBRIS FROM ENTERING DRAIN BODY BY SEALING DRAIN OPENING PRIOR TO START OF WORK. UNSEAL DRAINS AT COMPLETION OF CONSTRUCTION.

E. COORDINATE INSTALLATION OF PIPING, DUCTWORK, CONDUIT, LIGHTS, CABLE TRAY, STRUCTURE, AND EQUIPMENT TO PREVENT CONFLICTS.

F. THE CONTRACTOR SHALL BE FAMILIAR WITH ALL THE CONDITIONS BOTH EXISTING AND THOSE ILLUSTRATED BY THESE DOCUMENTS AS WELL AS THOSE WHICH CAN BE REASONABLY ANTICIPATED INCLUDING, BUT NOT LIMITED TO ARCHITECTURAL, ELECTRICAL, VENTILATION, PLUMBING, AND OTHER SYSTEMS INVOLVED ON THIS PROJECT.

G. FINAL PRODUCT SHALL BE A COMPLETE AND FUNCTIONING SYSTEM, AND SHALL CONFORM TO ALL REQUIREMENTS OF APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING BUT NOT LIMITED TO THE INTERNATIONAL BUILDING CODE AND INTERNATIONAL MECHANICAL CODE.

H. LOCATE EQUIPMENT REQUIRING ACCESS 2'-0" MAXIMUM ABOVE CEILING.

J. ALL ROOF MOUNTED EQUIPMENT SHALL BE A MINIMUM 10'-0" FROM EDGE OF ROOF.

K. LOCATE DUCTWORK, PIPING AND MECHANICAL EQUIPMENT AWAY FROM THE SPACE ABOVE ELECTRICAL PANELS. TRANSFORMERS AND OTHER ELECTRICAL EQUIPMENT.

L. PENETRATIONS OF RATED ASSEMBLIES SHALL BE FIRE STOPPED. FIRE STOPPING SHALL BE AN APPROVED MATERIAL AS PRESCRIBED IN CSFM STANDARD 43-1 AND SHALL BE U.L. LISTED.

M. PROVIDE SLEEVES AND/OR OPENINGS TO RUN PIPES AND DUCTS THROUGH FOUNDATIONS, FLOORS, WALLS, AND ROOF.

N. MAINTAIN CLEAR ACCESS TO SERVICE EQUIPMENT AND OTHER ACCESSORIES REQUIRING SERVICE, VISUAL INSPECTION OR HAND OPERATION. WHERE INDICATED OR REQUIRED, PROVIDE ACCESS PANELS OF THE TYPE SELECTED TO SUIT MATERIALS IN WHICH INSTALLED.

O. ADJUST PIPING AND DUCTWORK SIZES TO PROPERLY CONNECT TO MECHANICAL EQUIPMENT.

Q. PIPE SIZES SHOWN SHALL BE CONTINUED IN THE DIRECTION OF FLOW UNTIL ANOTHER SIZE IS SHOWN.

R. FOR DETAILS, EQUIPMENT CONNECTIONS, AND PIPE SIZES NOT SHOWN ON THE SEGMENTS, REFER TO DETAILS, SCHEDULES, AND SPECIFICATIONS.

S. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE RESPECTIVE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AT A LEVEL OF QUALITY AND WORKMANSHIP CONSISTENT WITH THE SPECIFICATIONS.

T. LOCATIONS OF PIPING, DUCTWORK AND EQUIPMENT AS INDICATED ON THE DRAWING, ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. WORK SHALL BE COORDINATED WITH ALL OTHER TRADES TO AVOID INTERFERENCE IN THE FIELD.

U. INSTALL EXPOSED PIPING AND DUCTWORK AS HIGH AS PRACTICAL IN ROOMS WITHOUT CEILINGS.

V. THE CONTRACTOR'S WORK SCHEDULE SHALL BE SUBMITTED TO AND APPROVED BY THE OWNER.

W. PRIOR TO STARTING WORK, SUBMIT SHOP DRAWINGS FOR ALL MECHANICAL EQUIPMENT; ~~PLUMBING FIXTURES, AND DIFFUSERS~~.

X. ~~CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND SHALL ARRANGE FOR ALL INSPECTIONS AS REQUIRED.~~

Y. PROVIDE THREE YEAR WARRANTY FOR ALL WORKMANSHIP AND MATERIALS AFTER THE DATE OF FINAL ACCEPTANCE.

HVAC General Notes

A. ~~SUPPLY AND RETURN PIPING TO COILS ARE THE SAME SIZE.~~

B. CONTRACTOR SHALL LOCATE THERMOSTATS AND TEMPERATURE SENSORS AT 5'-0" AFF, A MINIMUM OF 8" FROM LIGHT SWITCH.

C. REFER TO HVAC DRAWINGS FOR THERMOSTAT AND TEMPERATURE SENSOR LOCATIONS.

D. CONDENSATE DRAINS SHALL BE SUPPLIED FOR ALL COOLING EQUIPMENT. CONTRACTOR SHALL ENSURE PROPER INSTALLATION AND DRAINAGE AS REQUIRED BY FEDERAL, STATE, AND LOCAL CODES. CONDENSATE PIPING SHALL BE TYPE "L" COPPER.

D. ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK SHALL BE RATED FOR PRESSURE CLASS OF 2" W.G. UNLESS NOTED OTHERWISE.

E. ~~COORDINATE THE EXACT LOCATION OF ALL CEILING DIFFUSERS, REGISTERS, AND GRILLES WITH NEW AND EXISTING LIGHTING.~~

F. ~~PROVIDE DIFFUSERS AND REGISTERS WITH 4-WAY BLOW PATTERN UNLESS OTHERWISE NOTED.~~

G. PROVIDE A 4" HOUSEKEEPING PAD FOR EACH PIECE OF MECHANICAL EQUIPMENT. COORDINATE SIZES WITH MECHANICAL EQUIPMENT SELECTED.

H. THIS CONTRACTOR SHALL BE REQUIRED TO REPLACE FILTERS ON HVAC EQUIPMENT AFTER ALL DUST PRODUCING CONSTRUCTION HAS BEEN COMPLETED AND PRIOR TO THE FINAL PUNCH.

HVAC SHEET INDEX

NOTE: DO NOT REUSE REFRIGERANT LINE SETS FOR NEW EQUIPMENT.

NOTE: EXISTING EQUIPMENT AND HOUSEKEEPING PADS MAY BE REUSED IF THEY ARE OF ADEQUATE SIZE TO ACCOMIDATE THE NEW EQUIPMENT. SEE M3.0 FOR PAD SIZES.

NOTE: NEW DUCTWORK & FITTINGS TO BE INSULATED - TO MATCH EXISTING.

PRIOR TO WORK - CONTRACTOR SHALL PROVIDE A TESTING & BALANCE REPORT FOR AIR EQUIPMENT THAT IS SCHEDULED TO BE REPLACED. UPON COMPLETION OF PROJECT A SECOND REPORT WILL BE MADE TO INDICATE PERFORMANCE

ARCHER CONSULTING ENGINEERS
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THIS SQUARE APPEARS 1/2"x1/2" ON FULL SIZE SHEETS

REGISTERED PROFESSIONAL ENGINEER — LAWRENCE J. McELHENY 062-051700 — STATE OF ILLINOIS

DATE: 6.5.2023
EXP: 11.30.23

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Design	LJM
Drawn	ACE/LJM
Checked	E.K.

engineering solutions team

NO	DATE	REVISION	BY
	6.1.2023	Owner Review	
	6.7.2023	Rebid	

CITY OF GENEVA
1800 S. Street
Geneva, IL 60134

PROJECT	SHEET TITLE	SCALE	PROJECT NO.	SHEET
WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID	**HVAC Title Sheet**	AS SHOWN	22013-00	No. M-0.1
			DATE: MAR. 2023	Of 12

