CONTRACT DOCUMENTS
&
TECHNICAL SPECIFICATIONS

HU 2025-73

WEC 1 FLY ASH SILO
ELECTRICAL CONSTRUCTION

CITY OF HASTINGS

Proposals Will Be Opened Promptly At
1:30 PM, Friday, September 12, 2025

Bid Submitted By: _____

HASTINGS
Nebraska

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CONTRACT AND SPECIFICATIONS
FOR
WEC UNIT 1 FLY ASH SILO
ELECTRICAL CONSTRUCTION
FOR
CITY OF HASTINGS
HASTINGS, NEBRASKA

Contract No. HU 2025-73

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ADVERTISEMENT FOR BIDS

The City of Hastings, Nebraska, will receive bids for the **WEC 1 Fly Ash Silo Electrical Construction, HU 2025-73** until 1:30 p.m. at the City of Hastings, 1228 N Denver Ave., Hastings, Nebraska, on Friday, September 12, 2025, at which time and place all bids will be publicly opened and read aloud. **Brief description of project: Installation of a new motor control center, electrical equipment, instrumentation, raceway, power cables, and controls cables for WEC1 Fly Ash Silo in Hastings, Nebraska.** If you plan on bidding and are not already on our approved bidders list for this project, you are REQUIRED to fill out the Plan Holders Submittal Form that is located on the City website: https://www.cityofhastings.org/bids/.

The Contract Documents, including plans and specifications, are on file at the City of Hastings 1228 N Denver Avenue, Hastings, Nebraska 68901. Copies of the plans and specifications in electronic (PDF) format may be obtained by visiting the City of Hastings Website: www.cityofhastings.org/bids. A paper copy is available for $75.00, plus sales tax ($5.25), plus shipping.

Each bid shall be accompanied by a certified check, drawn on a solvent bank in the State of Nebraska, or a bid bond in an amount of not less than five percent (5%) of the total bid of all contract construction costs, made payable to the City Treasurer of the City of Hastings, Nebraska, as security that the bidder to whom the contract may be awarded will enter into a contract to build all the improvements in accordance with this notice and give bond in the sum hereinafter provided for the construction of improvements.

No bid shall be withdrawn after opening of bids without the consent of the City of Hastings, Nebraska, for a period of sixty (60) days after scheduled time of closing bids.

Time is of the essence in this contract. In evaluating bid(s) received, the City will consider the timelines of completion of prior construction contracts, existing workload of bidders and available manpower that bidder commits to the project.

The successful bidder will be required to furnish a Performance Bond in the sum of the full amount of the Contract within ten (10) days of the date of award. No additional time will be allowed the Contractor for providing the Performance Bond.

DATED AT HASTINGS, NEBRASKA, this 18th day of August, 2025.

CITY OF HASTINGS, NEBRASKA

_____

Tyler Ficken, City Clerk

Publish:
August 20, 2025
August 27, 2025

Furnish 2 proofs of publication

INSTRUCTIONS TO BIDDERS

All proposal information, including any unit price fill in sheets or other required information, shall be submitted on the proposal forms hereto attached. Copies of addenda, if any, shall be signed and attached. City of Hastings does NOT accept faxed or emailed bid returns.

Bidders shall inform themselves of all relevant matters, and, if awarded the contract, shall not be allowed any extra compensation by reason of any matter or thing concerning which such Bidder might not have fully informed himself, prior to the bidding.

The Bidder bidding on the Specifications herein, who has exceptions to those called for in the Specifications, must so state in the space provided below and/or attach a letter explaining in detail the exceptions taken to those required in the Specifications. This letter of explanation shall become a part of the bid and shall be attached hereto. Failure by the Bidder to outline his exceptions will require the successful Bidder to comply with these Specifications.

EXCEPTIONS TO SPECIFICATIONS:

_____

_____

_____

_____

_____

The City will not assume obligations resulting from losses or damages until acceptance of the equipment.

If any person contemplating submitting a bid for this contract is in doubt as to the true meaning of any part of the Specifications or other proposed contract documents, he may submit to Purchaser a written request for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addendum duly issued or delivered to each person receiving a set of such documents. The Purchaser will not be responsible for any other explanation or interpretation of the proposed documents.

All addendums must be signed and attached to bid documents.

IF YOU HAVE QUESTIONS OR NEED HELP ON THESE SPECIFICATIONS

PLEASE CONTACT ANY OF THE FOLLOWING:

TECHNICAL QUESTIONS

Brandon Miller – Mechanical Engineer
1228 N Denver Ave
Hastings, NE 68901
Ph# 402-462-3653
Email: bidquestions@cityofhastings.org

GENERAL QUESTIONS OR REQUESTS

Renae Griess
Engineering Admin Assistant
Ph# 402-462-3665
Email: bidquestions@cityofhastings.org

IMPORTANT SUBMITTAL INSTRUCTIONS

ON HOW TO SUBMIT YOUR BID
FOR
CITY OF HASTINGS
WEC UNIT 1 FLY ASH SILO
ELECTRICAL CONSTRUCTION
Contract No. HU 2025-73

Your bid MUST be returned by means of hand delivery, USPS, Fed-X, UPS, or other carrier. City of Hastings DOES NOT ACCEPT bids that are faxed or emailed.

ALL the following documents are TO BE SUBMITTED in your bid packet.

1. **Cover sheet with your company's name filled in**
2. **ALL addendums received – must be acknowledged and signed**
3. **Bid Bond**
4. **If Exceptions, Instructions to Bidders with any exceptions listed**
5. **Proposal Page(s)**

FAILURE TO RETURN REQUIRED BID DOCUMENTS

COULD SUBJECT YOUR BID PROPOSAL TO BE REJECTED

IMPORTANT MAILING (OR HAND DELIVERY) INSTRUCTIONS

Please address your return envelope as shown in the example below. All bids must be sealed in a properly marked envelope.

To hand deliver, please drop off between the hours of 8am – noon and 1-5pm Monday through Friday.

Your Return Address

City of Hastings
Attn: Renae Griess
1228 N Denver Avenue
Hastings, NE 68901

This Information MUST BE typed or written in the lower left hand corner of return envelope
OR SIMPLY CUT OUT AND TAPE ON YOUR RETURN ENVELOPE

✂ ✂ ✂ ✂

BID DOCUMENTS ENCLOSED
ATTN: Renae Griess
Contract No: Fly Ash Silo Electrical Construction HU 2025-73
Bid Opens: Friday, September 12, 2025 @ 1:30 PM

If returning Fed-X or similar carrier, please enclose the bid in an "inner" envelope which is sealed. Please make sure BOTH envelopes are properly marked on the OUTSIDE OF THE ENVELOPE as shown in the example above.

One bid per envelope. Bid submittal via email is not allowed. Bids must be checked in to the City of Hastings prior to 1:30 pm deadline.

Proposal for WEC Unit 1
Fly Ash Silo Electrical Construction
Contract No. HU 2025-73

TO: City of Hastings
1228 N. Denver Ave
Hastings, NE 68901

Bid Opening: Sep. 12, 2025 (Friday)
SEALED BIDS MUST BE RECEIVED BY 1:30 P.M. AND WILL BE OPENED PROMPTLY AT THAT TIME

We, the undersigned, being familiar with all parts of these documents, being Notice to Bidders, Bid Proposal Price Sheets, Contract Document Forms, Plans and Specifications, Affidavit, Material List, and all other parts of this document, do herein submit our proposal to furnish, install, and perform all tasks required to complete said project area(s) for the total costs.

The labor portion is not subject to sales tax; however, the material portion is taxed accordingly. The project is outside of city limits and is subject to **5.5% sales tax**. See following tax rules and regulation language.

BID SECTION I: Fly Ash Silo System Construction

Item#	Description	Unit Price	Total
1	Mobilization	LUMP SUM	$
2	Labor for demolition of existing MCC and electrical equipment in precipitator building	LUMP SUM	$
3	Labor for installation of CoH provided MCC, transformer, power panel, I/O module, ash cabinet terminal boards	LUMP SUM	$
4	Supply of Materials for all power cables per the cable schedule	LUMP SUM	$
5	Labor for installation of power cables	LUMP SUM	$
6	Supply of materials for all control cables per the control cable schedule	LUMP SUM	$
7	Labor for installation of control cables	LUMP SUM	$
8	Supply of materials for receptacles and lighting circuits at fly ash silo including lights, receptacles, and wiring	LUMP SUM	$
9	Labor for installation of receptacles and lighting at fly ash silo	LUMP SUM	$
10	Supply of materials for conduit, raceway, cable tray, and all supports	LUMP SUM	$
11	Labor for installation of conduit, raceway, cable tray, and all supports	LUMP SUM	$
13	Supply of instrumentation tubing, fittings, hardware, and instrument mounting supports	LUMP SUM	$
14	Labor for installation of all instrumentation per Inst. List, all hardware, and supports.	LUMP SUM	$
15	Sales Tax	*(For Option 1 Contractors only) Sales Tax	$

		on materials of the above items	
TOTAL SECTION I			
			$
In Words			

BID SECTION II: Fly Ash Silo System Start-Up Support

Item#	Description	Unit Price	Total
1	Labor for start-up support provide a daily rate and expected number of crew members needed	LUMP SUM per day	$

Note: Material and Labor for building wall penetrations and seals, equipment base grouting, touch-up painting, all testing, conduit and circuit labeling, and all other labor and materials not explicitly called out in proposal but included in scope of work shall be subsidiary to line items listed in proposal.

Liquidated Damages: The Contractor shall pay a fee of $500.00 per working day for failure to deliver the work before the specified dates in accordance with Section GC.36 – Liquidated Damages of Section 1 – General Conditions.

Substantial Completion Date: November 20, 2025
Project Completion Date (including system checkout and startup): December 3, 2025

Note: Unit prices shall prevail in the case of potential mathematical discrepancies.

The labor portion is not subject to sales tax; however, the material portion is taxed accordingly. See following tax rules and regulation language.

For purposes of sales/use tax, this project falls under Nebraska Sales and Use Tax Regulation 1-017 for Contractors. By definition, a contractor is "any person who repairs property annexed to, or who annexes property to, real estate, including leased property, by attaching building materials to the annexed property or improvement being built or repaired, or who arranges for annexation of property." Please refer to www.revenue.nebraska.gov/salestax.html for additional information.

For calculating this proposal:

- All contractors are to include sales/use tax on materials in the bidder's prices, if applicable.

Proposal for WEC Unit 1
Fly Ash Silo Electrical Construction
Contract No. HU 2025-73

- **Option 1 contractors must separately state materials, sales tax, labor, and other charges on all invoices for the project. Any invoices submitted that do not include this required breakdown of the charges will not be accepted for payment. (This requirement does not apply to Option 2 or 3 contractors.)**
- The sales/use tax rate on building materials is 7.0% for projects within Hastings' city limits and 5.5% for projects outside of city limits.
- Contractor labor charges for this proposal are not subject to sales/use tax per the Nebraska Department of Revenue Notice to Contractors effective October 1, 2007.
- In submitting this bid, the bidder certifies that he will comply with all applicable laws, ordinances, and codes of the City of Hastings and the State of Nebraska.
- For this project, Contractor will supply all materials.

What contractor option have you registered with the Nebraska Department of Labor (must select one)? Please refer to https://dol.nebraska.gov for additional information.

Option 1 _____

Option 2 _____

Option 3 _____

Is Nebraska Sales/Use Tax included in the above prices.

Yes _____ No _____

(ALL COSTS TO INCLUDE CITY AND STATE SALES TAX)

The undersigned bidder agrees to furnish the required performance bond and to enter into a contract within ten (10) days after acceptance of the Proposal and further agrees to complete all work covered by the foregoing Proposal in accordance with specified requirements.

Exceptions: No ☐ Yes ☐ (If yes, list on ***"Instructions to Bidders"*** page)

Any modification of bid proposal will be considered non-conformance of the bid. All exceptions to the proposal shall be noted as an exception to the bid.

City of Hastings may at its own discretion delete any project area and / or component prior to award of contract. City of Hastings will award all bid sections to one contractor.

In submitting this proposal, it is further understood that the City of Hastings reserves the right to reject any or all proposals and may waive any informalities and may accept the proposal which best suits its needs. It is further understood that this proposal may not be withdrawn for a period of sixty days (60) days after bids are opened.

Proposal for WEC Unit 1
Fly Ash Silo Electrical Construction
Contract No. HU 2025-73

All bid documents, including proposals, bid bonds, subcontractor designation, etc., must be submitted with original signatures. No copies will be accepted.

OFFICIAL NAME & ADDRESS

Firm Name	Signature
Address	Typed or Printed Name
City, State, Zip	Title
Phone No.	Date
Fax No.	Email Address

ALL BIDS MUST BE CHECKED IN TO THE CITY OF HASTINGS PRIOR TO 1:30 PM DEADLINE

AGREEMENT

THIS AGREEMENT, made and entered into this __ day of _____, 2025, by and between the City of Hastings, Party of the First Part, hereinafter called the "Purchaser" or "City", and _____of (town) _____ in the State of _____, Party of the Second Part, hereinafter called the "Contractor".

WITNESSETH: THAT,

WHEREAS: The Purchaser has caused the necessary contract documents to be prepared for defining material, equipment, and/or labor to be supplied to the City of Hastings and delivered complete as specified in the accompanying contract documents.

WHEREAS: The Purchaser has advertised for bids from Contractors, has received said bids, analyzed same and duly awarded a contract to the "Contractor", "Party of the Second Part", for material, equipment, and/or labor as hereinafter set forth and as stated more in detail in the Proposal and related contract documents to wit; Notice to Bidders, Instructions to Bidders, Specifications; all of which documents are attached hereto and made a part of this Contract.

NOW, THEREFORE: It is hereby agreed that for the sum of_____. ($ _____)

to be paid by the Purchaser, within Thirty (30) days after the acceptance of material, equipment, and/or labor by the Purchaser, to the Contractor, the Contractor agrees to furnish all materials, equipment, and/or labor as required by the accompanying specifications, and the aforesaid contract documents, for **HU 2025-73 Fly Ash Silo Electrical Construction.**

All materials, equipment, and/or labor shall be in accordance with the accompanying contract documents and specifications which are as much a part of this Agreement as if repeated verbatim herein.

It is further agreed that the Contractor will start work promptly, furnish the necessary drawings promptly and complete the work in the number of days set forth in the Proposal.

IN WITNESS WHEREOF: The Parties of the First and Second Parts have hereto set their hands and seals on the day and year above written.

CITY OF HASTINGS
Party of the First Part

By: _____

Date: _____

ATTEST:

_____
City Clerk

CONTRACTOR
Party of the Second Part

SEAL _____

By: _____

Title: _____

Date: _____

APPROVED TO FORM:

_____
City Attorney

Note: If executed by one other than President, Partner or the individual Owner, a Power-of-Attorney authorizing execution should accompany this Contract.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, the undersigned, _____,
as principal, and _____,
a corporation organized and existing under the laws of the State of _____,
and duly authorized to transact business in the State of Nebraska, as surety are held and firmly bound unto the CITY OF HASTINGS, NEBRASKA, a municipal corporation organized and existing under the laws of the State of Nebraska, hereinafter referred to as CITY, in the penal sum of _____ Dollars ($_____),
lawful money of the United States, for the payment of which will and truly be made, we the said principal and the said surety do hereby bind ourselves, our heirs, executors, administrators and assigns, jointly and severally, by these presents as follows:

The condition of this obligation is such that, whereas the principal, by an instrument in writing attached hereto and bearing the date of _____, 20____, has agreed with the CITY to do all work necessary and to furnish all labor, materials, supplies, tools and equipment to

_____

_____

_____

as specified thereby and in the specifications, proposals and contract forming the Contract Documents attached thereto and made a part hereof:

NOW THEREFORE, if the principal shall well and truly in good, sufficient and in a workmanlike manner, and to the satisfaction of the CITY perform and complete the work required, and shall defend, indemnify and save harmless the CITY against all damages, claims, demands, expenses and charges of every kind (including claims of patent infringement) arising from any act, omission or neglect of said principal, his agents, servants or employees, with relation to said work, and shall pay all costs, charges, rentals and expenses for labor, materials, supplies and equipment and deliver the said improvement to the CITY completed and ready for operation and free from all encumbrances or claims for labor, materials or otherwise, and shall pay all other expenses lawfully chargeable to the CITY, and this bond shall also be for the use and benefit of all persons who may perform any work or labor or furnish any material in the execution of said Contract and may be

sued on thereby in the name of any such party claiming the benefit hereof, then this obligation shall be void, otherwise the same shall remain in full force and effect. This obligation shall be in full force and effect for the full guarantee period provided in the specifications contained herein.

PROVIDED FURTHER, that 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 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 change, extension of time, alteration or addition to terms of the Contract, to the work or to the specifications.

PROVIDED FURTHER, that if the principal of his, their or its subcontractor or subcontractors fail to duly pay for any labor, materials team, hire sustenance, provisions, provender or any other supplies or materials used or consumed by such contractor of his, their or its subcontractors in performance of the work contracted to be done, the surety will pay the same in any amount not exceeding the sum specified in the bond together with interest as provided by law.

IT WITNESS WHEREOF, said principal and surety have hereunto set their hands and seals at _____ this _____ day of _____, 20____,

This Bond is executed in triplicate counterparts.

_____
Principal

_____
Street Address

(SEAL)

_____ _____
Witness City, State, Zip

_____
Name of Person Executing

_____
Surety

ATTEST:

_____ By: _____
_____ Title: _____

INSURANCE COVERAGE

The undersigned hereby certifies that Workmen's Compensation, Public Liability and Property Damage, and Automobile Liability and Property Damage Insurance is in force and effect in accordance with the requirements contained in "Instruction To Bidders" which is a part of this document "Bid Proposal And Specifications". We further agree to give ten (10) days notice to the Public Power Generation Agency before effective date of cancellation or reduction of any of the above coverage.

This Insurance Coverage applies only to _____

_____

Dated _____

_____
SUPPLIER

By _____

Title_____

Date _____

_____
INSURANCE COMPANY

By_____

Title_____

Address_____

_____

Date_____

A F F I D A V I T

State of Nebraska)
) ss.
County of Adams)

I _____ , _____
Name Title

of _____
Firm Name

do hereby certify that all subcontractors, vendors, persons or firms who have furnished labor or material for the _____

_____

_____

have been fully paid and that all taxes have been paid.

_____
Signature

_____
Date

Subscribed and sworn to me this _____ day of _____, 20_____

_____
Notary Public

My commission expires _____.

A signed and notarized copy of affidavit must be in City of Hastings file before final payment may be made.

Copy of forms will be supplied by City of Hastings prior to final payment.

GENERAL CONDITIONS

GC.1 Contract Documents

It is understood and agreed that the Notice to Bidders, Instructions to Bidders, Proposal, Proposal Data, Contract Agreement, Performance Bond, Payment Bond, General Conditions, Special Conditions, Specifications, Drawings, Addenda, and Change Orders issued by the Purchaser or the Engineer, and specifications and engineering data furnished by the Contractor and accepted by the Purchaser, are each included in this Contract and the work shall be done in accordance therewith.

GC.2 Definitions

Words, phrases, or other expressions used in these contract documents shall have meanings as follows.

1. "Contract" or "contract documents" shall include the items enumerated above under CONTRACT DOCUMENTS.
2. "Purchaser" shall mean the City of Hastings named and designated in the Contract Agreement as "Party of the First Part," and their duly authorized agents. All notices, letters, and other communication directed to the Purchaser shall be addressed and delivered to:

   City of Hastings
   1228 North Denver Avenue
   P.O. Box 398
   Hastings, Nebraska 68902-0289
   Attention: Brandon Miller
   Mechanical Engineer

3. "Contractor" shall mean the corporation, company, partnership, firm or individual named and designated in the Contract Agreement as the "Party of the Second Part," who has entered into this Contract for the performance of the work covered thereby, and its, his, or their duly authorized representatives.
4. "Subcontractor" shall mean and refer only to a corporation, partnership, or individual having a direct contract with the Contractor for performing work covered by these contract documents.
5. "Engineer" shall also refer to City of Hastings as the purchaser.
6. "Date of contract," or equivalent words, shall mean the date written in the first paragraph of the Contract Agreement.
7. "Day" or "days," unless herein otherwise expressly defined, shall mean a calendar day or days of 24 hours each.
8. "The work" shall mean the equipment, supplies, materials, labor, and services to be furnished under the contract and the carrying out of all obligations imposed by the contract documents.

9. "Drawings" or "plans" shall mean all (a) drawings furnished by the Purchaser as a basis for proposals, (b) supplementary drawings furnished by the Purchaser to clarify and to define in greater detail the intent of the contract drawings and specifications, (c) drawings submitted by the successful bidder with his proposal, provided such drawings are acceptable to the Purchaser, (d) drawings furnished by the Purchaser to the Contractor during the progress of the work, and (e) engineering data and drawings submitted by the Contractor during the progress of the work, provided such drawings are acceptable to the Engineer.

10. Whenever in these contract documents the words "as ordered," "as directed," "as required," "as permitted," "as allowed," or words or phrases of like import are used, it shall be understood that the order, direction, requirement, permission, or allowance of the Purchaser or Engineer is intended only to the extent of judging compliance with the terms of the contract; none of these terms shall imply that the Purchaser or the Engineer has any authority or responsibility for supervision of the Contractor's forces or construction operations, such supervision and the sole responsibility therefor being strictly reserved for the Contractor.

11. Similarly the words "approved," "reasonable," "suitable," "acceptable," "proper," "satisfactory," or words of like effect and import, unless otherwise particularly specified herein, shall mean approved, reasonable, suitable, acceptable, proper, or satisfactory in the judgment of the Purchaser or Engineer, to the extent provided in (10) above.

12. Whenever in these contract documents the expression "it is understood and agreed" or an expression of like import is used, such expression means the mutual understanding and agreement of the parties executing the Contract Agreement.

13. "Official acceptance" shall mean the Purchaser's written acceptance of all work performed under this Contract, based on the Engineer's final inspection and issuance of a final payment certificate.

14. “Project completion” shall mean that the Fly Ash Silo is ready for operation. The project construction completion date is at the end of day, November 20th, 2025 with the silo ready for operation on December 3rd, 2025.

15. “Final Acceptance” shall mean that all work has been completed in accordance with these specifications, the project has been walked down, punch list items have been completed, and Purchaser is ready to accept the Work as complete.

16. “Stop Work Order” shall mean that the Purchaser will provide a written order to the Contractor requiring the Contractor to stop all, or any part of, the work called for by this Contract, for a time defined by the order. The order shall specify the reasoning for the suspended work, which may include, but are not limited to, engineering considerations, changes to the

project scope, safety or environmental concerns, or other issues detrimental to the project. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order. As soon as practical, the Purchaser and Contractor shall discuss the impacted activities, schedule, materials, labor, and equipment. If applicable, Purchaser and Contractor will seek to negotiate an equitable adjustment in the schedule, Contract price, or both, and the contract shall be modified, or a change order issued, as necessary. Upon any agreement and finalization of commercial conditions, Purchaser to provide written order to cancel the stop work order.

GC.3 Execution of the Contract

Once the bids have been evaluated, the Purchaser will electronically submit the Contract Agreement to the Contractor. The Contractor shall sign the Contract Agreement and return to Purchaser for the final approval process. Upon final approvals, the Contract Agreement will be signed by the Purchaser and electronically returned to the Contractor. Contractor shall then mail one hardcopy of required bonds, one electronic or hardcopy of insurance documents, and one electronic or hardcopy of power of attorney forms to the Purchaser. The date of contract on the bond forms and power of attorney forms shall match the date provided on the Contract Agreement by the Purchaser.

The Purchaser will review the final documents and electronically send a final conformed contract to the Contractor.

GC.4 Legal Addresses

The business address of the Contractor listed in the Proposal is hereby designated as the place to which all notices, letters, and other communication to the Contractor will be mailed or delivered. The address of the Purchaser appearing in section GC.2 is hereby designated as the place to which all notices, letters, and other communication to the Purchaser shall be mailed or delivered. Either party may change his address at any time by an instrument in writing delivered to the Engineer and to the other party.

GC.5 Scope and Intent of Contract Documents

The various parts of the contract documents are intended to supplement but not necessarily duplicate each other. Any work exhibited in one part and not in another shall be executed as if it had been set forth in all parts, so that the work will be performed according to the complete design as determined by the Engineer.

Should anything necessary for a clear understanding of the work be omitted from the contract documents, or should the requirements appear to be in conflict, the Contractor shall secure written instructions from the Engineer before proceeding with the work affected thereby. It is understood and agreed that the work shall be performed according to the true intent of the contract documents.

GC.6 Independent Contractor

The relationship of the Contractor to the Purchaser shall be that of an independent contractor.

GC.7 Assignment

The Contractor shall not assign the work, or any part thereof, without the previous written consent of the Purchaser, nor shall he assign, by power of attorney or otherwise, any of the money payable under this Contract unless written consent of the Purchaser has been obtained. No right under this Contract, nor claim for any money due or to become due hereunder shall be asserted against the Purchaser, or persons acting for the Purchaser, by reason of any so-called assignment of this Contract or any part thereof, unless such assignment has been authorized by the written consent of the Purchaser. In case the Contractor is permitted to assign moneys due or to become due under this Contract, the instrument of assignment shall contain a clause subordinating the claim of the assignee to all prior liens for services rendered or materials supplied for the performance of the work.

GC.8 Oral Statements

It is understood and agreed that the written terms and provisions of this agreement shall supersede all oral statements of representatives of the Purchaser, and oral statements shall not be effective or be construed as being a part of this Contract.

GC.9 Reference Standards

Reference to the standards of any technical society, organization, or association, or to codes of local or state authorities, shall mean the latest standard, code, specification, or tentative standard adopted and published at the date of taking bids, unless specifically stated otherwise.

GC.10 Source of Materials

To the extent possible, materials, and equipment (including components thereof) furnished under these specifications shall be produced, processed, manufactured, and assembled within the United States of America. Substitution of foreign materials for domestic materials will not be permitted unless such substitution is clearly stated in the Proposal and accepted by the Purchaser.

GC.11 Contractor to Check Drawings and Lists

The Contractor shall check all dimensions, elevations, and quantities indicated on the drawings and lists furnished to him by the Engineer. The Contractor shall notify the Engineer of any discrepancy between the drawings and the conditions at the site, or any error or omission in the drawings, or in the layout as given by stakes, points, or instructions, which he may discover in the course of the work. The Contractor will not be allowed to take advantage of any error or omission in the drawings or other contract documents that a reasonable inspection of them by Contractor would reveal. Full instructions will be furnished by the Engineer should such error or omission be discovered, and the Contractor shall carry out such instructions as if originally specified.

GC.12 Figured Dimensions to Govern

Dimensions and elevations indicated on the drawings shall be accurately followed even though different from scaled measurements. No work indicated on the drawings, the dimensions of

which are not indicated, shall be executed until necessary dimensions have been obtained from the Engineer.

GC.13 No Waiver of Rights

Neither the inspection by the Purchaser or Engineer or any of their officials, employees, or agents, nor any order by the Purchaser or Engineer for payment of money, or any payment for, or acceptance of, the whole or any part of the work by the Purchaser or Engineer, nor any extension of time, nor any possession taken by the Purchaser or its employees, shall operate as a waiver of any provision of this Contract, or of any power herein reserved to the Purchaser, or any right to damages herein provided, nor shall any waiver of any breach in this Contract be held to be a waiver of any other or subsequent breach.

GC.14 Authority of the Engineer

To prevent delays and disputes, and to discourage litigation, it is agreed by the parties to this Contract that the Engineer shall determine the quantities of work which are to be paid for under the contract and shall resolve all questions in relation to the work.

If, in the opinion of the Contractor or the Purchaser, a decision made by the Engineer is not in accordance with the meaning and intent of the contract, either party may file with the Engineer and the other party to the contract, within 30 days after receipt of the decision, a written objection to the decision. Failure to file an objection within the allotted time will be considered acceptance of the Engineer's decision and the decision shall become final and conclusive.

The Engineer's decision and the filing of the written objection thereto shall be a condition precedent to the right to request arbitration or to start action in court.

It is the intent of this agreement that there shall be no delay in the execution of the work and the decision of the Engineer as rendered shall be promptly observed.

GC.15 Engineering Inspection

The Purchaser may appoint (either directly or through the Engineer) such inspectors as the Purchaser deems proper to inspect the work for compliance with the contract documents. The Contractor shall furnish all reasonable assistance required by the Engineer, or inspectors, for the proper inspection of the work. Should the Contractor object to any interpretation of the contract by an inspector, the Contractor may make written appeal to the Engineer for a decision.

Inspectors shall have the authority to reject work which is unsatisfactory, faulty, or defective or does not conform to the requirements of the contract documents. Inspection shall not relieve the Contractor from any obligation to construct the work strictly in accordance with the contract documents.

Upon the failure of the Contractor or its Subcontractors to comply with any of the requirements of this Contract (but not limited to quality or safety), the Purchaser shall have the authority to stop any portion of the work affected by such failure until such failure is

remedied. If the Purchaser issues a Stop Work Order, the Purchaser shall not be liable for any costs or expenses claimed by Contractor arising out of such issuance. The construction schedule shall not be delayed or extended as a result of the Purchaser's issuance of a Stop Work Order.

GC.16 Contractor Default

If the work to be done under this Contract is abandoned by the Contractor; or if this Contract is assigned by him without the written consent of the Purchaser; or if the Contractor is adjudged bankrupt; or if a general assignment of his assets is made for the benefit of his creditors; or if a receiver is appointed for the Contractor or any of his property; of if at any time the Engineer certifies in writing to the Purchaser that the performance of the work under this Contract is being unnecessarily delayed, that the Contractor is violating any of the conditions of this Contract, or that he is executing the same in bad faith or otherwise not in accordance with the terms of said contract; or if the work is not substantially completed within the time named for its completion or within the time to which such completion date may be extended; then the Purchaser may serve written notice upon the Contractor and his surety of the Purchaser's intention to terminate this Contract. Unless within 5 days after the serving of such notice, a satisfactory arrangement is made for continuance, this Contract shall terminate. In the event of such termination, the surety shall have the right to take over and complete the work, provided that if the surety does not commence performance within 30 days, the Purchaser may take over and prosecute the work to completion, by contract or otherwise. The Contractor and his surety shall be liable to the Purchaser for all excess cost sustained by the Purchaser by reason of such prosecution and completion. The Purchaser may take possession of, and utilize in completing the work, all materials, equipment, tools, and plant on the site of the work.

GC.17 Beginning, Progress, and Completion of the Work

The time of completion is a basic consideration of this Contract. Unless otherwise specified in these contract documents or advised by written order of the Purchaser, the Contractor shall begin work within 10 days after the date of contract. The work shall be prosecuted to completion in accordance with the specified schedule, subject to adjustment as provided in these contract documents.

A detailed construction schedule shall be prepared by the Contractor and submitted to the Purchaser for review. The schedule shall contain the various activities required to perform the work and the dates the activities will be started and completed in order to complete the work in accordance with the specified schedule requirements. The Contractor is responsible for determining the sequence and time estimates of the detailed construction activities. However, the Purchaser reserves the right to require the Contractor to modify any portion of the schedule the Purchaser determines to be impracticable or unreasonable; as required to coordinate the Contractor's activities with those of other contractors, if any, engaged in work for the Purchaser on the site; to avoid undue interference with the Purchaser's operations; and to assure completion of the work by the date or dates stipulated. Upon acceptance by the Purchaser of the Contractor's detailed construction schedule, the Contractor will be responsible for maintaining such schedule.

If at any time the Contractor's work is behind schedule, he shall immediately put into effect definite procedures for getting the work back on schedule. The procedures shall be subject to review and modification by the Purchaser.

GC.18 Hindrances and Delays

The Contractor expressly agrees that in undertaking to complete the work within the time specified, he has made allowances for all hindrances and delays which might usually be expected to occur in performing the work. No claims shall be made by the Contractor for such hindrances and delays.

If the Contractor experiences hindrances and delays which, in his opinion, are not usually to be expected in the performance of the work and which affect the performance of the work, he may request a change in the contract. Such hindrances and delays may include, but not be limited to, acts or failure to act by the Purchaser or other contractors employed by the Purchaser, fires, floods, labor disputes, epidemics, or acts of God. Such hindrances and delays shall not include rain, snow, or other non-severe inclement weather. Claims by the Contractor for any change in the contract due to such hindrances and delays shall be made in accordance with the requirements of Article GC.22, CHANGES TO THE CONTRACT. The Contractor shall use all reasonable means to minimize the extent of the delay.

GC.19 Suspension of Work

The Purchaser reserves the right to suspend and reinstate execution of the whole or any part of the work without invalidating the provisions of the contract. Suspension or reinstatement of the work will be by written notice to the Contractor from the Purchaser.

Suspension of work shall not automatically entitle the Contractor to additional compensation or a change in the contract time; however, the Contractor will be reimbursed for real and unavoidable direct costs incurred by him as a result of such suspension and/or the contract will be extended as required to compensate for any delay due to such suspension. Claims by the Contractor for change of contract time or an adjustment of the contract price, due to work suspensions ordered by the Purchaser shall be made in accordance with the requirements of Article GC.22, CHANGES TO THE CONTRACT. The Contractor shall use all reasonable means to minimize the consequences of such suspension.

GC.20 Cancellation of Work

The Purchaser reserves the right to cancel the unshipped portion of the work by giving written notice to the Contractor. In the event of cancellation, the Purchaser will pay the Contractor reasonable and proper cancellation costs.

Cancellation of the work shall not constitute the basis for a claim for damages or loss of anticipated profits.

The Contractor shall, after consultation with the Purchaser, take all reasonable steps to minimize the costs related to cancellation. The Contractor shall provide the Purchaser with an accounting of costs claimed, including adequate supporting information, and the Purchaser may, at its expense, audit the claimed costs and supporting information.

GC.21 Modifications

The Contractor shall modify the work whenever so ordered by the Purchaser and such modifications shall not affect the validity of the contract. Modifications may involve changes in the amount of the work to be performed or changes in the contract time for which appropriate changes to the contract will be made.

Contract changes due to modifications shall be made in accordance with the requirements of Article GC.22, CHANGES TO THE CONTRACT.

GC.22 Changes to the Contract

The contract may be changed only by duly executed change orders issued by the Purchaser.

If, in the opinion of the Purchaser or the Contractor, any event or action by the other party justifies a change in the contract, either party shall initiate with the other party, within 5 days after such event or action, a request for a change to the contract. All documentation required to substantiate the proposed change shall be submitted within a minimum reasonable time after initiating the request for change. Upon the parties reaching agreement regarding the proposed change, the Purchaser will issue a written change order therefor.
Notwithstanding the foregoing provisions requiring duly authorized change orders, in the event agreement has been reached between authorized representatives of the parties regarding the change in the contract pending processing of such change order, the Contractor shall proceed with the work on the basis of written interim authorization from the Purchaser.

If the Contractor claims that any instruction, request, drawing, specifications, or other directive or action of the Purchaser or the Engineer constitutes a change in the contract, but has not been authorized as such by a change order in writing by the Purchaser, the Contractor shall immediately request a written interim authorization and proceed without delay to perform the work in accordance with such authorization. The Contractor shall provide written notice of the claim or dispute to the Engineer and the Purchaser within 5 days of the request for interim authorization. The Contractor's failure to give said written notice within the 5 day period shall constitute a waiver and relinquishment of any such claim or dispute. The Purchaser's written interim authorization shall not constitute approval of the claim for increased or decreased work, but shall be a condition precedent to the Contractor's right to receive payment for such work and to the Contractor's right to prosecute or maintain any proceeding to recover for such work.

GC.22.1 Contract Price Changes

The contract price may be changed due to modifications which involve extra work or decreased work; or due to work suspensions, hindrances, and delays over which the Contractor has no control. Claims for changes in the contract price shall conform to the requirements specified herein.

GC.22.1.1 Increased Price

If a change in the contract is required due to work suspensions or hindrances and delays, the contract price will be increased according to agreed lump sums, agreed acceleration costs, or

other demonstrable costs submitted by the Contractor and substantiated to the satisfaction of the Purchaser.

If a change in the contract price is required due to a modification which increases the amount of the work, and the added work or any part thereof is of a type and character which can properly and fairly be classified under one or more unit price items of the contract, then the contract price will be increased according to the amount actually done and at the applicable unit price. Otherwise, such work shall be paid for as herein-after provided.

Contract price changes for modifications involving extra work will be based on agreed lump sums or on agreed unit prices whenever the Purchaser and the Contractor agree upon such prices before the extra work is started; otherwise, payments for extra work will be based on actual direct cost plus the specified percentage allowance.

For the purpose of determining whether proposed extra work will be authorized, or for determining the payment method for extra work, the Contractor shall submit to the Engineer, upon request, a detailed cost estimate for proposed extra work. The estimate shall indicate itemized quantities and charges for all elements of direct cost. Charges for the Contractor's and subcontractor's extra profit, extra general superintendence, extra field office expense, and extra overheads shall be indicated as a percentage addition to the total estimated direct cost. Unless otherwise agreed upon by the Contractor and the Purchaser, such percentage additions shall be 15 percent for the extra work performed by the Contractor's own forces or 20 percent for extra work performed by a subcontractor.

When payment for extra work is based on actual direct cost, the Contractor will be paid the actual direct cost plus an allowance of 15 percent if the extra work is performed by the Contractor's own forces or 20 percent if the extra work is performed by a subcontractor. The allowance will be paid as full compensation for the Contractor's and sub-contractor's extra profit, extra general superintendence, extra field office expense, extra overheads, and all other elements of extra cost not defined herein as actual direct cost.

The actual direct cost shall include only those extra costs for labor and material expended in direct performance of the extra work and may include the following.

a. The actual payroll cost of all workmen such as laborers, mechanics, craftsmen, and foremen.

b. The Contractor's or subcontractor's net cost for materials and supplies.

c. The rental charge for vehicles and construction equipment.

d. The transportation charges for equipment.

e. The charges for extra power, fuel, lubricants, water, and special services.

f. The charges for extra payroll taxes, bond premiums, and insurance premiums.

The form in which actual direct cost records are kept, the construction methods, and the type and quantity of equipment used shall be acceptable to the Engineer.

Construction equipment which the Contractor has on the jobsite and which is of a type and size suitable for use in performing the extra work shall be used. The hourly rental charges for equipment shall not exceed 1/2 percent of the latest applicable monthly rental rates as published by Dataquest Incorporated in its "Rental Rate Blue Book" and shall apply to only the actual time the equipment is used in performing the extra work.

When extra work requires the use of equipment which the Contractor does not have on the jobsite, the Contractor shall obtain the concurrence of the Engineer before renting or otherwise acquiring additional equipment. The rental charges for the additional equipment shall not exceed the latest applicable "Rental Rate Blue Book" published rental rates.

GC.22.1.2 Decreased Price

If a change in the contract price is required due to a modification which decreases the amount of work, such decrease shall not constitute the basis for a claim for damages or anticipated profits on work affected by such decrease. Where the value of omitted work is not covered by applicable unit prices, the Engineer shall determine, on an equitable basis, the amount of:

a. Credit due the Purchaser for contract work deleted as a result of an authorized change,

b. Allowance to the Contractor for any actual loss incurred in connection with the purchase, delivery, and subsequent disposal of materials or equipment required for use on the work as planned and which could not be used in any part of the work as actually built, and

c. Any other adjustment of the contract amount where the method to be used in making such adjustment is not clearly defined in the contract documents.

Unless otherwise agreed upon by the Purchaser and the Contractor, the credit due the Purchaser for reductions in the amount of work to be done shall be the estimated direct cost of the deleted work plus an overhead allowance of the following.

- 10 percent of the estimated direct cost if the work was to have been done by the Contractor's own forces, or
- 15 percent of the estimated direct cost if the work was to have been done by a subcontractor.

Direct cost referred to above shall include the category of costs listed as actual direct costs, Items (a) to (f) inclusive of the article entitled Increased Price.

GC.22.2 Contract Time Changes

The contract time may be changed due to work modifications, hindrances and delays, and work suspensions over which the Contractor has no control.

Contract time will not be changed for delays caused by unfavorable weather or unsuitable ground conditions normally incident to the work, inadequate construction force, failure to

place timely orders for equipment and materials, or other causes within the control of the Contractor.

GC.23 Step Dispute Resolution

In the event of any controversy, claim or dispute between the Parties arising out of or relating to this Agreement, including its enforcement, such controversy, claim or dispute, including disputes regarded as such by only one of the Parties, the Parties shall negotiate in good faith to resolve such dispute, including third party mediation, if the Parties so agree.

If no settlement is achieved, either Party may pursue a claim in a federal or state court with competent jurisdiction.

GC.24 Laws and Regulations

The Contractor shall observe and comply with all ordinances, laws, and regulations, and shall protect and indemnify the Purchaser and the Purchaser's officers and agents, including the Engineer, against any claim or liability arising from or based on any violation of the same.

GC.25 Taxes, Permits, and Licenses

The Contractor shall pay all sales, use, and other taxes that are lawfully assessed against the Purchaser or Contractor in connection with the work and shall obtain and pay for all required licenses, permits, and inspections.

The Contractor will be compensated for any increase in tax rates, license fees, and permit fees or any new taxes, licenses, or permits imposed after the date of the Proposal; provided, however, that this provision shall be limited to sales, use, and excise taxes assessed against the completed work and to licenses and permits required specifically for the proposed work.

GC.26 Patents

Royalties and fees for patents covering materials, articles, apparatus, devices, equipment, or processes used in the work shall be included in the contract amount. The Contractor shall satisfy all demands that may be made at any time for such royalties or fees and he shall be liable for any damages or claims for patent infringements. The Contractor shall, at his own cost and expense, defend all suits or proceedings that may be instituted against the Purchaser for alleged infringement of any patents involved in the work and, in case of an award of damages, the Contractor shall pay such award. Final payment to the Contractor by the Purchaser will not be made while any such suit or claim remains unsettled.

GC.27 Materials and Equipment

Unless specifically provided otherwise in each case, all materials and equipment furnished for permanent installation in the work shall conform to applicable standard specifications and shall be new, unused, and undamaged when installed or otherwise incorporated in the work. No such material or equipment shall be used by the Contractor for any purpose other than that intended or specified, unless such use is specifically authorized by the Purchaser in each case.

All required tests in connection with acceptance of source of materials shall be made at the Contractor's expense by a properly equipped laboratory of established reputation whose work

and testing facilities are acceptable to the Purchaser. Any change in origin or method of preparation or manufacture of a material being routinely tested will require new tests. Reports of all tests shall be furnished to the Engineer or Purchaser in as many copies as required.

GC.28 Guarantee

The Contractor guarantees that the work herein contracted will be as specified and will be free from defects in design, workmanship, and materials. Contractor does not guarantee or warrant parts subject to normal wear and tear during operation. If within the guarantee period the work fails to meet the provisions of this guarantee, the Contractor shall promptly correct any defects, including nonconformance with the contract documents by adjustment, repair, or replacement of all defective parts or materials at the Contractor's option and expense, after consulting with the Purchaser on the proposed remedy plans.

Except as otherwise prescribed by the terms of any special guarantees required by the contract documents, the guarantee period shall begin on the date of final payment and shall end 12 months later.