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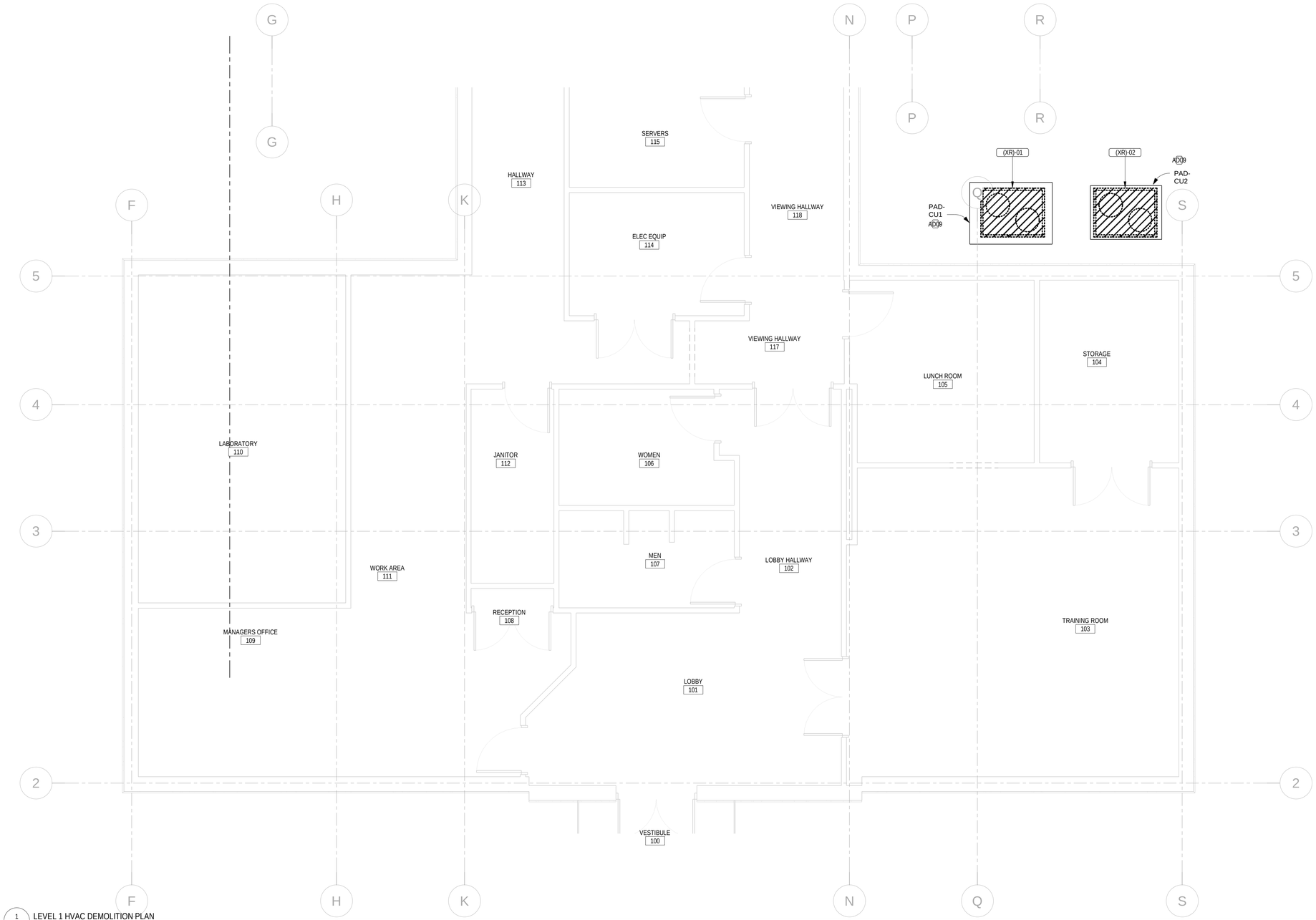

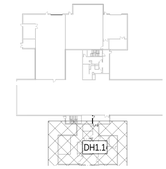

Key Plan

KEYNOTES

AD09 REPLACE EXISTING CONCRETE PAD WITH NEW IF EQUIPMENT FOOTPRINT IS LARGER THAN EXISTING. PAD DIMENSIONS SHOWN ON M3.0.

1 / MD1.1 LEVEL 1 HVAC DEMOLITION PLAN
1/4" = 1'-0"

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	6.7.2023	Rebid	

CITY OF GENEVA ILLINOIS

CITY OF GENEVA
1800 S. Street
Geneva, IL 60134

PROJECT: **WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID**

SHEET TITLE: **Level 1 Mechanical Demolition Plan**

SCALE: AS SHOWN

PROJECT NO.: 22013-00

DATE: MAR. 2023

SHEET: No MD1.1 Of 12

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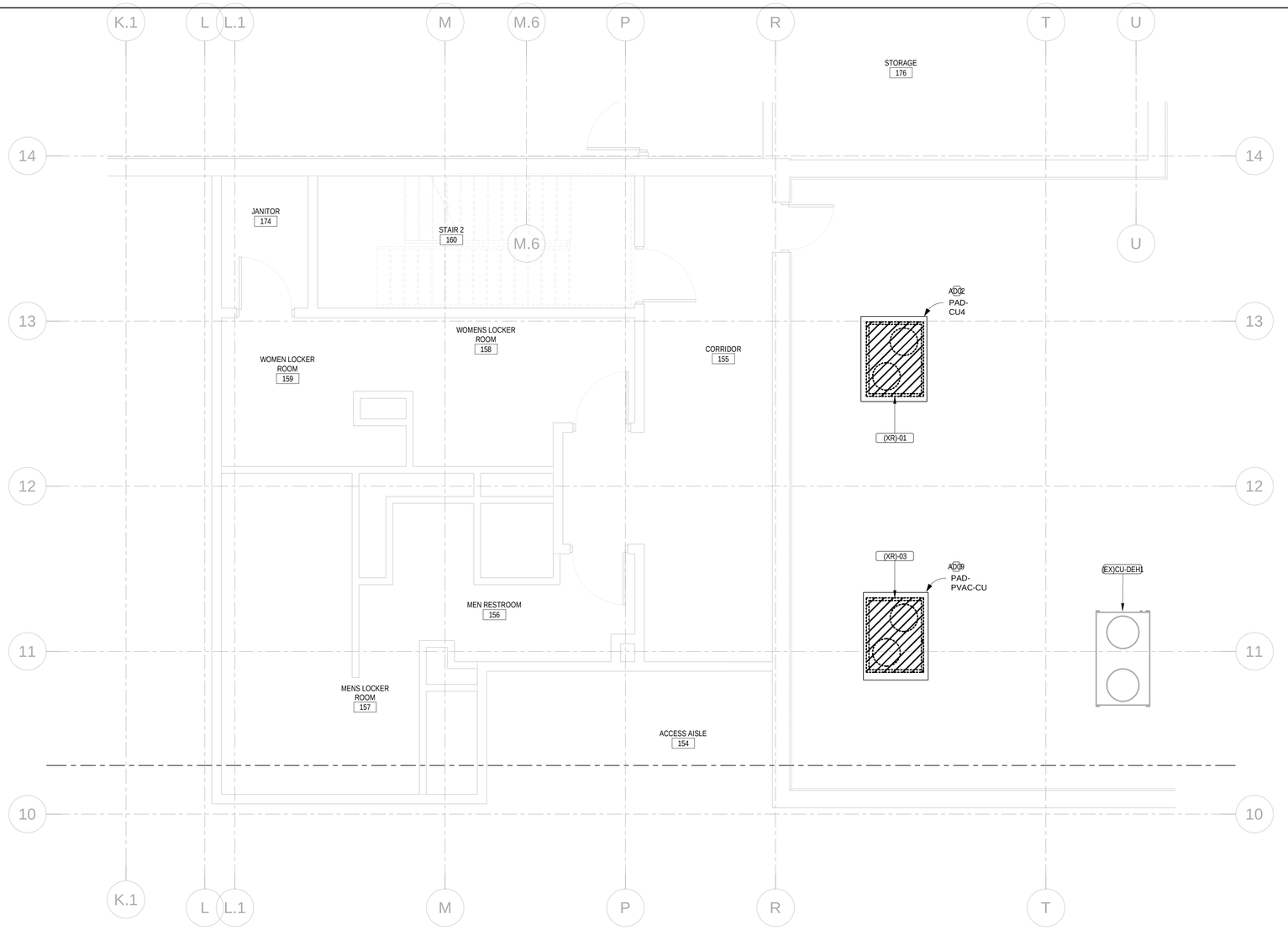

1 MD1.6 LEVEL 1.6 HVAC DEMOLITION PLAN
1/4" = 1'-0"

Key Plan

KEYNOTES

AD02	HOUSEKEEPING OR EQUIPMENT PAD TO REMAIN. PREPARE FOR NEW EQUIPMENT.
AD09	REPLACE EXISTING CONCRETE PAD WITH NEW IF EQUIPMENT FOOTPRINT IS LARGER THAN EXISTING. PAD DIMENSIONS SHOWN ON M3.0.