The cost of all materials, parts, labor, transportation, supervision, special tools, and supplies required for replacement or repair of parts and for correction of defects shall be paid by the Contractor or by the surety.

This guarantee shall be extended to cover all repairs and replacements furnished under the guarantee and the period of the guarantee for each such repair or replacement shall be 1 year after correction of the defect except as otherwise prescribed by the terms of any special guarantees required by the contract documents.

The Contractor will be given an opportunity to confirm the existence of the defect, but he shall not delay the correction while making such determination.

If within 10 days after the Purchaser has notified the Contractor of a defect, failure, or abnormality in the work, the Contractor has not started to make the necessary repairs or adjustments, the Purchaser is hereby authorized to make the repairs or adjustments or to order the work to be done by a third party; the cost of the work to be paid by the Contractor.

In the event of an emergency where, in the judgment of the Purchaser, delay would cause serious loss or damage, repairs or adjustments may be made by the Purchaser or a third party chosen by the Purchaser without advance notice to the Contractor and the cost of the work shall be paid by the Contractor or by the surety.

GC.29 Contractor's Insurance Coverage

The Contractor shall not commence work under this Contract until Contractor has obtained all the insurance required under this article. Furthermore, the Contractor shall not allow any sub-contractor to commence work under this Contract until the sub-contractor has obtained the same insurance as is required of the Contractor. The sub-contractor alone shall be responsible for the sufficiency of its own insurance program.

GC.29.1 Certificates of Insurance
Certificates of Insurance acceptable to the Purchaser shall be filed with the Purchaser prior to commencement of the work. All insurance carried shall conform to the relevant provisions of the respective Project Documents and be with insurance companies which are rated "A, X" or better by Best's Insurance Guide, or other insurance companies of recognized responsibility satisfactory to the Purchaser.

GC.29.2 Proof of Carriage of Insurance. Satisfactory certificates of insurance shall be filed with the Purchaser prior to starting any construction work on this contract. The parties agree that the requirements with respect to requirements to procure and maintain insurance under this Section is a material part of this Agreement.

GC.29.3 Additional Insureds
Insurance coverages furnished under this Contract, with the exception of Workers' Compensation and Employer's Liability, shall include the City of Hastings and their members, directors, officers, agents, and employees as named Additional Insureds on a primary and noncontributory basis, and shall include Products and completed operations with respect to the activities of the Contractor and shall be maintained for the full duration of the project including for a period after completion to include the statute of repose.

Notwithstanding any other provision of these policies, the insurance afforded shall apply separately to each insured, with respect to any claim, suit, or judgment made or brought by or for any other insured, as though a separate policy had been issued to each, except the insurer's liability shall not be increased beyond the amount or amounts for which the insurer would have been liable had only one insured been named.

The Purchaser shall not by reason of their inclusion under these policies incur liability to the insurance carrier for payment of premium for these policies.

GC.29.4 Waiver of Subrogation
To the extent permitted by applicable law, the Contractor and their sub-contractor shall require their insurance carriers, with respect to all insurance policies, to waive all rights of subrogation against the Purchaser their partners, directors, officers, agents, and employees.

GC.29.5 Workers' Compensation and Employer's Liability Insurance
The Contractor shall procure, and shall maintain during the life of this Contract, Workers' Compensation Insurance as required by workers' compensation laws of the State of Nebraska and also of the state in which the sub-contractor is domiciled.

The Contractor shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workers' compensation law. The Employer's Liability Insurance shall contain the following limits of liability:

Bodily Injury by Accident	$500,000 each accident
Bodily Injury by Disease	$500,000 each employee

Bodily Injury by Disease	$500,000 policy limit

GC.29.6 General Liability Insurance

This insurance shall be written per project on an “occurrence” policy form, including coverage for premises/operations, products/completed operations, blanket contractual liability, independent contractors and personal injury, with no exclusions for explosion, sudden and accidental pollution or an absolute or total pollution exclusion, collapse and underground perils. The commercial general liability policy shall also include a severability of interest clause and a cross liability clause in the event more than one entity is “named insured” or “named additional insured” under the liability policy.

Limits of Insurance shall be as follows:

Each Occurrence Limit	$1,000,000
Products/Completed Operations	$2,000,000
General Aggregate Limit	$2,000,000
Personal and Advertising Injury	$1,000,000

GC.29.7 Automobile Liability Insurance

This insurance shall be written under a Business Auto Policy and shall protect the Contractor and Additional Insureds against claims arising from injuries to members of the public or damage to property of others arising from the use of automobiles whether such automobiles are owned, non-owned, or hired. Automobile insurance shall include Motor Carrier Endorsement Act MCS 90 and transportation pollution coverage if applicable. If work is being done near a railroad track, the 50’ railroad right of way exclusion must be deleted.

Limit of Liability	$1,000,000 each accident

GC.29.8 Umbrella Liability Policy

This insurance shall protect the Contractor and the Additional Insureds against all claims in excess of the limits provided under the employer's liability, automobile liability, and general liability policies. The liability limits of the umbrella liability policy shall be not less than $5,000,000 per occurrence. This policy shall be an "occurrence" type policy. However, Purchaser reserves the right to require higher limits with respect to each project.

GC.29.9 Pollution Liability – If Applicable

Limits of at least:	$1,000,000 per occurrence; $1,000,000 aggregate

If Contractor or its Sub-subcontractor's work includes but not limited to remediating, handling, processing or disposing of hazardous material including but not limited to asbestos containing materials, silica, lead, PCBs, contaminated soil, etc, coverage shall be provided for bodily injury, property damage and clean-up costs resulting for pollution conditions.

GC.29.10 Riggers Liability – If Applicable

Should work involve the moving, lifting, lowering, rigging or hoisting of property or equipment Contractor shall carry Rigger's Liability Insurance to insure against physical loss or damage to the property or equipment on a Replacement Cost Basis.

GC.29.11 Railroad Protective Liability – If Applicable

Limits of at least: As required by the railroad company

If Contractor or its Subcontractor's work includes working within a railroad right-of-way, Contractor shall carry Railroad Protective Liability Insurance to insure against physical loss or damage to the real property or any equipment located on such railroad right-of-way, on a replacement cost basis. Contractor shall name the railroad and PPGA as additional insureds, in such limits as required by such railroad company.

GC.29.12 Professional Liability – If Applicable

Limits of at least: $1,000,000 per occurrence; $1,000,000 aggregate

Policy shall provide for a retroactive date prior to the starting date of services for which this agreement applies. Policy shall not exclude damages for bodily injury, property damage, or pollution liability. Coverage shall remain in force for a minimum of 3 years following substantial completion of construction through either policy renewal or the purchase of an Extended Reporting Provision. Contractor agrees to waive its rights of recovery. Subcontractor's insurer shall endorse the policy to waive subrogation against Owner and their respective agents, officers, directors and employees.

GC.29.13 Transportation Insurance – If Applicable
Contractor shall purchase inland marine coverage at the expense of Contractor on all equipment and materials, where Purchaser has an insurable interest. Insurance shall protect for Contractor and Purchaser from physical loss of equipment while loading, unloading, in transit to jobsite, and until equipment or materials have been installed or received by Purchaser.

GC.29.14 Property Insurance A.K.A. Builder's Risk – If Applicable
Unless otherwise provided, Contractor shall purchase and maintain property insurance, a.k.a. builder's risk insurance, on the building construction project in amount thereto for entire work at site on a replacement cost basis. Such property insurance shall be maintained, unless otherwise provided in contract documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final acceptance of work by PPGA. Insurance shall include interests of PPGA, Contractor, Subcontractor, and sub-subcontractors in work. This property insurance covering work will have deductible for each occurrence, which will be responsibility of Contractor.

Before an exposure to loss may occur, the Contractor will provide a copy of the property insurance policy or evidence of property insurance, upon request that includes all property insurance coverages.

Waivers of Subrogation: PPGA, Contractor, and all Subcontractors waive all rights against

(1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) PPGA's or Contractor's consultants, separate contractors, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other perils to extent covered by property insurance obtained, or other property insurance applicable to work, except such rights as they have to proceeds of such insurance held by PPGA and/or Contractor as fiduciary. Contractor shall require of consultants, separate contractors, if any, and subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. Policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay insurance premium directly or indirectly and whether or not person or entity had an insurable interest in property damaged.

GC.30 Indemnification

To the fullest extent permitted by laws and regulations, the Contractor shall defend, indemnify, and hold harmless the Purchaser, their officers, directors, members, consultants, agents, and employees from and against all claims, damages, losses, and expenses, direct, indirect, or consequential (including but not limited to fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising out of or resulting from the negligent, wrongful, or defective performance of the work by the Contractor, any sub-contractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the work, or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder or arises by or is imposed by law and regulations regardless of the negligence of any such party.

In any and all claims against the Purchaser, or of any of their officers, directors, members, consultants, agents, or employees by any employee of the Contractor, any sub-contractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the work or anyone for whose acts any of them may be liable, this indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any such sub-contractor or other person or organization under workers' or workmen's compensation acts, disability benefit acts, or other employee benefit acts, nor shall this indemnification obligation be limited in any way by any limitation on the amount or type of insurance coverage provided by the Purchaser, the Contractor, or any of their sub-contractors.

GC.31 Release of Liability

Acceptance by the Contractor of the last payment shall be a release to the Purchaser and every officer and agent thereof, from all claims and liability hereunder for anything done or furnished for, or relating to the work, or for any act or neglect of the Purchaser or of any person relating to or affecting the work.

GC.32 Claims for Labor and Materials

The Contractor shall indemnify and save harmless the Purchaser from all claims for labor and materials furnished under this Contract. When requested by the Purchaser, the Contractor shall submit satisfactory evidence that all persons, firms, or corporations who have done work or furnished materials under this Contract, for which the Purchaser may become legally liable, have been fully paid or satisfactorily secured. In case such evidence is not furnished or is not satisfactory, an amount will be retained from money due the Contractor which, in addition to any other sums that may be retained, will be sufficient, in the opinion of the Purchaser, to liquidate all such claims. Such sum will be retained until the claims as aforesaid are fully settled or satisfactorily secured.

Before final acceptance of the work by the Purchaser, the Contractor shall submit to the Engineer in duplicate a notarized affidavit stating that all subcontractors, vendors, persons, or firms who have furnished labor or materials for the work have been fully paid and that all taxes have been paid. If a performance bond has been executed, a statement from the surety shall also be submitted consenting to the making of the final payment.

GC.33 Final Inspection

When the work has been substantially completed and at a time mutually agreeable to the Purchaser and Contractor, the Purchaser will make a final inspection of the work as to the acceptability and completeness of the work.

GC.34 Payments

Payment will be based on the Contractor's progress payment which he will submit to the Purchaser for approval. The Purchaser will retain 10% of the total contract amount for all work. The Purchaser will reduce the retainage to 5% after the project is 50% complete.

GC.35 Hazardous Materials

As required under Federal Hazardous Communications Standards and certain state and local laws, the Contractor shall provide Material Safety Data Sheets covering all hazardous materials furnished under or otherwise associated with the work under this Contract. The Contractor shall provide the Purchaser with either copies of the applicable Material Safety Data Sheets or copies of a document certifying that no Material Safety Data Sheets are required under any federal, state, or local law, regulation, statute, or ordinance in effect at the jobsite.

Hazardous materials are defined in the applicable statue which may use the terminology "toxic substances" instead of "hazardous materials." The Contractor is responsible for determining if any substance or material furnished, used, applied, or stored under this Contract is within the provisions of any applicable statute.

If the work under this Contract includes onsite construction or erection, the Contractor shall provide written notice of the presence of hazardous materials to local fire, medical, and law enforcement agencies as required with a copy of such notice to the Purchaser.

The Contractor shall provide labeling of hazardous materials and training of employees in the safe usage of such materials as required under any applicable federal, state, or local law, regulation, statute, or ordinance.

GC.36 Liquidated Damages

Time is a material provision of this Agreement. If the Contractor is unable to meet the agreed upon completion dates, the Contractor shall immediately notify the Purchaser and confirm the notice in writing within ten (10) business days of the delaying event. The notice shall contain detailed information of the delay including Contractor's estimate of the duration of the delay, Contractor's estimate of the delay's impact to Contractor's schedule and Contractor's plan to mitigate the effects of the delay.

Contractor shall be excused for delays in completion of the work only in accordance with GC.18. In the event of any such delay, Contractor shall only be allowed an extension of the date of completion for a period of time reasonably necessary to overcome the effect of the delay. Contractor shall not be entitled to any extra compensation for such delay. Contractor shall promptly notify the Purchaser in writing, with confirmation receipt of notification,

The liquidated damages amount per calendar day specified in the proposal form will be assessed, not as a penalty but as predetermined and agreed liquidated damages. The Purchaser and Contractor specifically agree the per calendar day amount to be assessed as liquidated damages is fair and reasonable and not excessive. The parties further agree that said per calendar day amount accurately reflect the anticipated loss and inconvenience to the public and lost revenue to or use by the Purchaser due to the project not being completed by the end of the project period or the end of the contract completion date.

The Purchaser shall have the right to deduct liquidated damages from any money in its hands, otherwise due, or to become due, to the Contractor; to submit invoice for payment; or to sue for and recover compensation for damages for nonperformance of this Contract within the time stipulated.

The Liquidated Damages for this project will be $500.00 per calendar day past the project completion date.

GC.37 Consequential Damages

Except for Supplier's third party obligations arising out of or liability for breach of Articles GC.26 and/or GC.30, Purchaser and Supplier will not be liable to each other for loss of profits, loss of use, loss of contracts, or consequential damages arising out of this Contract. This Section will not relieve Supplier of any obligation under GC.36.

GC.38 Limitation of Liability

With the exception of (a) indemnification stated in Article GC.30 and (b) the insurance coverages and limits set forth in Article GC.29, Supplier's total limit of liability on any claim, whether for breach of Contract, breach of warranty, tort, negligence, strict liability, or any other legal theory, for any loss or damage arising out of or connected to, or resulting from this Contract, shall be limited to the purchase price to be paid by Purchaser.

GC.39 Confidentiality

"Confidential Information" means the confidential or proprietary designs, know-how, processes, trade secrets, and other information owned or controlled by Purchaser, Engineer, or Supplier respectively. Supplier agrees to hold any Confidential Information received in the strictest confidence, shall only use the Confidential Information as necessary to perform the work. Purchaser agrees to hold any Confidential Information received in the strictest confidence and shall only use the confidential information as necessary for engineering, construction, start-up, commissioning, maintenance, or other purposes related to the project. Each party shall use the same degree of care as is used for its own information of similar importance, but no less than reasonable care.

GC.40 Work Eligibility Status

The Contractor is required and hereby agrees to use a federal immigration verification system to determine the work eligibility status of new employees physically performing services within the State of Nebraska. A federal immigration verification system means the electronic verification of the work authorization program authorized by the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, 8 U.S.C. 1324a, known as the E-Verify Program, or an equivalent federal program designated by the United States Department of Homeland Security or other federal agency authorized to verify the work eligibility status of a newly hired employee.

GC.41 Fair Labor Standards

The Contractor agrees to comply with all current applicable State, Federal, and City fair labor standards in the execution of the contract. Pursuant to the Title VI Non-Discrimination Program of the City of Hastings, Contractor agrees to comply with the provisions set forth by CITY's Title VI Non-discrimination Program, if applicable. A copy of said provisions are as follows:

During the performance of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

(1) Compliance with Regulations: The contractor shall comply with the Regulation relative to nondiscrimination in Federally-assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, and the Federal Highway Administration (hereinafter "FHWA") Title 23, Code of Federal Regulations, Part 200 as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

(2) Nondiscrimination: The Contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin, sex, age, and disability/handicap in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by 49 CFR, section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

(3) Solicitations for Subcontractors, Including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin, sex, age, and disability/handicap.

(4) Information and Reports: The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the (Recipient) or the FHWA to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information the contractor shall so certify to the (Recipient), or the FHWA as appropriate, and shall set forth what efforts it has made to obtain the information.

(5) Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the (Recipient) shall impose such contract sanctions as it or the FHWA may determine to be appropriate, including, but not limited to:

(a.) Withholding of payments to the contractor under the contract until the contractor complies, and/or

(b.) Cancellation, termination or suspension of the contract, in whole or in part.

(6) Incorporation of Provisions: The contractor shall include the provisions of paragraphs (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

The contractor shall take such action with respect to any subcontract or procurement as the (Recipient) or the FHWA may direct as a means of enforcing such provisions including sanctions for non-compliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the (Recipient) to enter into such litigation to protect the interests of the (Recipient), and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

SECTION 2 – GENERAL DESCRIPTION AND SCOPE OF WORK

2.1 General:

The City of Hastings (Owner) is accepting bids for the Electrical Installation for a new Fly Ash Silo and Conveying Equipment for Whelan Energy Center, Unit 1 in Hastings, Nebraska. The bidder is strongly encouraged to visit with Hastings prior to submitting a bid. The Bidder shall inform themselves of all conditions and factors which would affect the execution of the work. No claims for financial compensation or time extension, based on the lack of such prior information (or its effect on the cost of the work) will be permitted by the Owner. Please contact Brandon Miller, Mechanical Engineer, at 402-462-3653 if you have any questions about this project or would like to set up a visit.

2.2 Description of System:

Whelan Energy Center, Unit 1 (WEC1) is an 82 megawatt (MW), pulverized coal-fired generating plant located near Hastings, Nebraska. The Unit began commercial operation in 1981. The existing ash sluicing system is being replaced with a new fly ash silo and mechanical vacuum conveying system. The fly ash will be conveyed from existing precipitator, economizer, and air heater hoppers to a new fly ash silo being constructed north of the WEC1 precipitator building. Two mechanical exhausters will pull vacuum and convey the fly ash to the silo where it will be separated from the air stream by a filter separator on top of the silo. The fly ash will travel through a transfer hopper to the new silo. The silo will be equipped with a telescopic spout where it will be top loaded into a bulk transport trailer. The exhaust from the mechanical separators and vents from the telescopic spout and silo will be piped back to the flue gas duct upstream of the precipitator building. The silo will be powered from a new MCC that will replace the existing MCC 1E in the precipitator building. All instrumentation and controls will be integrated into the existing combined bottom ash and fly ash PLC.

2.3 Scope of Work Performed Under This Contract:

The contractor shall perform the following scope of work:

- Demolition of existing Motor Control Center MCC 1E, transformer, and power panel
  - Existing motor control center will be demolished once new MCC is in service
- Installation of City of Hastings supplied electrical equipment
  - Install new motor control center MCC 1E directly behind existing MCC (Dwg No. E103)
  - Install new 45 KVA 480-120/208V transformer (Dwg No. E103)
  - Install new power panel LP1E (Dwg No. E103 & E106)
  - Rewire existing outlets fed from existing MCC 1E and transformer to new power panel LP1E.
- Supply and Install all power wiring including:
  - From Precipitator SUS to new MCC 1E – new 400-amp breaker will be provided and installed by COH in Precipitator SUS
  - From MCC 1E and Power Panel LP1E to loads at fly ash silo including motor loads and equipment
- Supply and Install all conduit, raceway, cable tray and associated mounting hardware

    - From existing Precipitator building cable tray TL0120 to conduit at underground duct bank outside precipitator building (already installed by others)
    - From underground duct bank at silo to end equipment on silo
- Supply and Installation of all instrumentation tubing, fittings, hardware, and instrument mounting steel & accessories
- Installation of all non-inline instrumentation provided by UCC per the provided P&IDs and Instrument List
- Supply and Installation of all instrumentation and controls wiring from devices at silo to existing ash control cabinet and PLC
- Installation of new I/O module and terminal boards in ash control cabinet provided by COH
- Supply and Installation of receptacles at ground level of silo, on unloading floor, and at top of silo
- Supply and Installation of lighting fixtures at ground level of silo, on unloading floor, stairs, and top of silo
- System Start-Up Support:
    - Contractor shall provide labor to support testing and checkout of system. Contractor shall repair and fix items from their scope of work found to be defective during testing.
- Other scope
    - All terminations needed for cable installation
    - All conduit and cable tray mounting hardware
    - Supply all hardware to mount instrumentation to existing steel or provide new stands
    - Labeling cables, conduit, cable trays, and equipment with COH provided numbers and cable numbers on wiring diagrams. Contractor to provide physical labels to attach to equipment.
    - Provide a spreadsheet or document showing circuit numbers and the conduit and raceway numbers the circuits are routed through. Purchaser will provide available conduit/ raceway numbers. Contractor will be responsible for assigning numbers to each individual raceway/ conduit.

2.4 <u>Work Performed by Others:</u>

The following will be performed under Contract HU 2024-50 (Silo Supply):

- Supply of equipment for the fly ash silo including items indicated as supplied by UCC on UCC provided contract drawings:
    - Fly ash silo
    - Filter separator and transfer hopper
    - Telescopic spout
    - Telescopic spout vent fan and silo vent fan
    - Two mechanical exhausters
- Supply of piping, valves, and fittings per UCC provided contract drawings:
    - Ash conveyor piping/valves/ fittings from terminal point on existing piping in precipitator building to filter separator
    - Ash conveyor piping from existing air heater piping to tie-in at precipitator building
    - Ash conveyor piping from existing economizer hopper piping to tie-in at precipitator building

- Exhauster suction piping from filter separator to mechanical exhausters
- Exhauster discharge piping from mechanical exhausters to flue gas duct

The following will be performed under Contract HU 2025-57 (Foundations and Paving):

- Site earthwork, grading, removal of existing concrete/ asphalt paving
- Silo foundations, paving, and aggregate surfacing
- Pipe support and utility rack foundations
- Removal of existing and installation of new silo/ precipitator area storm drain piping
- Concrete and conduit for underground electrical and controls duct bank – conduits are stubbed up into foundation on silo end and stubbed above ground at precipitator wall
- Installation of pipe bollards
- Installation of underground duct bank between the precipitator building and fly ash silo

The following will be performed under Contract HU 2025-72 (Mechanical Construction):

- Installation of all the silo equipment furnished by UCC
- Installation of all piping provided by UCC
- Supply and installation of all Contractor supplied piping
- Installation of utility rack and all pipe supports

The following will be performed under Contract HU 2025-94 (Grounding Grid):

- Supply and installation of the grounding grid below grade
- Connection of grounding grid to silo base and silo stairs

The following will be performed under Contract HU 2024-102 (Silo Erection):

- Installation of the UCC provided Silo
- Grouting the base of the silo
- Installing silo stairs

The following will be performed under Contract HU 2024-108 (PLC Programming):

- All PLC programming and integrating new equipment into existing bottom ash and fly ash programs
- Development of HMI screens

2.5 <u>Miscellaneous Materials and Services Scope:</u>

Miscellaneous Materials and Services Scope			
Item	Description	Contractor (Applies to)	Owner (Applies to)
1.	Receipt, inspection, unloading and storage of materials provided by Silo Supplier		X
2.	Receipt, inspection, unloading and storage of materials supplied by Contractor	X	

3.	Supply and installation of anchor bolts for contractor installed equipment	X	
4.	All hardware, welding supplies, and miscellaneous materials not provided by owner that is necessary for the completion of the work	X	
5.	Removal and disposal of all demolished equipment, piping and materials	X	
6.	Supply, installation, and removal of all temporary erection bracing, rigging, attachments and supports	X	
7.	All tooling and equipment required to perform the specified work	X	
8.	Survey and layout of the work from the Purchaser's designated control points	X	
9.	Supply of lifting equipment including cranes, man lifts, fork lifts, and telehandlers needed to complete the work	X	
10.	Supply of all work platforms including scaffolding, and OSHA required fall protection	X	
11.	Tests and inspections as required by specification	X	
12.	Grouting of equipment and column bases	X	
13.	Supply and install of touch up coatings	X	
14.	Station services including air, water, and electrical power		X
15.	Sanitary services in the form of portable toilets	X	
16.	Supply of common trash dumpster		X
17.	Clean up of work area	X	

2.6 <u>Other Requirements:</u>

The contractor shall comply with the following:

- All of Contractor's employees and any Sub-Contractor's employees shall take a mandatory safety orientation provided by City of Hastings before starting work on the project. The safety orientation is required once a year and is good from Jan 1 through Dec 31 each year.
- Contractor shall comply with site LOTO policy. LOTO will be performed by City of Hastings prior to starting any work on the system.
- Contractor shall comply with site Hotwork and Confined Spacy policies where applicable. Owner will provide Hotwork permits.
- Contractor shall follow all relevant OSHA regulations including fall protection and trenching and shoring.
- Weekly progress meetings between Contractor's project superintendent and Project Engineer.

2.7 <u>Submittal Requirements:</u>

The contractor shall submit the following information to the owner:

- Product data sheets for all contractor supplied materials.

    - Cables
    - Conduit, Cable Tray, Raceway
- Material test reports.
- Red-lined drawings indicating deviations from original drawing designs.

2.8 Project Schedule:

The new fly ash silo is scheduled to be completed during the WEC Unit 1 2025 Fall outage per the dates below. The existing ash sluicing system will need to be kept in-service until after ash has been cleared from the precipitator hoppers once the outage begins. The below details work that will need to be done during the outage:

- Work to be completed during WEC1 Fall 2025 Outage:
    - Demolition of existing MCC 1E, transformer
    - Installation and termination of power cables from Precipitator SUS to new MCC 1E.
    - Termination of controls cables in ash control cabinet

- Work to be completed ahead of WEC1 Fall 2025 Outage:
    - Installation of new MCC 1E, transformer, and Power Panel LP1E
    - Installation of conduits, cable tray, and raceway.
    - Installation of instrumentation on silo.
    - Installation and pulling of power and controls cables.

Work will be coordinated with mechanical contractor to allow completion during scheduled outage.

Material and Installation Contract:

Activity	Schedule
Bid Opening	Friday, September 12, 2025
Anticipated Contract Award Date	Wednesday, September 17, 2025

Preliminary Construction Schedule:

The work under this contract will have to be coordinated with City of Hastings and other Contractors to assure the Fly Ash Silo is completed before the end of the scheduled outage. A preliminary construction schedule is shown below.

Activity	**Schedule**
Completion of Silo Foundations and Paving	Completed
Delivery of Fly Ash Silo	Completed
Erection of Fly Ash Silo	Wednesday, August 13, 2025 through Wednesday, September 10, 2025
Start of Fall Outage	**Friday, November 7, 2025 at 23:59**
End of Fall Outage	**Thursday, December 4, 2025 at 11:59**
Pre-Outage Electrical Construction	Monday, September 29, 2025 through Friday, November 7, 2025

Outage Electrical Construction	Saturday, November 8, 2025 through Thursday, November 20, 2025
PLC Programming Controls and System Checkout	Friday, November 21, 2025 through Wednesday, December 3, 2025

2.9 Project Drawings:

The following drawings are part of the project. Vendor drawings for materials and equipment will be supplied to Contractor before the start of work. They are also available upon request. A full set of Issued For Construction drawings will be sent to the contractor electronically via Sharepoint after contract has been signed.

Drawing No.	Revision	Description
PT-333-07	-	DEMOLITION PLAN
PT-333-08	-	DEMOLITION PLAN
PT-333-09	-	STATION AIR P&ID
E100	-	OLSSON GENERAL NOTES AND DETAILS
E101	-	ELECTRICAL SITE GROUNDING PLAN
E102	-	ELECTRICAL SITE CONDUIT ROUTING PLANS
E103	-	ELECTRICAL SITE POWER PLAN
E104	-	ELECTRICAL SITE LIGHTING PLAN
E105	-	ELECTRICAL SILO POWER & LIGHTING ELEVATIONS
E106	-	ELECTRICAL PANEL SCHEDULES
E107	-	ELECTRICAL DETAILS
E1003	-	ONE-LINE PRECIPITATOR SUS
E1006	5	ONE-LINE 480 VOLT MCC 1E, 1F, AND 1G
CABLE SCHEDULE	0	POWER CABLE SCHEDULE
CONTROLS CABLE SCHEDULE	0	CONTROLS CABLE SCHEDULE
GEN	0	GENERAL NOTES
ASA-29	0	WIRING DIAGRAM
ASA-30	0	WIRING DIAGRAM
ASA-31	0	WIRING DIAGRAM
ASA-32	0	WIRING DIAGRAM
ASA-33	0	WIRING DIAGRAM
G2	C	CE WALTHER PRECIPITATOR ELEVATION
G5	C	CE WALTHER PRECIPITATOR INLET DUCTWORK
C-55650-05-001	0	GENERAL NOTES AND REFERENCE DRAWINGS PIPING
C-55650-05-002	0	GENERAL NOTES AND REFERENCE DRAWINGS PIPE SUPPORTS
C-55650-05-003	0	PLAN, SECTION AND DETAIL FLY ASH NUVEYOR VACUUM SYSTEM HOPPER AREA UNIT 1

C-55650-05-004	0	PLAN, SECTION AND DETAIL FLY ASH NUVEYOR VACUUM SYSTEM HOPPER AREA UNIT 1
C-55650-05-005	0	PLAN, SECTION AND DETAIL FLY ASH AIR VACUUM SYSTEM FILTER SEPARATORS TO EXHAUSTERS UNIT 1
C-55650-05-006	0	PLAN, SECTION AND DETAIL FLY ASH AIR VACUUM SYSTEM EXHAUSTERS DISCHARGE TO DUCT UNIT 1
C-55650-05-007	1	PLAN, SECTION AND DETAIL SILO VENT PIPING VENT FAN TO DUCT TIE-IN UNIT 1
C-55650-05-008	0	PLAN, SECTION AND DETAIL SILO VENT PIPING VENT FAN TO DUCT TIE-IN UNIT 1
EL-55650-05-001	D	I/O LIST
EL-55650-05-001	A	POWER DISTRIBUTION ELECTRICAL LOAD LIST
G-55650-05-001	C	GENERAL ARRANGEMENT OF FLY ASH SILO UNIT 1
G-55650-05-002	B	SILO FLOOR & UNLOADING FLOOR EQUIPMENT PLANS & SECTIONS UNIT 1
G-55650-05-003	B	SILO UNLOADING FLOOR EQUIPMENT ELEVATION
G-55650-05-004	B	SILO ROOF EQUIPMENT PLAN & SECTION
G-55650-05-005	B	SILO ROOF EQUIPMENT DETAILS
M-55650-05-001	C	P&I DIAGRAM GENERAL NOTES
M-55650-05-002	A	P&I DIAGRAM STANDARD SYMBOLS
M-55650-05-003	B	KEY PROCESS DIAGRAM FLY ASH NUVEYOR VACUUM SYSTEM
M-55650-05-004	C	P&I DIAGRAM FLY ASH NUVEYOR VACUUM SYSTEM HOPPER AREA
M-55650-05-005	C	P&I DIAGRAM FLY ASH NUVEYOR VACUUM AND UNLOADING SYSTEM SILO AREA
M-55650-05-006	C	P&I DIAGRAM FILTER SEPARATOR - CONTINUOUS OPERATION
M-55650-05-007	C	P&I DIAGRAM BIN FLUIDIZING SYSTEM
M-55650-05-008	C	P&I DIAGRAM MECHANICAL EXHAUSTERS
M-55650-05-009	C	P&I DIAGRAM COMPRESSED AIR FLY ASH NUVEYOR VACUUM SYSTEM
ML-55650-05-001	B	VALVE LIST
ML-55650-05-002	B	INSTRUMENT LIST
ML-55650-05-003	A	EQUIPMENT LIST
SV-55650-05-S001		TARSCO SILO DRAWINGS
E3001	5	RACEWAY – TRAY GROUND FLOOR
E3002	3	RACEWAY – TRAY MEZZANINE FLOOR
E3113	5	RACEWAY – CONDUIT PRECIPITATOR
5-EI	E	PRECIPITATOR SUS ONE LINE DIAGRAM
G1	D	PRECIPITATOR PLAN
G2	C	PRECIPITATOR ELEVATION

SECTION 3 – Technical Specifications

3.1 Demolition:

3.1.1 General:

A new Motor Control Center (MCC 1E) will be installed adjacent to the existing Motor Control Center MCC 1E. The existing MCC 1E will need to stay in operation until the fall outage period since the existing ash sluicing system needs to be operational until the outage. The existing equipment will be demolished during the outage once the existing equipment is in place. LOTO of the existing system will be performed by City of Hastings prior to beginning of demolition work. Care should be taken to prevent damage to parts of plant and equipment that are staying in service.

3.1.2 Equipment to be Demolished:

The following equipment will be demolished:

- Existing Motor Control Center MCC 1E
- Existing transformer and electrical panel wired to bucket 1-H on MCC 1E.
- Any conduit not reused for new MCC 1E
- Power wires from Precipitator SUS breaker to existing MCC 1E

The following equipment will be reused:

- Outlets inside and outside precipitator building which are currently fed from panel/transformer fed from MCC 1E bucket 1-H. These shall be rewired to new power panel LP1E as shown on drawing E106 (labeled Stack/ ID Fan Area Receptacles).

3.1.3 Reference Drawings:

The following drawings show equipment to be demolished:

- Sheet E103

3.2 Equipment Installation:

3.2.1 General:

The contractor shall install equipment provided by City of Hastings.

3.2.2 Equipment to be Installed:

The following equipment will be installed:

- New Motor Control Center MCC 1E
    - Rockwell MCC will have four sections with approximate dimensions 80” x 20” x 90” high
- New transformer T-001 480V-120/208V 45KVA (Provided by CoH)
- Power Panel LP1E (Provided by CoH)

3.2.3 Reference Drawings:

The following drawings show equipment to be demolished:

- Sheet E103

3.2.4 Low Voltage Equipment:

This equipment consists of low voltage motor control centers (MCCs), reliable power supply equipment, and other low voltage ac switchboards and panels.

All low voltage equipment and medium voltage to low voltage transformers shall be installed according to the manufacturer's recommendations and instructions and local code requirements.

Installation of this equipment shall include accurately aligning each unit on its foundation and securing it in place; and checking all main and secondary connections and tightening them where found loose. All covers or enclosures which have been removed for shipment or removed during installation shall be securely bolted in place. Each enclosure shall be installed so that it is level and all doors freely swing full travel.

Where top mounted junction boxes are provided, they shall be assembled and bolted to the motor control center enclosures.

The enclosures that are split for shipping shall be assembled, bus and control wire shipping split connections shall be made, to assure that mechanical and safety interlocks are installed and functional, all stabs and disconnect devices are properly aligned, isolation barriers are in place, and the drawout units move freely in and out of their compartments. All breakers, starters, and miscellaneous devices shall be installed and exercised to assure that the equipment is suitable for electrical energization.

Motor starter overload heater elements or overload relays of various sizes may be shipped separately. Motor nameplate data and MCC manufacturer's bulletins shall be used for field selecting and installing the proper size overload relays and heater elements. Overload devices shall be set, removed, or installed as directed by Purchaser.

All circuit breakers, fused switches, motor starters, etc., shall be checked for proper mechanical and electrical operation.

3.2.5 Panelboard Installation:

3.2.5.1 General. All panelboards shall be installed so that branch circuit protective devices are not more than 6 feet (1.8 m) above the finished floor or grade. Panelboards shall be installed in accordance with the following articles.

3.2.5.2 Cabinets. The cabinets shall be leveled and securely fastened to the mounting surface, utilizing all of the mounting holes provided in the panelboard cabinets. The mounting surfaces shall be adjusted as required to maintain the cabinets in a true vertical plane.

3.2.5.3 Panel Interior. The panel interior shall be mounted in the cabinet using all of the mounting provisions furnished. The panelboard interior shall then be connected, with wires tightly secured in the terminals provided and with unnecessary lengths of wires eliminated. Wiring shall be neatly arranged in the gutters.

3.2.5.4 Panelboard Fronts. Each panelboard front shall be carefully aligned and adjusted until its edges are parallel to the panelboard interior and the building lines, and then shall be firmly secured with the fasteners provided.

The directory shall be accurately and neatly completed to permit ready location of the protective devices controlling circuit loads.

3.2.6 <u>Transformer Installation:</u>

3.2.6.1 General. Transformers shall be installed in accordance with the manufacturer's instructions, recommendations, and drawings.

3.3 Conductors:

3.3.1 General:

The contractor shall supply and install all power and control conductors per the attached drawings, Power Cable Schedule, and Controls Cable Schedule. Contractor shall adhere to the latest edition of the National Electric Code and all State and Local codes. The Contractor shall follow all specifications on provided drawings as stated in the General Notes and Sheets Notes sections.

3.3.2 Drawings & Cable Schedule:

The drawings and cable schedules shall be used to determine the sizes, types, and quantities of conductors used on the project. These specifications can be found on the following documents:

- Power Cable Schedule
- Controls Cable Schedule
- Drawing E103 – receptacle circuits
- Drawing E104 – lighting circuits

3.3.3 Installation:

3.3.3.1 Cable Placement - All cable described in the Power Cable Schedule and Controls Cable Schedule shall be routed as indicated therein. Routing of other cable shall be as indicated on the drawings and field routed where not specified on the drawings and cable schedules.

If at any time during the progress of the Work, raceways are found which appear inadequate to accommodate the assigned cable, Purchaser shall be notified immediately. Further work on the questionable raceway shall be paused until Purchaser advises how to proceed.

All cable shall be carefully checked both as to size and length before being pulled into conduits or ducts. Cable pulled into the wrong conduit or duct or cut too short to rack, train, and splice as specified herein shall be removed and replaced. Cable removed from one conduit or duct shall not be pulled into another conduit or duct without prior approval from Purchaser.

3.3.3.2 Cable in Trays. All cable shall be carefully laid in or pulled through the tray system so that neither the cable nor the trays are damaged. Cable may be laid along the side of the tray system during placement provided it is protected from dirt, water, oil, or other detrimental materials and from mechanical injury. Cable shall be cut sufficiently long to conform to the contour of the trays, with particular attention paid to vertical inside bends. All excessive slack shall be removed from the cable so that it lies parallel to the sides of the trays. Multiple single conductor cable which constitutes a single power circuit shall be grouped together as defined by the NEC to minimize magnetic influence on other cable in the area.

Power cables shall be installed in tray in accordance with the NEC and the following additional requirements:

Low Voltage Power Cables (2000 volts or less)
Low voltage power cables (all single-conductor and multi-conductor greater than or equal to 4/0 AWG) shall be installed in cable tray in a single layer. If single-conductor cables are triplexed or bound together in circuit groups, the sum of the diameters of all single conductors shall not exceed the cable tray width.

Multiconductor power cables less than 4/0 AWG may be installed in a random manner in accordance with NEC Article 392.22 (A)(1)(b) and (c).

Low voltage multi-conductor power cables 4/0 AWG or larger shall be installed in cable tray in the following manner(s):

In a single layer with no maintained spacing requirement between cables.
The sum of the diameters of all cables shall not exceed the tray width.

Low voltage single-conductor power cables shall be installed in cable tray in the following manner(s):

Triplexed or bound in circuit groups of a single layer with a minimum spacing of 1 times the diameter of the largest conductor contained within the configuration and adjacent conductor configurations or cables.

The cable shall be tied to the trays with nylon ties as necessary (but at not greater than 10 foot intervals) to hold it in place.

3.3.3.3 Splicing - No splices shall be made in conductors for instrument circuits or control circuits except where required at connections to accessory devices equipped with factory installed pigtails or where high temperature wire is necessary locally to connect to a particular device. Shields may be spliced where necessary to permit connection to the station ground.

Power cable circuits may not be spliced unless specifically approved by Purchaser. Where splices are unavoidable, they shall be performed in accordance with the standards listed in this section and at locations acceptable to Purchaser.

Splices shall not be made to utilize short lengths of cable nor shall they be made to provide correct lengths on cable initially cut too short for a particular circuit.

Splices, joints, and connections in cable shall be made only in pull boxes or junction boxes unless otherwise indicated on the drawings and shall be made in accordance with the instructions of the cable manufacturer.

3.3.3.4 Stripping Requirements - Any material in contact with the conductor shall be free-stripping. Cables which require wire brushing of the conductor or dipping of the conductor into molten solder to facilitate termination are not acceptable. If the material in contact with the conductor is not free-stripping, the entire cable reel may be rejected at the option of Purchaser.

3.3.3.5 Cable Identification and Labeling - The ends of all circuits listed in the Cable Schedules shall be identified with a circuit tag. Each tag shall be marked with the circuit number according to the Cable Schedules and drawings. At terminations, each circuit shall be identified. Each phase of multiphase power circuits shall be individually identified. The circuit tag shall be so attached that it is readily visible for circuit identification. During the installation of power and instrument cables, Contractor shall keep a list of all conduits each circuit number is routed through. Purchaser will use this information at the conclusion of the project to create a master circuit list. Example circuit lists showing routing of cables through conduits can be provided by Purchaser.

Phase tape shall be applied to each conductor at the terminations of all power and lighting circuits. The phase taping for power conductors shall be as follows:

208/120 V Circuits	Black – Phase A; Red – Phase B; Blue – Phase C; White – Neutral
480/277 V Circuits	Brown – Phase A; Orange – Phase B; Yellow – Phase C; Grey – Neutral
4160 (or 6900) V Circuits	Black – Phase A; Red – Phase B; Blue – Phase C

Green shall be used for ground at every voltage level. Phase taping circuits shall not be required if cable with colored insulation is installed.

3.3.3.6 Spare Conductors - All spare conductors of a multiconductor cable shall be left at their maximum lengths for possible replacement of any other conductors in the cable. Each spare conductor shall be neatly dressed for future use.

3.3.3.7 Terminations - Cable shall be terminated in accordance with the following requirements:

In general where possible, cables for power circuits exceeding 50 V should be terminated on the field side first followed by the source side.

Train cable in place and cut squarely to required length. Avoid sharp bends.

Remove necessary amount of cable jacket and insulation without damage to the conductor.

Install terminals or terminal connectors as required, ensuring a firm metal-to-metal contact.

Reducing pin terminals (if required and approved for use by Purchaser) shall be installed where 600V power cables have been oversized and will not fit into mechanical connections such as on molded case breakers.

Install high voltage cable termination kits for shielded cable rated 5 kV and above using the procedures recommended by the manufacturer of the kit being used.

Insulate each connection of cable to an insulated conductor (whether cable, bus, or equipment bushing). The insulation shall cover all exposed surfaces of the conductors; the insulation voltage level of the completed termination shall be not less than the insulation voltage level of the connected conductors.

Instrument cable shields and drain wires shall remain on the pair as close to the termination point as practical. Shields shall be permanently taped to prevent unraveling and the drain wires shall have insulating sleeves installed up to the point of termination.

3.3.3.8 Tests After Placement - All insulated conductors shall be electrically tested after placement.

All circuits, including lighting circuits, shall be tested with the circuit complete except for connections to equipment. All splices, stress cones on shielded cable, and terminal connector attachments shall be complete prior to testing.

In addition to the tests performed after cable placement is complete, continuity tests shall be performed on all supervisory and communication cable before and after each splice is made.

Any circuit failing to test satisfactorily shall be replaced or repaired and then retested.

Subcontractor shall provide documentation of the tests on forms provided by Purchaser or acceptable for each test performed.

Continuity Tests. Continuity tests shall include all tests necessary to confirm that each conductor is continuous throughout its entire length.