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	6.7.2023	Rebid	

CITY OF GENEVA
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Geneva, IL 60134

PROJECT: **WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID**

SHEET TITLE: **Level 1 Mechanical Demolition Plan**

SCALE: AS SHOWN

PROJECT NO.: 22013-00

DATE: MAR. 2023

SHEET No. MD1.6 Of 12

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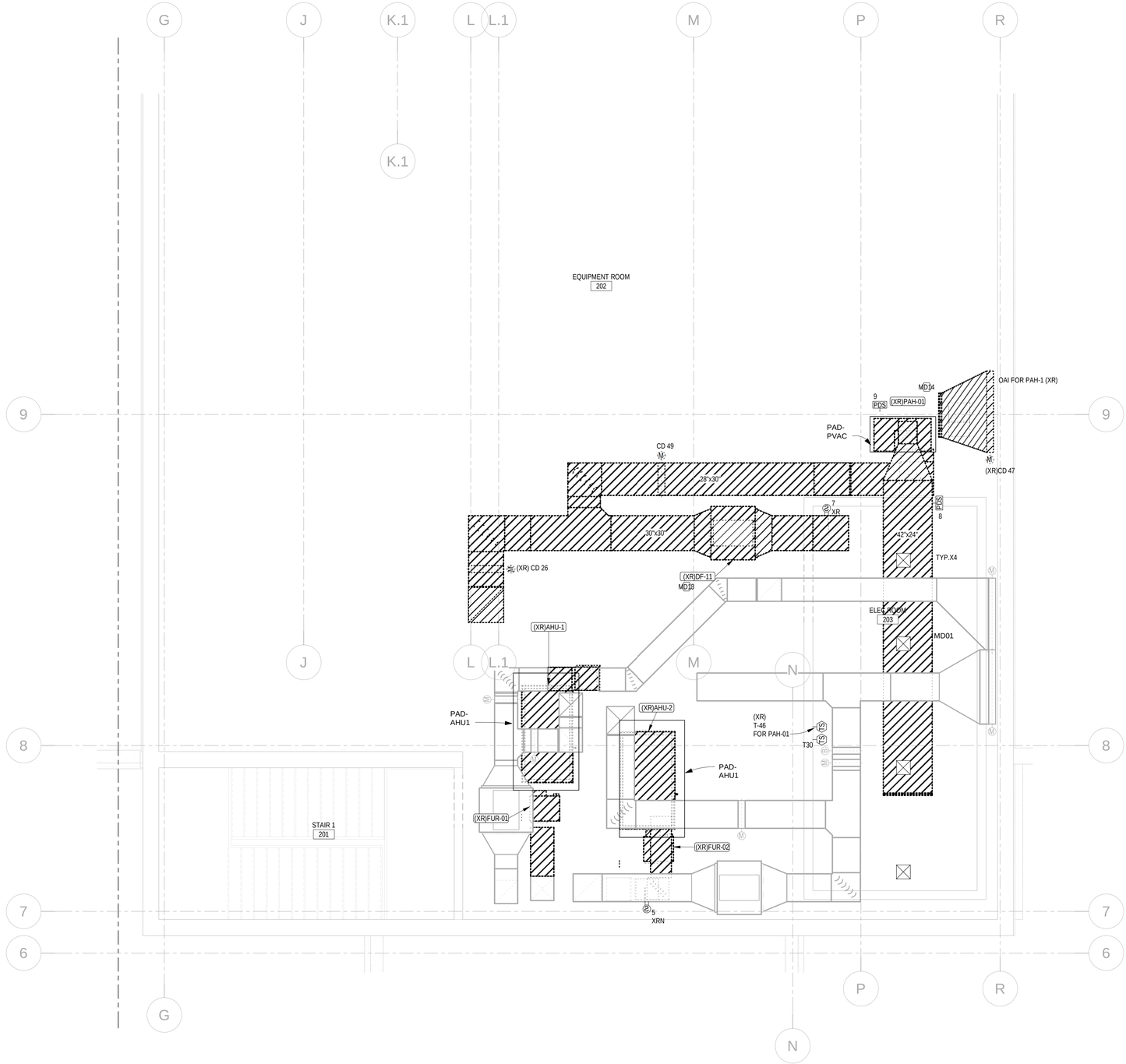

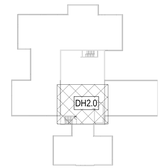

2 MD2.0 Key Plan
1" = 100'-0"

KEYNOTES

AD02	HOUSEKEEPING OR EQUIPMENT PAD TO REMAIN. PREPARE FOR NEW EQUIPMENT.
AD09	REPLACE EXISTING CONCRETE PAD WITH NEW IF EQUIPMENT FOOTPRINT IS LARGER THAN EXISTING. PAD DIMENSIONS SHOWN ON M3.0.
MD13	DEMOLISH EXHAUST FAN.
MD14	DEMOLISH AIR HANDLER, ASSOCIATED DX UNIT, AND REFRIGERANT PIPING.

1 MD2.0 LEVEL 2 HVAC DEMOLITION PLAN
1/4" = 1'-0"

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PROJECT: **WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID**

SHEET TITLE: **Level 2 Mechanical Demolition Plan**

SCALE: AS SHOWN

PROJECT NO.: 22013-00

DATE: MAR. 2023

SHEET: No. MD2.0 Of 12

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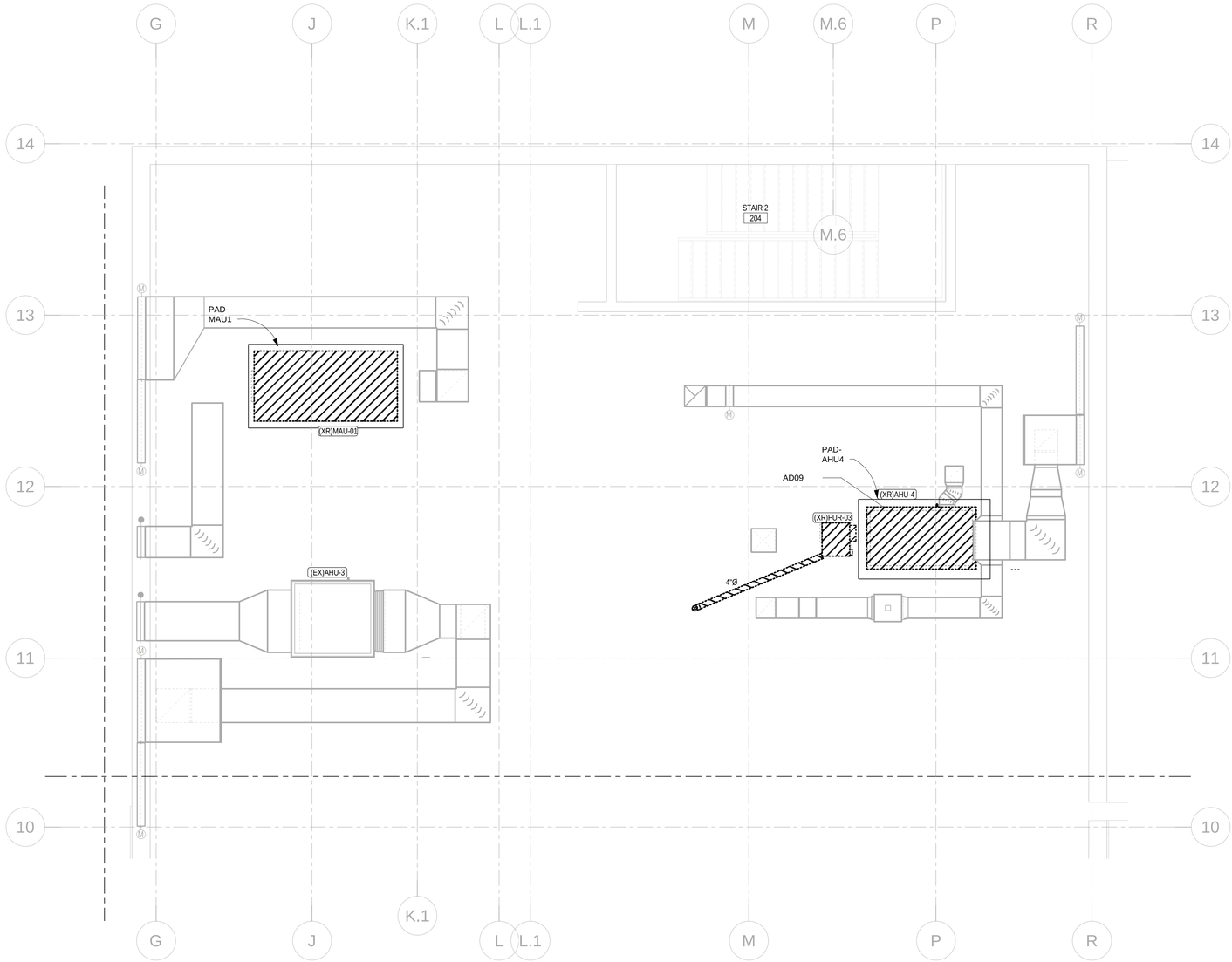
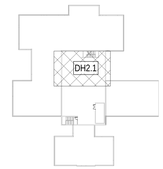


1 MD2.1 LEVEL 2 HVAC DEMOLITION PLAN
1/4" = 1'-0"



Key Plan

KEYNOTES

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PROJECT	SHEET TITLE	SCALE	PROJECT NO.	SHEET
WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID	**Level 2 Mechanical Demolition Plan**	AS SHOWN	22013-00	No. MD2.1
			DATE: MAR. 2023	Of 12