Identification Tests. Identification tests shall include all tests necessary to confirm that the conductor being investigated originates and terminates at the locations designated in the Circuit List or indicated on the drawings.

Insulation Tests. Resistance from ground provided by the insulation on all field-installed insulated power conductors shall be measured.

Cable Rated Below 5000 Volts. All insulated conductors, except control, instrumentation, supervisory and communication cable, rated less than 5000 volts shall be tested for insulation resistance with a megger or an equivalent testing device, per the most current NETA ATS specification. Insulation resistance measurements shall be made between each conductor and ground and between each conductor and all other conductors of the same circuit. Minimum acceptable resistance values shall comply with the specified acceptance criteria in NETA ATS specification.

3.4 Raceway Components and Installation:

3.4.1 General:

This section covers the furnishing and field installation of all electrical raceway systems and components. The raceway system and installation shall be in accordance with the drawings, Cable Schedules, and these specifications.

The raceway system is defined to include conduit, flexible conduit, cable tray, wireway, junction boxes and pull boxes, and all materials and devices required to install, support, secure, and provide a complete system for support and protection of electrical conductors.

3.4.2 Codes and Standards:

Work performed under these specifications shall be done in accordance with the following codes and standards. Unless otherwise specified, the applicable governing edition and addenda to be used for all references to codes or standards specified herein shall be interpreted to be the jurisdictionally approved edition and addenda. If a code or standard is not jurisdictionally mandated, then the current edition and addenda in effect at the date of this document shall apply. These references shall govern the work except where they conflict with other specifications. In case of conflict, the more stringent shall govern to the extent of such difference.

Raceway systems and components furnished with these specifications shall be manufactured in accordance with applicable standards of the American National Standards Institute (ANSI), the National Electrical Manufacturers Association (NEMA), and Underwriters' Laboratories, Inc. (UL). Raceway systems and components shall be installed in accordance with the applicable requirements of the National Electrical Code (NEC) and the Occupational Safety and Health Administration (OSHA) standards.

3.4.3 Conduit and Raceway Labeling:

Contractor shall label all new field routed cable tray, raceway, and conduits with raceway numbers provided by Purchaser. Labels shall have a white background with black lettering and be approximately 2” x 5” in size. During the installation of cables, Contractor shall make a list of all conduits each circuit on the cable schedule is routed through. See sections 3.3.3.5 and 3.6.3.

3.4.3 Approved Manufacturers of Components:

For the following components, only the listed manufacturers are recognized as maintaining the level of quality of workmanship required by these specifications. A non-listed manufacturer that is considered to provide an equivalent level of quality may be substituted pending supporting testimony provided and prior approval. Acceptance of the manufacturer as a substitute is at the discretion of Purchaser:

Component	**Manufacturer**
Fire stops	Nelson Fire Stops Flame-Safe Fire Stop Systems Fire Stop Systems
Conduit - Steel	Allied Tube and Conduit Triangle PWC, Inc. Wheatland Company
Conduit - Aluminum	Allied Tube and Conduit Wheatland Company Indalex
Conduit - Plastic	Cantex PVC Products Carlon Plastic Conduit

Component	Manufacturer
Conduit - Flexible	Anamet Canada, Inc. Liquatite International Hose Company
Conduit - Fiberglass	Champion Fiberglass United
Conduit bodies and fittings - Metal	O-Z/Gedney Crouse-Hinds Appleton Allied Tube and Conduit
Conduit bodies and fittings - Plastic	Cantex PVC Products Carlon Plastic Conduit
Support channels and fittings	Unistrut Metal Framing Eaton B-Line
Conduit supports	O/Z/Gedney Crouse-Hinds Appleton
Wireway	Cope Legrand Cablofil Eaton B-Line Pentair Hoffman Lee Products Company
Boxes and enclosures - Metal	Pentair Hoffman Wiegmann Appleton Hammond Manufacturing Co.
Boxes and enclosures - Plastic	Hammond Manufacturing Co. Carlon Plastic Products Crouse-Hinds
Cable tray and accessories - Metal	Eaton B-Line Cope Legrand PW MP Husky ABB T&B

3.4.4 General Installation Requirements:

3.4.4.1 Routing of Above Grade Raceway. Electrical cable tray and wireway shall be routed as indicated on the drawings. Conduit shall be field routed according to the general routing indicated on the drawings. The location of field routed raceway and all raceway supports shall be coordinated with other equipment and structures.

Wherever practical, field routed raceway shall be routed so that, except where it is changing floor elevations or being lowered to enter equipment, the lowest part of the raceway, including its associated supports and appurtenances, is at least 7'-6" (2.3 m) above the closest floor or walking surface beneath it. Field routed raceway and its associated supports and appurtenances, located at least 7'-6" (2.3 m) above the closest walking surface, may be routed a reasonable distance away from the supporting wall, ceiling, or structural member so long as the specified support is provided and interference with other equipment and structures is avoided. Field routed raceway and its associated supports and appurtenances, which must be routed closer than 7'-6" (2.3 m) above the closest walking surface, shall be routed as close as possible to surfaces of walls, columns, and the equipment served.

Field routed raceway and all raceway supports shall be located at least 6 inches (150 mm) from the final outside surface of all steam piping, including insulation, and 2 inches (50 mm) from the final outside surface of all other piping, including insulation if provided. Consideration shall be given to the thermally expanded position of piping when field routing raceway.

Field routed raceway and all raceway supports shall be located so that they do not interfere with equipment which expands, vibrates, or moves under normal operation such as a steam generator, flue gas ductwork, or overhead crane.

3.4.4.2 Raceway Attached to Building Steel. Except as otherwise approved or specified, indicated on the drawings, raceway and raceway supports attached to building steel shall be secured by welding, by drilling and tapping, by powder activated devices and fasteners, or by beam clamps. All necessary touch up paint or galvanization shall be completed.

Raceway and raceway supports shall not be attached to grating, handrail, ladders, pipe, equipment, and other raceway not designed for the additional loading.

Raceway and raceway supports shall not be attached to the flanges of the cold-formed support steel in pre-engineered buildings. Instead, raceway and raceway supports shall be attached to the web of the cold-formed support steel by using bolts installed through holes field drilled in the web.

3.4.4.3 Openings through metal wall panel. Single conduit openings in metal wall panel shall be hole punched or drilled the minimum size to allow passage of the conduit through the wall panel. Openings for multiple conduits or cable tray shall be neatly saw cut 2 inches (50 mm) larger than required on all four sides to allow passage of the raceway components.

Insulation removed to clear the opening for the passage of raceway components through metal insulated wall panel shall be reinserted around the outside edges of the opening.

3.4.5 <u>Conduit Components:</u>

An electrical conduit system shall be furnished and installed in accordance with the drawings and the following specifications. Conduit components shall include conduit, fittings, supports, and hardware required for a complete system.

3.4.5.1 Rigid galvanized steel conduit. Steel conduit, couplings and elbows shall be a threaded hot-dipped galvanized rigid mild steel manufactured in accordance with ANSI/NEMA C80.1 and UL 6. The conduit interior and exterior surfaces shall have a continuous hot-dipped galvanized coating with a transparent overcoat of enamel, lacquer, or zinc chromate. Each length of conduit shall have a coupling on one end and a thread protector on the other. The thread protector shall have sufficient mechanical strength to protect the threads during normal handling and storage. Rigid galvanized steel conduit shall be similar to Type GRC as manufactured by Allied Tube and Conduit Corporation, or approved equal.

3.4.5.2 Liquidtight flexible metallic conduit. Liquidtight flexible metallic conduit shall be a plastic jacketed, heavy-duty, locking, flexible metal core manufactured in accordance with ANSI/UL 360. The plastic jacket shall be UV, oil, and acid resistant and shall be suitable for a temperature rating of 60° C. The metal core shall be a locking galvanized steel core for use with galvanized conduit systems, or a locking aluminum core for use with aluminum conduit systems. Liquidtight flexible metallic conduit used in high temperature areas shall have a thermoplastic PVC jacket suitable for a temperature rating of 105° C. Galvanized liquidtight flexible metallic conduit shall be similar to Sealtite Type UA as manufactured by Anamet Canada, Inc. or approved equal. High temperature galvanized liquidtight flexible metallic conduit shall be similar to Sealtite Type HTUA as manufactured by Anamet Canada, Inc. or approved equal. Aluminum liquidtight flexible metallic conduit shall be similar to Sealtite Type EFL as manufactured by Anamet Canada, Inc. or approved equal.

Fittings for flexible conduit in hazardous locations shall be properly rated and marked for the area classification.

3.4.5.3 Rigid metal conduit bodies and fittings. Rigid metal conduit bodies and fittings shall conform to the requirements of ANSI/NEMA FB-1, UL 514B and UL 886 where these standards apply. Conduit bodies and fittings shall be appropriate for the area and equipment with which they are associated. Conduit bodies and fittings used in hazardous areas shall conform to NEC requirements for the area classification.

Threaded galvanized malleable iron or galvanized steel bodies and fittings shall be used with galvanized conduit. Threaded copper free aluminum or aluminum alloy bodies and fittings shall be used with aluminum conduit. Unthreaded zinc coated steel fittings shall be used with electrical metallic tubing. Metallic tubing fittings shall be compression type and watertight.

Additional requirements for rigid metal conduit bodies and fittings are as follows.

3.4.5.4 Conduit outlet bodies. Conduit outlet bodies shall be provided where required for pulling ease and changing conduit direction. Standard conduit outlet bodies shall be threaded to accept threaded cover screws. Standard conduit outlet bodies installed outdoors or in wet locations shall be gasketed to provide a watertight seal. Conduit outlet bodies used in hazardous areas shall be provided with internally threaded gasketed covers.

Standard conduit outlet bodies shall be similar to Types LB, X, LL, LR, T, TB or C as manufactured by O-Z/Gedney or approved equal.

3.4.5.4 Insulated bushings. Insulated bushings with insulating inserts in metal housings shall be provided for the termination of all threaded conduits not terminated in hubs or couplings. Insulating inserts shall be phenolic or a similar thermoplastic material.

Grounding type insulated bushings shall be provided for all conduits containing power circuits and all conduits located in hazardous areas.

Insulated bushings shall be similar to Type IBC as manufactured by O-Z/Gedney or approved equal. Grounding type insulated bushings shall be similar to Type IBC-L-BC as manufactured by O-Z/Gedney or approved equal.

3.4.5.5 Locknuts. Locknuts shall be provided for the termination of all indoor threaded conduits not terminated in hubs or couplings. One interior and one exterior locknut shall be provided. Exterior locknuts shall be gasketed. Locknuts shall be designed to securely bond the conduit to the box when tightened while also preventing loosening by vibration. Interior locknuts shall be similar to Type 1 as manufactured by O-Z/Gedney or approved equal. Exterior locknuts shall be similar to Type SLG as manufactured by O-Z/Gedney or approved equal.

3.4.5.6 Unions. Conduit unions shall be provided for the connection of two threaded conduit ends when the conduit cannot be turned. Standard conduit unions shall be similar to three piece Type 4 Series as manufactured by O-Z/Gedney or approved equal. Hazardous area conduit unions shall be similar to Type UNF as manufactured by O-Z/Gedney or approved equal.

3.4.5.7 Raintight hubs. Raintight hubs shall be provided for the termination of threaded conduits on outdoor equipment where threaded hubs are not provided. Raintight hubs shall be provided with an insulated throat. Standard and hazardous area rated raintight hubs shall be manufactured by Crouse-Hinds, Appleton or approved equal.

3.4.5.8 Combination fittings. Combination fittings shall be provided to connect threaded rigid metal conduit to electrical metallic tubing. Combination fittings shall have a threaded throat to receive the rigid metal conduit, and a threadless compression type throat to receive the electrical metallic tubing. Combination fittings shall be similar to Type ETR as manufactured by O-Z/Gedney or approved equal.

3.4.5.9 Expansion fittings. Expansion fittings shall be provided in threaded conduit runs to allow for the expansion and contraction of conduit supported across expansion joints. Expansion fittings shall be watertight, and shall be provided with bonding jumpers. Standard expansion fittings shall be similar to Type EX as manufactured by O-Z/Gedney or approved equal. Expansion fittings for hazardous areas shall be similar to Type UNFE as manufactured by O-Z/Gedney or approved equal.

3.4.5.9 Drains. Drains shall be provided in the low spots of outdoor conduit runs, and in outdoor conduit runs prior to entering buildings, to remove condensation from the conduit. Conduit drains shall be similar to Type DB as manufactured by O-Z/Gedney or approved equal.

3.4.5.10 Reducers. Reducers shall be provided to connect two different conduit sizes together. Reducers shall be external couplings similar to Type REC as manufactured by Crouse-Hinds or approved equal.

3.4.5.11 Conduit Seal-off fittings. Seal-off fittings shall be provided to isolate conduit runs and prevent the passage of flammable gases, vapors, and dusts from hazardous areas and to contain explosive gases and flame within an explosionproof enclosure. Seal-off fittings shall be suitable for vertical and horizontal conduit installations, and properly rated and marked for the applicable area classification. Seal-off fittings shall have a removable plug for the placement of sealing fiber, and an additional removable plug for the placement of sealing compound. Seal-off fittings shall be similar to Type EYA as manufactured by O-Z/Gedney or approved equal.

Sealing fiber and sealing compounds shall be compatible with the seal-off fittings provided.

3.4.5.12 Liquidtight flexible metallic conduit fittings. Liquidtight flexible metallic fittings shall be provided to connect liquidtight flexible metallic conduit to rigid metal conduit and devices. Liquidtight flexible metallic fittings shall have insulated throats and shall bear the UL label. Liquidtight flexible metallic fittings shall be similar to Type STB and Type STN as manufactured by Appleton or approved equal. Galvanized malleable iron fittings shall be used with galvanized core flexible conduit. Copper free aluminum or aluminum alloy fittings shall be used with aluminum core flexible conduit. Fittings for flexible conduits in hazardous locations shall be properly rated and marked for the area classification.

3.4.5.13 Flexible metallic conduit fittings. Flexible metallic fittings shall be provided to connect flexible metallic conduit to light fixtures and wiring devices in finished areas. Flexible metallic fittings shall have "Squeeze" type or friction connectors for fastening the fitting to the flexible conduit. Flexible metallic fittings shall have insulated throats and bear the UL label. Flexible metallic combination fittings shall have a friction type connector on one end for fastening to flexible metallic conduit, and a compression type connector on the other end for fastening to electrical metallic tubing. Flexible metallic fittings shall be similar to Types C, 24 Series, and CB as manufactured by O-Z/Gedney or approved equal.

3.4.5.14 Flexible metallic conduit fittings. Flexible metallic fittings shall be provided to connect flexible metallic conduit to light fixtures and wiring devices in finished areas. Flexible metallic fittings shall have "Squeeze" type or

3.4.6 <u>Conduit Supports:</u>

Conduit supports shall conform to the requirements of the articles that follow. Specific conduit support materials shall be as indicated on the drawings.

3.4.6.1 Hanger rods. Hanger rods used for the support of formed channel shall be 1/2 inch (13 mm) diameter electrogalvanized continuous threaded steel rods. Hanger rods shall be similar to Type HTHR as manufactured by Unistrut Metal Framing or approved equal.

3.4.6.2 Support channel. Support channel shall be hot-dipped galvanized formed channel made from 12 gauge steel in 1-5/8 inch (41 mm) series sizes. Support channel shall be similar to Type P1000 Series as manufactured by Unistrut Metal Framing or approved equal.

3.4.6.3 Support channel fittings. Support channel fittings shall be flat plate and angular fittings and brackets designed for use with the 1-5/8 inch (41 mm) series formed channel indicated previously. Support channel fittings shall be hot-dipped galvanized steel. Support channel fittings shall be as manufactured by Unistrut Metal Framing or approved equal.

3.4.6.4 Conduit clamps. Conduits in single runs or groups of two shall be supported by one hole cast metal clamps with clamp backs, or with conduit clamps attached to beams. One hole clamps, clamp backs and conduit clamps attached to beams shall be hot-dipped galvanized malleable iron. One hole conduit clamps

and clamp backs shall be similar to Type 14-G Series manufactured by O-Z/Gedney or approved equal. Conduit beam clamps shall be similar to Types UBC, UEC, and UPC manufactured by O-Z/Gedney or approved equal.

Supports for banks of three or more conduits shall be constructed of formed channel with associated two piece galvanized conduit clamps. Two piece conduit clamps shall be designed for use with the 1-5/8 inch (41 mm) series formed channel indicated previously. Two piece conduit clamps shall be similar to Type P1100 Series or Type P1400 Series manufactured by Unistrut Metal Framing or approved equal.

Conduits in single runs or groups of two terminated at cable tray shall be supported from the tray side rail using galvanized malleable iron cable tray conduit clamps similar to Type LCC Series clamps manufactured by Crouse-Hinds or approved equal. Banks of three or more conduits shall be terminated at cable tray with the use of two piece conduit clamps and formed channel attached to the tray side rail as indicated on the drawings.

3.4.6.5 Conduit support spacing. All conduit runs shall be rigidly supported in accordance with the following requirements.

Vertical rigid metal conduit shall be supported in maximum 20 foot (6 m) intervals. Vertical plastic conduit and electrical metallic tubing shall be supported at the maximum intervals indicated for their respective horizontal conduit support spacing shown below.

Rigid metal conduit, plastic conduit, and electrical metallic tubing shall be supported within 3 feet (900 mm) of each junction box, pull box, cabinet, conduit body, or other conduit termination.

Horizontal rigid metal conduit, plastic conduit, and electrical metallic tubing shall be supported at the indicated maximum intervals.

Maximum Support Intervals			
Nominal Conduit Size, inches	**Rigid Metal Spacing, feet**	**Rigid Plastic Spacing, feet**	**Electrical Metallic Tubing Spacing, feet**
1/2	10	3	5
3/4	10	3	5
1	12	3	6
1-1/2	14	5	7
2	16	5	8
2-1/2	16	6	8
3	20	6	10
4	20	7	10
5	20	7	-
6	20	8	-

3.4.7 <u>Conduit Installation:</u>

Conduit and associated components shall be installed as indicated on the drawings and as described in these specifications.

3.4.7.1 Routing. Field routed conduit and associated supports shall not interfere with the installation or maintenance of any dimensioned equipment, building steel, cable tray, HVAC duct, fans, dampers, or pre-routed piping.

Conduit shall not be routed under crane or trolley rails, or through areas designated for the maintenance or removal of equipment accessed by overhead removable panels and hatches. Any conduit which interferes with these areas or purpose shall be promptly removed so as not to delay installation or use of any equipment.

Except as otherwise specified or indicated on the drawings, all conduit shall be installed in exposed runs parallel or perpendicular to dominant surfaces with right angle turns made of symmetrical bends or fittings. Except where prevented by the location of other work, a single conduit or a conduit group shall be centered on structural members.

3.4.7.2 Conduit drains. Outdoor conduits shall not contain moisture pockets. Drains shall be installed in outdoor conduit to remove moisture at locations where conduits terminate on equipment or devices, and at locations where conduits penetrate an exterior wall.

Outdoor conduits shall be installed so that water will not drain into any equipment containing electrical devices or connections. Drains shall be installed at lowest point in conduit above grade. Outdoor conduits terminating on equipment from above shall have a conduit seal fitting with drain installed in the conduit run near the conduit termination where practical. Outdoor conduit terminating on equipment from the side shall have a conduit “tee” body with drain installed in the conduit run near the conduit termination where practical. Outdoor conduit terminating on equipment from below shall have a conduit “tee” body with drain installed in the conduit run at the lowest vertical location directly below the equipment. Equipment serviced from below by underground or embedded conduits shall not require drains.

Outdoor conduits penetrating exterior walls shall have a conduit “tee” body with drain installed on the exterior side of the wall at the “low point” of the conduit as close as practical to the wall penetration.

3.4.7.3 Couplings and unions. Rigid metal conduit shall be joined by threaded conduit couplings with the conduit ends butted. The use of running threads will not be permitted. Where rigid metal conduit cannot be turned and joined together by standard threaded couplings, conduit unions or split couplings may be used. Conduit union coupling nuts shall be installed uppermost on vertical or inclined conduit runs to prevent the entrance of water into the union. Split couplings shall not be installed on outdoor conduit.

Plastic conduit shall be joined together in accordance with manufacturer recommendations using unthreaded couplings and a medium bodied solvent cement. Joining surfaces shall be wiped clean of dirt, moisture, or other contaminants prior to application of the solvent cement. If joining surfaces are extremely dirty or coated with oil, a cloth saturated with PVC cleaner shall be used to clean the surfaces. Joining surfaces shall be thoroughly dried before applying solvent cement.

Electrical metallic tubing shall be joined together by unthreaded compression couplings. The use of set-screw couplings will not be permitted.

3.4.7.4 Bends and offsets. A run of conduit shall not contain more than the equivalent of four 90 degree bends, including those immediately at outlet bodies and fittings. Field bends shall be made without reducing the internal diameter of the conduit. The center line radius of field bends shall not be less than six times the nominal trade size diameter of the conduit.

The use of a pipe tee or vise for bending metal conduit will not be permitted.

Plastic conduit bends shall be factory fabricated wherever possible. Where field bending of plastic conduit is required, the conduit length shall be heated to approximately 275° F. Conduit heating may be by radiant heat, hot air, or hot liquid immersion. Open flame heating will not be permitted. Special mandrels or forms shall be used to provide a smooth bend without reduction of the conduit diameter. Conduit discolored by prolonged heating will not be acceptable.

3.4.7.5 Fittings. Conduit outlet bodies installed in conduit runs shall be sized and installed in accordance with the NEC. Covers shall be installed on outlet bodies at the time of installation to prevent the entrance of moisture or contaminants into the conduit system prior to cable pulling operations.

Conduit outlet bodies shall not be installed in conduit runs containing 5 kV and higher voltage conductors, unless the type and location have been reviewed for excessive cable bending radius constraints as defined by the cable manufacturer.

Conduit fittings for metal conduit shall be installed wrench-tight.

Hazardous area conduit seal-off fittings shall be installed at locations required by the NEC for the classified area. Seal-off fitting compounds and fiber shall be installed as recommended by the fitting manufacturer. Completed conduit seal-off fitting installations shall not restrain equipment removal or access beyond that which would be encountered if there were no sealing fitting installed on the conduit run.

3.4.7.6 Cutting and threading. The plane of all conduit ends shall be square and perpendicular with the center line. The ends of all conduit and tubing shall be reamed to remove all rough edges and burrs.

Where threads are required, they shall be cut and cleaned prior to conduit reaming. A cutting oil shall be used in threading operations. The dies shall be kept sharp and provisions shall be made for chip clearance.

All steel conduit ends, after cutting or threading, shall be cleaned and regalvanized with a cold galvanizing coating as specified by Technical Attachment Coating System 1302 Datasheet or with an acceptable equal that meets the specified performance requirements. This protective material shall be applied to any surface where the galvanized coating is damaged or removed.

3.4.7.7 Cleaning. Precautions shall be taken to prevent the accumulation of water, dirt, or concrete in the conduit. Conduit in which water or other foreign materials have been permitted to accumulate shall be thoroughly cleaned. Refer to IEEE 1185-2019 for recommended practice for pre-installation of cables and cleaning of raceway systems.

3.4.7.8 Liquidtight flexible conduit. Liquidtight flexible conduit inserts shall be installed at the locations indicated below. Liquidtight flexible conduit lengths shall not be greater than 24 inches (600 mm) in length for 2 inch (50 mm) and under nominal conduit diameter, and 48 inches (1,200 mm) in length for nominal conduit diameter greater than 2 inches (50 mm)

Liquidtight flexible metallic conduit shall be installed in all rigid metal conduit runs which are supported by both building steel and by structures subject to vibration or thermal expansion.

Liquidtight flexible metallic conduit shall be installed in rigid metal conduit runs which cross expansion joints or which connect to building supported independent structures, such as storage tanks or ash hoppers.

Liquidtight flexible metallic conduit should be considered in all long rigid metal conduit runs where differential expansion problems may be expected.

Liquidtight flexible metallic conduit shall be installed adjacent to all equipment and devices which move in relation to the supply conduit due to vibration, normal operation of the mechanism, or thermal expansion.

The supply conduit shall be connected to pressure switches, thermocouples, solenoids, and similar devices with liquidtight flexible metallic conduit. Liquidtight flexible metallic conduit shall be installed adjacent to the motor terminal housing for motors requiring 4 inch (100 mm) and smaller conduit. Provisions for vibration and thermal expansion at motors requiring larger than 4 inch (100 mm) conduit shall be accomplished by use of pendent hangers or other acceptable means.

3.5 Instrumentation and Control Installation:

3.5.1 General:

All controls and instrumentation shall be installed in accordance with the requirements of this section, project drawings, and instrument lists. Any installation procedures not specified herein or in the Instrument Installation Details shall be done in accordance with the manufacturer's recommendations and good engineering practice and shall be acceptable to Purchaser.

Instruments shall be oriented so that the indication faces the direct access approach to the equipment with which they are associated.

Where an instrument is associated with a valve, it shall be located at the valve or the scale shall be visible from the valve.

An instrument shall not be mounted on a handrail, adjacent to process vents and exhausts, or where it obstructs a walkway.

Instruments shall be accessible for use, calibration, and repair without requiring the removal of piping, grating, or other structures. This requirement also applies to the removal of any covers or housing that is part of the instrument or its installation.

All instruments shall be installed in such a way that they are not subject to shock, excessive vibration, or temperature extremes from process heating, and that they do not block any access-way.

The location of instruments shall permit easy access from grade, permanent platforms, temporary access, ladder or stairways for operation, inspection, and maintenance. Locations shall also minimize the possibility of damage from falling or passing objects and from fire. The use of special ladders or mobile steps should be minimized. If they are necessary, then prior approval will be required on a case-by-case basis.

Safety Instrumented System (SIS – Emergency shutdown) devices must be easily accessed due to the high level of maintenance required for these devices. Ladders or other temporary means are not allowed.

All vent valves or tubes connected to vent ports as well as pressure safety valve vents shall be directed away from the normal personnel access position.

All instruments and connection lines shall have allowance for the movement of equipment caused by seismic loading, vibration, or expansion and contraction caused by temperature changes. Instruments subjected to excessive vibration, shall be installed on separate supports. The layout of the impulse lines shall provide sufficient flexibility to contain the vibration.

All controls and instrument installation and accessories shall be executed and supervised by personnel experienced in this type of work.

Sequence of installation work shall be coordinated with Purchaser to support the project commissioning schedule.

During installation, all connections, covers, and fittings on all instruments shall be in place and provided with temporary coverings as necessary; to protect them until permanently connected. Plastic caps or other protection on electrical access openings to instruments must remain in place until the final wiring installation with appropriate weather-tight connections is made.

Local panels or cabinets shall remain closed once installed. On enclosures using more than one hold-down device or clamp, all hold-down devices shall be fully engaged.

3.5.2 Installation of Locally Mounted Equipment:

In addition to the installation requirements indicated on the drawings, the requirements specified herein shall apply:

Remote mounted transmitters shall be installed below the process tap for liquids and condensing gasses, and above the process taps for gasses. No instrument (other than direct mounted gauges) shall be installed using the impulse piping, tubing, or electrical conduit connection for support or rigidity.

Instrument shall be mounted with a clearance from hot surfaces/systems of at least 2 (two) feet per 100-degree Fahrenheit (for equipment with surface temperature excess 200 degrees Fahrenheit).

Locally mounted instruments shall be mounted on the specified instrument stands or shall be suitably bracketed and surface mounted on the nearest suitable firm steelwork.

Surface mounting pressure gauges with blowout pressure release backs shall be mounted at least 20 mm away from the mounting plate by means of spacers.

All field instruments shall be rigidly supported using 2-inch pipe stanchions, brackets, etc. Instrument stands shall be generally fabricated as shown on the instrument installation details.

Instrument stands shall be attached to columns, building structural steel, or concrete. All instruments shall be supported to avoid stresses being put on the instrument by pneumatic, process, or signal connections.

Bracket, mounting, and stand materials shall be selected, or suitably insulated, to avoid galvanic corrosion and to be suitable for the ambient environment. Miscellaneous hardware including nuts, bolts, spring washers, etc., shall be 316 stainless steel. Standard sized fasteners, such as 0.2362 inches (M6) and 0.3937 inches (M10), shall be used. Alternate materials shall be used where appropriate for the ambient conditions (such as sea spray environments).

All pedestal mounts, support brackets, and general fixing materials shall be hot-dipped galvanized steel or stainless steel to suit the duty. Any cuts, holes, or welds made during installation shall be painted with a suitable galvanizing paint.

Galvanized steel is only acceptable where there is no possibility of the steelwork receiving splash or spray from caustic, acidic, or otherwise corrosive environments such as seawater. It must be suitable for all other chemical and environmental exposure in the area of use. Galvanizing shall be provided by a hot-dipped process; cold galvanized plating is not acceptable.

Brackets, supports, and other materials not already protected in an approved way shall be primed and painted in accordance with the painting specifications to withstand the environment.

Where necessary, electronic instrumentation shall be protected by sunshades to minimize the effects of sun and weather. These sunshades may be for individual instruments or, where appropriate, for several instruments grouped together. Alternatively, a complete area of process plant, (e.g., a mechanical package) may be protected by a shelter giving adequate protection without the need for specific instrument sunshades.

Welding, drilling, or any fixing operations shall not be carried out on process equipment, pipe work, or primary steel structure unless specifically indicated in the construction drawings.

Actuated valves, whether modulating or on-off type, will generally be provided with associated electric-to-pneumatic (E/P) positioners, filter regulators, solenoid valves (where applicable), etc., already piped and mounted on the valve/actuator assembly.

Solenoid valves, positioners, and control loop accessories not located in enclosures or mounted on valves shall be mounted in easily accessible, protected locations near the components with which they are associated. Precautions shall be taken to not install these devices in a location exposed to high heat. Solenoid valves shall not be supported merely by the tubing that they are attached to.

Instrument enclosures shall be mounted with clearance away from adjacent steel or equipment. Clearance shall be provided to allow opening of doors, equipment access, and for proper installation of tubing or pre-traced tube bundles (including pre-traced tube bundle bend radii).

Transmitters that are supplied with local indicators shall be installed so that the indicator is positioned to be easily read. Where necessary, indicator units on transmitters shall be field rotated as required.

Thermal elements that are to be installed in gas or air ducts shall be provided with structural supports as recommended by the manufacturer and as required to prevent excessive deflection of the elements because of their own weight, or to the flow of the gas or air within the ducts.

Individual transmitters or other instruments designated to be locally mounted shall be mounted on an instrument stand and upright, using the appropriate mounting components, approximately 4 feet 6 inches (1,350 mm) above floor level and approximately in the locations indicated on the drawings unless otherwise accepted by Purchaser. For instruments directly mounted to manifolds, the instrument manifold shall be mounted to the instrument stand via the factory supplied mounting bracket.

Transmitters fitted with vent and drain connections shall be mounted so that the vent connection is pointed upward, and the drain connection is pointed downwards.

Line mounted gauges shall be oriented, so the indicator is clearly visible from a nearby walkway or platform.

Panels shall be shimmed for proper alignment and bolted to their foundations or building structure as required. The panels shall be protected from damage during the construction period. Shipping crates modified to permit necessary access may be used for panel protection.

All pressure gauges shall be installed near the process connection, unless otherwise directed by Purchaser, and located where they may be easily read.

Level transmitters, level controllers, and level switches of the displacer or float type shall be installed on vessel instrument piping columns as indicated on the drawings. Topworks of transmitters, controllers, and switches shall be rotated to positions that provide convenient access for calibration, operation, and maintenance. Such work shall be accomplished before installation of tubing and wiring to the devices.

All thermometers shall be installed in the process line and adjusted for ease of reading. Thermocouples and RTDs shall be installed such that the tip touches the bottom of the well, unless noted otherwise.

Pressure switches shall be installed upright with the appropriate mounting hardware near the piping or duct to which they are connected and mounted to permit ease of adjustment.

Temperature switch thermowells and bulbs shall be installed in the process connection. The switches shall be located on an upright support, using the appropriate mounting hardware, and mounted to permit ease of adjustment. The connecting capillary tubing shall be guarded or continuously supported in tubing raceway to protect it from damage.

Any filled systems (temperature, pressure, level or flow devices with capillary tubing from the measuring element to the main instrument) shall be installed in such a manner that the capillary is not "kinked", broken, or otherwise made inoperable. Excess capillary tubing shall be coiled and adequately supported to provide protection from damage. Long lengths of capillary tubing shall be run from process tap to instrument within tube tray. Filled systems

shall never be cut to shorten the capillary length. Where possible, long capillary tubing runs should be protected from direct sunlight to minimize ambient expansion of the fill fluid, causing error in the measurements.

Prior to piping hydrotesting, any instruments which could be damaged (or have a shift in calibration) from the hydrotest pressure shall be isolated or removed from service.

3.5.3 <u>Connection of Equipment and Devices:</u>

3.5.3.1 Pressure Connection Piping and Tubing. Except as otherwise specified or indicated on the drawings, pressure connections between pressure gauges, transmitters, controllers, or pressure switches and the shutoff valve(s) on the main piping or equipment shall be made in accordance with the drawings and the Pipeline List.

Pressure instruments connected to steam lines shall be installed so that a condensate seal shall be formed. Preformed siphons or acceptable equivalent devices may also be used for applications where pressure instruments are mounted above the process connection, subject to approval of Purchaser. Loop seals shall normally be located near the main piping.

Pressure connecting piping and tubing shall slope continuously from the process connection to the instrument. A 1 inch or more per foot (25 mm per 300 mm) slope is preferred on all horizontal installations and where this is not possible, the slope shall never be less than 1/2 inch per foot (13 mm per 300 mm).

Connecting piping and tubing shall be adequately supported so that no pockets are formed in either the hot or cold positions. The preferred direction of slope is downward from process to instrument for steam and liquid piping and upward for gas and air piping. The direction of slope may be reversed by use of appropriate vents or drain connections, subject to approval of Purchaser. Condenser vacuum piping must slope continuously upward from process connection to instrument. Sloping of high static pressure connecting piping may be omitted, subject to the concurrence of Purchaser.

3.5.3.2 Flow Connection Piping and Tubing. Except as otherwise specified or indicated on the drawings, flow sensing connections between flow indicators, transmitters, controllers, or switches and the shutoff valve(s) on the main piping shall be made in accordance with the project drawings.

If condensing reservoirs are required by the meter design, the reservoirs shall be mounted horizontally at or above the elevation of the pressure taps, and both reservoirs shall be at the same elevation within a tolerance of 1/8 inch (3 mm). Support brackets shall be attached to the main line if required to ensure that the position of the reservoirs is accurately maintained. The design of any bracket attached to the main line shall be submitted for approval. Reservoirs shall be installed in accordance with ASME Performance Test Code PTC 19.5, Section 5, Article C.

Flow sensing connecting piping or tubing shall slope continuously from the pressure taps or reservoirs to the meter or flow transmitter, and all horizontal runs shall have a preferred slope of 1 inch or more per foot (25 mm per 300 mm) and where this is not possible, the slope shall never be less than 1/2 inch per foot (13mm per 300 mm). Connecting piping and tubing shall be adequately supported so that no pockets are formed in either the hot or cold positions. If piping or tubing runs are subject to freezing, the high- and low-pressure runs shall be installed so that both runs can be insulated and freeze protected as a single unit. The preferred direction of slope is downward from process to instrument for steam and liquid piping and upward for gas and air piping. The direction of slope of steam or liquid piping may be reversed by use of a vent valve and riser in each line at the system high point, if the static pressure at the high point is positive under all conditions of operation. The direction of slope of gas and air piping may be reversed by use of drain pots and drain valves at the system low point. However, any deviation for the Instrument Installation Details is subject to approval of Purchaser.

3.5.3.3 Level Instrument Piping and Tubing. Piping and tubing for pressure differential type level instruments of the manometric type shall be installed in accordance with the requirements specified above for flowmeters and in accordance with the Instrument Installation Details. Reservoirs or constant head chambers shall be installed at the specified elevation, and connecting piping from the vessel to the reservoir or constant

head chamber shall slope continuously without pockets to the vessel. The transmitter must be located below the low tap, unless diaphragm seals are used.

3.6 Electrical Startup, Testing, and Checkout:

3.6.1 General:

This section describes and defines general criteria which pertain to the startup, testing, and checkout work covered by these specifications. This work is in addition to testing activities required in other sections of this specification. The Contractor shall be responsible, as part of the base scope, for all labor and materials required to demonstrate that the electrical equipment has been installed correctly and functions properly. Functional testing shall include a demonstration that all major equipment installed can be operated in accordance with the design from local and remote stations, control loops and protective devices perform as designed, and other equipment operates in accordance with their specification. After such demonstration, the systems and components shall be turned over to the Purchaser. Upon acceptance of electrical completion, the Contractor shall provide standby craft labor to correct discrepancies found during initial operation on a time and material basis when requested by the Purchaser. Such standby craft labor shall not be utilized for completion of Contractor punch list items for work later identified as resulting from Contractor's lack of construction completion or Contractor's warranty work. Construction checkout of all electrical systems shall be provided by the Contractor subject to approval by the Purchaser. The scope of work extends to all equipment connected and/or installed under these specifications.

The Contractor test procedures and plans must meet NETA and IEEE standards for testing on Switchgear, Load Centers, MCCs, Wet and Dry Transformers, Relay Protection, and Circuit Breaker Testing, as well as Circuit Loop Checks and Control Loop Checks. The Contractor shall document all testing and inspections on Commissioning Test Forms (CTF) that will be supplied by the Engineer to document the testing. The Contractor shall supply to the Purchaser's Startup group their proposed Electrical and Instrumentation Testing procedures for review.

The following activities shall be performed as part of the equipment installation. The Contractor shall perform all mechanical and electrical work required to calibrate, check out, and make the equipment ready for service as required by these specifications.

The following activities shall be completed under these specifications:

Visual and mechanical inspection of equipment.

Mechanical adjustment and testing of all electrical equipment, as required, to assure proper mechanical functioning and operation.

All testing and reconnection necessary to obtain correct operation of the electrical equipment.

Loop verification of all control and instrumentation circuits, in accordance with the Circuit List, to confirm continuity of conductors and that conductors originate and terminate at the locations designated in the circuit list or on the drawings.

All mechanical adjustment necessary or recommended by the manufacturer of all Contractor-supplied or Purchaser-supplied electrical equipment being connected or installed.

Complete testing of the lighting and receptacle system, (including any welding receptacles added to the system) as applicable.

All cable and wiring tests in accordance with Section 3.3 are complete.

All circuit installation records in accordance with Section 3.3 are complete.

All instruments wired and calibrated, even if installed by others.

Verify all cables at termination points and all raceway/conduits have labels as directed by sections 3.3.3.5 and 3.4.3

Assistance shall be provided as required during trial operation and functional testing to correct installation deficiencies.

3.6.2 Equipment Checkout:

Preoperational checks and inspections shall be performed on all equipment as specified herein and in accordance with the equipment manufacturer's recommendations. A representative of the Contractor shall be present during the equipment checks. All field tests shall be witnessed by the Purchaser at the Purchaser's discretion.

Preoperational checks shall include, but not necessarily be limited to, the following:

Safety Equipment. All personnel safety items shall be installed. All bolting shall be securely tightened to the correct torque as recommended by the equipment manufacturer.

Motor Insulation. Motor insulation shall be meggered immediately before energization.

Instrumentation and Controls.

Interlock jumpers shall be removed.

Panel instrumentation shall be turned on.

Lighting and Receptacle Checkout. The Contractor shall test, check out, and energize the lights and receptacles furnished and installed under this Contract. Immediately before energizing a lighting or receptacle circuit, the Contractor shall make the following checks:

The transformer neutral supplying the source panelboard is solidly connected to ground.

The phase and neutral conductors to be energized are free from grounds.

All covers are on lighting fixtures, pull boxes, and junction boxes so exposed conductors will not be energized.

The ground conductor (if required) is solidly grounded.

After completing the pre-energization checks, the Contractor may energize the circuit under the direction of the Purchaser's startup equipment.

All metering, including panel meters and transducers, shall be calibrated to within the manufacturer's accuracy.

Panel instrumentation indicating lights, switches, and relays shall be adjusted and checked out as part of the checkout of the Contractor-installed electrical equipment. Electric metering for volts, watts, amperes, and other electrical quantity functions shall be checked out as described in this article and the following article.

Panel indicators shall initially be calibrated by simulating the electronic signal normally received by the indicator. The final calibration shall be performed using the actual transmitter, signal converter, or system output to be connected to the indicator. The transmitter-receiver combination shall be calibrated to read out accuracy tolerance no greater than twice the average tolerance of the individual devices throughout the range from 0 percent to 100 percent of total scale. In certain instances for specific equipment, the Purchaser will specify a range of interest. In these cases, the Contractor shall calibrate the transmitter-receiver combination to read exactly correct with the calibration standard being utilized, within the range of interest.

Electrical panel instrumentation shall be calibrated.

Unless specified otherwise, all meters shall be tested and calibrated with equipment of no more than 50 percent of the manufacturer's stated accuracy instrument being tested.

All meters shall be visually inspected for damage, and wiring connections shall be verified in accordance with the three-line diagrams.

Every instrument utilizing a plastic lens or window shall be given a static effect check. The static check shall consist of wiping the lens or window vigorously with a dry cloth of a type recommended by the manufacturer which will not harm the surface. If the needle or pointer holds up-scale or below zero set for more than 15 seconds, the surface of the lens or window shall be treated with a clear antistatic compound recommended by the manufacturer.

The Contractor shall verify that direct grounds do not exist on any dc or 480 volt powered systems. Should a ground be detected, the Contractor shall locate the ground source and inform the Purchaser.

Measurement of resistance to ground shall be made of all motors, switchgear, isolated phase bus, cable bus, panelboard bus, nonsegregated phase bus, and motor control center bus immediately prior to placing in service. Measurement of resistance will be with a line operated tester. Voltage of testing device shall be in accordance with the following table or the equipment manufacturer's recommendation, as directed by the Purchaser:

Equipment Voltage	**Voltage, dc**	**Test Current, max, mA**
480 volts	1000 volts	3
4.16 kV	2 kV	1
Above 4.16 kV	5 kV	1

Complete check of all field wiring shall be made after installation and connection to verify that field wiring is as indicated on the drawings and schematic wiring diagrams. Equipment jumpers as indicated on the schematics shall be checked.

Shielded cable ground check should be made after termination is complete using a volt-ohm meter to determine that each is grounded only at the points indicated on the drawings.

All instrument transformers, including bushing current transformers, shall be tested.

Ratio and polarity tests shall be performed on all instrument transformers. Current transformer ratio and polarity tests shall be voltage ratio tests using a digital voltmeter or current ratio tests using high current injection test equipment, as directed by the Engineer.

The external circuit for each current transformer shall be completely tested before the shorting devices are removed from the current transformer secondary terminals. The tests shall include the following:

Continuity check of the circuit external to the current transformer by application of current.

Phase check to verify correct phase relationship at each device connected in the current transformer circuit.

The Contractor shall verify in writing that all work and checkouts have been completed, and when the services of equipment manufacturer's field service representatives are specified, the Contractor shall include verification by such representatives that the equipment is ready for trial operation.

3.6.3 Corrected Drawings. The Contractor shall keep records of changes made to the following documents and provide the purchaser with red lined drawings at the end of construction:

Electrical schematic and wiring diagrams.

Electrical one-line and three-line diagrams.

Cable schedules.
Cable routings in raceway/ conduits as directed by sections 3.3.3.5 and 3.4.3

APPENDIX A – SITE PICTURES

FOR

CONTRACT NO. HU 2025-73

FLY ASH SILO

ELECTRICAL CONSTRUCTION

WHELAN ENERGY CENTER, UNIT I

CITY OF HASTINGS

HASTINGS, NEBRASKA

MCCI-E

SK1007
SK1007

DANGER
480 VOLTS
DANGER
480 VOLTS

APPENDIX B – DRAWINGS

FOR

CONTRACT NO. HU 2025-73

FLY ASH SILO

ELECTRICAL CONSTRUCTION

WHELAN ENERGY CENTER, UNIT I

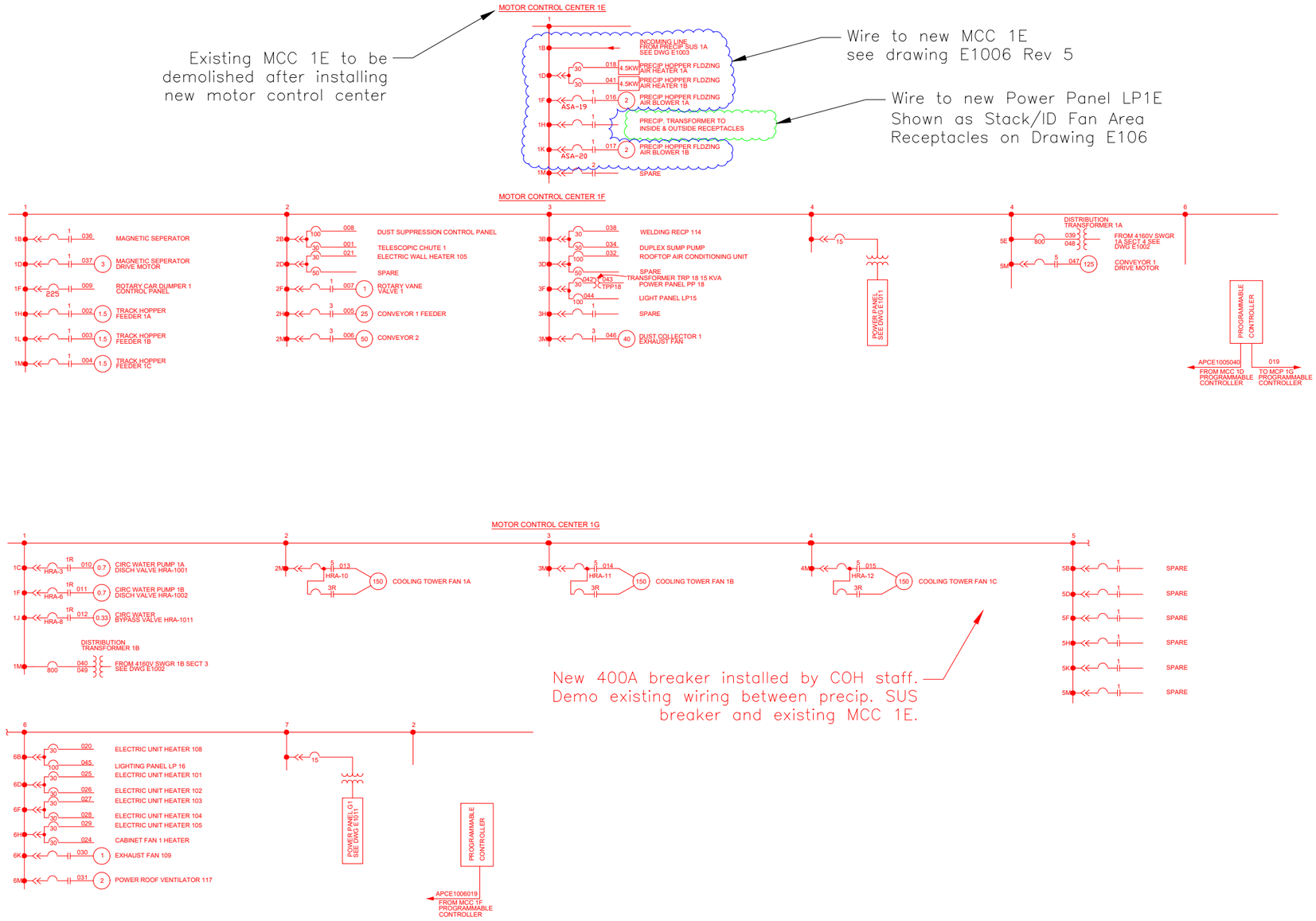
CITY OF HASTINGS

HASTINGS, NEBRASKA

Existing MCC 1E to be demolished after installing new motor control center

Wire to new MCC 1E see drawing E1006 Rev 5

Wire to new Power Panel LP1E Shown as Stack/ID Fan Area Receptacles on Drawing E106



New 400A breaker installed by COH staff. Demo existing wiring between precip. SUS breaker and existing MCC 1E.

NO	DATE	REVISIONS	DWN	CK	ACC	APP
5	8/04/25	UPDATED MCC 1E - 1H & 1K	BM			
4	1/22/14	AUTOCAD FORMAT	EK			
3	9/15/81	CONFORMED TO CONSTRUCTION REC.	GB	JJ	JJ	MN

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DATE _____ REG. NO. _____

BLACK & VEATCH
CONSULTING ENGINEERS

PROJECT 7677

CITY OF HASTINGS, NEBRASKA
WHELAN ENERGY CENTER UNIT 1

ONE - LINE
480 VOLT MCC 1E, 1F, AND 1G

B&V DWG NO. E1006

REV. 5

PGN-122A

No.	Revision	By	Date

HASTINGS UTILITIES

CITY OF HASTINGS ENGINEERING DEPT.

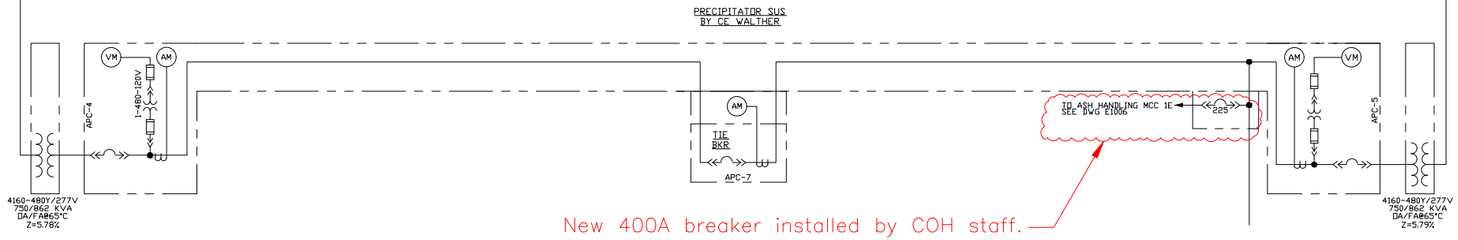
SCALE: N.T.S.	CONTRACTOR -	DRN. BY.	BWM
DATE: 7/15/25		APPRD. BY.	-

WEC1 FLY ASH SILO

ELECTRICAL DEMOLITION

DRG. NO. PT-333-07

480V SUS 1A & 1B
DELETED FROM THIS
DRAWING. FOUND ON
DWG
194294-1APC-E1101



New 400A breaker installed by COH staff.
Demo existing wiring between precip. SUS
breaker and existing MCC 1E.

NO	DATE	REVISIONS	DWN	CK	ACC	APP
8	1/22/23	REMOVED SUS 1A & 1B	DR			
7	1/4/19	4160 FEED ADDITION	TT			
6	9/29/15	UPDATE 2C, 6C, 7C, 8C	SH			
5	1/21/14	AUTOCAD FORMAT	EK			
4	9/15/81	CONFORMED TO CONST. RECORDS	GB	GB	JJ	MN
3	5/28/80	GENERAL REVISIONS	GB	JJ		
2	7/20/79	REVISED AS CIRCLED	JJ			

PGN-122A

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CONSULTING ENGINEERS
PROJECT
7677

CITY OF HASTINGS, NEBRASKA
WHELAN ENERGY CENTER UNIT 1

ONE - LINE
PRECIPITATOR SUS

B&V DWG NO. E1003
REV. 8

No.	Revision	By	Date

HASTINGS UTILITIES

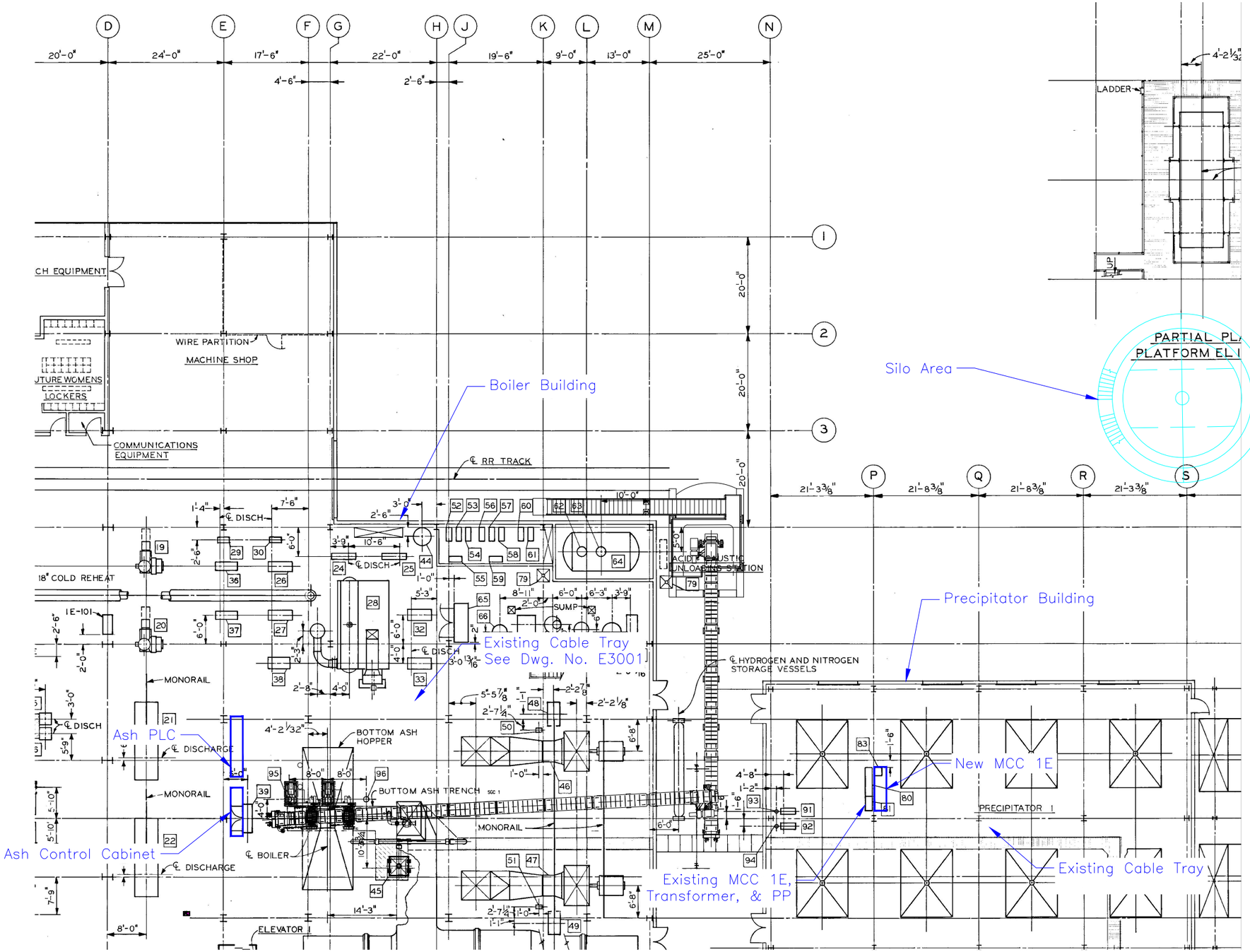
CITY OF HASTINGS ENGINEERING DEPT.

SCALE: N.T.S.	CONTRACTOR -	DRN. BY.	BWM
DATE: 7/15/25		APPRD. BY.	-

WEC1 FLY ASH SILO

ELECTRICAL DEMOLITION

DRG. NO. PT-333-08



No.	Revision	By	Date

HASTINGS UTILITIES

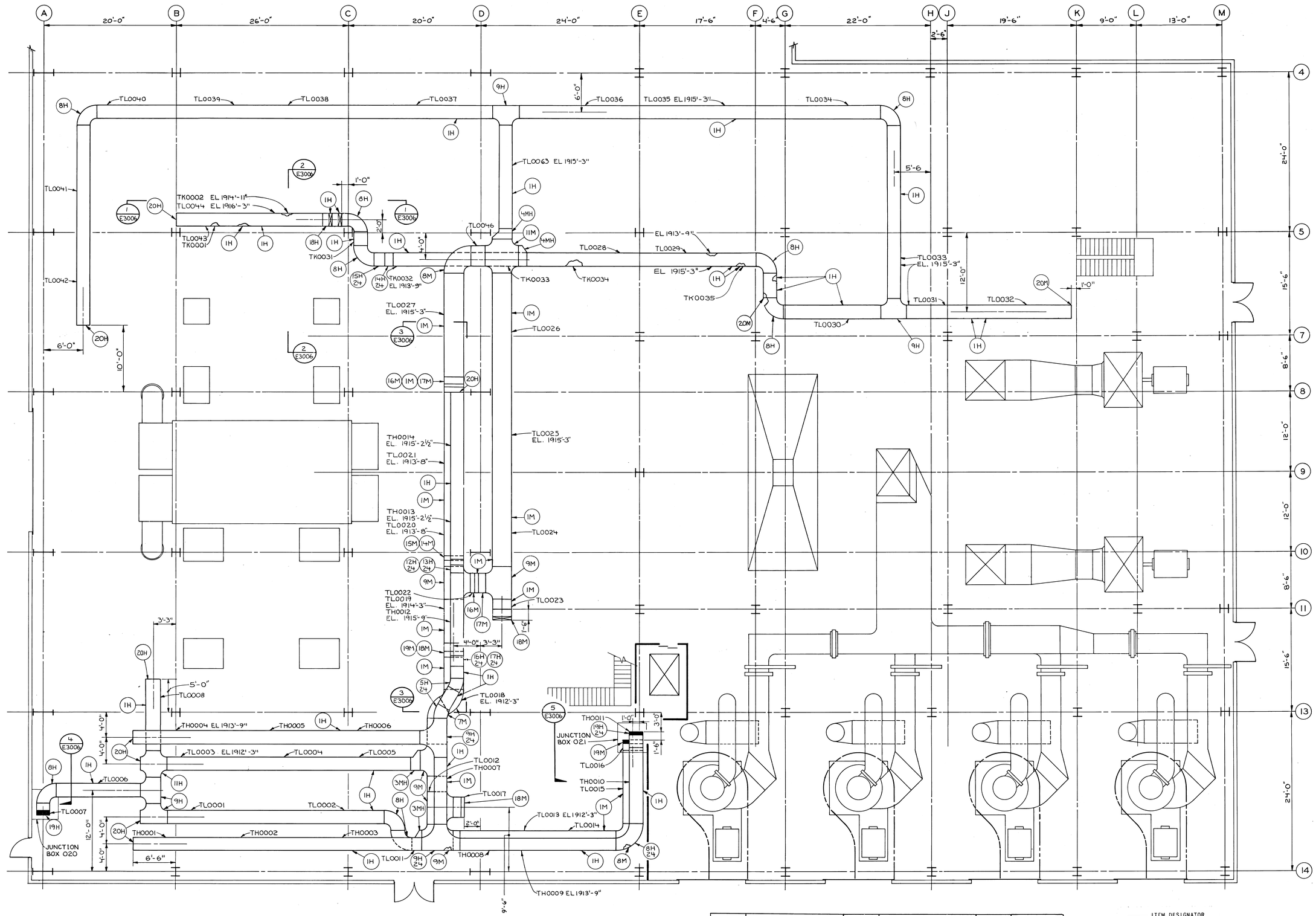
CITY OF HASTINGS ENGINEERING DEPT.

SCALE: N.T.S.	CONTRACTOR -	DRN. BY. BWM
DATE: 8/14/25		APPRD. BY. -

WEC1 FLY ASH SILO

ELECTRICAL ARRANGEMENT

DRG. NO. PT-333-09



ITEM DESIGNATOR	DESCRIPTION	ITEM DESIGNATOR	DESCRIPTION	TRAY SIZE DESIGNATOR	TRAY SIZE DEPTH x WIDTH
1	STRAIGHT				
2	STRAIGHT REDUCER	16	60° INSIDE VERTICAL ELBOW	A	3x6
3	LEFT HAND REDUCER	17	60° OUTSIDE VERTICAL ELBOW	B	6x6
4	RIGHT HAND REDUCER	18	90° INSIDE VERTICAL ELBOW	C	3x12
5	30° HORIZONTAL ELBOW	19	90° OUTSIDE VERTICAL ELBOW	D	6x12
6	45° HORIZONTAL ELBOW	20	BLIND END	E	3x18
7	60° HORIZONTAL ELBOW	21	DROPOUT	F	6x18
8	90° HORIZONTAL ELBOW	22	TRAY TO BOX CONNECTOR	G	3x24
9	HORIZONTAL TEE	23	CABLE HANGER ELBOW	H	6x24
10	VERTICAL TEE	24	SOLID COVER	J	3x30
11	HORIZONTAL CROSS	25	VENTILATED COVER	K	6x30
12	30° INSIDE VERTICAL ELBOW	26	SPECIAL FITTING (AS REQUIRED)	L	3x36
13	30° OUTSIDE VERTICAL ELBOW	27	SPECIAL FITTING (AS REQUIRED)	M	6x36
14	45° INSIDE VERTICAL ELBOW				
15	45° OUTSIDE VERTICAL ELBOW				

ITEM DESIGNATOR
TRAY SIZE DESIGNATOR
TRAY RADIUS SEE NOTE 1

NOTES:
1. ALL TRAY SHALL HAVE 12" RADIUS UNLESS OTHERWISE DESIGNATED.

NO	DATE	REVISIONS	DWN	CK	ACC	APP
3	7-9-79	REVISED AS CIRCLED	JJ			
2	4-10-79	ISSUED FOR CONST. SPEC. 73.0000	ML			
1	3-2-79	ISSUED FOR ADDUM II.	JS			
0	2-9-79	ISSUED FOR BID, SPEC 73.0000	ML			
5	9-15-81	CONFORMED TO CONSTRUCTION RECORDS	GB	GB	JJ	MN
4	9-22-80	REVISED AS CIRCLED	GB			

SCALE: 3/16" = 1'-0"

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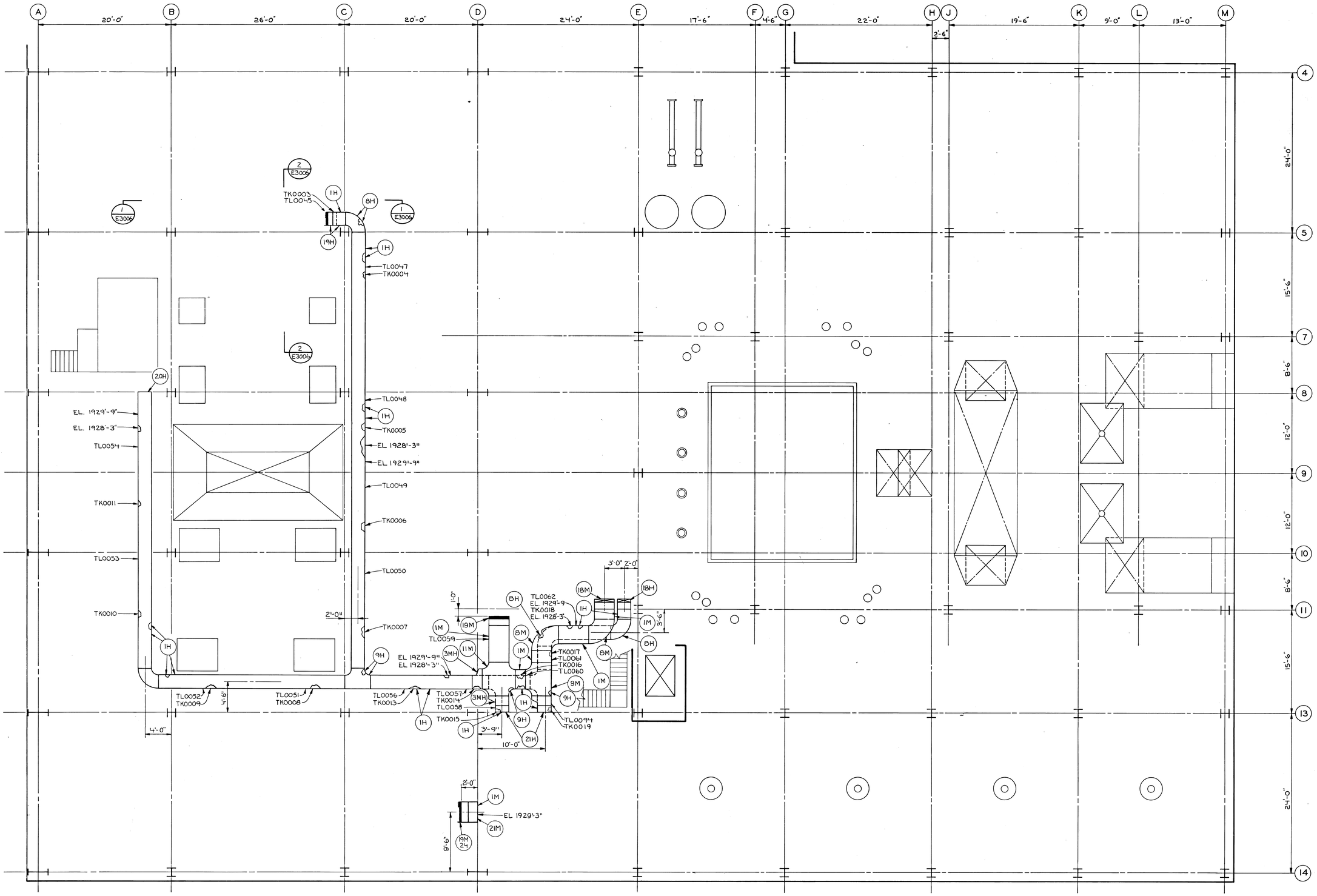
SIGNED
DATE REG. NO.

BLACK & VEATCH CONSULTING ENGINEERS
PROJECT 7677

CITY OF HASTINGS, NEBRASKA
HASTINGS ENERGY CENTER UNIT 1
RACEWAY - TRAY
GROUND FLOOR EL. 1902'-0"

B&V DWG NO. E3001 REV

FORM 222 A



ITEM DESIGNATOR	DESCRIPTION
1	STRAIGHT
2	STRAIGHT REDUCER
3	LEFT HAND REDUCER
4	RIGHT HAND REDUCER
5	30° HORIZONTAL ELBOW
6	45° HORIZONTAL ELBOW
7	60° HORIZONTAL ELBOW
8	90° HORIZONTAL ELBOW
9	HORIZONTAL TEE
10	VERTICAL TEE
11	HORIZONTAL CROSS
12	30° INSIDE VERTICAL ELBOW
13	30° OUTSIDE VERTICAL ELBOW
14	45° INSIDE VERTICAL ELBOW
15	45° OUTSIDE VERTICAL ELBOW

ITEM DESIGNATOR	DESCRIPTION
16	60° INSIDE VERTICAL ELBOW
17	60° OUTSIDE VERTICAL ELBOW
18	90° INSIDE VERTICAL ELBOW
19	90° OUTSIDE VERTICAL ELBOW
20	BLIND END
21	DROPOUT
22	TRAY TO BOX CONNECTOR
23	CABLE HANGER ELBOW
24	SOLID COVER
25	VENTILATED COVER
26	SPECIAL FITTING (AS REQUIRED)
27	SPECIAL FITTING (AS REQUIRED)

TRAY SIZE DESIGNATOR	TRAY SIZE DEPTH x WIDTH
A	3x6
B	6x6
C	3x12
D	6x12
E	3x18
F	6x18
G	3x24
H	6x24
J	3x30
K	6x30
L	3x36
M	6x36

ITEM DESIGNATOR
TRAY SIZE DESIGNATOR
22H 36
TRAY RADIUS SEE NOTE 1

NOTES:
1. ALL TRAY SHALL HAVE 12" RADIUS UNLESS OTHERWISE DESIGNATED.

NO	DATE	REVISIONS	DWN	CK	ACC	APP
3	9-15-81	CONFORMED TO CONSTRUCTION RECORDS	GB	GB	JJ	MN
2	7-9-79	REVISED AS CIRCLED	JJ			
1	4-10-79	ISSUED FOR CONSTRUCTION	[illegible]			
0	2-9-79	ISSUED FOR BID, SPEC 73.0000	[illegible]			

N

6' 4' 2' 0 5' 10'
SCALE: 3/16" = 1'-0"

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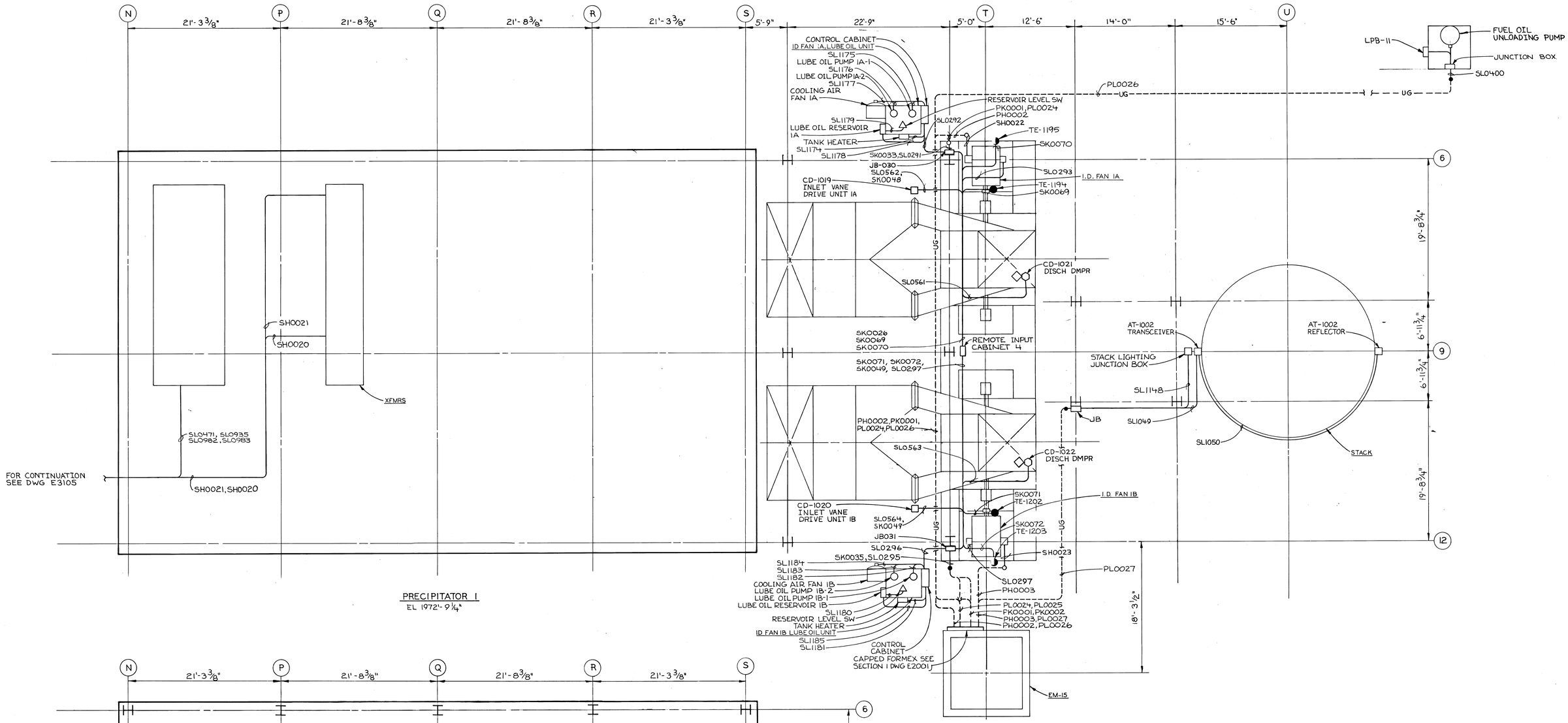
DATE REG. NO.

BLACK & VEATCH
CONSULTING ENGINEERS
PROJECT 7677

CITY OF HASTINGS, NEBRASKA
HASTINGS ENERGY CENTER UNIT 1
RACEWAY-TRAY
MEZZANINE FLOOR EL 1918'-0"

E3002 REV.

FORM 122 A



NO	DATE	REVISIONS	DWN	CK	ACC	APP
5	9-15-81	CONFORM TO CONSTRUCTION RECORDS	GB	GB	JJ	MN
4	9-22-80	REVISED AS CIRCLED	GB			
3	5-28-80	GENERAL REVISIONS	AZ	JJ		
2	11-16-79	REVISED AS CIRCLED	GB	JJ		
1	7-20-79	ISSUED FOR CONSTR SPEC 73.0000	JJ			
0	2-9-79	ISSUED FOR BID, SPEC 73.0000	KF			

SCALE: 3/16"=1'-0"

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SIGNED
DATE REG. NO.

BLACK & VEATCH CONSULTING ENGINEERS
PROJECT 7677

CITY OF HASTINGS, NEBRASKA
HASTINGS ENERGY CENTER UNIT 1
RACEWAY - CONDUIT
PRECIPITATOR AND I.D. FAN AREA

B&V DWG NO. E3113 REV. 5

FORM 122 A

POWER DISTRIBUTION PANEL "A" (480V. 3Ø. 60HZ) (RIGHT)

BUS BRACING 50,000 RMS SYM.

BUS DUCT "A"

480V 3Ø 4W

MAIN BREAKER NO. M2

1600A M2

1600A BUS

KEY INTERLOCK

0-600V

750 KVA = OA
862.5 KVA = FA

TO 125VDC POWER SUPPLY (BY CUSTOMER)

4160V FEEDER NO.1 (BY CUSTOMER)

4160V FEEDER NO.2 (BY CUSTOMER)

TO 125 VDC POWER SUPPLY (BY CUSTOMER)

TIE BREAKER NO. M3

1600A

750 KVA = OA
862.5 KVA = FA

TO 125VDC POWER SUPPLY (BY CUSTOMER)

480V 3Ø 4 WIRE

T.R. CONTROL PANEL

T.R. SET NO.1

T.R. SET NO.2

T.R. SET NO.3

T.R. SET NO.4

400 (FRAME) AMPS 150A TRIP 3P

ASH HANDLING FEEDER BREAKER NO.1

HOIST CONTROL PANEL

7½ HP HOIST

RAPPER CONTROL PANEL

⅓ HP DE RAPPER DRIVE (16 REQ'D)

¼ HP INLET RAPPER DRIVE (2 REQ'D)

¼ HP C.E. RAPPER DRIVE (8 REQ'D)

15 KVA 480Y/208-120V

120/208V LIGHTING PANEL (LOCATED IN CONT. HOUSE.)

TO VIBRATOR CONTROL PANEL

TO HOPPER HEATER CONTROL PANEL

SPARE

POWER DISTRIBUTION PANEL "B" (480V. 3Ø. 60HZ) (LEFT)

BUS BRACING 50,000 RMS. SYM.

BUS DUCT "B"

MAIN BREAKER NO M1

1600A M1

1600A BUS

KEY INTERLOCK

0-600V

1500 MA CONTROL PANEL 260 AMP, 119.5 KVA 460V, 1Ø (8-REQD)

1500 MA T.R. SET 460V, 1Ø, 60HZ 258 AMPS 119 KVA (TYP. FOR 8)

T.R. CONTROL PANEL

T.R. SET NO.5

T.R. SET NO.6

T.R. SET NO.7

T.R. SET NO.8

SPARE

ASH HANDLING FEEDER BREAKER NO.2

TO POWER DIST. PANEL-A

TO POWER DIST PANEL-A

HVAC

480/277 VAC LIGHTING PANEL

HOPPER VIBRATOR/ LEVEL CONTROL PANEL

HOPPER LEVEL INDICATOR (TYP. FOR 8) LI THRU LI 8

HOPPER VIBRATORS (16-REQ'D)

LOCATED IN HOPPER AREA

HOPPER HEATER CONTROL PANEL

DUAL ELEMENT THERMOSTAT (8 REQ'D)

OPENS @ 260°F

OPENS @ 230°F

HOPPER HEATERS (TYPICAL FOR 8)

125V DC POWER SUPPLY ANNUNCIATOR (BY CUSTOMER)

CONTROL ROOM CONTROL PANEL

THERO OPENS @ 215°F

OVERHEAT OPENS @ 400°F

1TAS

2TAS

1FLS AIR FLOW SWITCH

1PS & 3-6PS (5) REQ'D AIR PRESSURE

2PS FILTER AIR PRESSURE SWITCH

DAMPER

5 HP MAIN INSULATOR HEATER BLOWER

INSULATOR HEATERS 95 KW

5 HP SPARE INSULATOR HEATER BLOWER

480V 3Ø 4W

LEGEND —— INDICATES POWER WIRING
- - - - INDICATES CONTROL WIRING

NO EXCEPTIONS NOTED
EXCEPTIONS NOTED REVISE & RESUBMIT FOR DISTRIBUTION
RETURNED FOR CORRECTION
DEC 7 1931
REVIEW DOES NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS OR DEVIATIONS FROM CONTRACT REQUIREMENTS.
BLACK & VEATCH

CERTIFIED FOR CONSTRUCTION
C-E WALTHER, INC.
BY M.D. Hamby DATE 11-18-81

REV	DESCRIPTION	BY	DATE	APPR.	RE-VIEWED
E	CHG 2-11 FROM 100A TO 15A; CHG. 2-6 FROM 100A TO 30A REV BRK #1-7 FROM 100A TO 30A, CHG. #1-11 FROM 100 TO 15A,	TW	11 7 80		11/16/81
D	REV. PWR. DIST. PNL "A" & "B" MOVED CTL RM CTL PNL - REV CB. AMP RATINGS	BCR	01-18 80	TCW 1-18-80	
C	CHG. HOPPER THERM., CHG. HEATER BLOWER MTR. ADDED QTY. TO P.S. CHG LST. LI 400 NOTE	JJH	4-2-79	TCW 4-2-79	
B	ADD T.R. RATING & WATER GUARD	JJH	8/3/78		
A	REDRAWN	JJH	5/16/78	LHS	

REFERENCE DWGS.

TOLERANCES UNLESS OTHERWISE SPECIFIED	
FRACTION	±
DECIMAL	±
ANGULAR	±
SURFACE FIN. √ RMS.	

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED, ACCUMULATION OF TOLERANCES NOT PERMISSIBLE.

NEXT ASSY.

DRAWN BY J.J. HESTER 8/29/78

CHECKED BY W.R. BORDER 8/29/78

APPROVED BY 9/6/78

REVIEWED BY

REVIEWED BY

MODEL NO. 1P2C25D4F/12 X 40 X 64 (4@160)

C-E WALTHER, INC.
A SUBSIDIARY OF COMBUSTION ENGINEERING, INC.
BIRMINGHAM, ALABAMA

CUSTOMER CITY OF HASTINGS, NEBRASKA ENERGY CENTER UNIT #1

SCALE —

TITLE SINGLE LINE DIAGRAM

CONTRACT NO. EP; 6581-52

DWG. NO. 5-E1

REV E

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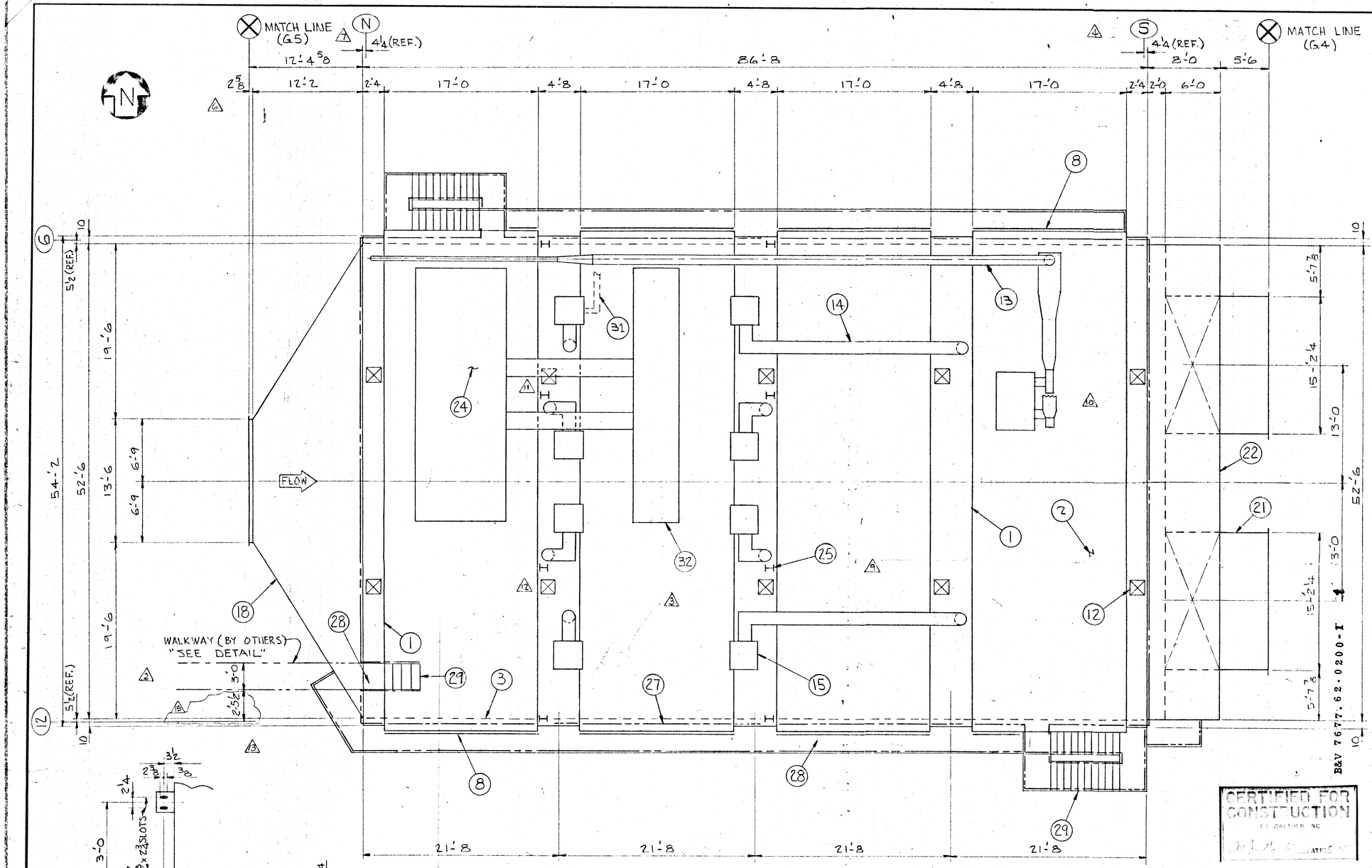
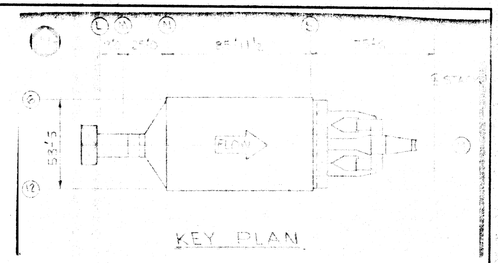


PLAN

WALKWAY DETAIL



EQUIPMENT LIST

ITEM NO.	ITEM	DESIGN DWG.	ERECTION DWG.
1	INS. COMP.	1D - SHELL	1E - SHELL
2	ROOF PR.		
3	SIDEWALL		
4	PPTR. HOPPER		
5	HEADWALL		
6	BEARING		
7	POKE PIPE		
8	ROOF DRAIN & DN. SPOUT	do	do
9	RAPPER DRIVE		2E- CE SYSTEM
10	RAPPER SHAFT		3E- DE SYSTEM
11	V BRATOR FOUND. PR.		4E - MISC.
12	ACCESS DOOR		
13	BLOWER SYS.		
14	H.V. SHIELD		do
15	T.R. SET		5E - ELECTRICAL
16	LEVEL ALARM		
17	HOPPER HEATER		do
18	INLET NOZZLE	25D - NOZZLE	25E - NOZZLE
19	INLET FLUE	27D - FLUES	27E - FLUES
20	FLUE HOPPER		
21	OUTLET FLUE	do	do
22	OUTLET PLENUM	28D - PLENUM	28E - PLENUM
23	EXP. JOINT		29E - EXP. JT.
24	CONTROL HOUSE	48D - CONT. HOUSE	
25	ENCLOSURE	49D - ENCLOSUEE	
26	EQ. LIFT DEVICE	50D - EQ. LIFT DEV.	50E - EQ. LIFT DEV.
27	HANDRAIL	51D - ACCESS	51E - ACCESS
28	PLATFORM		
29	STAIRS		
30	CAGED LADDER	do	do

NO EXCEPTIONS NOTED
EXCEPTIONS NOTED
REVISE & RESUBMIT FOR DISTRIBUTION
RETURNED FOR CORRECTION
JUL 26 1979
REVIEW DOES NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS OR DEVIATIONS FROM CONTRACT REQUIREMENTS.
BLACK & VEATCH

CERTIFIED FOR CONSTRUCTION
C-E WALTHER, INC.

RECEIVED
JUL 28 1979
BLACK & VEATCH
Hastings Energy Center

EQUIPMENT LIST CONT.

ITEM NO.	ITEM	DESIGN DWG.	ERECTION DWG.
31	PIPE DRIP PANS		4E - MISC.
32	SUBSTATION		5E-ELECTRICAL

REV.	DESCRIPTION	BY	DATE	APPR.	RE-VIEWED
C	13 14 REVISED DIM. ON WALKWAY	JLN	3-22-79	KR	
	12 16 RELOCATED ACCESS DOORS	PJS	5/14/79	KR	
	9 RELOCATED BLOWER SYS.				
D	15 REVISED DIMENSION	EDJ	6/5/79		
A	7 CHG'D. DIM. 8 CHG'D. TITLE; 4 CHG'D. COL. NO. 5 ADD DETAIL; 2 ADD WALKWAY. 3 ADD NO.; 1 ADD EQUIP. LIST.	JLN	8-1-78	JOB	

TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTION
DECIMAL
ANGULAR
SURFACE FIN. √ RMS.