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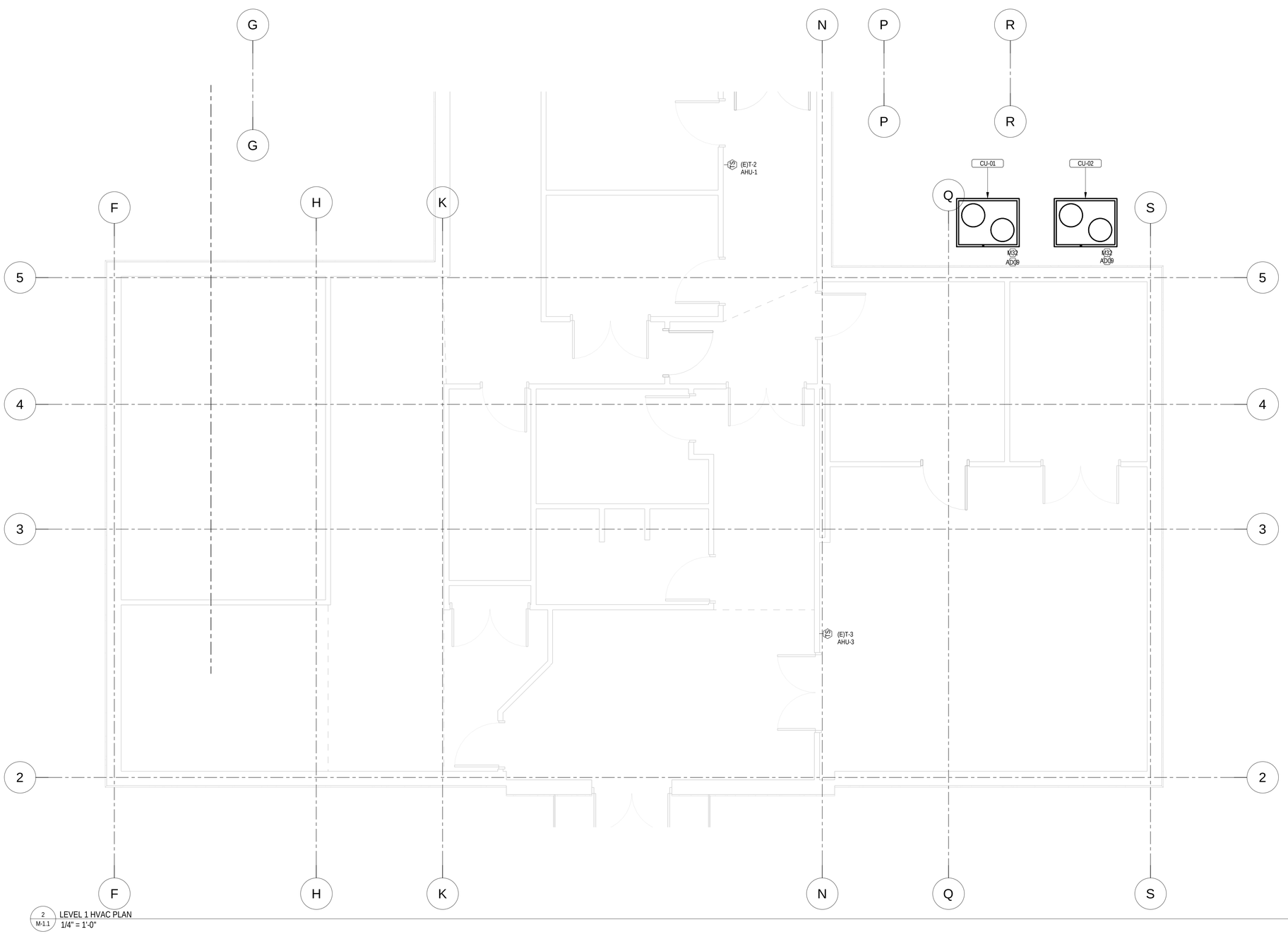
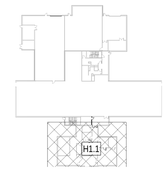


2 M-1.1 LEVEL 1 HVAC PLAN
1/4" = 1'-0"



Key Plan

HVAC Sheet Notes

A	CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE A COMPLETE AND WORKING SYSTEM.
B	INSTALL, SUPPORT, & BRACE NEW DUCTWORK AND ACCESSORIES PER SMACNA GUIDELINES.
C	DUCT SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS. CONTRACTOR SHALL MAKE ALLOWANCE FOR ANY INTERIOR LINING, INSULATION, ETC.
D	ALL NEW DUCT ELBOWS SHALL BE RADIUS TYPE. WHERE NECESSARY, CONTRACTOR MAY SUBSTITUTE MITERED ELBOWS WITH TURNING VANES.
E	
F	INSTALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS.
G	ALL PRIMARY CONDENSATE DRAIN PIPING SHALL BE INSULATED TO A MINIMUM THICKNESS OF 1" AND SHALL INCLUDE A VAPOR RETARDANT OUTSIDE THE INSULATION. SEAL ALL JOINTS AND PENETRATIONS.
H	COORDINATE ALL EXTERIOR PENETRATIONS INCLUDING ROOF PENETRATIONS WITH OTHER TRADES TO PROVIDE A COMPLETE AND FULLY WEATHER-PROOF INSTALLATION.
I	
J	CONTRACTOR SHALL ENGAGE A TESTING AND BALANCE FIRM CERTIFIED BY AABC TO PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS.
K	FOR TESTING AND BALANCING HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS" AND PROVIDE TWO COPIES OF THE CERTIFIED TAB REPORTS.
L	THIS DRAWING IS DIAGRAMMATIC IN NATURE AND SHALL NOT BE SCALED TO DETERMINE THE EXACT LOCATION OR EXTENT OF THE WORK. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO THE START OF THE WORK. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE A COMPLETE AND WORKING SYSTEM.
M	THIS DRAWING IS BASED ON VISUALLY OBSERVABLE EXISTING CONDITIONS AS OF THE TIME OF DESIGN. CONTRACTOR SHALL BE RESPONSIBLE TO FULLY VERIFY ALL EXISTING CONDITIONS, COMPONENTS, ETC. PRIOR TO THE START OF THE WORK. ANY DEVIATION FROM THIS DRAWING IN KIND, OR IN LOCATION EXCEEDING 1'-0", SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

KEYNOTES

AD09	REPLACE EXISTING CONCRETE PAD WITH NEW IF EQUIPMENT FOOTPRINT IS LARGER THAN EXISTING. PAD DIMENSIONS SHOWN ON M3.0.
M32	PROVIDE NEW REFRIGERANT LINE SETS SIZED PER MANUFACTURER'S RECOMMENDATIONS. DO NOT REUSE EXISTING.

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	6.7.2023	Rebid	

CITY OF GENEVA
1800 S. Street
Geneva, IL 60134

PROJECT	SHEET TITLE	SCALE	PROJECT NO.	SHEET
WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID	**Level 1 HVAC Plan**	AS SHOWN	22013-00	No. M-1.1
			DATE: MAR. 2023	Of 12

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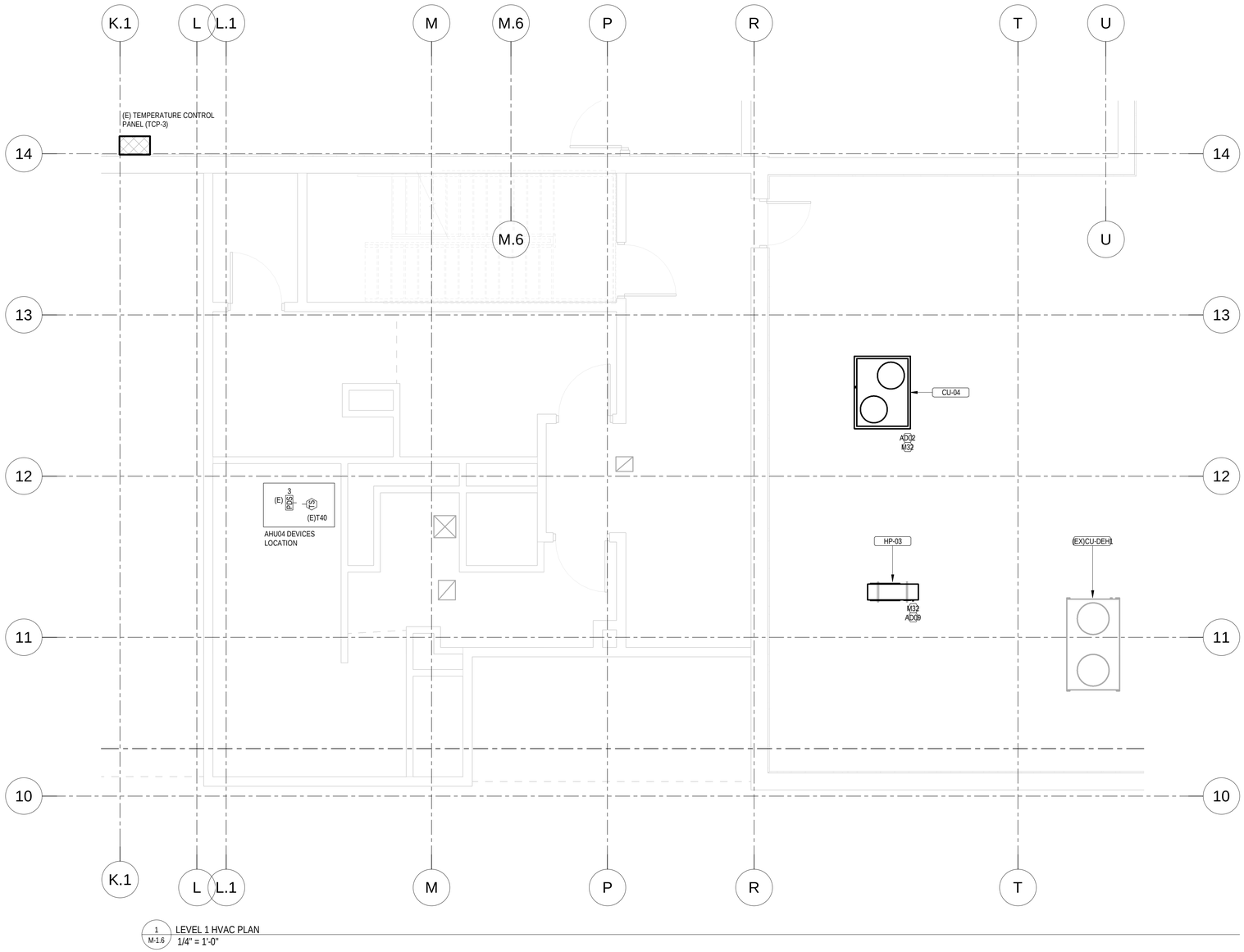
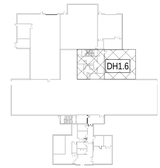


1 M-1.6 LEVEL 1 HVAC PLAN
1/4" = 1'-0"



Key Plan

HVAC Sheet Notes

A CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE A COMPLETE AND WORKING SYSTEM.
B INSTALL, SUPPORT, & BRACE NEW DUCTWORK AND ACCESSORIES PER SMACNA GUIDELINES.
C DUCT SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS. CONTRACTOR SHALL MAKE ALLOWANCE FOR ANY INTERIOR LINING, INSULATION, ETC.
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E
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H COORDINATE ALL EXTERIOR PENETRATIONS INCLUDING ROOF PENETRATIONS WITH OTHER TRADES TO PROVIDE A COMPLETE AND FULLY WEATHER-PROOF INSTALLATION.
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KEYNOTES

AD09 REPLACE EXISTING CONCRETE PAD WITH NEW THAT WILL ACCOMDIATE NEW EQUIPMENT FOOTPRINT.
M32 PROVIDE NEW REFRIGERANT LINE SETS SIZED PER MANUFACTURER'S RECOMMENDATIONS. DO NOT REUSE EXISTING.

ARCHER CONSULTING ENGINEERS
IL DESIGN NUMBER: 184003430-0002
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REGISTERED PROFESSIONAL ENGINEER · LAWRENCE J. McELHENY · 062-051700 · STATE OF ILLINOIS

DATE: 6.5.2023
EXP: 11.30.23

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ACTION	NAME
Design	LJM
Drawn	ACE/LJM
Checked	E.K.

engineering solutions team

NO	DATE	REVISION	BY
	6.1.2023	Owner Review	
	6.7.2023	Rebid	

CITY OF GENEVA
1800 S. Street
Geneva, IL 60134

PROJECT	SHEET TITLE	SCALE	PROJECT NO.	SHEET
WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID	**Level 1 HVAC Plan**	AS SHOWN	22013-00	No. M-1.6
			DATE	Of 12
			MAR. 2023	

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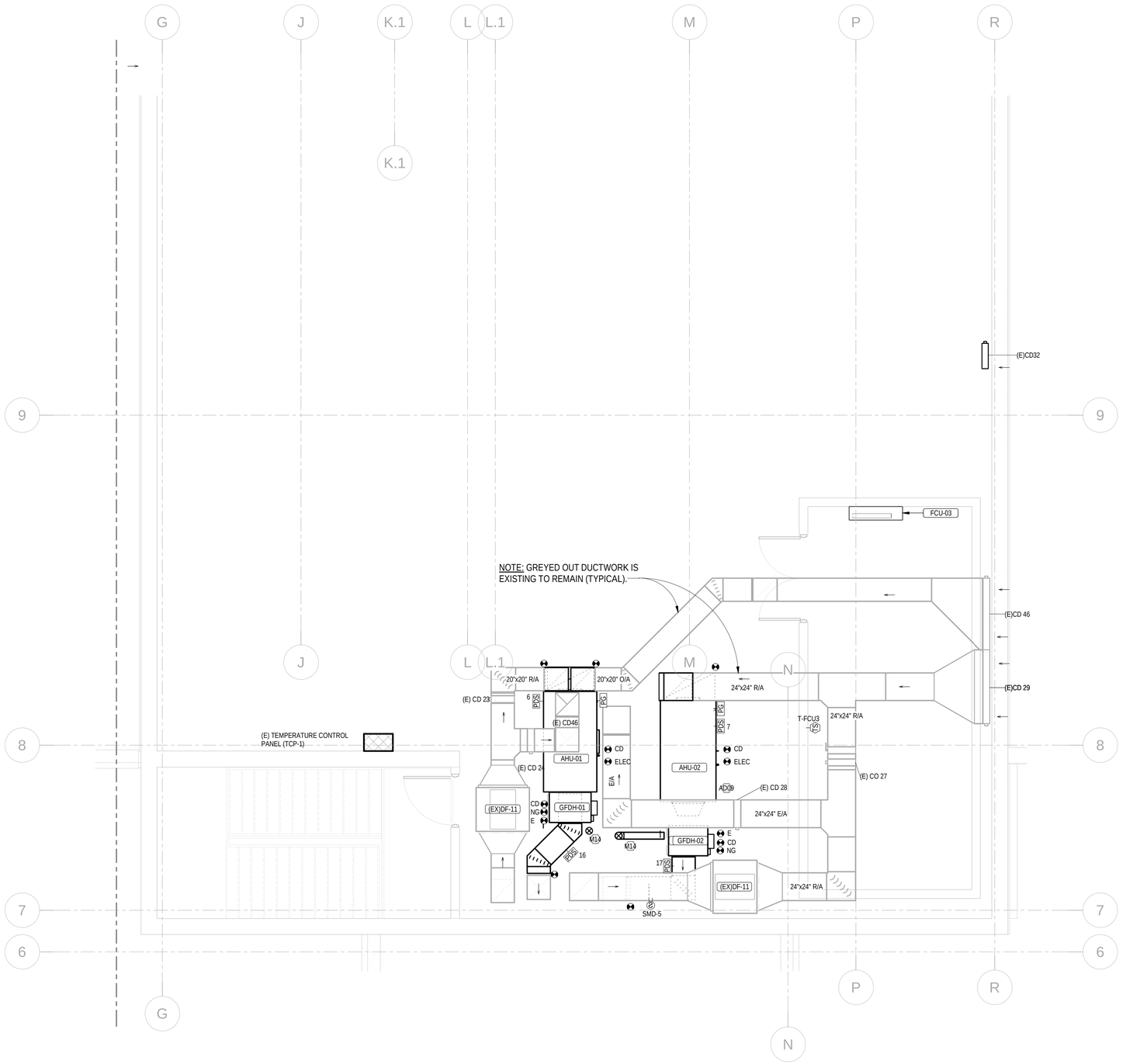
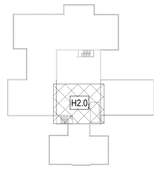


1 / M-2.0 LEVEL 2 HVAC PLAN - NORTH
1/4" = 1'-0"



Key Plan

HVAC Sheet Notes

A CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE A COMPLETE AND WORKING SYSTEM.

B INSTALL, SUPPORT, & BRACE NEW DUCTWORK AND ACCESSORIES PER SMACNA GUIDELINES.

C DUCT SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS. CONTRACTOR SHALL MAKE ALLOWANCE FOR ANY INTERIOR LINING, INSULATION, ETC.

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KEYNOTES

AD09 REPLACE EXISTING CONCRETE PAD WITH NEW IF EQUIPMENT FOOTPRINT IS LARGER THAN EXISTING. PAD DIMENSIONS SHOWN ON M3.0.