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED. ACCUMULATION OF TOLERANCES NOT PERMISSIBLE.

NEXT ASSY.

	DATE
DRAWN BY	J.L. NORRIS 4-28-78
CHECKED BY	C.P.P. Kenney 5/9/79
APPROVED BY	[illegible] 5-22-79
REVIEWED BY	[illegible] 5-30-79
REVIEWED BY	[illegible] 7-19-79

MODEL NO. 1 P 2 C 25 [illegible] x 64 (4@16)

C-E WALTHER, INC.
A SUBSIDIARY OF COMBUSTION ENGINEERING, INC.
BIRMINGHAM, ALABAMA

CUSTOMER: HASTINGS ENERGY CENTER, UNIT 1 FOR CITY OF HASTINGS, NEBRASKA

SCALE: 3/16" = 1'-0

TITLE: PRECIPITATOR 1 — 8 PLAN

CONTRACT NO. EP-6587-52 | DWG. NO. G 1 | REV. D

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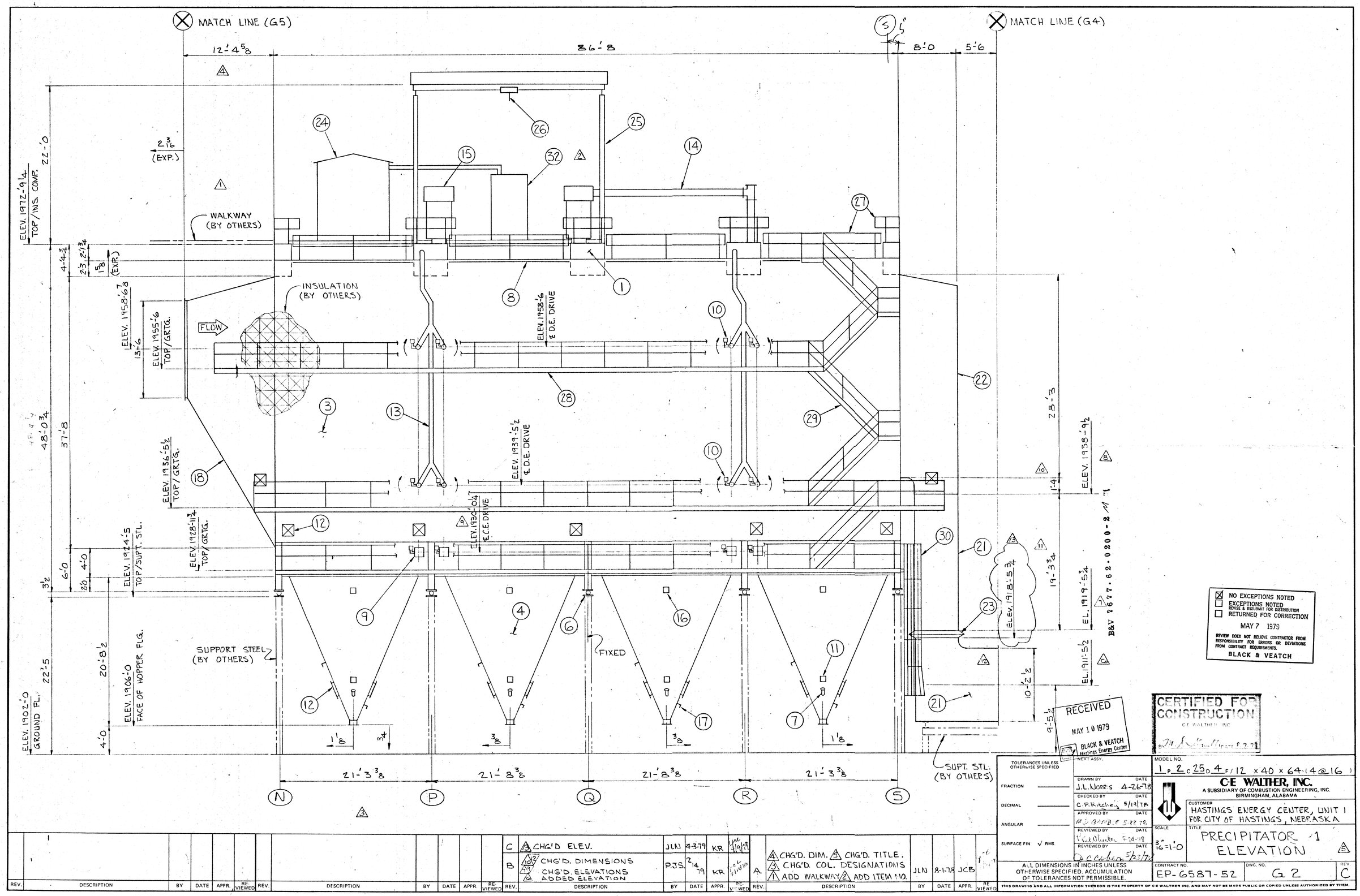

NO EXCEPTIONS NOTED
EXCEPTIONS NOTED
REVISE & RESUBMIT FOR DISTRIBUTION
RETURNED FOR CORRECTION
MAY 7 1979
REVIEW DOES NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS OR DEVIATIONS FROM CONTRACT REQUIREMENTS.
BLACK & VEATCH

RECEIVED
MAY 10 1979
BLACK & VEATCH
Hastings Energy Center

CERTIFIED FOR CONSTRUCTION
CE WALTHER INC
BY _____ DATE 5-23-79

REV.	DESCRIPTION	BY	DATE	APPR.	RE VIEWED
C	3 CHG'D ELEV.	JLN	4-3-79	KR	see 7/16/79
B	1 2 CHG'D. DIMENSIONS 3 4 CHG'D. ELEVATIONS 5 6 ADDED ELEVATION	PJS	2-14-79	KR	5/16/79
A	4 CHG'D. DIM. 5 CHG'D. TITLE. 3 CHG'D. COL. DESIGNATIONS 1 ADD WALKWAY 2 ADD ITEM NO.	JLN	8-1-78	JCB	

TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTION
DECIMAL
ANGULAR
SURFACE FIN √ RMS

NEXT ASSY.

		DATE
DRAWN BY	J.L. Norris	4-26-78
CHECKED BY	C.P. Richey	5/19/78
APPROVED BY	M.S. Smith	5-22-78
REVIEWED BY	Neil Wheeler	5-24-78
REVIEWED BY	D. Crocker	5/31/78

MODEL NO. 1P2C25D4F/12 x 40 x 64-14@16

C-E WALTHER, INC.
A SUBSIDIARY OF COMBUSTION ENGINEERING, INC.
BIRMINGHAM, ALABAMA

CUSTOMER: HASTINGS ENERGY CENTER, UNIT 1 FOR CITY OF HASTINGS, NEBRASKA

SCALE: 3/16"=1'-0

TITLE: PRECIPITATOR -1 ELEVATION

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED. ACCUMULATION OF TOLERANCES NOT PERMISSIBLE.

CONTRACT NO. EP-6587-52

DWG. NO. G2

REV. C

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ELECTRICAL SYMBOL LEGEND

POWER DEVICES

- DUPLEX RECEPTACLE; MOUNT AT 18" TO CENTER OF DEVICE AFF UNLESS OTHERWISE NOTED.
- SINGLE RECEPTACLE; MOUNT AT 18" TO CENTER OF DEVICE AFF UNLESS OTHERWISE NOTED.
- FOUR PLEX RECEPTACLE; MOUNT AT 18" TO CENTER OF DEVICE AFF UNLESS OTHERWISE NOTED.
- DUPLEX RECEPTACLE; DEVICE MOUNTED 6" ABOVE COUNTER
- HORIZONTAL DUPLEX RECEPTACLE
- GFI GROUND FAULT INTERRUPTER DUPLEX RECEPTACLE
- WP WATERPROOF RECEPTACLE
- IG ISOLATED GROUND RECEPTACLE
- SPECIAL-PURPOSE OUTLET. LETTER DESIGNATES TYPE, SEE SPECIAL CONNECTION SCHEDULE FOR REQUIREMENTS
- DUPLEX RECEPTACLE; PEDESTAL MOUNTED
- DUPLEX RECEPTACLE. ON EMERGENCY CIRCUIT
- FOUR PLEX RECEPTACLE. ON EMERGENCY CIRCUIT
- DUPLEX RECEPTACLE; SOLID FILL DESIGNATES WHICH RECEPTACLE IS TO BE SWITCHED.
- 220V RECEPTACLE
- J WALL MOUNTED JUNCTION BOX
- J CEILING MOUNTED JUNCTION BOX
- J FLOOR MOUNTED JUNCTION BOX
- SURFACE RACEWAY WITH OUTLETS AS INDICATED ON PLANS,MOUNTED AT 18" TO CENTER OF DEVICE AFF UNLESS OTHERWISE NOTED
- FLOOR MOUNTED DUPLEX RECEPTACLE
- FLOOR MOUNTED FOUR PLEX RECEPTACLE
- CEILING MOUNTED DUPLEX RECEPTACLE
- CEILING MOUNTED FOUR PLEX RECEPTACLE
- ELECTRICAL DISTRIBUTION PANEL
- RECESSED MOUNTED ELECTRICAL PANEL
- SURFACE MOUNTED ELECTRICAL PANEL
- T ELECTRICAL POWER TRANSFORMER
- FUSED DISCONNECT SWITCH
- NON-FUSED DISCONNECT SWITCH
- COMBINATION MAGNETIC STARTER AND DISCONNECT SWITCH
- STARTER/MOTOR CONTROLLER
- ELECTICAL MOTOR - SINGLE PHASE
- ELECTRICAL MOTOR - THREE PHASE
- R RELAY
- B BATTERY PACK
- MOTORIZED DAMPER

LIGHTING

- CEILING MOUNTED OR RECESSED LIGHT FIXTURE; LABEL INDICATES FIXTURE TYPE
- PENDANT MOUNTED LIGHT FIXTURE; LABEL INDICATES FIXTURE TYPE
- WALL MOUNTED LIGHT FIXTURE; LABEL INDICATES FIXTURE TYPE
- 2'x4' FLUORESCENT LIGHT FIXTURE; LABEL INDICATES FIXTURE TYPE
- 2'x2' FLUORESCENT LIGHT FIXTURE; LABEL INDICATES FIXTURE TYPE
- 1'x4' TYPICAL CEILING MOUNTED FLUORESCENT FIXTURE; LABEL INDICATES FIXTURE TYPE
- 1'x4' TYPICAL PENDANT MOUNTED FLUORESCENT FIXTURE; LABEL INDICATES FIXTURE TYPE
- 1'x4' TYPICAL WALL MOUNTED FLUORESCENT FIXTURE; LABEL INDICATES FIXTURE TYPE
- 1'x2' TYPICAL WALL MOUNTED FLUORESCENT FIXTURE; LABEL INDICATES FIXTURE TYPE
- FLUORESCENT INDUSTRIAL STRIP LIGHT FIXTURE; LABEL INDICATES FIXTURE TYPE
- FLUORESCENT STRIP LIGHT FIXTURE; LABEL INDICATES FIXTURE TYPE
- FLUORESCENT UNDER CABINET FIXTURE; LABEL INDICATES FIXTURE TYPE
- 2'x4' TYPICAL FLUORESCENT FIXTURE - NORMAL/EMERGENCY
- 2'x2' TYPICAL FLUORESCENT FIXTURE - NORMAL/EMERGENCY
- 1'x4' TYPICAL CEILING MOUNTED FLUORESCENT FIXTURE - NORMAL/EMERGENCY
- CEILING MOUNTED OR RECESSED TYPICAL FIXTURE - NORMAL/EMERGENCY
- BRANCH CIRCUIT WIRING CONCEALED IN WALLS OR CEILING
- BRANCH CIRCUIT WIRING CONCEALED IN WALLS OR CEILING
- OS CEILING OR WALL-MOUNTED OCCUPANCY SENSOR
- PC CEILING OR WALL-MOUNTED PHOTO CELL
- DOUBLE FACED CEILING OR WALL-MOUNTED, EXIT SIGN WITH EMERGENCY POWER BACK UP.
- SINGLE FACED CEILING OR WALL MOUNTED, EXIT SIGN WITH EMERGENCY POWER BACK UP.
- COMBINATION EXIT AND EMERGENCY LIGHT
- DIRECTION ARROW FOR EMERGENCY LIGHT
- CEILING OR WALL MOUNTED, SELF-CONTAINED EMERGENCY LIGHT UNIT; FIXTURE SHALL MONITOR LIGHTING CIRCUIT IN AREA.
- $ SINGLE-POLE SWITCH
- $2 DOUBLE-POLE SWITCH
- $3 3-WAY SWITCH
- $4 4-WAY SWITCH
- $P SINGLE-POLE SWITCH AND PILOT LIGHT
- $TE SINGLE POLE MANUAL MOTOR STARTER WITH THERMAL ELEMENT
- $D SINGLE-POLE DIMMER SWITCH
- $K SINGLE-POLE KEYED SWITCH
- $L LOW VOLTAGE SWITCH
- $F FAN SWITCH
- $M MOMENTARY CONTACT SWITCH
- PUSHBUTTON SWITCH
- COMBINATION PUSHBUTTON SWITCH
- MUSHROOM EMERGENCY SHUT-OFF SWITCH.
- LC LIGHTING CONTACTOR
- TC TIME CLOCK, AS INDICATED ON PLANS

SPECIAL SYSTEMS

- DATA/TELEPHONE OUTLET, FLOOR MOUNTED
- COMBINATION DATA/TELEPHONE OUTLET
- TELEPHONE
- DATA OUTLET; NUMBER INDICATES QUANTITY, BLANK INDICATES SINGLE OUTLET. MOUNTED AT 18" TO CENTER OF DEVICE AFF UNLESS OTHERWISE NOTED.
- DATA, CEILING MOUNTED
- DATA, FLOOR MOUNTED
- TV TELEVISION OUTLET, CEILING MOUNTED
- TV TELEVISION CABLE OUTLET; MOUNT AT 18" TO CENTER OF DEVICE AFF UNLESS OTHERWISE NOTED
- WAP WIRELESS ACCESS POINT, CEILING MOUNTED
- FB MULTI-OUTLET FLOOR BOX, SEE FLOOR BOX SCHEDULE FOR REQUIREMENTS.
- S SPEAKER, WALL MOUNTED
- S SPEAKER, CEILING MOUNTED
- E ELECTRIC VALVE
- I INSTRUMENT DEVICE
- IS INTERIOR SIREN ALARM
- C CLOCK, WALL MOUNTED
- C CLOCK, CEILING MOUNTED
- CABLE TRAY
- GROUND BAR

FIRE ALARM

- M MAGNETIC DOOR HOLD DEVICE
- FS SPRINKLER FLOW SWITCH
- TS SPRINKLER TAMPER SWITCH
- EXTERIOR REMOTE FLASHING STROBE LIGHT
- F MANUAL PULL STATION; MOUNT ACCORDING TO MOUNTING HEIGHT DETAIL AT 46" TO CENTER OF DEVICE AFF. ADA COMPLIANT
- F HORN & STROBE; MOUNT SO BOTTOM OF DEVICE IS AT 80" AFF UNNLESS OTHERWISE NOTED. ADA COMPLIANT
- F STROBE; MOUNT SO BOTTOM OF DEVICE IS AT 80" AFF UNLESS OTHERWISE NOTED. ADA COMPLIANT
- F SPEAKER & STROBE; MOUNT SO BOTTOM OF DEVICE IS AT 80" AFF UNNLESS OTHERWISE NOTED. ADA COMPLIANT
- FIRE ALARM VOICE WALL MOUNT SPEAKER
- FIRE ALARM VOICE CEILING MOUNT SPEAKER
- SMOKE DETECTOR
- DUCT MOUNTED SMOKE DETECTOR
- HD THERMAL HEAT DETECTOR
- PIV POST INDICATOR VALVE
- BELL
- R SHUTDOWN RELAY WITH REMOTE TEST SWITCH
- R SHUTDOWN RELAY AND TEST SWITCH
- FACP FIRE ALARM CONTROL PANEL
- RAP REMOTE ANNUNCIATOR PANEL
- SMOKE DAMPER
- FIRE DAMPER
- COMBINATION FIRE AND SMOKE DAMPER

SECURITY DEVICES

- DCM DOOR CONTROL MODULE
- ACP ACCESS CONTROL PANEL
- ES ELECTRIC DOOR STRIKER
- VIDEO CAMERA, WITH MOUNTING HARDWARE
- VM VIDEO MONITOR
- VR VIDEO RECORDER
- ML ELECTRIC MAGNETIC LOCK
- CL ELECTRIC CYLINDER LOCK
- CR CARD READER
- REX REQUEST TO EXIT
- DOOR CONTACT - RECESSED
- DOOR CONTACT - SURFACE MOUNT
- M MOTION DETECTOR, CEILING MOUNTED
- M MOTION DETECTOR, WALL MOUNTED
- EMERGENCY DOOR RELEASE BUTTON
- PANIC BUTTON
- SECURITY BUZZER HORN
- INTERCOM SUBSTATION
- INTERCOM SUBSTATION WITH CAMERA
- INTERCOM MASTER STATION
- GLASS BREAK SENSOR
- POWER TRANSFER HINGE

ABBREVIATIONS/MODIFIERS

(X)	SHEET NOTE TAG, LABEL INDICATES NOTE NUMBER
*	ABOVE COUNTER
A	AMPERE
AD	AUTOMATIC DAMPER
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AFCI	ARC FAULT CIRCUIT INTERUPTER
ATS	AUTOMATIC TRANSFER SWITCH
C	CONDUIT
C/B	CIRCUIT BREAKER
CIR	CIRCUIT
CUH	CABINET UNIT HEATER
E	EXISTING DEVICES TO REMAIN
EF	EXHAUST FAN
EMT	ELECTRIC METALLIC TUBING
ER	NEW LOCATION OF EXISTING RELOCATED
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
FA	FIRE ALARM
FB	FLOOR BOX
FMC	FLEXIBLE METALLIC TUBING
GFI	GROUND FAULT INTERRUPTER
HD	HAND DRYER
IG	ISOLATED GROUND
MAU	MAKE-UP AIR UNIT
MD	MOTORIZED DAMPER
NF	NON-FUSED
NL	NIGHT LIGHT
NR	NEW TO REPLACE EXISTING
P	POLE
PE	PRIMARY ELECTRIC SERVICE
PTD	ELECTRIC PAPER TOWEL DISPENSER
PVC	POLYVINYL CHLORIDE CONDUIT
RE	REMOVE EXISTING
REF	ROOF EXHAUST FAN
RL	RELOCATE EXISTING
RMC	RIGID METALLIC CONDUIT
RR	REMOVE AND REPLACE ON NEW SURFACE
RTU	ROOFTOP UNIT
SD	SMOKE DAMPER
SE	SECONDARY ELECTRIC SERVICE
S&P	SPACE AND PROVISION
T	TELEPHONE SERVICE
TCP	TEMPERATURE CONTROL PANEL
TP	TAMPER PROOF
TV	TELEVISION
UGE	UNDERGROUND ELECTRICAL
VFC	VARIABLE FREQUENCY CONTROLLER
VFD	VARIABLE FREQUENCY DRIVE
W	WIRE
WG	WIRE GUARD
WP	WEATHERPROOF
XFMR	TRANSFORMER

GENERAL NOTES:

A. ALL SYMBOLS & ABBREVIATIONS ARE TYPICAL AND MAY NOT APPLY TO THIS PROJECT.

B. CIRCUITING SHOWN IS DIAGRAMMATIC ONLY. EXACT ROUTING MAY CARRY AND MAY REQUIRE ADDITIONAL J-BOXES AND/OR SPECIAL FITTINGS.

C. FIELD VERIFY EXISTING CONDITIONS.

D. ALL EMPTY CONDUITS INDICATED SHALL BE FURNISHED AND INSTALLED WITH PULLWIRES, INSULATED BUSHINGS ON EACH END AND HAVE IDENTIFICATION FLAG AT EACH END LABELED FOR INTENDED USE.

E. ALL ELECTRICAL PENETRATIONS THROUGH CONCRETE SHALL BE SPACED TO HAVE A MINIMUM OF 3" OF CONCRETE ON ALL SIDES.

F. WHERE DEVICES OR POWER ROUGH-IN IS SHOWN TO BE INSTALLED IN A MASONRY WALL, PROVIDE MASONRY BOXES AND INSTALL CONDUIT WITHIN WALL. COORDINATE WITH CONTRACTOR.

G. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AS REQUIRED BY LOCAL JURISDICTION.

H. CONTRACTOR SHALL GUARANTEE ALL EQUIPMENT, ACCESSORIES, AND MATERIAL FURNISHED BY HIM FOR A PERIOD OF ONE YEAR FROM FINAL ACCEPTANCE AGAINST ALL DEFECTS.

I. ALL WIRING SHALL BE INSTALLED IN CONDUIT.

J. ALL POWER CIRCUITS SHALL HAVE AN EQUIPMENT GROUND CONDUCTOR.

K. ALL RECEPTACLES SHALL BE AT 18" AFF TO CENTERLINE UNLESS NOTED OTHERWISE.

L. VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING BID. NO ADDITIONAL FEES WILL BE PAID DUE TO UNANTICIPATED EXISTING CONDITIONS.

M. COORDINATE ALL SCHEDULING, ELEVATIONS, SIZES, QUANTITIES, AND ROUTING OF WORK WITH OWNER AND OTHER TRADES.

N. FIELD VERIFY SIZE, LOCATION, ELEVATION AND QUANTITY OF ALL ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PIPING EQUIPMENT AND COMPONENTS THAT MAY IMPACT IMPLEMENTATION OF THIS WORK.

O. PROVIDE CIRCUIT # AND PANEL LABELING ON ALL DEVICES. ALL PANELBOARDS SHALL BE PROVIDED WITH AN UPDATED TYPED CIRCUIT DIRECTORY WITH CIRCUIT NUMBER AND EQUIPMENT SERVED. ALL LABELING TO BE STENCILED ADHESIVE ON RECEPTACLES, SWITCHES, OR EQUIPMENT TERMINATIONS.

P. ALL DISCONNECT SWITCHES SHALL BE HEAVY DUTY HP RATED SAFETY SWITCHES WITH NEMA RATINGS AS SHOWN IN THE DRAWINGS OR SPECIFICATIONS.

Q. ALL CONDUIT STUBS SHALL BE TERMINATED WITH BUSHINGS.

R. EXTERIOR RECEPTACLES SHALL BE GFCI TYPE, INSTALLED IN WEATHERPROOF BOXES WITH "WHILE-IN-USE" COVERS.

S. RECEPTACLES PROVIDED SHALL BE DUPLEX NEMA 5-20R UNLESS OTHERWISE NOTED.

T. WHERE A DEVICE IS TO BE MOUNTED ON A BLOCK OR CONCRETE WALL, PROVIDE SURFACE MOUNTED BOX AND RACEWAY (UNLESS INDICATED OTHERWISE).

U. ALL WIRING TO BE CONTINUOUS WITHOUT SPLICES UNLESS OTHERWISE NOTED.

V. POWER AND CONTROL WIRING SHALL NOT BE RUN IN SAME CONDUIT.

olsson

2111 South 67th Street
Suite 200
Omaha, NE 68106

olsson.com
TEL 402.341.1116
FAX 402.341.5895

Olsson - Engineering
Nebraska COA #CA-0638

PROFESSIONAL ELECTRICAL & COMPUTER ENGINEER
NATHAN A. MILLER
E-12967
06/11/2025
STATE OF NEBRASKA

REV. NO.	DATE	DESCRIPTION
0	06-10-2025	ISSUED FOR CONSTRUCTION

REVISIONS

GENERAL NOTES AND DETAILS

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA

2025

drawn by: ACE
designed by: NAM
project no.: 024-07087
date: 06-10-2025

SHEET
E100

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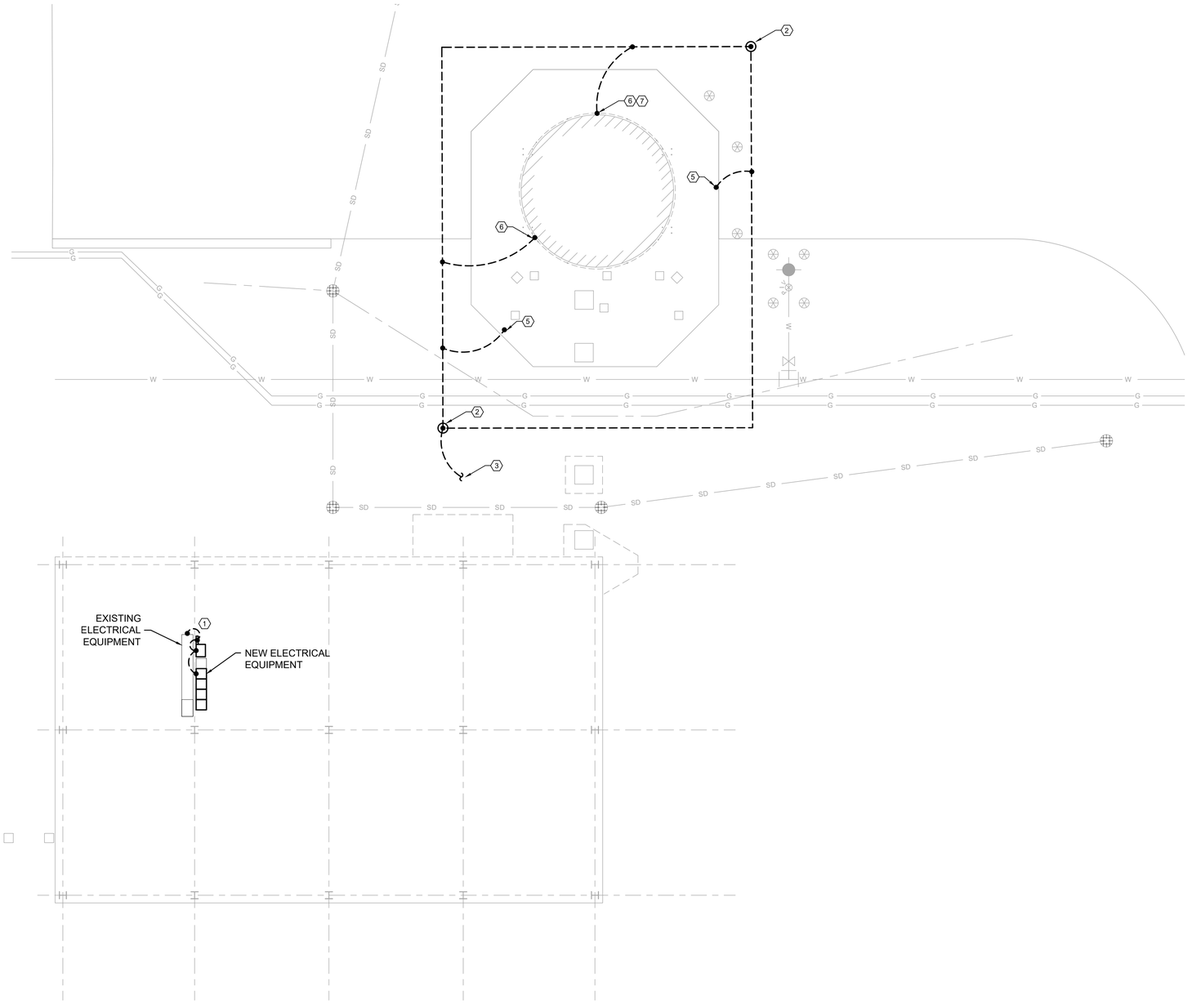
DATE: Jun 11, 2025 11:16am USER: chayes



1 SITE GROUDING PLAN

SCALE: 1" = 10'

GENERAL NOTES:

A. PER FEDERAL, STATE, AND LOCAL STATUTES, NOTIFY NEBRASKA ONE-CALL SYSTEM IN. PRIOR TO ANY DIGGING, TRENCHING, EXCAVATION, ETC.

B. INFORMATION SHOWN ON THIS DRAWING CONCERNING TYPE AND LOCATION OF UNDERGROUND AND OTHER UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING DETERMINATION AS TO TYPE AND LOCATION OF SAME AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.

C. IF WIRING DEVIATES SIGNIFICANTLY FROM THE LAYOUT ON THE PLANS, ACCOUNT FOR MORE VOLTAGE DROP BY INCREASING THE CONDUCTOR SIZE BY A FACTOR OF ONE SIZE AND THE GROUND WIRE PROPORTIONALLY PER CODE.

D. ALL WIRING SHALL BE ALLOWED TO BE IN PVC CONDUIT WHERE NOT LOCATED BELOW A TRAFFIC DRIVE AREA. TRANSITION TO STEEL AT ELBOW PRIOR TO GOING ABOVE GRADE. USE RIGID STEEL CONDUIT BELOW ALL TRAFFIC AREAS AND TRANSITION MATERIALS ACCORDINGLY.

E. COORDINATE ALL NEW PRIMARY SERVICE WORK, OUTAGES, PAD REQUIREMENTS, ETC. WITH UTILITY COMPANY FOR EXACT INSTALLATION REQUIREMENTS.

F. ALL TRENCHING, BACKFILL, AND CONDUIT SHALL BE PROVIDED AS REQUIRED FOR ALL PRIMARY AND SECONDARY SERVICE WORK. COORDINATE EXACT REQUIREMENTS WITH UTILITY AS PART OF THIS CONTRACT WORK.

G. TEST GROUND SYSTEMS ONLY WHEN EARTH IS DRY. MEASUREMENTS WILL INCLUDE EARTH RESISTIVITY AND RESISTANCE OF ELECTRODES AND GROUNDING SYSTEM. WHERE RESISTANCE IS GREATER THAN 5 OHMS, CONTRACTOR SHALL INVESTIGATE AND CORRECT ANY INSTALLATION DEFICIENCIES WHICH WOULD CAUSE THE MEASURMENTS TO BE POOR. RETEST SYSTEMS QUARTERLY TO VERIFY 5 OHM RESISTANCE IS MAINTAINED. INCLUDE ALL TESTING IN CONTRACT.

SHEET NOTES:

1. TIE-IN NEW ELECTRICAL EQUIPMENT GROUNDING SYSTEM INTO EXISTING ELECTRICAL EQUIPMENT.
2. PROVIDE COPPER CLAD GROUND ROD IN ACCORDANCE TO THE NEC.
3. TIE-IN NEW GROUNDING SYSTEM TO EXISTING GROUND GRID.
4. NEW 2/0 COPPER GROUND RING AROUND STRUCTURE. THE GROUND RING SHALL BE BURIED AT A DEPTH OF NO LESS THAN 30" BELOW THE EARTH'S SURFACE.
5. TIE-IN 2/0 BARE GROUND CONDUCTOR TO LOWEST HORIZONTAL REBAR IN SLAB. CONTRACTOR TO CONFIRM REBAR SIZE BEFOER MAKING GROUND CONNECTION.
6. CONNECT 2/0 BARE GROUND WIRE TO SILO ANCHOR BOLT WITH A SINGLE HOLE LUG CONNECTOR OR OWNER APPROVED EQUAL.
7. CONNECT 2/0 BARE GROUND WIRE TO STAIR TOWER

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E-12967
06/11/2025
STATE OF NEBRASKA

REVISIONS

REV. NO.	DATE	DESCRIPTION
0	06-10-2025	ISSUED FOR CONSTRUCTION

ELECTRICAL SITE GROUNDING PLAN

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA

2025

drawn by: ACE
designed by: NAM
project no.: 024-07087
date: 06-10-2025

SHEET
E101

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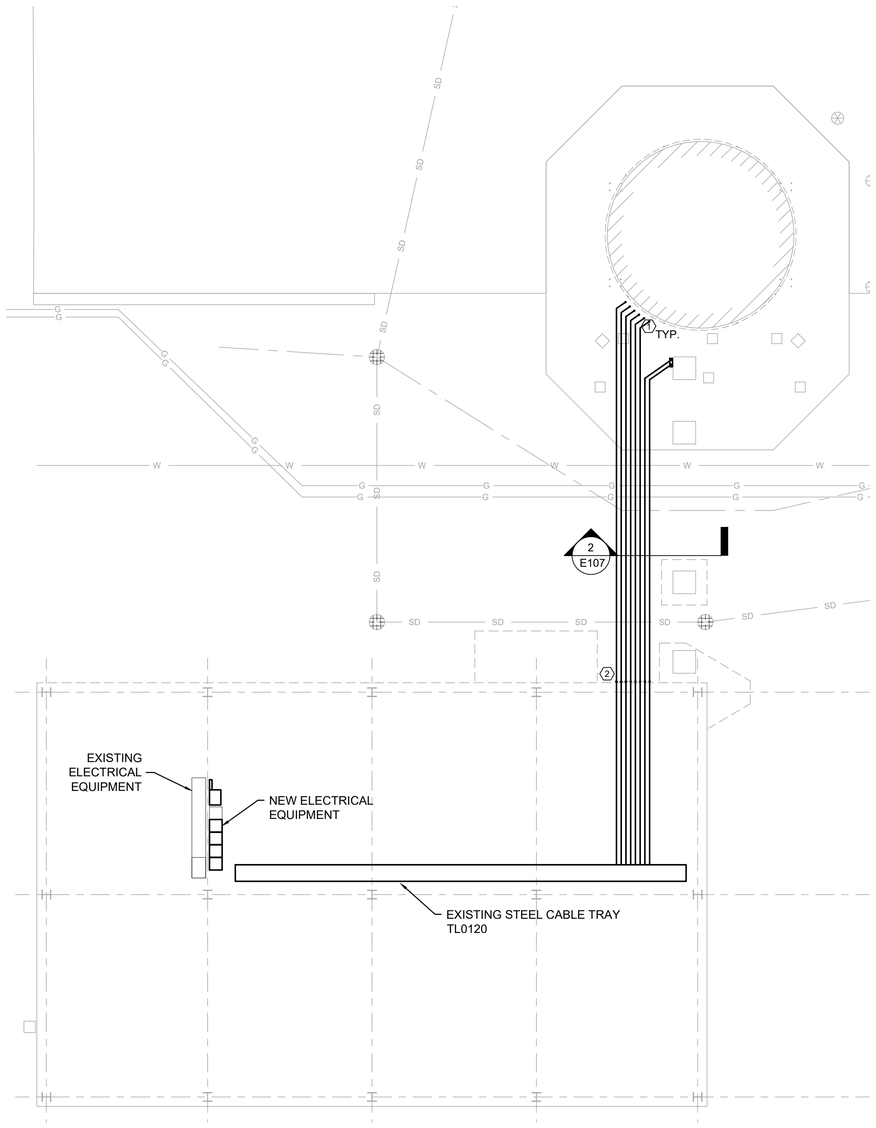
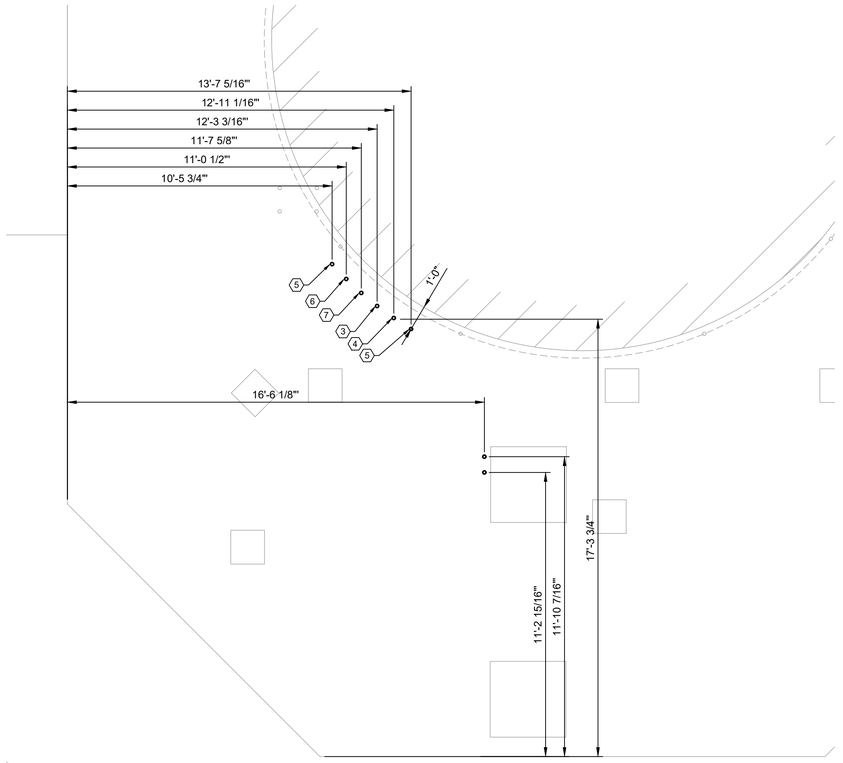


1 SITE CONDUIT ROUTING PLAN

SCALE: 1" = 10'



2 SITE CONDUIT STUB UP PLAN

SCALE: 1" = 3'

GENERAL NOTES:

A. SPARE CONDUITS TO BE TERMINATED ABOVE FINISHED GRADE/FLOOR AND CAPPED FOR FUTURE USE.

B. DRAWINGS DO NOT REPRESENT EXACT END LOCATION OF WIRING AND CONDUIT. WIRING AND CONDUIT SHALL BE PROVIDED AS REQUIRED TO EXTEND TO THE FINAL TERMINAL BLOCK DESTINATIONS. E.C. SHALL COORDINATE WITH EACH MANUFACTURER'S SHOP DRAWINGS.

C. COORDINATE CONDUIT ENTRY LOCATION WITH EQUIPMENT MANUFACTURER SPECIFICATIONS/DRAWINGS.

D. UNDERGROUND CONDUIT WITH STUB-UPS EXPOSED TO AMBIENT: TRANSITION TO RIGID STEEL CONDUIT BELOW GRADE WITH RIGID STEEL 90 DEGREE FITTINGS AND RIGID STEEL STUB ABOVE FINAL GRADE AND SLABS, UNLESS OTHERWISE NOTED. SEE DETAILS ON SHEET E107.

SHEET NOTES:

1. SEE DETAIL 1/E107 FOR ELECTRICAL CONDUIT STUB-UP DETAIL.
2. ROUTE RGS SCHEDULE 40 CONDUITS UP SIDE OF PRECIPITATOR BUILDING UP TO EXISTING CABLE TRAY ELEVATION AND TRANSITION INTO BUILDING.
3. ROUTE CONDUIT UP SIDE OF SILO TO MID-LEVEL ELEVATION FOR ELECTRICAL MOTOR LOADS.
4. ROUTE CONDUIT UP SIDE OF SILO TO TOP-OF-TANK ELEVATION FOR ELECTRICAL GENERAL POWER AND LIGHTING CIRCUITS.
5. CAP AND SEAL SPARE CONDUIT.
6. ROUTE CONDUIT UP SIDE OF SILO TO MID-LEVEL ELEVATION FOR INSTRUMENTATION LOADS.
7. ROUTE CONDUIT UP SIDE OF SILO TO TOP-OF-TANK ELEVATION FOR INSTRUMENTATION LOADS.

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ELECTRICAL SITE CONDUIT ROUTING PLANS

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA

2025

drawn by: ACE
designed by: NAM
project no.: 024-07087
date: 06-10-2025

SHEET
E102

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DATE: Jun 11, 2025 11:16am USER: chayes

ELECTRICAL EQUIPMENT SCHEDULE	
TAG	DESCRIPTION
M1	TELESCOPIC SPOUT
M2	TELESCOPIC SPOUT VENT FAN
M3	MECHANICAL EXHAUSTER A
M4	MECHANICAL EXHAUSTER A ENCLOSURE SILO ENCLOSURE FAN
M5	SILO VENT FAN
M6	MECHANICAL EXHAUSTER B
M7	MECHANICAL EXHAUSTER B ENCLOSURE SILO ENCLOSURE FAN

GENERAL NOTES:

A. ELECTRICAL INSTALLATION SHALL ADHERE TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODE.

B. REFER TO EXISTING ONE LINE DRAWING E1006 FOR MOTOR CONTROL CENTER 1E ONE LINE DIAGRAM.

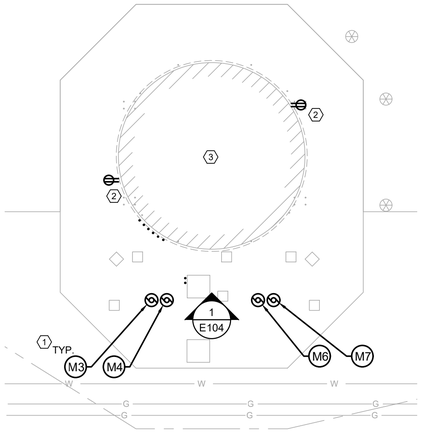
C. REFER TO CABLE SCHEDULE FOR ADDITIONAL INFORMATION.

D. CIRCUITING SHOWN IS DIAGRAMMATIC ONLY. EXACT ROUTING MAY VARY AND MAY REQUIRE ADDITIONAL J-BOXES AND/OR SPECIAL FITTINGS.

E. ALL RECEPTACLE CIRCUITS TO BE 2/C #10, #10G. ROUTED IN A 1" CONDUIT.

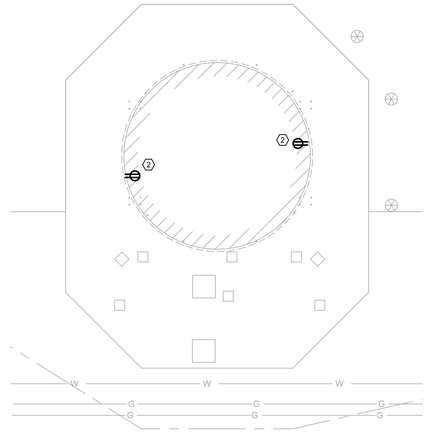
SHEET NOTES:

1. REFER TO ELECTRICAL EQUIPMENT LIST ON SHEET E103 FOR LOAD DESCRIPTION.
2. INSTALL NEMA 5-20R RECEPTACLE IN WEATHER RATED ENCLOSURE. CIRCUIT RECEPTACLES TO NEW LOW VOLTAGE ELECTRICAL PANEL LP1E. CIRCUIT RECEPTACLES TO CIRCUIT LP1E:1.
3. FOR INTERIOR SILO MOTOR LOCATIONS, REFER TO 1/E105 SOUTH SILO POWER ELEVATION.



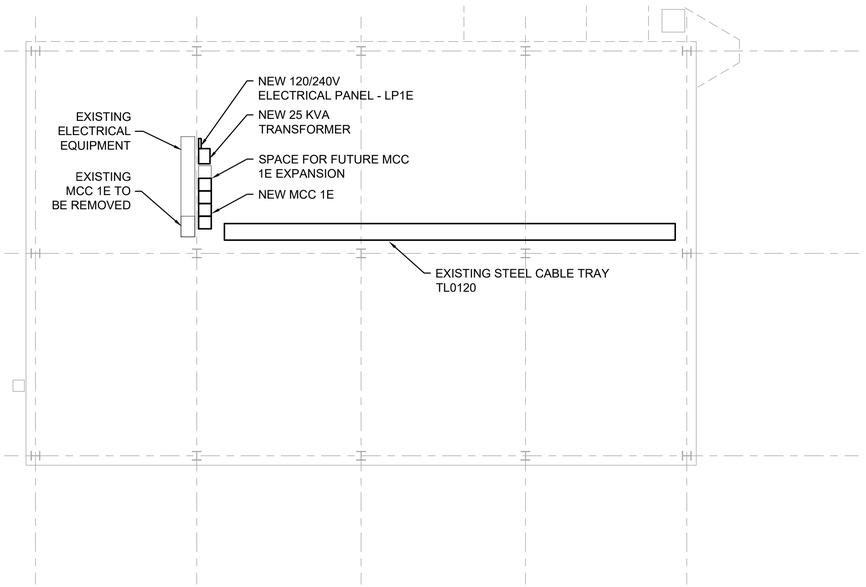
1 SILO GRADE LEVEL POWER PLAN

SCALE: 1" = 10'



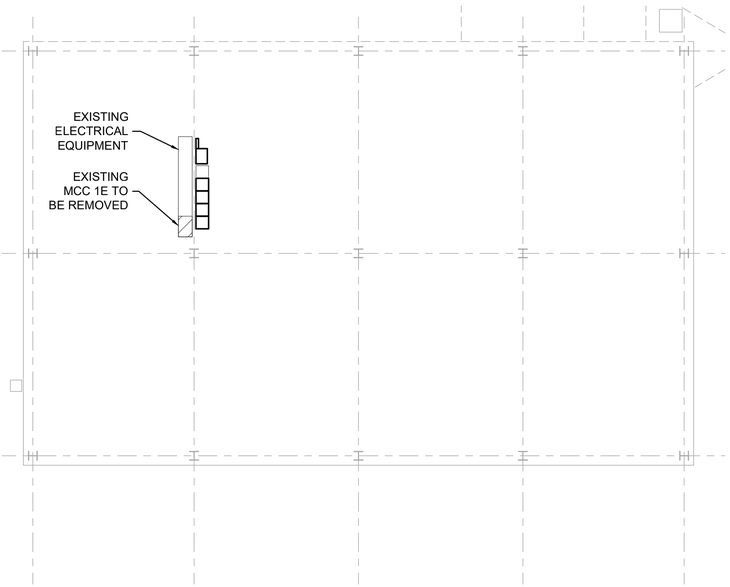
2 UNLOADING FLOOR POWER PLAN

SCALE: 1" = 10'



3 PRECIPITATOR BUILDING POWER PLAN

SCALE: 1" = 10'



4 PRECIPITATOR BUILDING DEMOLITION PLAN

SCALE: 1" = 10'

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08/01/2025
STATE OF NEBRASKA

REV. NO.	DATE	DESCRIPTION
0	06-10-2025	ISSUED FOR CONSTRUCTION
1	08-01-2025	ADDENDUM #1

REVISIONS

ELECTRICAL SITE POWER PLAN

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA

2025

drawn by: ACE
designed by: NAM
project no.: 024-07087
date: 06-10-2025

SHEET
E103

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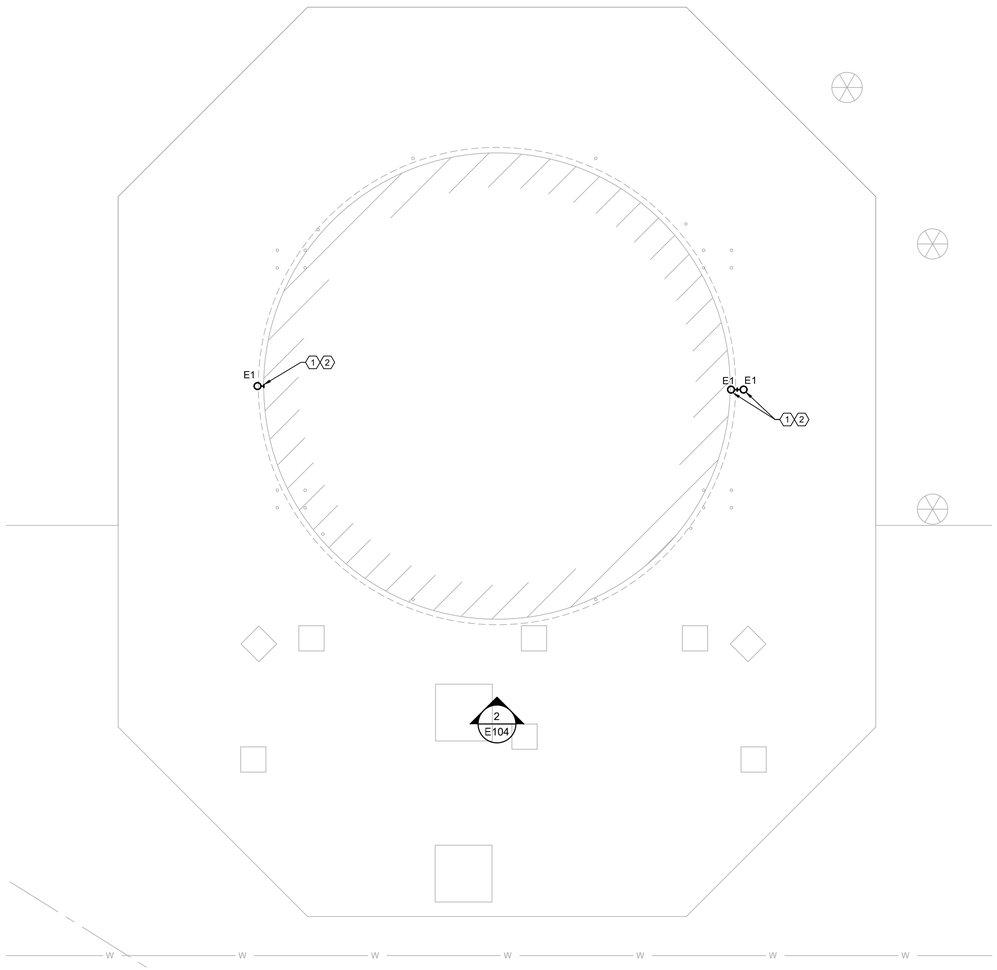
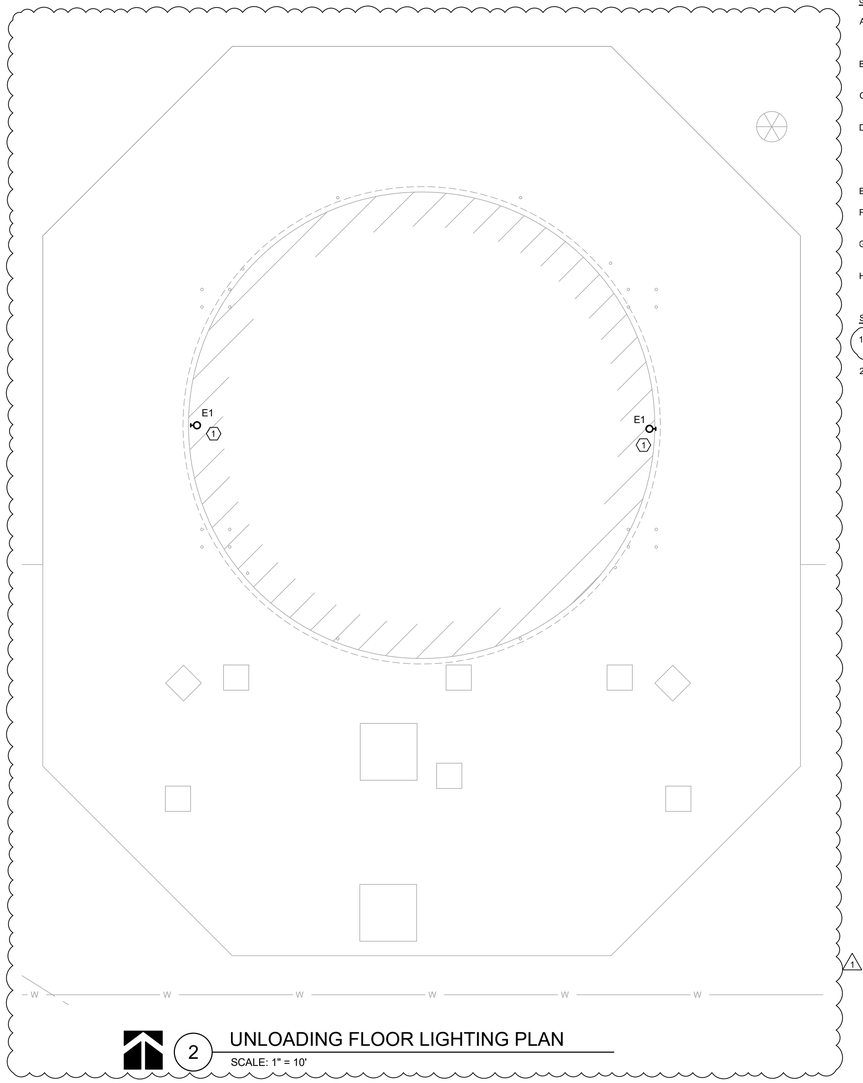


1 SILO GRADE LEVEL LIGHTING PLAN

SCALE: 1" = 10'



2 UNLOADING FLOOR LIGHTING PLAN

SCALE: 1" = 10'

GENERAL NOTES:

A. ELECTRICAL INSTALLATION SHALL ADHERE TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODE.

B. COORDINATE FINAL LOCATIONS OF FIXTURES WITH OTHER DISCIPLINES TO AVOID CONFLICTS.

C. FLAG ALL UTILITIES PRIOR TO DIGGING FOOTINGS FOR LIGHTING CONDUITS.

D. CONTRACTORS SHALL FURNISH AND INSTALL ALL ITEMS NECESSARY FOR THE COMPLETION OF THIS SCOPE OF WORK TO INCLUDE, BUT NOT LIMITED TO, CONDUIT, WIRE, TERMINATION MATERIAL, LIGHT FIXTURES, AND FIXTURE MOUNTING HARDWARE .

E. ALL WIRE SHALL BE 600V, STRANDED COPPER TYPE THWN.

F. FOR FIXTURE TYPE AND INFORMATION, REFER TO LIGHT FIXTURE SCHEDULE ON SHEET E103.

G. FOR STANCHION MOUNTED FIXTURE LOCATIONS, REFER TO SILO ELEVATION PLANS ON SHEET E104.

H. ALL LIGHTING CIRCUITS TO BE 2/C #10, #10G. ROUTED IN A 1" CONDUIT.

SHEET NOTES:

1. CIRCUIT LIGHT FIXTURES TO NEW LOW VOLTAGE ELECTRICAL PANEL LP1E. CIRCUIT FIXTURES TO LIGHTING CIRCUIT LP1E:2. 1
2. MOUNT FIXTURE TO STRUCTURE ABOVE GARAGE DOOR OPENING.

LIGHTING FIXTURE SCHEDULE

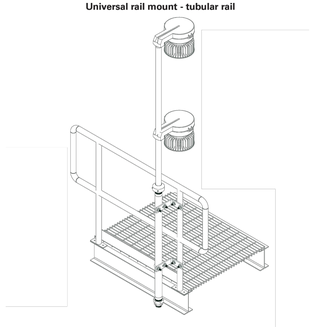
FIXTURE TYPE	DESCRIPTION	MANUFACTURER	MODEL	LAMP TYPE	LAMP CCT	INPUT POWER	VOLTAGE	MOUNTING	KEYED NOTES	QUANTITY
E1	LED WALL PACK	LITHONIA	TWR1 LED ALO SWW2 UVOLT PE DDBTXD	LED	4000 K	36 W	120 V	WALL	1, 2, 3	5
E2	LED STANCHION MOUNT FIXTURE	EATON	PVML-3-N-J-UNV1-S831-D2S20	LED	4000 K	27W	120 V	WALL	1, 2	6

1

KEYED NOTES:

1. SUPPLY FIXTURES WITH ALL HARDWARE FOR MOUNTING
2. EXTERIOR FIXTURES SHALL BE PROVIDED WITH PHOTO-ELECTRIC CELL FOR LIGHTING CONTROL.
3. FIXTURE ADJUSTED TO LUMEN OUTPUT OF 5,300 LUMENS.

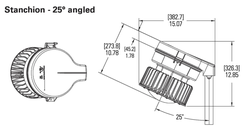
Universal rail mount - tubular rail



3 STANCHION POLE DETAIL

SCALE: NOT TO SCALE

Stanchion - 25° angled



4 FIXTURE MOUNTING DETAIL

SCALE: NOT TO SCALE

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08/01/2025
STATE OF NEBRASKA

REVISIONS

REV. NO.	DATE	DESCRIPTION
0	06-10-2025	ISSUED FOR CONSTRUCTION
1	08-01-2025	ADDENDUM #1

ELECTRICAL SITE LIGHTING PLAN

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA

2025

drawn by: ACE
designed by: NAM
project no.: 024-07087
date: 06-10-2025

SHEET
E104

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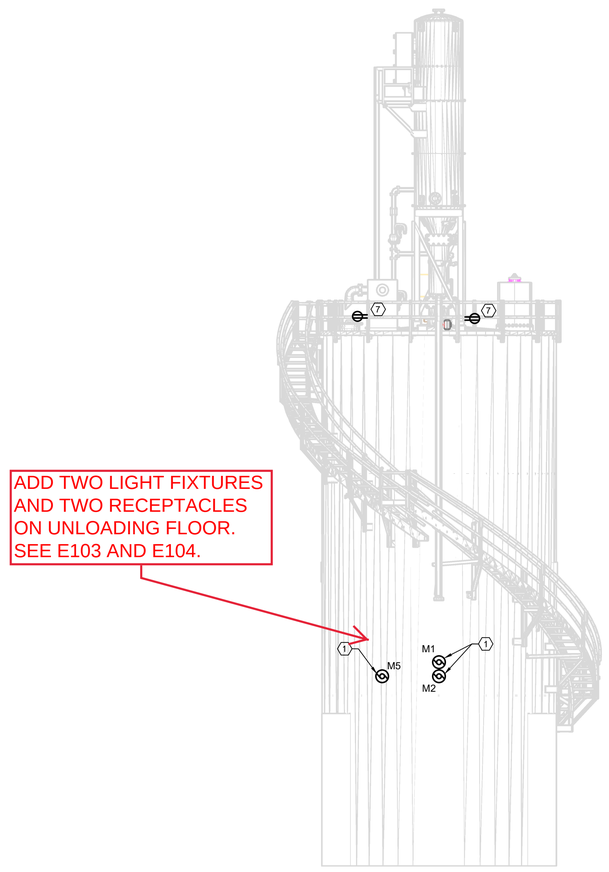
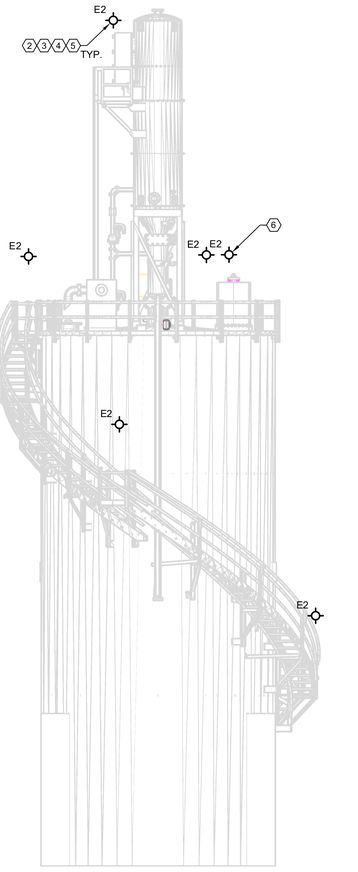


1 SOUTH SILO POWER ELEVATION

SCALE: 1/8" - 1"0"



2 SOUTH SILO LIGHTING ELEVATION

SCALE: 1/8" - 1"0"

GENERAL NOTES:

A. ELECTRICAL INSTALLATION SHALL ADHERE TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODE.

B. REFER TO EXISTING ONE LINE DRAWING E1006 FOR MOTOR CONTROL CENTER 1E ONE LINE DIAGRAM.

C. REFER TO CABLE SCHEDULE FOR ADDITIONAL INFORMATION.

D. CIRCUITING SHOWN IS DIAGRAMMATIC ONLY. EXACT ROUTING MAY VARY AND MAY REQUIRE ADDITIONAL J-BOXES AND/OR SPECIAL FITTINGS.

SHEET NOTES:

1. REFER TO SHEET E102 FOR ELECTRICAL EQUIPMENT SCHEDULE AND SITE POWER PLAN.
2. REFER TO SHEET E103 FOR LIGHTING FIXTURE AND SITE LIGHTING PLAN.
3. STANCHION MOUNT FIXTURE 5'-0" ABOVE TOP OF HAND RAIL.
4. CIRCUIT LIGHT FIXTURES TO EXISTING LOW VOLTAGE ELECTRICAL PANEL.
5. REFER TO DETAILS 2/E103 & 3/E103 FOR STANCHION POLE DETAIL AND FIXTURE MOUNTING DETAIL.
6. MOUNT STANCHIONS AND FIXTURES TO RAILINGS ON OPPOSING SIDES OF TANK.
7. INSTALL NEMA 5-20R RECEPTACLE IN WEATHER RATED ENCLOSURE ON TOP LEVEL OF SILO. CIRCUIT RECEPTACLES TO NEW LOW VOLTAGE ELECTRICAL PANEL LP1E.

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ELECTRICAL SILO POWER & LIGHTING ELEVATIONS

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA

2025

drawn by: ACE
designed by: NAM
project no.: 024-07087
date: 06-10-2025

SHEET
E105

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DATE: Jun 11, 2025 11:17am USER: cfayes

PANEL NO.	LP1E		TYPE	POWER PANEL				
SERVICE VOLTAGE	120/240-1Ø		PHASE BUS RATING	125A		MOUNTING	Surface	
MAIN BREAKER SIZE	100A		NEUTRAL BUS RATING	125A		SHORT CIRCUIT RATING	10kAIC	

DESCRIPTION	C/B AMP	VOLT AMPS A	VOLT AMPS B	CKT. NO.	CKT. NO.	VOLT AMPS A	VOLT AMPS B	C/B AMP	DESCRIPTION
GROUND LEVEL RECEPTACLES	20/1	360		1	2	180		20/1	WALL MOUNT LIGHTING
TOP-OF-TANK RECEPTACLES	20/1		360	3	4		162	20/1	STANCHION MOUNT LIGHTING
TELESCOPIC SPOUT LOCAL CONTROL PANE	20/1	13		5	6	150		20/1	FILTER SEPARATOR WINTERIZING KIT
FILTER SEPARATOR PULSE TIMER PANEL	20/1		300	7	8		312	20/1	FILTER SEPARATOR LOCAL PANEL
DAMPER ELECTRIC ACTUATOR	20/1	216		9	10	75		20/1	MECHANICAL EXHAUSTER A MOTOR HEATER
STACK / ID FAN AREA RECEPTACLES	20/1		360	11	12		75	20/1	MECHANICAL EXHAUSTER B MOTOR HEATER
STACK / ID FAN AREA RECEPTACLES	20/1	360		13	14			20/1	SPARE
SPARE	20/1			15	16			20/1	SPARE
SPARE	20/1			17	18			20/1	SPARE
SPARE	20/1			19	20			20/1	SPARE
SPARE	20/1			21	22			20/1	SPARE
SPARE	20/1			23	24			20/1	SPARE
SPARE	20/1			25	26			20/1	SPARE
SPARE	20/1			27	28			20/1	SPARE
SPARE	20/1			29	30				SPACE
SPACE				31	32				SPACE
SPACE				33	34				SPACE
SPACE				35	36				SPACE
SPACE				37	38				SPACE
SPACE				39	40				SPACE
SPACE				41	42				SPACE

TOTAL PHASE A:	11.7 AMPS 1.4 KVA	TOTAL CONNECTED LOADS:	3.0 KVA
TOTAL PHASE B:	13.4 AMPS 1.6 KVA	CONNECTED LOADS PLUS SPARES:	3.0 KVA
		ESTIMATED DEMAND LOADS:	3.1 KVA

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ELECTRICAL PANEL SCHEDULES

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA

2025

drawn by: ACE
designed by: NAM
project no.: 024-07087
date: 06-10-2025

SHEET
E106

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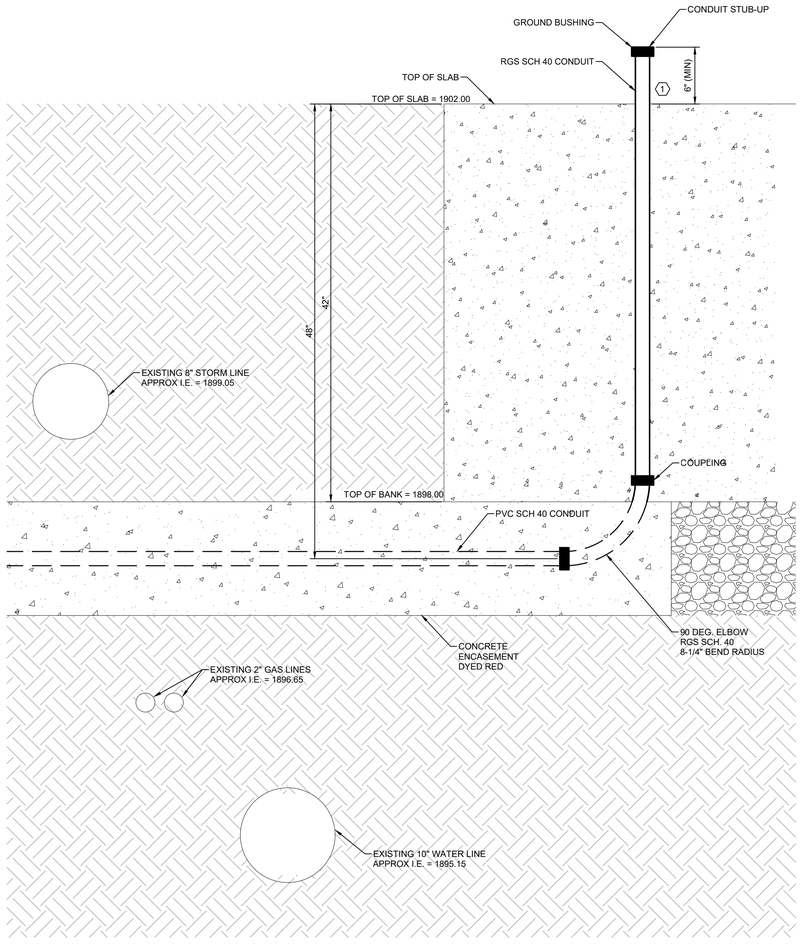
DATE: Jun 11, 2025 11:17am USER: chayes

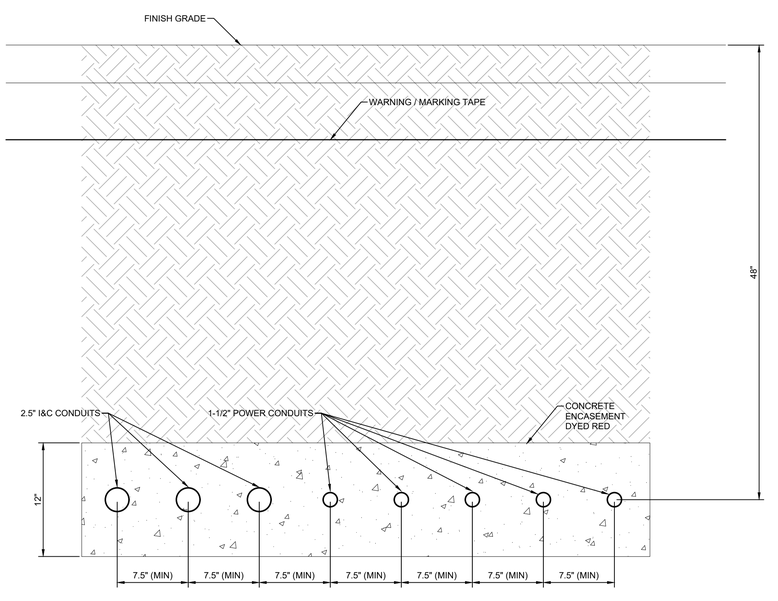
SHEET NOTES:

1. CONDUIT STUB-UP LOCATION SHOWN DIAGRAMMATICALLY. SEE 2/102 FOR EXACT CONDUIT STUB-UP LOCATION.



1 ELECTRICAL CONCRETE ENCASED CONDUIT STUB-UP

SCALE: 1 1/2" = 1'-0"



2 CONDUIT SECTION VIEW

SCALE: 1 1/2" = 1'-0"

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06/11/2025
STATE OF NEBRASKA

REV. NO.	DATE	DESCRIPTION
0	06-10-2025	ISSUED FOR CONSTRUCTION

REVISIONS

ELECTRICAL DETAILS

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA

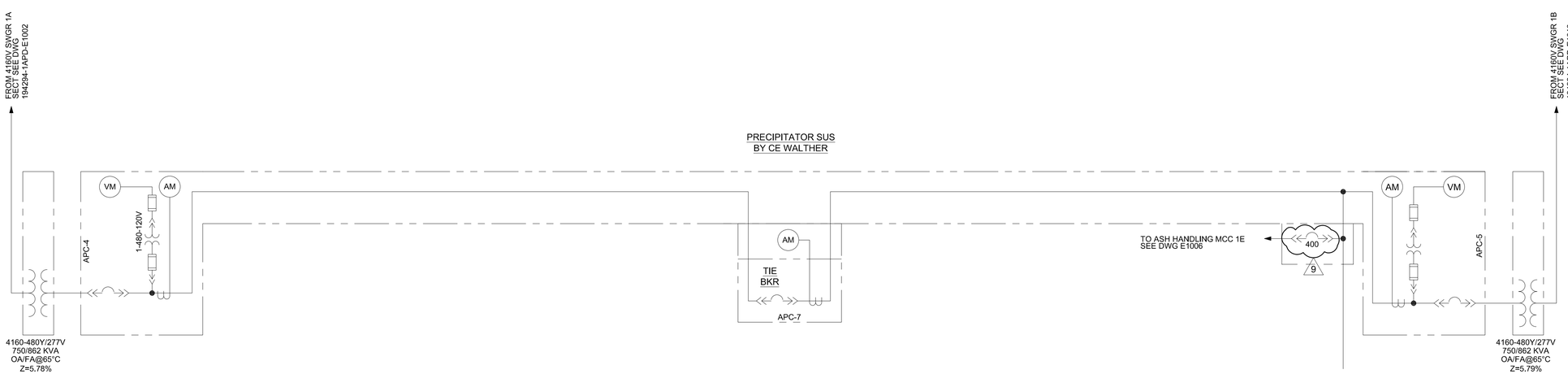
2025

drawn by: ACE
designed by: NAM
project no.: 024-07087
date: 06-10-2025

SHEET
E107

\\oa.ad.oaconsulting.com\fnfs-ns1\projects-direct\2024\07001-07500\024-07087\40-Design\AutoCAD\Final Plans\Sheets\FED\ELEC\E_DTL_02407087.dwg
DATE: Jun 11, 2025 11:17am USER: chayes

480V SUS 1A & 1B
DELETED FROM THIS
DRAWING. FOUND ON
DWG
194294-1APC-E1101



olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106 TEL 402.341.1116 www.olsson.com

OLSSON
ENGINEERING INFORMATION

drawn by: ACE
checked by: NAM
approved by: NAM
QA/QC by: NAM
date: 07-24-25
project no.: 024-07087
COA no.: CA-0638

PROFESSIONAL ELECTRICAL & COMPUTER ENGINEER
NATHAN A. MILLER
E-12967
07/24/2025
STATE OF NEBRASKA

PGN-122A

NO	DATE	REVISIONS	DWN	CK	ACC	APP
9	7/24/25	FLY ASH SYSTEM FOUNDATION	NM			
8	1/22/23	REMOVED SUS 1A & 1B	DR			
7	1/4/19	4160 FEED ADDITION	TT			
6	9/29/15	UPDATE 2C, 6C, 7C, 8C	SH			
5	1/21/14	AUTOCAD FORMAT	EK			
4	9/15/81	CONFORMED TO CONST. RECORDS	GB	GB	JJ	MN
3	5/28/80	GENERAL REVISIONS	GB	JJ		
2	7/20/79	REVISED AS CIRCLED	JJ			

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEBRASKA.

SIGNED _____
DATE _____ REG. NO. _____

BLACK & VEATCH
CONSULTING ENGINEERS

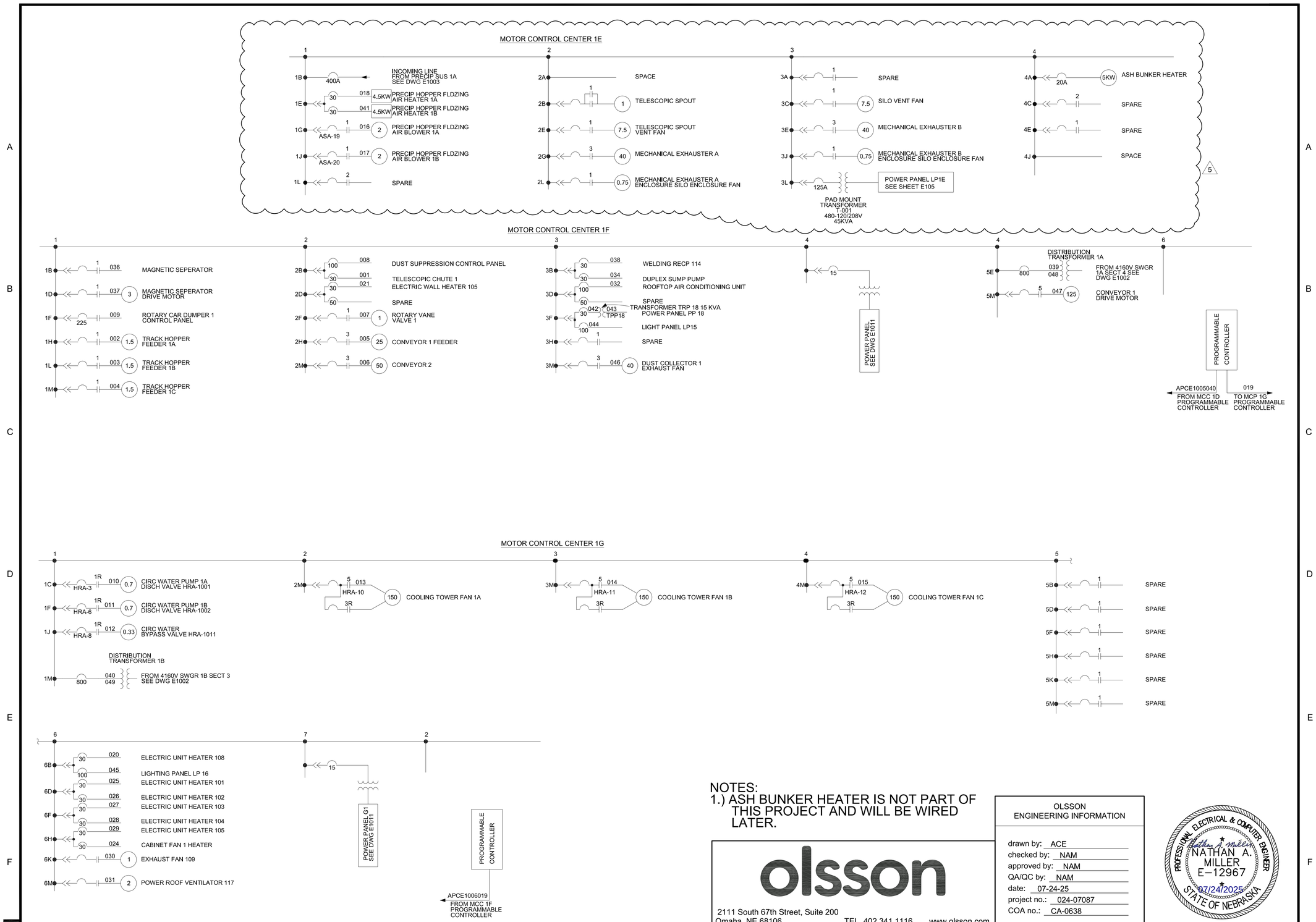
PROJECT
7677

CITY OF HASTINGS, NEBRASKA
WHELAN ENERGY CENTER UNIT 1

ONE - LINE
PRECIPITATOR SUS

B&V DWG NO. E1003

REV. 9



NOTES:
1.) ASH BUNKER HEATER IS NOT PART OF THIS PROJECT AND WILL BE WIRED LATER.

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PROFESSIONAL ELECTRICAL & COMPUTER ENGINEER
NATHAN A. MILLER
E-12967
07/24/2025
STATE OF NEBRASKA

NO	DATE	REVISIONS	DWN	CK	ACC	APP
5	7/24/25	FLY ASH SYSTEM FOUNDATION	NM			
4	1/22/14	AUTOCAD FORMAT	EK			
3	9/15/81	CONFORMED TO CONSTRUCTION REC.	GB	JJ	JJ	MN

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SIGNED
DATE REG. NO.

BLACK & VEATCH
CONSULTING ENGINEERS
PROJECT 7677

CITY OF HASTINGS, NEBRASKA
WHELAN ENERGY CENTER UNIT 1

ONE - LINE
480 VOLT MCC 1E, 1F, AND 1G

B&V DWG NO. E1006
REV. 5

PGN-122A

CABLE SCHEDULE

ITEM NO.	CABLE NO.	REV	FROM	TO	DESCRIPTION	CIRCUIT VOLTAGE	HP / KVA	CIRCUIT AMPERAGE	NO. OF SETS	CONDUCTOR SIZE	CABLE TYPE	CABLE VOLTAGE	CABLE O.D. (in.)	CABLE LBS/FT	ROUTING	MINIMUM CONDUIT SIZE	ESTIMATED CABLE LENGTH	COMMENTS
LOW VOLTAGE CABLES																		
1		0	MCC-1E	M1	MCC Bucket 2B to Telescopic Spout	480V	1HP	2.1A	1	3/C #12, #12 GND	3/C W/GND, TYPE XHHW-2, CU, TC	600V			TRAY/CONDUIT	0.5"	200'	
2		0	MCC-1E	M2	MCC Bucket 2E to Telescopic Spout Vent Fan	480V	7.5HP	11A	1	3/C #12, #12 GND	3/C W/GND, TYPE XHHW-2, CU, TC	600V			TRAY/CONDUIT	0.5"	200'	
3		0	MCC-1E	M3	MCC Bucket 2G to Mechanical Exhauster A	480V	40HP	52A	1	3/C #8, #10 GND	3/C W/GND, TYPE XHHW-2, CU, TC	600V			TRAY/CONDUIT	0.75"	150'	
4		0	MCC-1E	M4	MCC Bucket 2L to Mechanical Exhauster A Enclosure Silo Enclosure Fan	480V	0.75HP	1.6A	1	3/C #12, #12 GND	3/C W/GND, TYPE XHHW-2, CU, TC	600V			TRAY/CONDUIT	0.5"	150'	
5		0	MCC-1E	M5	MCC Bucket 3C to Silo Vent Fan	480V	7.5HP	11A	1	3/C #12, #12 GND	3/C W/GND, TYPE XHHW-2, CU, TC	600V			TRAY/CONDUIT	0.5"	200'	
6		0	MCC-1E	M6	MCC Bucket 3E to Mechanical Exhauster B	480V	40HP	52A	1	3/C #8, #10 GND	3/C W/GND, TYPE XHHW-2, CU, TC	600V			TRAY/CONDUIT	0.75"	150'	
7		0	MCC-1E	M7	MCC Bucket 3J to Mechanical Exhauster B Enclosure Silo Enclosure Fan	480V	0.75HP	1.6A	1	3/C #12, #12 GND	3/C W/GND, TYPE XHHW-2, CU, TC	600V			TRAY/CONDUIT	0.5"	150'	
8		0	Precipitator SUS	MCC-1E	PRECIPITATOR SUS to MCC BUCKET 1B MAIN Line Feeder	480V	NA	400A	2	3/C #4/0, #3 GND	3/C W/GND, TYPE XHHW-2, CU, TC	600V			TRAY/CONDUIT			
9		0	MCC-1E	Transformer T-001	MCC BUCKET 3L to Transformer T-001 Primary Feeder	480V	NA	125A	1	3/C #1, #6 GND	3/C W/GND, TYPE XHHW-2, CU, TC	600V			TRAY/CONDUIT			
10		0	Transformer T-001	Panel LP1E	Transformer T-001 Secondary Feeder to Panel LP1E	208V	NA	130A	1	3/C #2/0, #4 GND	3/C W/GND, TYPE XHHW-2, CU, TC	600V			TRAY/CONDUIT			

Notes:
1. AMPACITY OF 600V CABLES ARE BASED ON TABLE 310.16 OF THE NATIONAL ELECTRICAL CODE.
2. CABLE LENGTHS ARE ENGINEER'S ESTIMATE ONLY. CONTRACTOR TO VERIFY IN FIELD.
3. MINIMUM CONDUIT SIZES WERE BASED OFF SOUTHWIRE CABLE. IF OTHER CABLE IS USED, VERIFY CONDUIT SIZE IS SUFFICIENT.