M14 PROVIDE 6" COMBUSTION AIR, FLUE DISCHARGE. PIPE TO VERTICAL CONCENTRIC VENT BOX THEN THRU ROOF. USE MANUFACTURE'S APPROVED VENT BOX AND PIPING REQUIREMENTS..

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LAWRENCE J. McELHENY 062-051700 REGISTERED PROFESSIONAL ENGINEER STATE OF ILLINOIS

DATE: 6.5.2023
EXP: 11.30.23

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Design	LJM
Drawn	ACE/LJM
Checked	E.K.

NO	DATE	REVISION	BY
	6.1.2023	Owner Review	
	6.7.2023	Rebid	

CITY OF GENEVA
1800 S. Street
Geneva, IL 60134

PROJECT: **WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID**

SHEET TITLE: **Level 2 HVAC Plan**

SCALE: AS SHOWN

PROJECT NO.: 22013-00

DATE: MAR. 2023

SHEET: No. M-2.0 Of 12

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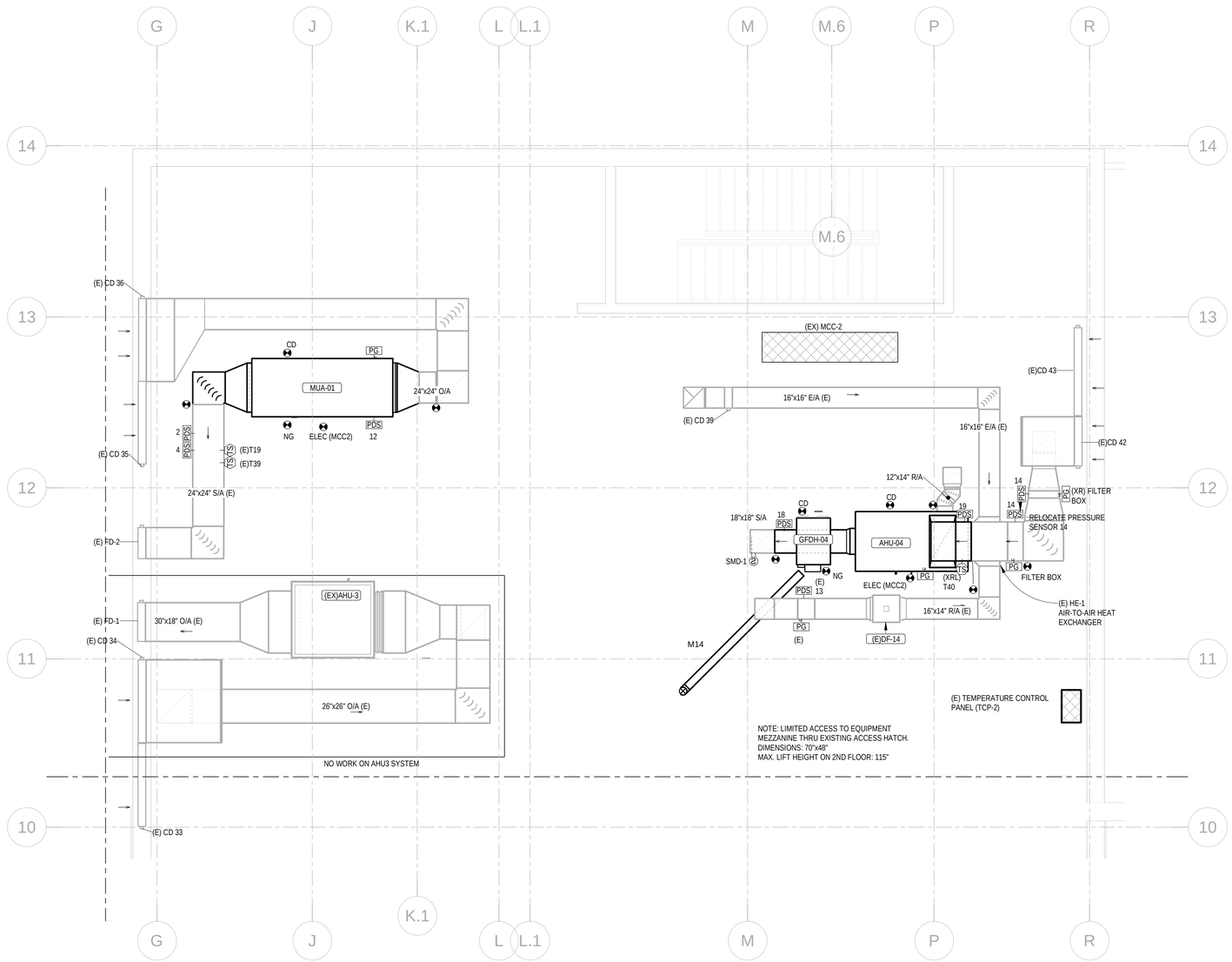
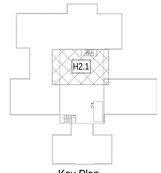


1 / M-2.1 LEVEL 2 HVAC PLAN - EAST
1/4" = 1'-0"



Key Plan

HVAC Sheet Notes

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KEYNOTES

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			DATE: MAR. 2023	Of 12

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Fan Coil Schedule

Identity	Location	Manufacturer	Model	Count	Product Type	Installation Type/ Arrangement	Nominal Capacity	Design Airflow Rate	Supply Fan Selection	Cooling Temperatures					Cooling Airflow Design	Cooling Coil Performance	Standard Ratings	System is Cooling Only	System is Heat Pump	Outdoor		Indoor		Exhaust		Heating Airflow Design	Overall Size	Product Weight	Rated Voltage	Electrical	Interlock	Notes
										Outdoor			Indoor																		
										OAT	MCWB	SAT	Setpoint	RH						OAT	SAT	Setpoint	RH	DB	WB							
FCU-03	ELEC ROOM 203	Mitsubishi	PKA-A36KA7	1	Compact	Support by Wall	3.0 ton	1,200 CFM	1,200 CFM, Motor: (0)	87.9 °F	72.3 °F	55 °F	78 °F	50%	Heat Pump Coil: 30,600 Btu/h Total, 24,480 Btu/h Sensible, 80% SHR, 1,200 CFM, 500 FPM Max AFV, EAT: 80/ 67, LAT: 55/ 54, 0.30 in-wg APD	Standard Ratings	Cooling:30,600 Btu/h, Indoor-80/67, Heating:32,600 Btu/h, Indoor-70/60,	No	Yes	-16 °F	95 °F	68 °F	30%	34 °F	33 °F	Heat Pump Coil: 32,600 Btu/h Output, 1,200 CFM, EAT 68 °F/ 94 °F LAT, 0.30 in-wg APD	46"W x 12"D x 14"H	40 lb	208 V	208 V, 1Φ , 2W	HP-03	ALL
Grand total: 1				1			3.0 ton																								

NOTES:
1. SEE SPECIFCIATION 23.81.13.13
2. POWER FROM HP-03
3. PROVIDE REMOTE ALARM - LOCATE IN CONTROL ROOM ON 1ST FLOOR - ASSUME 200' DISTANCE FOR BIDDING.

Make-Up Air Unit Schedule

Identity Tag	Location	Manufacturer	Model	Product Type	Installation Type/ Arrangement	Design Airflow Rate	Supply Fan Selection	Supply Fan Specification	Heating Airflow Design	Unit has Gas Supply	Gas Burner Rating	Gas Burner Spec	Product Weight	Specification	Electrical	Interlock	Notes
MUA-01	MECHANICAL PENTHOUSE EQUIPMENT ROOM 202	Reznor	SSCBL-500	Inline	Base Support	4,500 CFM	4,500 CFM, 1.25 in-wg ESP, 0.00 in-wg TSP, 0 RPM, Motor: (1)0.00 hp, 460/3/60	Wheel Type: AIR FOIL Motor: 3HP NEMA Premium	Gas Heat Input: 476,835 Btu/h Output, 4,500 CFM, EAT -16 °F/ 85 °F LAT, 1.50 in-wg APD	Yes	500,000 Btu/h Input, 400,000 Btu/h Output, 80%, 5:1 Turndown, Fuel Type: NG	Type/Material: STAINLESS STEEL No. of Burners: 2 CABINET BURNERS	730 lb	Included Accessories: SEE NOTES BELOW Material Notes: SEE NOTES BELOW	480 V, 3Φ , 3W	-	ALL
Grand total: 1																	

NOTES:
1. SS HEAT EXCHANGERS, BURNERS, & DRIP PAN
2. TWO-STAGE GAS CONTROL ON EACH FURNANCE
3. VFD MOTOR WITH SOFT START CONTROL OPTION
4. SUPPLY FAN TEDP CONFIGURATION
5. FIRESTAT / FREEZESTAT PROTECTION
6. FILTER RACK FOR 2" FILTERS
7. REMOTE CONTROL CENTER LOCATED IN CONTROL ROOM
8. T-STAT LOCATED IN AREA SERVED
9. 10 YEAR HEAT EXCHANGER WARRANTY

Split System Air Source Heat Pump

Identity Tag	Location	Manufacturer	Model	Product Type	Nominal Capacity	Outdoor Air Intake Flow	Design Airflow Rate	Rated Cooling Capacity	Rated Heating Capacity	Outdoor Coil Conditions			Minimum Efficiency	Overall Size	Electrical	Interlock	Notes
										Description	Cooling EDB	Heating EDB					
HP-03	GRADE	Mitsubishi	PUZ-A36NKA7-BS	Heat Pump	3.0 ton		1,200 CFM	36,000 Btu/h	42,000 Btu/h	Air-Source Coil	95	47	Cooling: XX EER, XX IEER, XX ERR Heating: XX COP, XX EI, XX ERR	0"L x 41"W x 13"D x 53"H	208 V, 1Φ , 2W	FCU-01	ALL
Grand total: 1					3.0 ton	0 CFM		36,000 Btu/h	42,000 Btu/h								

NOTES:
1. SEE SPECIFCIATION 23.81.13.13
2. REWIRE FROM A 208V/1PH SOURCE

Air Handling Unit Schedule

Identity Tag	Location	Manufacturer	Model	Product Type	Installation Type/ Arrangement	Nominal Capacity	Outdoor Air Intake Flow	Design Airflow Rate	Supply Fan Selection	Cooling Airflow Design	Electrical	Interlock	Notes
AHU-01	EQUIPMENT ROOM 202	Carrier	39M-N-06W-X-XX-S-R-E	Horizontal	Base Support	6.0 ton	2,700 CFM	2,700 CFM	2,700 CFM, 1.50 in-wg ESP, 1.80 in-wg TSP, 0 RPM, Motor: (1)5.00 hp, 460/3/60	Evaporator Coil: 67,600 Btu/h Total, 61,400 Btu/h Sensible, 90.8% SHR, 2,700 CFM, 500 FPM Max AFV, EAT: 81/ 65, LAT: 51/ 54, 0.37 in-wg APD	480 V, 3Φ , 3W	DF-8 / CU-01	ALL
AHU-02	EQUIPMENT ROOM 202	Carrier	39M-N-08W-X-XX-S-R-E	Horizontal	Base Support	10.0 ton	3,600 CFM	3,600 CFM	3,600 CFM, 1.20 in-wg ESP, 1.40 in-wg TSP, 0 RPM, Motor: (1)5.00 hp, 460/3/60	Evaporator Coil: 111,100 Btu/h Total, 88,880 Btu/h Sensible, 80% SHR, 3,600 CFM, 500 FPM Max AFV, EAT: 81/ 67, LAT: 57/ 54, 0.43 in-wg APD	480 V, 3Φ , 3W	DF-9 / CU-02	ALL
AHU-04	EQUIPMENT ROOM 202	Carrier	39M-N-06W-X-XX-S-R-E	Horizontal	Base Support	6.0 ton	1,750 CFM	2,360 CFM	2,360 CFM, 2.20 in-wg ESP, 2.50 in-wg TSP, 0 RPM, Motor: (1)5.00 hp, 460/3/60	Evaporator Coil: 92,900 Btu/h Total, 68,800 Btu/h Sensible, 74.1% SHR, 2,360 CFM, 500 FPM Max AFV, EAT: 82/ 59, LAT: 57/ 54, 0.44 in-wg APD	480 V, 3Φ , 3W	DF-14 / CU-04	ALL
Grand total: 3						22.0 ton	8,050 CFM						

NOTES:
1. SEE SPECIFICATION 23.73 13.16

Air Cooled Condensing Unit

Identity Tag	Location	Manufacturer	Model	Nominal Capacity	Specification	System Voltage	Phase	Electrical	Interlock	Notes
CU-01	GRADE	Carrier	38AUZ_08	7.5 ton	23.62.00	480 V	3	480 V, 3Φ , 3W	AHU-01	ALL
CU-02	GRADE	Carrier	38AUZ_12	10.0 ton	23.62.00	480 V	3	480 V, 3Φ , 3W	AHU-02	ALL
CU-04	GRADE	Carrier	38AUZ_07	6.0 ton	23.62.00	480 V	3	480 V, 3Φ , 3W	AHU-04	ALL
Grand total: 3				23.5 ton						

NOTES:
1. LOW AMBIENT AIR KIT
2. LOUVERED CONDENSER COIL HAIL GUARD
3. LIQUID SIGHT GLASS FOR OUTDOOR UNIT
4. 5 YEAR COMPLETE UNIT PARTS AND LABOR WARRANTY & STARTUP.

Gas Fired Duct Heater Schedule

Identity Tag	Location	Manufacturer	Model	Product Type	Installation Type/ Arrangement	Unit has Gas Supply	Gas Burner Rating	Product Weight	Electrical	Notes
GFDH-01	MECHANICAL PENTHOUSE EQUIPMENT ROOM 202	Reznor	SC-200	Power Vented	Base Support	Yes	200,000 Btu/h Input, 160,000 Btu/h Output, 80%, 5:1 Turndown, Fuel Type: NG	187 lb	120 V, 1Φ , 2W	ALL
GFDH-02	EQUIPMENT ROOM 202	Reznor	SC-250	Power Vented	Base Support	Yes	150,000 Btu/h Input, 120,000 Btu/h Output, 80%, 5:1 Turndown, Fuel Type: NG	215 lb	120 V, 1Φ , 2W	ALL
GFDH-04	EQUIPMENT ROOM 202	Reznor	SC-200	Power Vented	Base Support	Yes	200,000 Btu/h Input, 160,000 Btu/h Output, 80%, 5:1 Turndown, Fuel Type: NG	187 lb	120 V, 1Φ , 2W	ALL
Grand total: 3										

NOTES:
1. STAINLESS STEEL HEAT EXCHANGER, DRIP PAN, & BURNER.
2. ELECTRONIC MODULATION GAS CONTROL 20/28%-100%
3. HIGH/LOW GAS PRESSURE SWITCHES
4. CONDENSATE DRAIN FLANGE KIT
5. MANUAL SHUT-OFF VALVE AND UNION

EQUIPMENT PAD SIZES

	PAD ID	LENGTH	WIDTH	LOCATION
1	AHU 1	96"	60"	2ND FL
2	AHU 2	96"	66"	2ND FL
3	AHU 4	96"	60"	2ND FL
4	MUA 01	132"	66"	2ND FL
5	AHU 3	72"	72"	2ND FL
6	PVAC	90"	32"	2ND FL
7	PVAC CU	102"	54"	AT GRADE
8	CU 04	66"	48"	AT GRADE
9	CU 01	40"	40"	AT GRADE
10	CU 02	58"	44"	AT GRADE