REV	CABLE TAG/LABEL	CABLE RATING	CABLE TYPE	JACKET TYPE	INSUL TYPE	AWG	IO DEVICE TAG	SOURCE SIGNAL TYPE	SIGNAL TYPE VOLTAGE	RACK	SLOT	POINT	INDIVIDUAL WIRE COUNT	SOURCE TERM/PANEL	TERM BLOCK	TERMINAL	WIRE COLOR	DESTINATION TERM/PANEL / DEVICE	TERM BLOCK	TERMINAL	WIRE COLOR	INSTRUMENT TYPE	MANUFACTURE	MODEL #	EU RANGE	SETPOINT	VOLTAGE	SERVICE
0	1ASA29001	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1102	DO	120 VAC	4	3	8	1	AHP1	TBM	7	BLK	1ASB-ABV-1102	N/A	+	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	SILO VACCUM RELIEF GATE SOLENOID
0	1ASA29001	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1102	DO	120 VAC	4	3	8	2	AHP1	TBM	8	WHT	1ASB-ABV-1102	N/A	-	WHT							
0	1ASA29001	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1102	-	-	-	-	-	3	AHP1	TBM	9	GRN	1ASB-ABV-1102	N/A	GND	GRN							
0	1ASA29002	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1103	DO	120 VAC	4	3	9	1	AHP1	TBM	10	BLK	1ASB-ABV-1103	N/A	+	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	SILO VENT LINE ISOLATION GATE SOLENOID
0	1ASA29002	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1103	DO	120 VAC	4	3	9	2	AHP1	TBM	11	WHT	1ASB-ABV-1103	N/A	-	WHT							
0	1ASA29002	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1103	-	-	-	-	-	3	AHP1	TBM	12	GRN	1ASB-ABV-1103	N/A	GND	GRN							
0	1ASA29003	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1104	DO	120 VAC	4	3	10	1	AHP1	TBM	13	BLK	1ASB-ABV-1104	N/A	+	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	SILO VENT FAN BYPASS VALVE SOLENOID
0	1ASA29003	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1104	DO	120 VAC	4	3	10	2	AHP1	TBM	14	WHT	1ASB-ABV-1104	N/A	-	WHT							
0	1ASA29003	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1104	-	-	-	-	-	3	AHP1	TBM	15	GRN	1ASB-ABV-1104	N/A	GND	GRN							
0	1ASA29004	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1183	DO	120 VAC	4	3	11	1	AHP1	TBM	16	BLK	1ASB-ABV-1183	N/A	+	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	SILO VENT FAN DISCHARGE VALVE SOLENOID
0	1ASA29004	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1183	DO	120 VAC	4	3	11	2	AHP1	TBM	17	WHT	1ASB-ABV-1183	N/A	-	WHT							
0	1ASA29004	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1183	-	-	-	-	-	3	AHP1	TBM	18	GRN	1ASB-ABV-1183	N/A	GND	GRN							
0	1ASA29005	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1100	DO	120 VAC	4	3	1	1	AHP1	TBM	56	BLK	PNL-001	TB1	10	BLK	SOLENOID VALVE	ASCO	JKB8342G001MS	N/A	N/A	120 VAC	T/S ASH FEED VALVE SOLENOID
0	1ASA29005	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1100	DO	120 VAC	4	3	1	2	AHP1	TBM	57	WHT	PNL-001	TB1	9	WHT							
0	1ASA29005	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1100	-	-	-	-	-	3	AHP1	TBM	52	GRN	PNL-001	N/A	GND	GRN							
0	1ASA29006	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1101	DO	120 VAC	4	3	2	1	AHP1	TBM	58	BLK	PNL-001	TB2	3	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	T/S VENT LINE ISOLATION VALVE SOLENOID
0	1ASA29006	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1101	DO	120 VAC	4	3	2	2	AHP1	TBM	59	WHT	PNL-001	TB2	2	WHT							
0	1ASA29006	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1101	-	-	-	-	-	3	AHP1	TBM	62	GRN	PNL-001	N/A	GND	GRN							
0	1ASA29007	600V TC	1-6C	PVC	THHN	14 AWG	1ASB-DD-1263	PWR	120 VAC	-	-	-	1	AHP1	TBM	66	BLK	1ASB-DD-1263	TB	P+	BLK	DUST DETECTOR	FILTERSENSE	PM1 PRO	0 - 10,000 pA	N/A	120 VAC	F/S DUST DETECTED
0	1ASA29007	600V TC	1-6C	PVC	THHN	14 AWG	1ASB-DD-1263	PWR	120 VAC	-	-	-	2	AHP1	TBM	67	WHT	1ASB-DD-1263	TB	P-	WHT							
0	1ASA29007	600V TC	1-6C	PVC	THHN	14 AWG	1ASB-DD-1263	DI	120 VAC	4	4	0	3	AHP1	TBM	64	RED	1ASB-DD-1263	TB	C	RED							
0	1ASA29007	600V TC	1-6C	PVC	THHN	14 AWG	1ASB-DD-1263	PWR	120 VAC	-	-	-	4	AHP1	TBM	63	GRN	1ASB-DD-1263	TB	E	GRN							
0	1ASA29007	600V TC	1-6C	PVC	THHN	14 AWG	1ASB-DD-1263	DI	120 VAC	4	4	0	5	AHP1	TBM	65	ORG	1ASB-DD-1263	TB	A1	ORG							
0	1ASA29007	600V TC	1-6C	PVC	THHN	14 AWG	SPARE	-	-	-	-	-	6	AHP1	TBM	68	BLU	1ASB-DD-1263	TB	A2	BLU							
0	1ASA29008	600V TC	1-6C	PVC	THHN	14 AWG	1ASB-LS-1251	PWR	120 VAC	-	-	-	1	AHP1	TBM	69	BLK	1ASB-LS-1251	L	BLK	BLK	LEVEL SWITCH	BINDICATOR	LAR101050	N/A	3 FT	120 VAC	SILO HIGH LEVEL SWITCH
0	1ASA29008	600V TC	1-6C	PVC	THHN	14 AWG	1ASB-LS-1251	PWR	120 VAC	-	-	-	2	AHP1	TBM	70	WHT	1ASB-LS-1251	N/A	N	WHT							
0	1ASA29008	600V TC	1-6C	PVC	THHN	14 AWG	1ASB-LS-1251	DI	120 VAC	4	4	1	3	AHP1	TBM	72	RED	1ASB-LS-1251	N/A	COM	RED							
0	1ASA29008	600V TC	1-6C	PVC	THHN	14 AWG	1ASB-LS-1251	PWR	120 VAC	-	-	-	4	AHP1	TBM	71	GRN	1ASB-LS-1251	N/A	GND	GRN							
0	1ASA29008	600V TC	1-6C	PVC	THHN	14 AWG	1ASB-LS-1251	DI	120 VAC	4	4	1	5	AHP1	TBM	73	ORG	1ASB-LS-1251	N/A	N.O.	ORG							
0	1ASA29008	600V TC	1-6C	PVC	THHN	14 AWG	SPARE	-	-	-	-	-	6	AHP1	TBM	74	BLU	1ASB-LS-1251	N/A	N.C.	BLU							
0	1ASA29009	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-PS-1270	DI	120 VAC	4	6	8	1	AHP1	TBM	80	BLK	PNL-003	TB2	25	BLK	PRESSURE SWITCH	UNITED ELECTRIC	J400-134	N/A	3 PSIG	125 VAC	FLUIDIZING AIR PRESSURE SWITCH
0	1ASA29009	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-PS-1270	DI	120 VAC	4	6	8	2	AHP1	TBM	79	WHT	PNL-003	TB2	26	WHT							
0	1ASA29010	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-TS-1272	DI	120 VAC	4	2	5	1	AHP1	TBM	81	BLK	1ASB-TS-1272	SWITCH 3	N.O.	BLK	TEMPERATURE SWITCH	UNITED ELECTRIC	E400-385	N/A	260° F	125 VAC	MECH. EXHAUSTER DISCHARGE TEMP. SWITCH
0	1ASA29010	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-TS-1272	DI	120 VAC	4	2	5	2	AHP1	TBM	103	WHT	1ASB-TS-1272	SWITCH 3	COM	WHT							
0	1ASA29011	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-TS-1277	DI	120 VAC	4	2	6	1	AHP1	TBM	82	BLK	1ASB-TS-1277	SWITCH 3	N.O.	BLK	TEMPERATURE SWITCH	UNITED ELECTRIC	E400-385	N/A	260° F	125 VAC	MECH. EXHAUSTER DISCHARGE TEMP SWITCH
0	1ASA29011	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-TS-1277	DI	120 VAC	4	2	6	2	AHP1	TBM	104	WHT	1ASB-TS-1277	SWITCH 3	COM	WHT							
0	1ASA29012	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1109	DO	120 VAC	4	5	8	1	AHP1	TBM	121	BLK	PNL-003	TB2	11	BLK	SOLENOID VALVE	ASCO	JKHXB344G074MFMO-27248	N/A	N/A	120 VAC	F/S TRANSFER HOPPER TOP GATE SOLENOID (N/O)
0	1ASA29012	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1109	DO	120 VAC	4	5	8	2	AHP1	TBM	99	WHT	PNL-003	TB2	12	WHT							
0	1ASA29012	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1109	-	-	-	-	-	3	AHP1	TBM	117	GRN	PNL-003	-	GND	GRN							
0	1ASA29013	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-LS-1266	DI	120 VAC	4	4	4	1	AHP1	TBM	107	BLK	PNL-003	TB3	12	BLK	LIMIT SWITCH	DYNATROL	CL-10DIT-7	N/A	CONTACT	120 VAC	F/S FILTER BODY LEVEL
0	1ASA29013	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-LS-1266	DI	120 VAC	4	4	4	2	AHP1	TBM	106	WHT	PNL-003	TB3	13	WHT	LIMIT SWITCH	DYNATROL	CL-10DIT-7	N/A	CONTACT	120 VAC	
0	1ASA29013	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-LS-1267	DI	120 VAC	4	4	5	3	AHP1	TBM	111	RED	PNL-003	TB3	10	RED	LIMIT SWITCH	DYNATROL	CL-10DIT-7	N/A	CONTACT	120 VAC	F/S TRANSFER HOPPER LEVEL
0	1ASA29013	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-LS-1267	DI	120 VAC	4	4	5	4	AHP1	TBM	110	GRN	PNL-003	TB3	11	GRN	LIMIT SWITCH	DYNATROL	CL-10DIT-7	N/A	CONTACT	120 VAC	
0	1ASA29014	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1110	DO	120 VAC	4	5	9	1	AHP1	TBM	122	BLK	PNL-003	TB2	5	BLK	SOLENOID VALVE	ASCO	JKHXB344G074MFMO-27248	N/A	N/A	120 VAC	F/S TRANSFER HOPPER BOTTOM GATE SOLENOID
0	1ASA29014	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1110	DO	120 VAC	4	5	9	2	AHP1	TBM	100	WHT	PNL-003	TB2	6	WHT							
0	1ASA29014	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1110	-	-	-	-	-	3	AHP1	TBM	116	GRN	PNL-003	-	GND	GRN							
0	1ASA29015	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1112	DO	120 VAC	4	5	12	1	AHP1	TBM	123	BLK	PNL-003	TB2	23	BLK	SOLENOID VALVE	ASCO	JKHXB344G074MFMO-27248	N/A	N/A	120 VAC	F/S UPPER EQUALIZING VALVE SOLENOID (N/O)
0	1ASA29015	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1112	DO	120 VAC	4	5	12	2	AHP1	TBM	101	WHT	PNL-003	TB2	24	WHT							
0	1ASA29015	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1112	-	-	-	-	-	3	AHP1	TBM	115	GRN	PNL-003	-	GND	GRN							
0	1ASA29016	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1113	DO	120 VAC	4	5	13	1	AHP1	TBM	124	BLK	PNL-003	TB2	17	BLK	SOLENOID VALVE	ASCO	SUXB344G070MFMO-27248	N/A	N/A	120 VAC	F/S LOWER EQUALIZING VALVE SOLENOID
0	1ASA29016	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1113	DO	120 VAC	4	5	13	2	AHP1	TBM	102	WHT	PNL-003	TB2	18	WHT							
0	1ASA29016	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1113	-	-	-	-	-	3	AHP1	TBM	128	GRN	PNL-003	-	GND	GRN							
0	1ASA29017	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1126	DO	120 VAC	4	5	14	1	AHP1	TBM	125	BLK	PNL-003	TB3	20	BLK	SOLENOID VALVE	ASCO	SUXB344G070MFMO-27248	N/A	N/A	120 VAC	FLUIDIZING AIR SUPPLY SOLENOID
0	1ASA29017	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1126	DO	120 VAC	4	5	14	2	AHP1	TBM	126	WHT	PNL-003	TB3	21	WHT							
0	1ASA29017	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1126	-	-	-	-	-	3	AHP1	TBM	127	GRN	PNL-003	-	GND	GRN							
0	1ASA29018	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-PS-1262	DI	120 VAC	4	4	9	1	AHP1	TBM	131	BLK	1ASB-PS-1262	N/A	+	BLK	PRESSURE SWITCH	UNITED ELECTRIC	H100-702	N/A	85 PSIG	120 VAC	F/S COMPRESSED AIR LOW PRESSURE SWITCH
0	1ASA29018	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-PS-1262	DI	120 VAC	4	4	9	2	AHP1	TBM	132	WHT	1ASB-PS-1262	N/A	-	WHT							
0	1ASA30001	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1256	DI	120 VAC	4	6	5	1	AHP1	TBM	177	BLK	1ASB-ABV-1102	N/A	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	SILO VACCUM RELIEF GATE OPEN LIMIT
0	1ASA30001	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1256	DI	120 VAC	4	6	5	2	AHP1	TBM	178	WHT	1ASB-ABV-1102	N/A	2	WHT							
0	1ASA30002	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1257	DI	120 VAC	4	6	6	1	AHP1	TBM	179	BLK	1ASB-ABV-1102	N/A	5	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	CLOSED	120 VAC	SILO VACCUM RELIEF GATE CLOSE LIMIT
0	1ASA30002	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1257	DI	120 VAC	4	6	6	2	AHP1	TBM	180	WHT	1ASB-ABV-1102	N/A	6	WHT							
0	1ASA30003	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1253	DI	120 VAC	4	6	0	1	AHP1	TBM	191	BLK	T/S JB	N/A	H	BLK	LIMIT SWITCH	MICROSWITCH	LSPA	N/A	N/A	120 VAC	T/S FULL UP LIMIT SWITCH
0	1ASA30003	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1253	DI	120 VAC	4	6	0	2	AHP1	TBM	192	WHT	T/S JB	N/A	3	WHT							
0	1ASA30003	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1254	DI	120 VAC	4	6	1	3	AHP1	TBM	194	RED	T/S JB	N/A	H	RED	LIMIT SWITCH	MICROSWITCH	LSPA	N/A	N/A	120 VAC	T/S SLACK CABLE LIMIT SWITCH
0	1ASA30003	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1254	DI	120 VAC	4	6	1	4	AHP1	TBM	193	GRN	T/S JB	N/A	7	GRN							
0	1ASA30004	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1258	DI	120 VAC	4	6	7	1	AHP1	TBM	195	BLK	1ASB-ABV-1103	N/A	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	SILO VENT LINE ISOLATION GATE OPEN LIMIT
0	1ASA30004	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1258	DI	120 VAC	4	6	7	2	AHP1	TBM	196	WHT	1ASB-ABV-1103	N/A	2	WHT							
0	1ASA30005	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1259	DI	120 VAC	4	6	13	1	AHP1	TBM	199	BLK	1ASB-ABV-1103	N/A	5	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	CLOSED	120 VAC	SILO VENT LINE ISOLATION GATE CLOSE LIMIT
0	1ASA30005	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1259	DI	120 VAC	4	6	13	2	AHP1	TBM	200	WHT	1ASB-ABV-1103	N/A	6	WHT							
0	1ASA30006	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1260	DI	120 VAC	4	6	14	1	AHP1	TBM	201	BLK	1ASB-ABV-1104	N/A	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	SILO VENT FAN BYPASS VALVE OPEN LIMIT
0	1ASA30006	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1260	DI	120 VAC	4	6	14	2	AHP1	TBM	202	WHT	1ASB-ABV-1104	N/A	2	WHT							
0	1ASA30007	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1261	DI	120 VAC	4	6	15	1	AHP1	TBM	203	BLK	1ASB-ABV-1104	N/A	5	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	CLOSED	120 VAC	SILO VENT FAN BYPASS VALVE CLOSE LIMIT
0	1ASA30007	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1261	DI	120 VAC	4	6	15	2	AHP1	TBM	204	WHT	1ASB-ABV-1104	N/A	6	WHT							
0	1ASA30008	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1255	DI	120 VAC	4	6	2	1	AHP1	TBM	215	BLK	PNL-001	TB2	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	T/S VENT LINE ISOLATION VALVE OPEN LIMIT
0	1ASA30008	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1255	DI	120 VAC	4	6	2	2	AHP1	TBM	216	WHT	PNL-001	TB2	2	WHT							
0	1ASA30009	600V TC	1-4C	PVC	THHN	14 AWG	M-006	DO	120 VAC	4	12	14	1	AHP1	TBM	221	BLK	MCC 1E-3D	TBA	1A	BLK	MOTOR	-	-	-	-	-	MECHANICAL EXHAUSTER MOTOR RUN
0	1ASA30009	600V TC	1-4C	PVC	THHN	14 AWG	M-006	DO	120 VAC	4	12	14	2	AHP1	TBM	222	WHT	MCC 1E-3D	TBB	2	WHT							
0	1ASA30009	600V TC	1-4C	PVC	THHN	14 AWG	M-006	DI	120 VAC	4	6	9	3	AHP1	TBM	223	RED	MCC 1E-3D	TBB	5	RED							MECHANICAL EXHAUSTER MOTOR RUNNING
0	1ASA30009	600V TC	1-4C	PVC	THHN	14 AWG	M-006	DI	120 VAC	4	6	9	4	AHP1	TBM	224	GRN	MCC 1E-3D	TBB	6	GRN							
0	1ASA30010	600V TC	1-2C	PVC	THHN	14 AWG	M-007	DO	120 VAC	4	12	15	1	AHP1	TBM	225	BLK	MCC 1E-3F	TBA	1A	BLK	MOTOR	-	-	-	-	-	SOUND ENCLOSURE VENT FAN MOTOR RUN
0	1ASA30010	600V TC	1-2C	PVC	THHN	14 AWG	M-007	DO	120 VAC	4	12	15	2	AHP1	TBM	226	WHT	MCC 1E-3F	TBB	2	WHT							
0	1ASA30011	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1136	DO	120 VAC	4	7	8	1	AHP1	TBM	349	BLK	1ASB-ABV-1136	N/A	+	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	MECH. EXHAUSTER ISOLATION VALVE SOLENOID
0	1ASA30011	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1136	DO	120 VAC	4	7	8	2	AHP1	TBM	350	WHT	1ASB-ABV-1136	N/A	-	WHT							
0	1ASA30011	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1136	-	-	-	-	-	3	AHP1	TBM	351	GRN	1ASB-ABV-1136	N/A	GND	GRN							
0	1ASA30012	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1137	DO	120 VAC	4	7	9	1	AHP1	TBM	352	BLK	1ASB-ABV-1137		+	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	MECH. EXHAUSTER DISCHARGE VALVE SOLENOID
0	1ASA30012	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1137	DO	120 VAC	4	7	9	2	AHP1	TBM	353	WHT	1ASB-ABV-1137		-	WHT							
0	1ASA30012	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1137	-	-	-	-	-	3	AHP1	TBM	354	GRN	1ASB-ABV-1137	N/A	GND	GRN							
0	1ASA30013	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1140	DO	120 VAC	4	7	12	1	AHP1	TBM	355	BLK	1ASB-ABV-1140	N/A	+	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	MECH. EXHAUSTER ISOLATION VALVE SOLENOID
0	1ASA30013	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1140	DO	120 VAC	4	7	12	2	AHP1	TBM	356	WHT	1ASB-ABV-1140	N/A	-	WHT							
0	1ASA30013	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1140	-	-	-	-	-	3	AHP1	TBM	357	GRN	1ASB-ABV-1140	N/A	GND	GRN							
0	1ASA30014	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1141	DO	120 VAC	4	7	13	1	AHP1	TBM	358	BLK	1ASB-ABV-1141	N/A	+	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	MECH. EXHAUSTER DISCHARGE VALVE SOLENOID
0	1ASA30014	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1141	DO	120 VAC	4	7	13	2	AHP1	TBM	359	WHT	1ASB-ABV-1141	N/A	-	WHT							
0	1ASA30014	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1141	-	-	-	-	-	3	AHP1	TBM	360	GRN	1ASB-ABV-1141	N/A	GND	GRN							
0	1ASA30015	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1108	DO	120 VAC	4	3	14	1	AHP1	TBM	361	BLK	PNL-003	TB3	18	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	SILO VENT LINE RELIEF VALVE SOLENOID
0	1ASA30015	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1108	DO	120 VAC	4	3	14	2	AHP1	TBM	362	WHT	PNL-003	TB3	19	WHT							
0	1ASA30015	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1108	-	-	-	-	-	3	AHP1	TBM	363	GRN	PNL-003	-	GND	GRN							
0	1ASA31001	600V TC	1-4C	PVC	THHN	14 AWG	M-001	DO	120 VAC	4	12	8	1	AHP1	TBM	427	BLK	PNL-001	TB1	3	BLK	MOTOR	-	-	-	-	-	T/S HOIST UP
0	1ASA31001	600V TC	1-4C	PVC	THHN	14 AWG	M-001	DO	120 VAC	4	12	8	2	AHP1	TBM	428	WHT	PNL-001	TB1	7	WHT							
0	1ASA31001	600V TC	1-4C	PVC	THHN	14 AWG	M-001	DO	120 VAC	4	12	9	3	AHP1	TBM	429	RED	PNL-001	TB1	4	RED							T/S HOIST DOWN
0	1ASA31001	600V TC	1-4C	PVC	THHN	14 AWG	M-001	DO	120 VAC	4	12	9	4	AHP1	TBM	430	GRN	PNL-001	TB1	8	GRN							
0	1ASA31002	600V TC	1-4C	PVC	THHN	14 AWG	M-002	DO	120 VAC	4	12	10	1	AHP1	TBM	431	BLK	PNL-001	TB1	12	BLK	MOTOR	-	-	-	-	-	T/S VENT FAN MOTOR RUN
0	1ASA31002	600V TC	1-4C	PVC	THHN	14 AWG	M-002	DO	120 VAC	4	12	10	2	AHP1	TBM	432	WHT	PNL-001	TB1	13	WHT							
0	1ASA31002	600V TC	1-4C	PVC	THHN	14 AWG	M-002	DI	120 VAC	4	8	4	3	AHP1	TBM	433	RED	PNL-001	TB1	11	RED							T/S VENT FAN MOTOR RUNNING
0	1ASA31002	600V TC	1-4C	PVC	THHN	14 AWG	M-002	DI	120 VAC	4	8	4	4	AHP1	TBM	434	GRN	PNL-001	TB1	12	GRN							
0	1ASA31003	600V TC	1-4C	PVC	THHN	14 AWG	M-003	DO	120 VAC	4	12	11	1	AHP1	TBM	435	BLK	MCC 1E-3B	TBA	1A	BLK	MOTOR	-	-	-	-	-	SILO VENT FAN MOTOR RUN
0	1ASA31003	600V TC	1-4C	PVC	THHN	14 AWG	M-003	DO	120 VAC	4	12	11	2	AHP1	TBM	436	WHT	MCC 1E-3B	TBB	2	WHT							

REV	CABLE TAG/LABEL	CABLE RATING	CABLE TYPE	JACKET TYPE	INSUL TYPE	AWG	IO DEVICE TAG	SOURCE SIGNAL TYPE	SIGNAL TYPE VOLTAGE	RACK	SLOT	POINT	INDIVIDUAL WIRE COUNT	SOURCE TERM/PANEL	TERM BLOCK	TERMINAL	WIRE COLOR	DESTINATION TERM/PANEL / DEVICE	TERM BLOCK	TERMINAL	WIRE COLOR	INSTRUMENT TYPE	MANUFACTURE	MODEL #	EU RANGE	SETPOINT	VOLTAGE	SERVICE
0	1ASA31006	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1293	DI	120 VAC	4	10	4	1	AHP1	TBM	645	BLK	1ASB-ABV-1183	N/A	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	SILO VENT FAN DISCHARGE VALVE OPEN LIMIT
0	1ASA31006	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1293	DI	120 VAC	4	10	4	2	AHP1	TBM	646	WHT	1ASB-ABV-1183	N/A	2	WHT							
0	1ASA31007	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1292	DI	120 VAC	4	10	5	1	AHP1	TBM	647	BLK	1ASB-ABV-1183	N/A	5	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	CLOSED	120 VAC	SILO VENT FAN DISCHARGE VALVE CLOSE LIMIT
0	1ASA31007	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1292	DI	120 VAC	4	10	5	2	AHP1	TBM	648	WHT	1ASB-ABV-1183	N/A	6	WHT							
0	1ASA31008	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1268	DI	120 VAC	4	10	6	1	AHP1	TBM	649	BLK	PNL-003	TB3	14	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	SILO VENT FAN DISCHARGE VALVE OPEN LIMIT
0	1ASA31008	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1268	DI	120 VAC	4	10	6	2	AHP1	TBM	650	WHT	PNL-003	TB3	15	WHT							
0	1ASA31008	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1269	DI	120 VAC	4	10	7	3	AHP1	TBM	651	RED	PNL-003	TB3	16	RED	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	CLOSED	120 VAC	SILO VENT FAN DISCHARGE VALVE CLOSE LIMIT
0	1ASA31008	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1269	DI	120 VAC	4	10	7	4	AHP1	TBM	652	GRN	PNL-003	TB3	17	GRN							
0	1ASA31009	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1290	DO	120 VAC	4	11	14	1	AHP1	TBM	653	BLK	1ASB-ABV-1148	N/A	1	BLK	LIMIT SWITCH						RADIAL FAN DAMPER ACTUATOR OPEN COMMAND
0	1ASA31009	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1290	DO	120 VAC	4	11	14	2	AHP1	TBM	654	WHT	1ASB-ABV-1148	N/A	2	WHT							
0	1ASA31009	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1291	DO	120 VAC	4	11	15	3	AHP1	TBM	655	BLK	1ASB-ABV-1148	N/A	5	BLK	LIMIT SWITCH						RADIAL FAN DAMPER ACTUATOR CLOSE COMMAND
0	1ASA31009	600V TC	1-4C	PVC	THHN	14 AWG	1ASB-ZS-1291	DO	120 VAC	4	11	15	4	AHP1	TBM	656	WHT	1ASB-ABV-1148	N/A	6	WHT							
0	1ASA31010	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1273	DI	120 VAC	4	10	8	1	AHP1	TBM	657	BLK	1ASB-ABV-1136	N/A	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	MECH. EXHAUSTER ISOLATION VALVE OPEN LIMIT
0	1ASA31010	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1273	DI	120 VAC	4	10	8	2	AHP1	TBM	658	WHT	1ASB-ABV-1136	N/A	2	WHT							
0	1ASA31011	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1274	DI	120 VAC	4	10	9	1	AHP1	TBM	659	BLK	1ASB-ABV-1136	N/A	5	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	CLOSED	120 VAC	MECH. EXHAUSTER ISOLATION VALVE CLOSE LIMIT
0	1ASA31011	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1274	DI	120 VAC	4	10	9	2	AHP1	TBM	660	WHT	1ASB-ABV-1136	N/A	6	WHT							
0	1ASA31012	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1275	DI	120 VAC	4	10	10	1	AHP1	TBM	661	BLK	1ASB-ABV-1137	N/A	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	MECH. EXHAUSTER DISCHARGE VALVE OPEN LIMIT
0	1ASA31012	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1275	DI	120 VAC	4	10	10	2	AHP1	TBM	662	WHT	1ASB-ABV-1137	N/A	2	WHT							
0	1ASA31013	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1276	DI	120 VAC	4	10	11	1	AHP1	TBM	663	BLK	1ASB-ABV-1137	N/A	5	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	CLOSED	120 VAC	MECH. EXHAUSTER DISCHARGE VALVE CLOSE LIMIT
0	1ASA31013	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1276	DI	120 VAC	4	10	11	2	AHP1	TBM	664	WHT	1ASB-ABV-1137	N/A	6	WHT							
0	1ASA31014	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1278	DI	120 VAC	4	10	12	1	AHP1	TBM	665	BLK	1ASB-ABV-1140	N/A	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	MECH. EXHAUSTER ISOLATION VALVE OPEN LIMIT
0	1ASA31014	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1278	DI	120 VAC	4	10	12	2	AHP1	TBM	666	WHT	1ASB-ABV-1140	N/A	2	WHT							
0	1ASA31015	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1279	DI	120 VAC	4	10	13	1	AHP1	TBM	667	BLK	1ASB-ABV-1140	N/A	5	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	CLOSED	120 VAC	MECH. EXHAUSTER ISOLATION VALVE CLOSE LIMIT
0	1ASA31015	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1279	DI	120 VAC	4	10	13	2	AHP1	TBM	668	WHT	1ASB-ABV-1140	N/A	6	WHT							
0	1ASA31016	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1280	DI	120 VAC	4	10	14	1	AHP1	TBM	669	BLK	1ASB-ABV-1141	N/A	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	MECH. EXHAUSTER DISCHARGE VALVE OPEN LIMIT
0	1ASA31016	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1280	DI	120 VAC	4	10	14	2	AHP1	TBM	670	WHT	1ASB-ABV-1141	N/A	2	WHT							
0	1ASA31017	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1281	DI	120 VAC	4	10	15	1	AHP1	TBM	671	BLK	1ASB-ABV-1141	N/A	5	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	CLOSED	120 VAC	MECH. EXHAUSTER DISCHARGE VALVE CLOSE LIMIT
0	1ASA31017	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1281	DI	120 VAC	4	10	15	2	AHP1	TBM	672	WHT	1ASB-ABV-1141	N/A	6	WHT							
0	1ASA31018	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DI	120 VAC	4	4	13	1	AHP1	TBM	673	BLK	PNL-003	TB1	22	BLK	-	-	-	-	-	120 VAC	F/S PULSE VALVES AUTO
0	1ASA31018	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DI	120 VAC	4	4	13	2	AHP1	TBM	674	WHT	PNL-003	TB1	23	WHT	-	-	-	-	-	120 VAC	F/S PULSE VALVES AUTO
0	1ASA31018	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DI	120 VAC	4	4	14	3	AHP1	TBM	675	RED	PNL-003	TB1	24	RED	-	-	-	-	-	120 VAC	TRANSFER HOPPER VALVES AUTO
0	1ASA31018	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DI	120 VAC	4	4	14	4	AHP1	TBM	676	GRN	PNL-003	TB1	25	GRN	-	-	-	-	-	120 VAC	TRANSFER HOPPER VALVES AUTO
0	1ASA31018	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DI	120 VAC	4	4	15	5	AHP1	TBM	677	ORG	PNL-003	TB3	8	ORG	-	-	-	-	-	120 VAC	F/S CONTROL PANEL ENABLED
0	1ASA31018	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DI	120 VAC	4	4	15	6	AHP1	TBM	678	BLU	PNL-003	TB3	9	BLU	-	-	-	-	-	120 VAC	F/S CONTROL PANEL ENABLED
0	1ASA31019	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DO	120 VAC	4	9	12	1	AHP1	TBM	679	BLK	PNL-003	TB1	15	BLK	-	-	-	-	-	120 VAC	PULSE CLEAN OVERRIDE
0	1ASA31019	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DO	120 VAC	4	9	12	2	AHP1	TBM	680	WHT	PNL-003	TB1	16	WHT	-	-	-	-	-	120 VAC	PULSE CLEAN OVERRIDE
0	1ASA31019	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DO	120 VAC	4	9	13	3	AHP1	TBM	681	RED	PNL-003	TB1	26	RED	-	-	-	-	-	120 VAC	PULSE CLEAN VALVE ON LIGHT
0	1ASA31019	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DO	120 VAC	4	9	13	4	AHP1	TBM	683	GRN	PNL-003	TB1	27	GRN	-	-	-	-	-	120 VAC	PULSE CLEAN VALVE ON LIGHT
0	1ASA31019	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DO	120 VAC	4	9	14	5	AHP1	TBM	684	ORG	PNL-003	TB3	28	ORG	-	-	-	-	-	120 VAC	FILTER HIGH D.P. LIGHT
0	1ASA31019	600V TC	1-6C	PVC	THHN	14 AWG	PNL-003	DO	120 VAC	4	9	14	6	AHP1	TBM	682	BLU	PNL-003	TB3	29	BLU	-	-	-	-	-	120 VAC	FILTER HIGH D.P. LIGHT
0	1ASA32001	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-LT-1250	AI	4-20 mADC	4	13	0	1	AHP1	TBN	17	BLK	1ASB-LT-1250	N/A	+	BLK	LEVEL TRANSMITTER	SIEMENS	SITRANS LR 580	3' - 30'	3 - 30 FT	24 VDC	SILO LEVEL TRANSMITTER
0	1ASA32001	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-LT-1250	AI	4-20 mADC	4	13	0	2	AHP1	TBN	18	RED	1ASB-LT-1250	N/A	-	RED							
0	1ASA32001	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-LT-1250	-	-	-	-	-	3	AHP1	TBN	19	BARE	1ASB-LT-1250	N/A	GND	BARE							
0	1ASA32002	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1264	AI	4-20 mADC	4	13	2	1	AHP1	TBN	20	BLK	PNL-003	TB1	17	BLK	DIFF. PRESS. TRANSMITTER	DWYER	DCP200A	0" - 20" H2O	SEE P&ID	120 VAC	F/S FILTER BAG D.P. TRANSMITTER
0	1ASA32002	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1264	AI	4-20 mADC	4	13	2	2	AHP1	TBN	21	RED	PNL-003	TB1	18	RED							
0	1ASA32002	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1264	-	-	-	-	-	3	AHP1	TBN	22	BARE	PNL-003	TB1	19	BARE							
0	1ASA32003	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1252	AI	4-20 mADC	4	13	1	1	AHP1	TBN	23	BLK	1ASB-PT-1252	N/A	+	BLK	PRESSURE TRANSMITTER	ROSEMOUNT	3051	0.5" - 5" H2O	SEE P&ID	10-55 VDC	SILO PRESSURE TRANSMITTER
0	1ASA32003	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1252	AI	4-20 mADC	4	13	1	2	AHP1	TBN	25	RED	1ASB-PT-1252	N/A	-	RED							
0	1ASA32003	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1252	-	-	-	-	-	3	AHP1	TBN	24	BARE	1ASB-PT-1252	N/A	GND	BARE							
0	1ASA32004	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1256	AI	4-20 mADC	4	13	3	1	AHP1	TBN	26	BLK	1ASB-PT-1256	N/A	+	BLK	PRESSURE TRANSMITTER	ROSEMOUNT	3051	0.5" - 12" HG	SEE P&ID	10 - 55 VDC	MECH. EXHAUSTER PRESSURE TRANSMITTER
0	1ASA32004	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1256	AI	4-20 mADC	4	13	3	2	AHP1	TBN	27	RED	1ASB-PT-1256	N/A	-	RED							
0	1ASA32004	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1256	-	-	-	-	-	3	AHP1	TBN	28	BARE	1ASB-PT-1256	N/A	GND	BARE							
0	1ASA32005	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1271	AI	4-20 mADC	4	13	4	1	AHP1	TBN	29	BLK	1ASB-PT-1271	N/A	+	BLK	PRESSURE TRANSMITTER	ROSEMOUNT	3051	0" - 25" H2O	SEE P&ID	10 - 55 VDC	FLUE GAS DUCT PRESSURE TRANSMITER
0	1ASA32005	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1271	AI	4-20 mADC	4	13	4	2	AHP1	TBN	30	RED	1ASB-PT-1271	N/A	-	RED							
0	1ASA32005	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1271	-	-	-	-	-	3	AHP1	TBN	31	BARE	1ASB-PT-1271	N/A	GND	BARE							
0	1ASA33001	600V TC	1-4C	PVC	THHN	14 AWG	M-001	DO	120 VAC	-	-	-	1	PNL-001	TB1	3	BLK	MCC 1E-2D	TBD	TBD	BLK	MOTOR	-	-	-	-	-	T/S HOIST UP
0	1ASA33001	600V TC	1-4C	PVC	THHN	14 AWG	M-001	DO	120 VAC	-	-	-	2	PNL-001	TB1	7	WHT	MCC 1E-2D	TBD	TBD	WHT							
0	1ASA33001	600V TC	1-4C	PVC	THHN	14 AWG	M-001	DO	120 VAC	-	-	-	3	PNL-001	TB1	4	RED	MCC 1E-2D	TBD	TBD	RED							T/S HOIST DOWN
0	1ASA33001	600V TC	1-4C	PVC	THHN	14 AWG	M-001	DO	120 VAC	-	-	-	4	PNL-001	TB1	8	GRN	MCC 1E-2D	TBD	TBD	GRN							
0	1ASA33002	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1100	DO	120 VAC	-	-	-	1	PNL-001	TB1	10	BLK	1ASB-SV-1100	N/A	+	BLK	SOLENOID VALVE	ASCO	JKB8342G001MS	N/A	N/A	120 VAC	T/S ASH FEED VALVE SOLENOID
0	1ASA33002	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1100	DO	120 VAC	-	-	-	2	PNL-001	TB1	9	WHT	1ASB-SV-1100	N/A	-	WHT							
0	1ASA33002	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1100	-	-	-	-	-	3	PNL-001			GRN	1ASB-SV-1100	N/A	GND	GRN							
0	1ASA33003	600V TC	1-4C	PVC	THHN	14 AWG	M-002	DO	120 VAC	-	-	-	1	PNL-001	TB1	12	BLK	MCC 1E-2F	TBD	TBD	BLK	MOTOR	-	-	-	-	-	T/S VENT FAN MOTOR RUN
0	1ASA33003	600V TC	1-4C	PVC	THHN	14 AWG	M-002	DO	120 VAC	-	-	-	2	PNL-001	TB1	13	WHT	MCC 1E-2F	TBD	TBD	WHT							
0	1ASA33003	600V TC	1-4C	PVC	THHN	14 AWG	M-002	DI	120 VAC	-	-	-	3	PNL-001	TB1	11	RED	MCC 1E-2F	TBD	TBD	RED							T/S VENT FAN MOTOR RUNNING
0	1ASA33003	600V TC	1-4C	PVC	THHN	14 AWG	M-002	DI	120 VAC	-	-	-	4	PNL-001	TB1	12	GRN	MCC 1E-2F	TBD	TBD	GRN							
0	1ASA33003	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1110	DO	120 VAC	-	-	-	2	PNL-003	TB2	6	WHT	1ASB-SV-1110	N/A	-	WHT							
0	1ASA33004	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1255	DI	120 VAC	-	-	-	1	PNL-001	TB2	1	BLK	1ASB-ABV-1101	N/A	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	T/S VENT LINE ISOLATION VALVE OPEN LIMIT
0	1ASA33004	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1255	DI	120 VAC	-	-	-	2	PNL-001	TB2	2	WHT	1ASB-ABV-1101	N/A	2	WHT							
0	1ASA33005	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1101	DO	120 VAC	-	-	-	1	PNL-001	TB2	3	BLK	1ASB-ABV-1101	N/A	+	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	T/S VENT LINE ISOLATION VALVE SOLENOID
0	1ASA33005	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1101	DO	120 VAC	-	-	-	2	PNL-001	TB2	2	WHT	1ASB-ABV-1101	N/A	-	WHT							
0	1ASA33005	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1101	-	-	-	-	-	3	PNL-001	-	GND	GRN	1ASB-ABV-1101	N/A	GND	GRN							
0	1ASA33008	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1264	AI	4-20 mADC	-	-	-	1	PNL-003	TB1	17	BLK	PNL-002	N/A	+	BLK	DIFF. PRESS. TRANSMITTER	DWYER	DCP200A	0" - 20" H2O	SEE P&ID	120 VAC	F/S FILTER BAG D.P. TRANSMITTER
0	1ASA33008	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1264	AI	4-20 mADC	-	-	-	2	PNL-003	TB1	18	RED	PNL-002	N/A	-	RED							
0	1ASA33008	300V TC	1-TSP	PVC	THHN	18 AWG	1ASB-PT-1264	-	-	-	-	-	3	PNL-003	TB1	19	BARE	PNL-002	N/A	GND	BARE							
0	1ASA33009	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1268	DI	120 VAC	-	-	-	1	PNL-003	TB3	14	BLK	1ASB-ABV-1108	N/A	1	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	OPEN	120 VAC	SILO VENT FAN DISCHARGE VALVE OPEN LIMIT
0	1ASA33009	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1268	DI	120 VAC	-	-	-	2	PNL-003	TB3	15	WHT	1ASB-ABV-1108	N/A	2	WHT							
0	1ASA33010	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1269	DI	120 VAC	-	-	-	1	PNL-003	TB3	16	BLK	1ASB-ABV-1108	N/A	5	BLK	LIMIT SWITCH	MICROSWITCH	LSQA68134	N/A	CLOSED	120 VAC	SILO VENT FAN DISCHARGE VALVE CLOSE LIMIT
0	1ASA33010	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-ZS-1269	DI	120 VAC	-	-	-	2	PNL-003	TB3	17	WHT	1ASB-ABV-1108	N/A	6	WHT							
0	1ASA33011	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1108	DO	120 VAC	-	-	-	1	PNL-003	TB3	18	BLK	1ASB-ABV-1108	N/A	+	BLK	SOLENOID VALVE	ASCO	JKH8551G403MMS	N/A	N/A	120 VAC	SILO VENT LINE RELIEF VALVE SOLENOID
0	1ASA33011	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1108	DO	120 VAC	-	-	-	2	PNL-003	TB3	19	WHT	1ASB-ABV-1108	N/A	-	WHT							
0	1ASA33011	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1108	-	-	-	-	-	3	PNL-003	-	GND	GRN	1ASB-ABV-1108	N/A	GND	GRN							
0	1ASA33012	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1126	DO	120 VAC	-	-	-	1	PNL-003	TB3	20	BLK	1ASB-SV-1126	N/A	+	BLK	SOLENOID VALVE	ASCO	SUXB344G070MFMO-27248	N/A	N/A	120 VAC	FLUIDIZING AIR SUPPLY SOLENOID
0	1ASA33012	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1126	DO	120 VAC	-	-	-	2	PNL-003	TB3	21	WHT	1ASB-SV-1126	N/A	-	WHT							
0	1ASA33012	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1126	-	-	-	-	-	3	PNL-003	-	GND	GRN	1ASB-SV-1126	N/A	GND	GRN							
0	1ASA33013	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1110	DO	120 VAC	-	-	-	1	PNL-003	TB2	5	BLK	1ASB-SV-1110	N/A	+	BLK	SOLENOID VALVE	ASCO	JKHXB344G074MFMO-27248	N/A	N/A	120 VAC	F/S TRANSFER HOPPER BOTTOM GATE SOLENOID
0	1ASA33013	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1110	-	-	-	-	-	3	PNL-003	-	GND	GRN	1ASB-SV-1110	N/A	GND	GRN							
0	1ASA33014	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1109	DO	120 VAC	-	-	-	1	PNL-003	TB2	11	BLK	1ASB-ABV-1109	N/A	+	BLK	SOLENOID VALVE	ASCO	JKHXB344G074MFMO-27248	N/A	N/A	120 VAC	F/S TRANSFER HOPPER TOP GATE SOLENOID (N/O)
0	1ASA33014	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1109	DO	120 VAC	-	-	-	2	PNL-003	TB2	12	WHT	1ASB-ABV-1109	N/A	-	WHT							
0	1ASA33014	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1109	-	-	-	-	-	3	PNL-003	-	GND	GRN	1ASB-ABV-1109	N/A	GND	GRN							
0	1ASA33015	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1113	DO	120 VAC	-	-	-	1	PNL-003	TB2	17	BLK	1ASB-SV-1113	N/A	+	BLK	SOLENOID VALVE	ASCO	SUXB344G070MFMO-27248	N/A	N/A	120 VAC	F/S LOWER EQUALIZING VALVE SOLENOID
0	1ASA33015	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1113	DO	120 VAC	-	-	-	2	PNL-003	TB2	18	WHT	1ASB-SV-1113	N/A	-	WHT							
0	1ASA33015	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1113	-	-	-	-	-	3	PNL-003	-	GND	GRN	1ASB-SV-1113	N/A	GND	GRN							
0	1ASA33016	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1112	DO	120 VAC	-	-	-	1	PNL-003	TB2	23	BLK	1ASB-SV-1112	N/A	+	BLK	SOLENOID VALVE	ASCO	JKHXB344G074MFMO-27248	N/A	N/A	120 VAC	F/S UPPER EQUALIZING VALVE SOLENOID (N/O)
0	1ASA33016	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1112	DO	120 VAC	-	-	-	2	PNL-003	TB2	24	WHT	1ASB-SV-1112	N/A	-	WHT							
0	1ASA33016	600V TC	1-3C	PVC	THHN	14 AWG	1ASB-SV-1112	-	-	-	-	-	3	PNL-003	-	GND	GRN	1ASB-SV-1112	N/A	GND	GRN							
0	1ASA33017	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-PS-1270	DI	120 VAC	-	-	-	1	PNL-003	TB2	25	BLK	1ASB-PS-1270	SWITCH 3	N.O.	BLK	PRESSURE SWITCH	UNITED ELECTRIC	J400-134	N/A	3 PSIG	125 VAC	FLUIDIZING AIR PRESSURE SWITCH
0	1ASA33017	600V TC	1-2C	PVC	THHN	14 AWG	1ASB-PS-1270	DI	120 VAC	-	-	-	2	PNL-003	TB2	26	WHT	1ASB-PS-1270	SWITCH 3	COM	WHT							

INSTRUMENTATION AND CONTROL SYSTEM

1. SUMMARY

A. THIS SECTION COVERS THE FURNISHING AND INSTALLATION OF COMPONENTS REQUIRED TO SUPPORT THE MODIFICATION AND EXPANSION OF THE EXISTING SCADA SYSTEM.

B. THE CONTRACTOR SHALL PROVIDE ALL SPECIFIED HARDWARE, INPUT/OUTPUT DEVICES, INSTRUMENTATION, ACCESSORIES, AND APPURTENANCES NECESSARY TO SUPPORT THE SYSTEM MODIFICATIONS, INCLUDING MOUNTING, WIRING, TESTING, AND COORDINATION WITH THE SYSTEM INTEGRATOR FOR FINAL COMMISSIONING.

2. SYSTEM DESCRIPTION

A. SCADA SYSTEM CONSISTS OF SENSORS, INDICATORS, ACTUATORS, FINAL CONTROL ELEMENTS, INTERFACE EQUIPMENT, AND ACCESSORIES CONNECTED TO DISTRIBUTED, PROGRAMMABLE CONTROLLERS OPERATING IN A MULTI-USER, MULTITASKING ENVIRONMENT PROGRAMMED TO SUPERVISE AND CONTROL MECHANICAL SYSTEMS.

B. THE SCADA SYSTEM SHALL INCLUDE THE FOLLOWING:

1. NEW ISOLATED ANALOG INPUT MODULE SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR IN THE EXISTING ASH HANDLING CONTROL PANEL, AHP-1.

2. INSTALL CABLE, CONDUIT, AND TERMINATIONS BETWEEN PLC ENCLOSURE AND EQUIPMENT AND INSTRUMENTATION PER THE DRAWINGS.

3. SUBMITTALS

A. PRODUCT DATA. INCLUDE MANUFACTURER'S TECHNICAL LITERATURE FOR EACH CONTROL DEVICE. INDICATE DIMENSIONS, CAPACITIES, PERFORMANCE CHARACTERISTICS, ELECTRICAL CHARACTERISTICS, FINISHES FOR MATERIALS, AND INSTALLATION AND STARTUP INSTRUCTIONS FOR EACH TYPE OF PRODUCT FURNISHED UNDER THIS CONTRACT. PROVIDE INFORMATION SPECIFIC TO THIS PROJECT. WHERE STANDARD MANUFACTURER'S CUT SHEETS ARE PROVIDED, CLEARLY INDICATE MODEL NUMBERS AND OPTIONS PROVIDED.

B. SHOP DRAWINGS. DETAIL EQUIPMENT ASSEMBLIES AND INDICATE DIMENSIONS, REQUIRED CLEARANCES, METHOD OF FIELD ASSEMBLY, INDIVIDUAL COMPONENTS, AND WIRE LABELS. PROVIDE DRAWINGS THAT ARE SPECIFIC TO THIS PROJECT, NOT DRAWINGS OF A GENERAL NATURE. CONTRACTOR SHALL COORDINATE WITH THE OWNER TO DETERMINE SPECIFIC REQUIREMENTS FOR WIRE LABELING AND DRAWING NUMBERING SCHEMES.