PAD MAY BE REUSED IF RESPECTIVE EQUIPMENT FOOTPRINT LEAVES 2" CLEARANCE TO EDGE

UNIT	STATUS	DEVICE ID	DEVICE DESCRIPTION	TEMP CONTROL PANEL	DEVICE LOCATION	
AHU1						
	XRN	PDS16	PRESSURE DIFFERENTIAL FLOW SWITCH	TCP1		HIGH DUCT PRESSURE
	NEW	PDS6	HIGH FILTER PRESSURE LOSS SWITCH	TCP1		
	NEW	PG	PRESSURE DIFFERENTIAL GAUGE (FILTERS)	-		
	EX	CD24	CONTROL DAMPER (RELIEF CONTROL)			RETURN FAN
	EX	CD23	CONTROL DAMPER (RETURN CONTROL)			
	EX	CD46	CONTROL DAMPER (OUTSIDE AIR MINIMUM)			
	XRN	T2	SPACE THERMOSTAT		116	SINGLE ZONE CONST VOLUME
	EX	T27	OUTSIDE AIR THERMOSTAT		OUTSIDE	
	EX	SMD4	SMOKE DETECTOR			COMB F/S DETECTOR
AHU2						
	XRN	PDS17	PRESSURE DIFFERENTIAL FLOW SWITCH	TCP1		HIGH DUCT PRESSURE
	EX	SMD-5	SMOKE DETECTOR			COMB F/S DETECTOR
	NEW	PDS7	HIGH FILTER PRESSURE LOSS SWITCH	TCP1		
	NEW	PG	PRESSURE DIFFERENTIAL GAUGE (FILTERS)	-		
	EX	CD29	CONTROL DAMPER (OA DAMPER MAXIMUM)			
	EX	CD28	CONTROL DAMPER (RELIEF CONTROL)			
	EX	T27	OUTSIDE AIR THERMOSTAT		OUTSIDE	
	EX	CD45	CONTROL DAMPER (OA DAMPER MAXIMUM)			
	XRN	T3	SPACE THERMOSTAT		103	SINGLE ZONE CONST VOLUME
	EX	CD42	CONTROL DAMPER	TCP2		ON/OFF SELECTOR SWITCH
FCU03						
	NEW	T-FCU3	SPACE THERMOSTAT	STAND ALONE - ALARM IN CONTROL ROOM		
AHU04						
	XRL	PDS18	PRESSURE DIFFERENTIAL FLOW SWITCH	TCP2		HIGH DUCT PRESSURE
	EX	SMD1	SMOKE DETECTOR			COMB F/S DETECTOR
	EX	PDS19	PRESSURE DIFFERENTIAL FLOW SWITCH			
	EX	PDS13	PRESSURE DIFFERENTIAL FLOW SWITCH			
	NEW	PG	PRESSURE DIFFERENTIAL GAUGE (FILTERS)			
	XRL	PDS14	HIGH FILTER PRESSURE LOSS SWITCH	TCP2		
	NEW	PDS19	HIGH FILTER PRESSURE LOSS SWITCH			FILTER SENSOR
	EX	CD42	CONTROL DAMPER			
	XRL	T40	FREEZE PROT	TCP2	202	
	EX	CD39	CONTROL DAMPER			
	EX	PDS3	PRESSURE SWITCH			VENTILATION SYSTEM FAILURE
	NEW	T19	SPACE THERMOSTAT		155	
MUA01						
	EX	PDS2	PRESSURE SWITCH			VENTILATION SYSTEM FAILURE
	EX	PDS4	PRESSURE DIFFERENTIAL FLOW SWITCH	TCP2		HIGH DUCT PRESSURE
	EX	T19	SPACE THERMOSTAT			
	EX	T11	SPACE THERMOSTAT (SUPPLY AIR)		161	
	EX	T30	SPACE THERMOSTAT			
	EX	T39	FREEZE PROT	TCP2	202	
	EX	FD2	FIRE DAMPER			
	EX	FD1	FIRE DAMPER			
	EX	CD36	CONTROL DAMPER	TCP2		ON-OFF WINTER/SUMMER MODE
	NEW	PDS12	HIGH FILTER PRESSURE LOSS SWITCH	TCP2		
	NEW	PG	PRESSURE DIFFERENTIAL GAUGE (FILTERS)			
	EX	SMD2	SMOKE DETECTOR			COMB F/S DETECTOR
PAH-1						
	XR	PDS9	HIGH FILTER PRESSURE LOSS SWITCH	TCP1		
	EX	T29	OUTSIDE AIR THERMOSTAT		OUTSIDE	
	XR	T30	SPACE THERMOSTAT		203	
	XR	T46	PAH1 ALARM		203	
	XR	SMD7	SMOKE DETECTOR			
	XR	PDS8	PRESSURE SWITCH			VENTILATION SYSTEM FAILURE
	XR	CD47	OUTSIDE DAMPER			
	XR	CD49	RETURN DAMPER			
	XR	CD26	EXHAUST DAMPER			

EX - EXISTING TO REMAIN
XR - EXISTING TO BE REMOVED.
NEW - NEW DEVICE
XRL - EXISTING TO BE RELOCATED.
XRN - EXISTING TO BE REPLACED IN NEW LOCATION

CONTROLS INTENT:
THERE IS AN EXISTING SEMI-CUSTOM AUTOMATION SYSTEM THAT CONTROLS THE MECHANICAL SYSTEMS. THE INTENT IS TO REUSE AS MUCH OF THE SYSTEM TO THE MAXIMUM EXTENT. NEW DEVICES, INDICATED ABOVE, ARE TO MATCH EXISTING. NO NEW CONTROL POINTS ADDED - JUST DEVICES.

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CITY OF GENEVA 1833 ILLINOIS

CITY OF GENEVA
1800 S. Street
Geneva, IL 60134

PROJECT: **WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID**

SHEET TITLE: **Mechanical Schedules**

SCALE: AS SHOWN

PROJECT NO.: 22013-00

DATE: MAR. 2023

SHEET: No. M-3.0 Of 12

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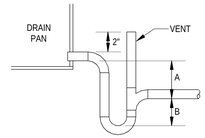
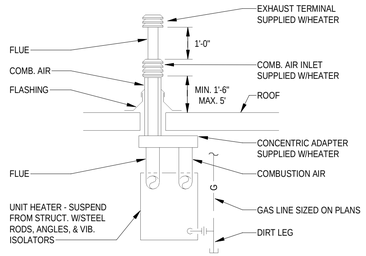
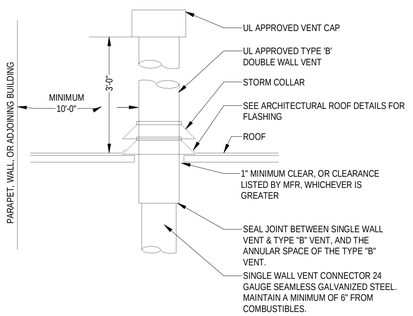


A= SCHEDULED FAN STATIC PLUS ONE INCH
B= 1/2 OF SCHEDULED FAN STATIC

5 M-3.1 COOLING COIL CONDENSATE DRAIN DETAIL
NOT TO SCALE

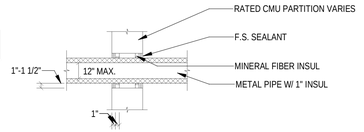


6 M-3.1 GAS FIRED DUCT HEATER DETAIL
NOT TO SCALE

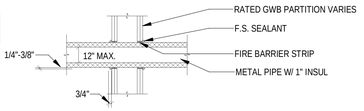


7 M-3.1 UNIT HEATER VENT
NOT TO SCALE

UL SYSTEM WJ 7029
WALL ASSEMBLIES



UL SYSTEM WL 2059
WALL ASSEMBLIES

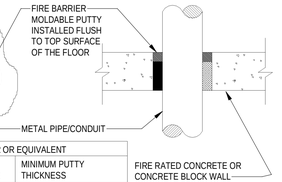


1 M-3.1 FIRESTOP DETAIL AT INSULATED METAL PIPE
NOT TO SCALE

DESIGNER NOTE:
COORDINATE WITH SPEC IF BOOK SPEC PROJECT IS USED.

TOP VIEW

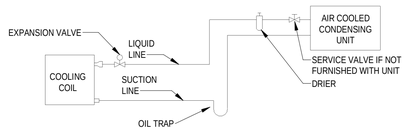
CROSS-SECTION VIEW



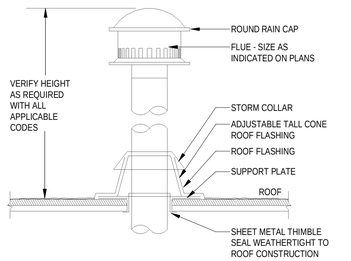
3M BRAND - UL SYSTEM NO. 202 OR EQUIVALENT		
MAXIMUM PIPE SIZES	MAXIMUM OPENING SIZE	MINIMUM PUTTY THICKNESS
5"	6 1/4"	1/2"
10"	12 1/4"	1"

NOTE: MAXIMUM ANNULAR SPACE BETWEEN PIPE AND OPENING NOT TO EXCEED 3/4 INCH.

2 M-3.1 VERTICAL PENETRATION FIRESTOP DETAIL
1/8" = 1'-0"



3 M-3.1 SPLIT SYSTEM FAN COIL UNIT PIPING SCHEMATIC
NOT TO SCALE



4 M-3.1 FLUE VENT AND FLASHING DETAIL
NOT TO SCALE

ARCHER CONSULTING ENGINEERS
IL DESIGN NUMBER: 184003430-0002
15534 Hawkhaven Rd.
Suite B
Homer Glen, IL 60491
United States
Tel 815.588.3535

THIS SQUARE APPEARS 1/2"x1/2" ON FULL SIZE SHEETS

REGISTERED PROFESSIONAL ENGINEER · LAWRENCE J. McELHENY · 062-051700 · STATE OF ILLINOIS

DATE: 6.5.2023
EXP: 11.30.23

This drawing shall not be used nor reproduced either wholly or in part except when authorized by the engineer- Engineering Solutions Team

ACTION	NAME
Design	LJM
Drawn	ACE/LJM
Checked	E.K.

engineering solutions team

NO	DATE	REVISION	BY
	6.1.2023	Owner Review	
	6.7.2023	Rebid	

CITY OF GENEVA
1800 S. Street
Geneva, IL 60134

PROJECT	SHEET TITLE	SCALE	PROJECT NO.	SHEET
WATER TREATMENT PLANT - HVAC SYSTEM REHABILITATION & MODERNIZATION PROJECT RE-BID	Ductwork & Equipment Details	AS SHOWN	22013-00	No. M-3.1
			DATE MAR. 2023	Of 12

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