1. SCHEMATIC DIAGRAMS. ILLUSTRATE WIRING OF MCC BUCKETS, LOCAL STARTERS, CONTROL VALVES, AND OTHER CONTROL DEVICES. SHOW DEVELOPMENTS THAT DOCUMENT AVAILABLE CONTACTS ON PUSHBUTTONS, SELECTOR SWITCHES, AUXILIARY CONTACTS AND RELAYS, AND OTHER DEVICES.

2. WIRING DIAGRAMS. ILLUSTRATE BOTH CONTROL PANEL INTERNAL WIRING AND WIRING THAT MUST BE PERFORMED EXTERNAL TO CONTROL PANELS. PROVIDE DIAGRAMS THAT INDICATE POWER WIRING AND FUSING BETWEEN CONTROL PANEL DEVICES. CLEARLY INDICATE FUSE SIZING AND PART NUMBERS FOR FIELD-REPLACEABLE MODULES, SUCH AS SURGE PROTECTION DEVICES. PROVIDE DIAGRAMS THAT ILLUSTRATE PLC INPUT AND OUTPUT WIRING. DESIGN LOGICAL WIRE LABELING SCHEME AND INCLUDE WIRE LABELS ON ALL WIRING DIAGRAMS.

3. LAYOUT DIAGRAMS. PROVIDE DIAGRAMS THAT ILLUSTRATE FRONT VIEWS OF ALL CUSTOM-FABRICATED OR RETROFIT CONTROL PANELS. ILLUSTRATE SIDE VIEWS WHERE SIDE PENETRATIONS ARE NECESSARY. PROVIDE DIAGRAMS THAT ILLUSTRATE CONTROL PANEL BACKPANEL LAYOUTS. MAKE DRAWINGS TO-SCALE.

4. BILL OF MATERIALS. DOCUMENT MANUFACTURER AND COMPLETE PART NUMBER OF ALL COMPONENTS USED. THE MATERIALS LIST SHALL BE IN A TABULAR FORMAT ON THE DRAWINGS AND SHALL INCLUDE BUT IS NOT LIMITED TO PLC COMPONENTS, OPERATOR INTERFACE DEVICES, POWER SUPPLIES, RELAYS, PUSHBUTTONS, SELECTOR SWITCHES, INDICATING LIGHTS, CIRCUIT BREAKERS, FUSE BLOCKS, AND TERMINAL BLOCKS.

C. CALCULATIONS. PROVIDE SUPPORTING CALCULATIONS TO DOCUMENT SIZING OF POWER SUPPLIES AND UN-INTERRUPTIBLE POWER SUPPLIES.

D. EXCEPTIONS. PROVIDE A DETAILED LIST OF ANY EXCEPTIONS, FUNCTIONAL DIFFERENCES, OR DISCREPANCIES BETWEEN THE SYSTEM PROPOSED AND THESE SPECIFICATIONS.

E. SITE ACCEPTANCE TEST REPORT. FOLLOWING THE SITE ACCEPTANCE TESTING (SAT), AN I/O CHECKOUT REPORT SHALL BE SUBMITTED TO PROVE A FULLY FUNCTIONAL SYSTEM TEST WAS EXECUTED.

4. FINAL DOCUMENTATION

A. SUBMIT FOUR COPIES OF FINAL DOCUMENTATION FOR APPROVAL. ALL FINAL DOCUMENTATION SHALL BE PROVIDED IN THREE-RING BINDERS WITH DESCRIPTIVE COVERS, INDEX, AND SECTION DIVIDERS. FINAL DOCUMENTATION SHALL BE PROVIDED IN ELECTRONIC .PDF FORMAT IN ADDITION TO PAPER COPIES. PROVIDE AN ELECTRONIC COPY IN EACH FINAL DOCUMENTATION BINDER.

B. FINAL DOCUMENTATION SHALL INCLUDE ALL OF THE INFORMATION PROVIDED AS SUBMITTALS.

C. AS-BUILT DRAWINGS: FINAL DOCUMENTATION SHALL INCLUDE ALL ADDITIONS, DELETIONS, AND CORRECTIONS MADE DURING I/O CHECKOUT AND STARTUP.

D. AS-BUILT DRAWINGS: PROVIDE THE COMPLETED CABLE SCHEDULE WITH ALL CONTRACTOR AS-BUILT MODIFICATIONS REFLECTED.

E. PHOTOS: PROVIDE HIGH RESOLUTION, FULL-LENGTH, COLOR PHOTOGRAPHS OF THE FRONT AND BACK OF EACH ENCLOSURE WITH DOORS OPEN. FILES SHALL BE INCLUDED IN JPEG FORMAT FOR FINAL DOCUMENTATION.

5. SPARE PARTS

A. MINIMUM REQUIREMENTS. EACH CONTRACTOR PROVIDING INSTRUMENTATION AND CONTROL SYSTEM COMPONENTS SHALL PROVIDE SPARE PARTS TO MEET THE FOLLOWING REQUIREMENTS:

1. 100 PERCENT SPARE OF ALL LAMPS AND FUSES.

2. 10 PERCENT SPARE AUXILIARY OR INTERPOSING RELAYS OF EACH TYPE USED.

B. ALL SPARE PARTS UTILIZED DURING SYSTEM STARTUP SHALL BE REPLACED BY THE CONTRACTOR PRIOR TO FINAL COMPLETION.

6. SITE ACCEPTANCE TESTING (SAT)

UPON COMPLETION OF SYSTEM INSTALLATION, THE CONTRACTOR SHALL CONDUCT SITE ACCEPTANCE TESTING TO VERIFY THE SCADA SYSTEM I/O AND POWER WIRING. EACH CONTROL PANEL OR DEVICE SHALL BE PUT INTO SERVICE AND EACH I/O POINT SHALL BE INDIVIDUALLY CHECKED FOR ACCEPTABLE OPERATION. WHERE POSSIBLE, SCADA SYSTEM INPUTS SHALL BE TESTED BY MANIPULATING THE SENSOR OR FIELD DEVICE TO VERIFY CORRECT OPERATION. WHERE POSSIBLE, SCADA SYSTEM OUTPUTS SHALL BE TESTED BY MANIPULATING REGISTERS IN THE CONTROLLER AND OBSERVING THE FINAL CONTROL ELEMENT FOR CORRECT OPERATION.

1. OBSERVATION. THE CONTRACTOR SHALL INFORM THE ENGINEER AT LEAST 15 DAYS IN ADVANCE OF THE SITE ACCEPTANCE TESTING DATE(S). THE ENGINEER AND/OR THE OWNER RESERVE THE RIGHT TO OBSERVE SITE ACCEPTANCE TESTING.

2. IF SITE ACCEPTANCE TESTING MUST BE PERFORMED ON AN OPERATING PROCESS, AND IF PLANT SYSTEMS MUST BE MODIFIED OR SHUT DOWN TO FACILITATE TESTING, THE CONTRACTOR MAY REQUEST THAT THE OWNER OR THE ENGINEER BE PRESENT TO VIEW SUCH TESTING.

B. THE CONTRACTOR SHALL PRODUCE A REPORT THAT DOCUMENTS EACH I/O POINT TESTED, ALONG WITH THE DATE TESTED AND THE INITIALS OF THE INDIVIDUAL PERFORMING THE TEST. THIS REPORT SHALL BE SUBMITTED TO THE ENGINEER.

C. UPON COMPLETION OF SITE ACCEPTANCE TESTING, THE ENGINEER WILL PERFORM A SOFTWARE STARTUP. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL HARDWARE AND WIRING TESTING PRIOR TO THE SOFTWARE STARTUP. THE CONTRACTOR WILL NOT BE REQUIRED TO BE PRESENT DURING THE SOFTWARE STARTUP UNLESS THE ENGINEER DETERMINES THAT WIRING PROBLEMS ARE PRESENT IN THE SYSTEM.

7. GENERAL NOTES

A. LOW VOLTAGE CONTROL WIRING SHALL NOT SHARE CONDUIT WITH 120VAC OR ABOVE.

B. ALL CONDUIT INSTALLATIONS FOR CONTROL WIRING SHALL COMPLY WITH NATIONAL ELECTRICAL CODE (NEC) CONDUIT FILL REQUIREMENTS. WHERE MULTIPLE CONDUCTORS ARE ROUTED THROUGH A SINGLE CONDUIT, THE TOTAL FILL PERCENTAGE SHALL NOT EXCEED THE ALLOWABLE LIMITS.

C. CONTRACTOR SHALL PROVIDE A PANDUIT OR EQUIVALENT CABLE MANAGEMENT SYSTEM. ALL WIREWAYS CONTAINING FIELD WIRING SHALL HAVE A MINIMUM DEPTH OF 4 INCHES. EXISTING WIREWAYS SHALL BE REUSED WHERE FEASIBLE AND IN GOOD CONDITION.

D. ALL DEVICES AND WIREWAYS SHALL BE SECURELY MOUNTED ON THE DESIGNATED BACKPANEL IN ACCORDANCE WITH THE PROJECT LAYOUT AND MANUFACTURER RECOMMENDATIONS.

E. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER SELECTION AND SIZING OF ALL FUSES AND CIRCUIT BREAKERS TO ENSURE COMPLIANCE WITH EQUIPMENT RATINGS AND APPLICABLE CODES.

F. PROVIDE INTERPOSING RELAYS AS REQUIRED TO MATCH CONTROL SYSTEM COIL VOLTAGE SPECIFICATIONS AND ENSURE PROPER INTERFACE BETWEEN FIELD DEVICES AND CONTROL EQUIPMENT.

G. WHERE TERMINAL BLOCKS ARE ADDED TO EXISTING CONTROL PANELS, THE CONTRACTOR SHALL COORDINATE WITH THE OWNER TO CONFIRM LOCATION AND CONFIGURATION PRIOR TO INSTALLATION.

H. CONTRACTOR SHALL MAKE ALL NECESSARY MODIFICATIONS TO THE EXISTING ASH HANDLING PANEL TO COMPLETE THE CIRCUIT CONNECTIONS BETWEEN FIELD I/O AND THE PLC MODULES.

I. FOR INSTRUMENT LOCATION DETAILS, REFER TO UNITED CONVEYOR CORPORATION (UCC) DRAWING SET NO. C-55650-05.

J. CONTRACTOR SHALL ROUTE ALL WIRING TO AND FROM THE SILO UTILIZING EXISTING CABLE TRAY INFRASTRUCTURE. FROM THE END OF THE TRAY SYSTEM, UNDERGROUND CONDUIT SHALL BE USED TO COMPLETE THE PATHWAY TO THE SILO. FOR DETAILED ROUTING AND INSTALLATION REQUIREMENTS, REFER TO ELECTRICAL DRAWING E-102.

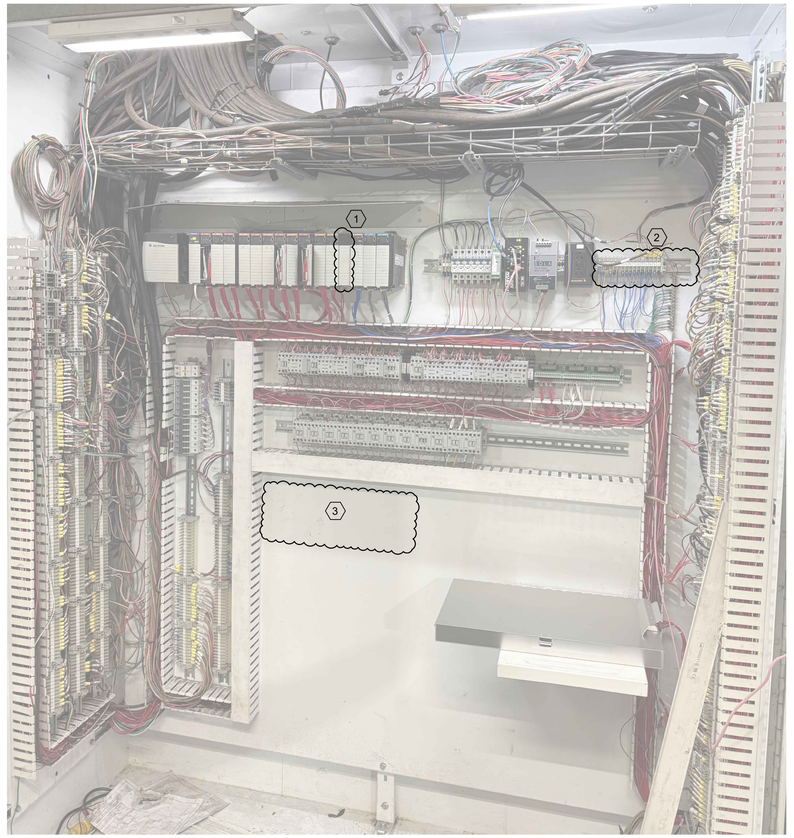
I. FOR CONDUCTOR TERMINATIONS IN PANELS AND AT INSTRUMENTS, SEE CONTROLS CABLE SCHEDULE.

SHEET KEYNOTES

1. REMOVE EXISTING FILLER MODULE AND REPLACE WITH NEW ALLEN BRADLEY 1756-IF8I ISOLATED ANALOG INPUT. CONTRACTOR SHALL ENSURE MODULE IS PROPERLY INSTALLED AND FULLY FUNCTIONAL BEFORE I/O CHECKOUT.

2. CONTRACTOR SHALL DISCONNECT ALL EXISTING ANALOG WIRING AND REMOVE THE ASSOCIATED ANALOG TERMINAL STRIP (TBN).

3. CONTRACTOR SHALL FURNISH AND INSTALL A NEW ANALOG TERMINAL STRIP (TBN) AND RECONNECT THE EXISTING ANALOG WIRING TO THE NEW TERMINAL STRIP. THE TERMINAL STRIP SHALL BE SIZED AND CONFIGURED TO ACCOMMODATE ALL EXISTING CONNECTIONS AS WELL AS PROVISIONS FOR FUTURE INSTRUMENTATION. FINAL LOCATION OF THE TERMINAL BLOCK SHALL BE COORDINATED WITH THE OWNER PRIOR TO INSTALLATION.



1 EXISTING ASH HANDLING PANEL
SCALE: NOT TO SCALE

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PROFESSIONAL ELECTRICAL ENGINEER
NATHAN J. CHAPMAN
E-20494
07.07.2025
STATE OF NEBRASKA

REV. NO.	DATE	DESCRIPTION
0	07-07-2025	ISSUED FOR CONSTRUCTION

REVISIONS

GENERAL NOTES

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA

2025

drawn by: CJH
designed by: NJC
project no.: 024-07087
date: 07.07.2025

SHEET
GEN

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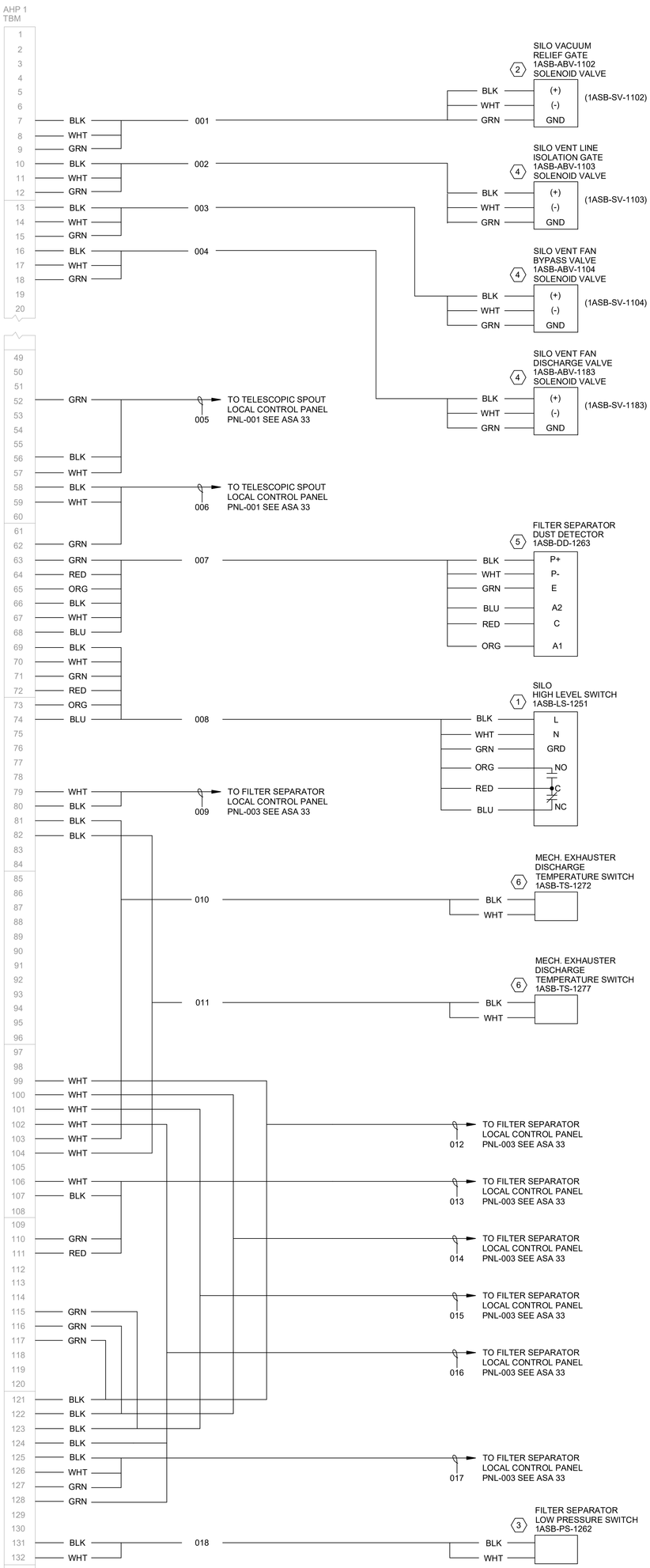

SHEET KEYNOTES

1. LOCATED ON TOP OF SILO.
2. LOCATED ON TOP OF SILO, BY OUTLET PLENUM.
3. LOCATED ON TOP OF FILTER SEPARATOR NEAR PULSE TIMER CONTROL PANEL, PNL-002.
4. LOCATED IN SILO, NEAR SILO VENT MOTOR.
5. LOCATED AT BASE OF SILO.
6. LOCATED AT BASE OF SILO NEAR MECHANICAL EXHAUSTER MOTORS.

SHEET ASA-29

drawn by: CJH
design check by: DCC
project no.: 024-07087
date: 07.07.2025

WIRING DIAGRAM

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA | 2025

REV. NO.	DATE	DESCRIPTION
0	07-07-2025	ISSUED FOR CONSTRUCTION

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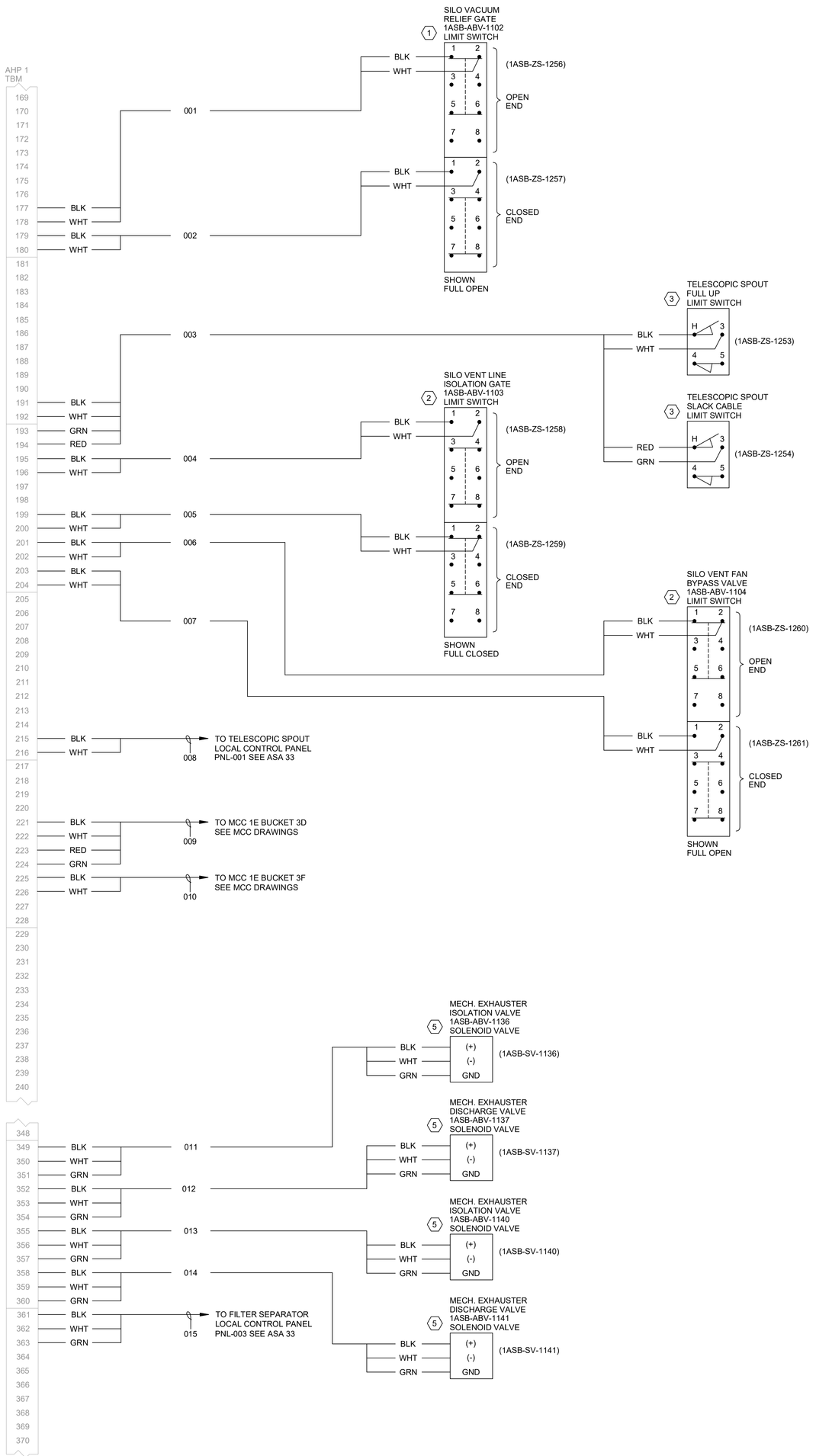

SHEET KEYNOTES

1. LOCATED ON TOP OF SILO, BY OUTLET PLENUM.
2. LOCATED IN SILO, NEAR SILO VENT MOTOR.
3. LOCATED IN SILO TELESCOPIC SPOUT JUNCTION BOX.
4. LOCATED AT BASE OF SILO.
5. LOCATED AT BASE OF SILO NEAR MECHANICAL EXHAUSTER MOTORS.

SHEET ASA-30

WIRING DIAGRAM

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA 2025

REV. NO.	DATE	DESCRIPTION
0	07-07-2025	ISSUED FOR CONSTRUCTION

REVISIONS

drawn by: CJH
designed by: CJH
project no.: 024-07087
date: 07.07.2025

PROFESSIONAL ENGINEER
CHRISTOPHER J. HUHMAN
E-20494
07.07.2025
I hereby certify that this engineering document was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Nebraska.

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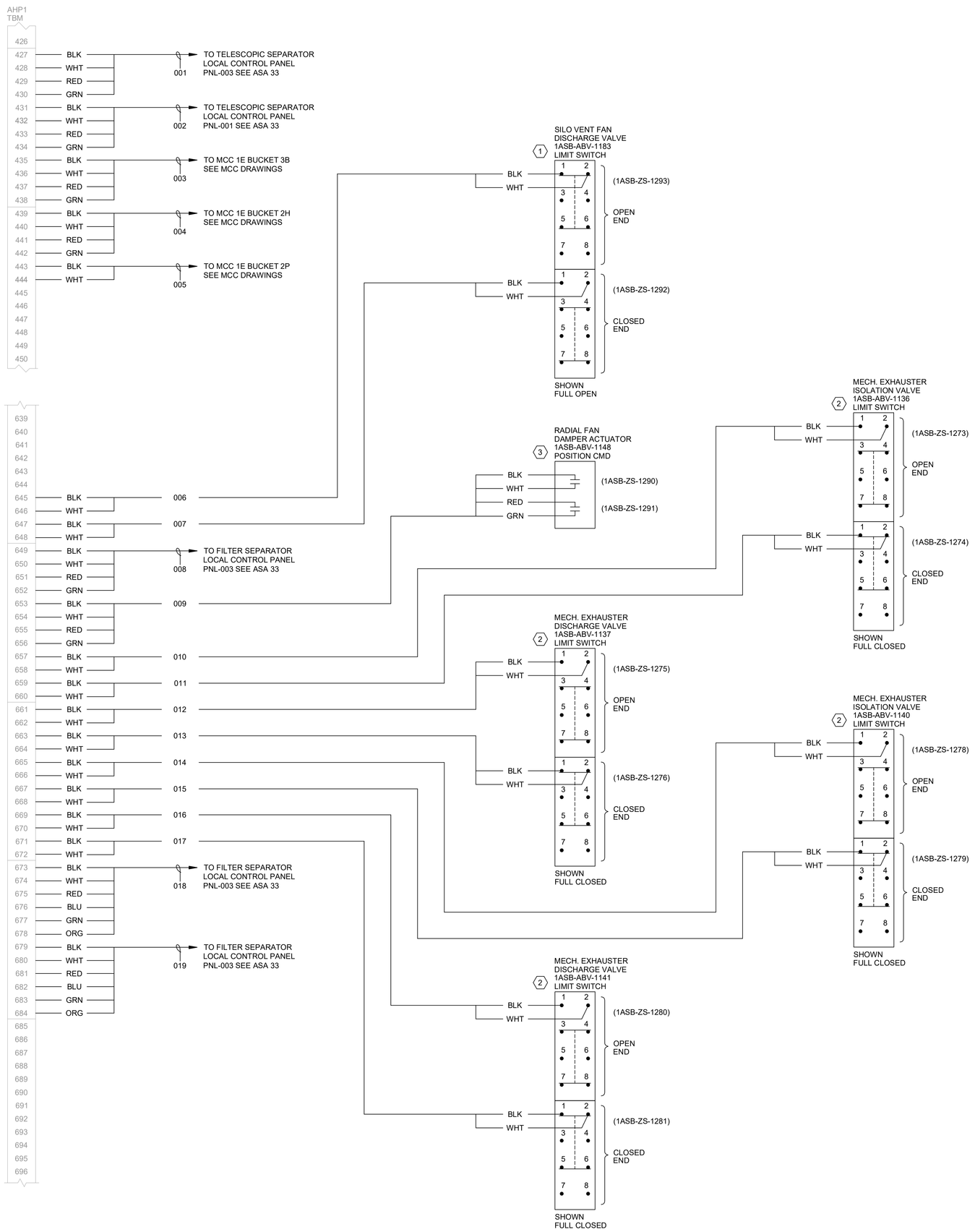

SHEET KEYNOTES

1. LOCATED IN SILO, NEAR SILO VENT MOTOR.
2. LOCATED AT BASE OF SILO NEAR MECHANICAL EXHAUSTER MOTORS.
3. LOCATED ON PIPING BETWEEN PRECIPITATOR BUILDING

SHEET ASA-31	WIRING DIAGRAM		
	WEC FLY ASH SYSTEM FOUNDATION		
	HASTINGS, NEBRASKA	2025	

drawn by: CJH
designed by: CJH
project no.: 024-07087
date: 07.07.2025

REV. NO.	DATE	DESCRIPTION
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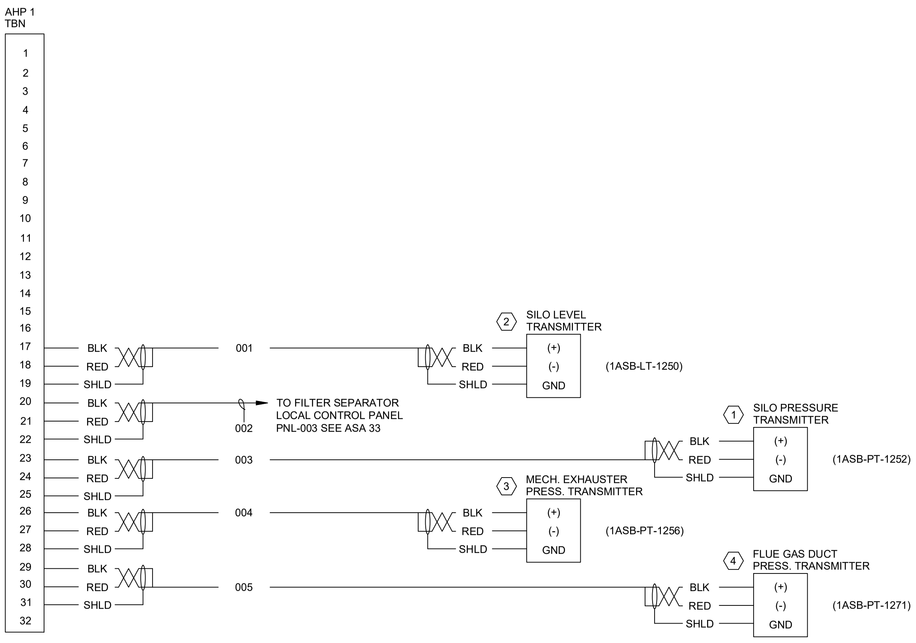

SHEET KEYNOTES

1. LOCATED ON TOP OF SILO, BY OUTLET PLENUM.
2. LOCATED ON TOP OF SILO.
3. LOCATED AT BASE OF SILO.
4. LOCATED ON PIPING BETWEEN PRECIPITATOR BUILDING

SHEET
ASA-32

drawn by: CJH
designed by: CJH
project no.: 024-07087
date: 07.07.2025

WIRING DIAGRAM

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA | 2025

REV. NO.	DATE	DESCRIPTION
0	07-07-2025	ISSUED FOR CONSTRUCTION

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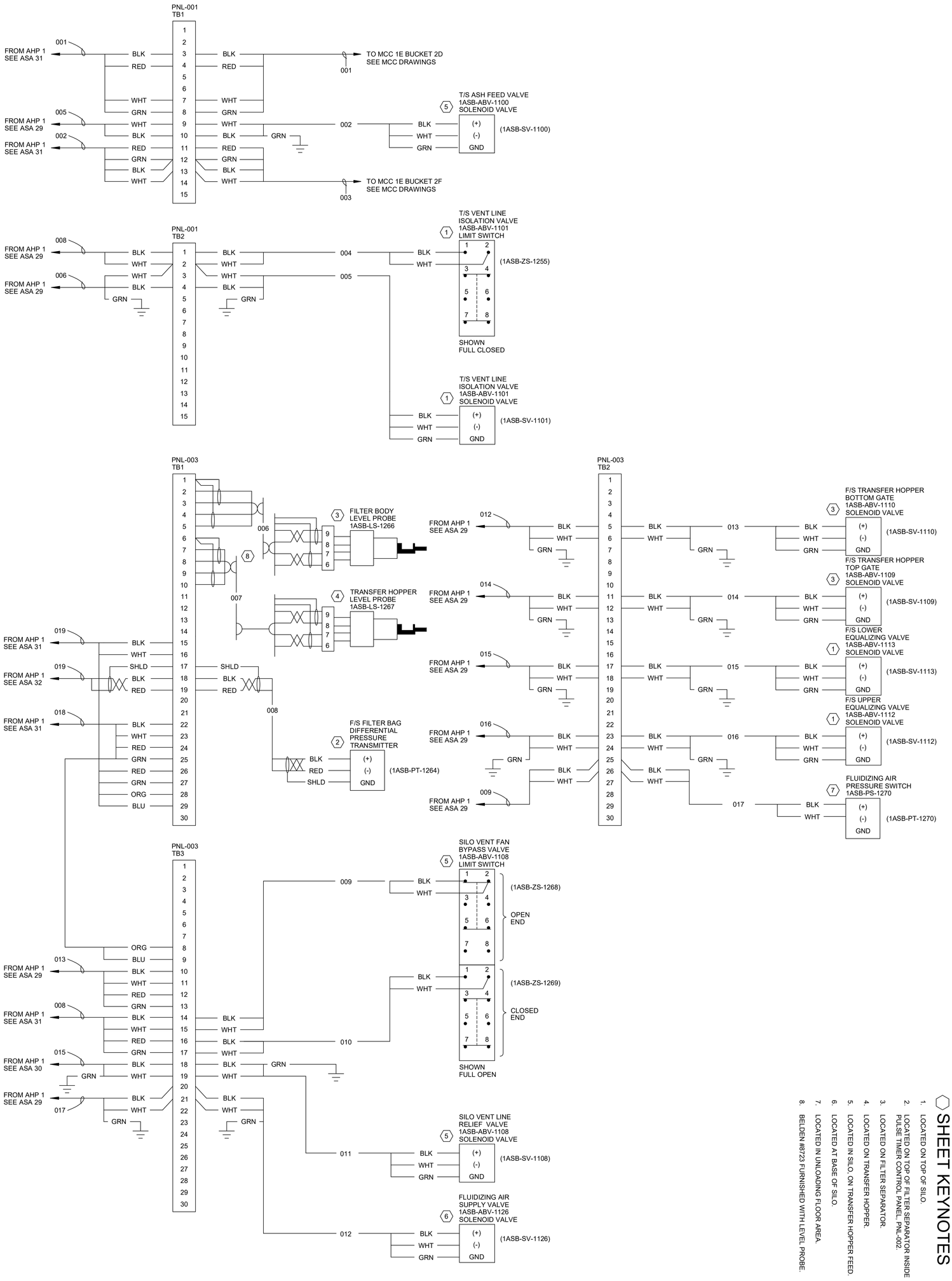

SHEET KEYNOTES

1. LOCATED ON TOP OF SILO.
2. LOCATED ON TOP OF FILTER SEPARATOR INSIDE PULSE TIMER CONTROL PANEL, PNL-002.
3. LOCATED ON FILTER SEPARATOR.
4. LOCATED ON TRANSFER HOPPER.
5. LOCATED IN SILO, ON TRANSFER HOPPER FEED.
6. LOCATED AT BASE OF SILO.
7. LOCATED IN UNLOADING FLOOR AREA.
8. BELDEN #8723 FURNISHED WITH LEVEL PROBE.

SHEET
ASA-33

WIRING DIAGRAM

WEC FLY ASH SYSTEM FOUNDATION

HASTINGS, NEBRASKA | 2025

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PIPING ABBREVIATIONS

@	AT
&	AND
AB	ANCHOR BOLT
ACI	AMERICAN CONCRETE INSTITUTE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AL	ALUMINUM
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASSN	ASSOCIATION
ASSY	ASSEMBLY
API	AMERICAN PETROLEUM INSTITUTE
AR	ABRASIVE RESISTANT
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
AWS	AMERICAN WELDING SOCIETY
B/	BOTTOM OF
B/M	BILL OF MATERIAL
BA	BOTTOM ASH
BC	BOLT CIRCLE
BD	BOARD
BLDG	BUILDING
BLR	BOILER
BOP	BOTTOM OF PIPE
BRKT	BRACKET
°C	DEGREES CENTIGRADE
CAP SCR	CAP SCREW
CI	CAST IRON
℄ OR CL	CENTERLINE
CLR	CLEAR
CO	CLEAN OUT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONV	CONVEYOR
CPLG	COUPLING
CS	CARBON STEEL
CTR	CENTER
CTSK	COUNTERSUNK
CU	CUBIC
CU FT	CUBIC FOOT
CU IN	CUBIC INCH
CU YD	CUBIC YARD
CYL	CYLINDER
CPVC	CHLORINATED POLYVINYL CHLORIDE
D	DURITE® PIPE
DC	DURA-CORE™ PIPE
DC II	DURA-CORE™ II PIPE
DET	DETAIL
DIA	DIAMETER
DR	DUR-ROK™ PIPE
DRG	DRILLING
DWG	DRAWING
E	EAST
EA	EACH
ECC	ECCENTRIC
ECON	ECONOMIZER
EIP	EXISTING IN PLACE
ELEV or EL	ELEVATION
ELL	ELBOW
ENCL	ENCLOSURE
EQL or =	EQUAL
ER	EXISTING RELOCATED
EXP	EXPANSION
EXP JT	EXPANSION JOINT
EXT	EXTERIOR
°F	DEGREES FAHRENHEIT
F/FLG	FACE OF FLANGE
FA	FLY ASH
FAB	FABRICATION
FC	FIELD CUT
FCTS	FIELD CUT TO SUIT
FDN	FOUNDATION
FL	FLOOR
FLG	FLANGE
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FRP	FIBERGLASS REINFORCED PLASTIC
FS	FAR SIDE
FT	FOOT (')
FURN	FURNISH
FW	FIELD WELD
GA	GAUGE
GALV	GALVANIZE
GPM	GALLONS PER MINUTE
GR	GRADE
GRTG	GRATING
HEX HD	HEXAGONAL HEAD
HGR	HANGER
HORIZ	HORIZONTAL
HP	HIGH POINT
HP	HORSE POWER
HR	HANDRAIL
HSP	HARDENED STEEL PIPE
HVY	HEAVY
HYD	HYDRAULIC
HDPE	HIGH-DENSITY POLYETHYLENE
ID	INSIDE DIAMETER
IN	INCH (")
INCL	INCLUDE
INS	INSIDE
IR	INSIDE RADIUS
JP PUMP	JETPULSION® PUMP
K	KIPS
KG	KNIFE GATE
L OR	ANGLE
LB OR #	POUND
LAT	LATERAL
LH	LEFT HAND
LG	LENGTH OR LONG
LP	LOW POINT
LS	LONG STROKE
M	METER
MATL	MATERIAL
MAX	MAXIMUM
MIN	MINIMUM
MK	MARK
mm	MILLIMETER
MTG	MOUNTING
N	NUVALOY® PIPE
NA	NOT APPLICABLE
NF	NOT FURNISHED
NO	NUMBER
NPT	NATIONAL PIPE TAPER
NS	NEAR SIDE
NTE	NOT TO EXCEED
NTS	NOT TO SCALE
NUV	NUVALOY
OC	ON CENTER
OD	OUTSIDE DIAMETER
PCF	LBS PER CUBIC FOOT
▱ OR PL	PLATE
PLATF	PLATFORM
PRE HTR	PRE HEATER
PROJ	PROJECTING
PSF	LBS PER SQUARE FOOT
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RAD	RADIUS
REF	REFERENCE
REQ'D	REQUIRED
RH	RIGHT HAND
S	SOUTH
SCH	SCHEDULE
SECT	SECTION
SP	SPACES
SS	STAINLESS STEEL
STA	STATION
STD	STANDARD
STL	STEEL
SYM	SYMMETRICAL
T/	TOP OF
TBE	THREADED BOTH ENDS
TC	TEST CONNECTION
TERS	TOTALLY ENCLOSED ROTARY SIDE
THK	THICK
TL	TRUE LENGTH
TOE	THREADED ONE END
TOS	TOP OF STEEL
TYP	TYPICAL
UCC®	UCC ENVIRONMENTAL
UN	UNLESS NOTED
VERT	VERTICAL
W	WEST
W/	WITH
W/O	WITHOUT
WP	WORK POINT
WS	WEAR SECTION
WT	WEIGHT
XS	EXTRA STRONG

PIPING CONTRACT DESIGN DRAWINGS

1.0 GENERAL NOTES - PIPING

1.1. DO NOT SCALE DESIGN DRAWINGS. USE FIGURE DIMENSIONS ONLY.

1.2. OBTAIN UCC GENERAL AND SUB-ASSEMBLY OPERATION & MAINTENANCE MANUAL INSTRUCTIONS BEFORE ERECTING OR SERVICING.

1.3. UCC PIPING DIMENSIONS ARE BASED ON THE NOMINAL DIMENSIONS OF THE COMPONENTS USED. ACTUAL DIMENSIONS OF COMPONENTS CAN VARY FRACTIONALLY. THIS FRACTIONAL DIFFERENCE CAN BE CUMULATIVE AND MAY BE OVERCOME BY GASKETING DURING ERECTION.

1.4. MATERIAL SHOWN ON CONTRACT DRAWINGS WILL NOT BE FURNISHED BY UCC UNLESS MARKED WITH ONE OF THE FOLLOWING SYMBOLS:

- (4)X MATERIAL FURNISHED BY UCC AS COVERED BY THIS DRAWING. NUMBER IN CIRCLE REFERS TO SEQUENCE NUMBER ON THE BILL OF MATERIAL. "X" DENOTES THE QUANTITY UTILIZED AT THE NOTED LOCATION.
- (E)
- (M) MATERIAL FURNISHED BY UCC AS PART OF AN ELECTRICAL DRAWING (DRAWING SERIES PREFIX E).
- (S) MATERIAL FURNISHED BY UCC AS PART OF A P&ID OR CONTRACT ASSEMBLY DRAWING (DRAWING SERIES PREFIX M).

MATERIAL FURNISHED BY UCC AS PART OF A STRUCTURAL DRAWING (DRAWING SERIES PREFIX S).

1.5. WHERE REQUIRED, (U) OR (R) ADJACENT TO A VALVE INDICATES "WEAR LINER" OR "FLOW CONE" TO BE LOCATED ON FLOW INLET SIDE.

1.6. WHERE REQUIRED,(S) ADJACENT TO A VALVE INDICATES "SEAT SIDE" FOR PROPER INSTALLATION ORIENTATION.

1.7. PIPING DESIGN DRAWINGS ARE PROVIDED FOR FIELD ERECTION AND ARE NOT INTENDED TO BE USED AS SHOP FABRICATION DETAIL DRAWINGS.

1.8. ALL PIPING 2-1/2" AND SMALLER IS TO BE FIELD ROUTED BY THE INSTALLING CONTRACTOR.

1.9. PIPE ROUTING DESIGN PROVIDED FOR PIPING LESS THAN 2-1/2" IS FOR REFERENCE ONLY. FIELD INSTALLED OBSTRUCTIONS INCLUDING BUT NOT LIMITED TO: HEATERS, LIGHTING, CONDUITS, CABLE TRAYS, EQUIPMENT ACCESS ZONES, DOORWAYS, WINDOWS, LOUVERS, FANS, OTHER SERVICE PIPING, DRAINS, MISCELLANEOUS STEEL, FIRE PROTECTION, ELECTRICAL PANELS, ETC. HAVE NOT BEEN CONSIDERED. PIPE ROUTING MUST BE FIELD REVIEWED BY INSTALLING CONTRACTOR PRIOR TO SHOP FABRICATING AND/OR INSTALLING PIPING. UCC IS NOT RESPONSIBLE FOR INTERFERENCES WITH EQUIPMENT/AREAS/PIPING NOT PROVIDED FOR CONSIDERA -TION DURING DESIGN.

1.10. PIPE TAPS INTO PIPING TO ACCOMMODATE TEST CONNECTIONS, MONITORING PORTS, INSTRUMENTATION, PURGE CONNECTIONS, ETC. ARE TO BE FIELD LOCATED BY INSTALLING CONTRACTOR. SEE P&ID's FOR RECOMMENDED SIZES, TYPES, LOCATIONS, AND INSTALLATION INSTRUCTIONS.

1.11. TEST CONNECTIONS ARE FURNISHED BY UCC AS 1" THREADOLETS, ¼" REDUCING BUSHINGS, AND ¼" PIPE PLUGS.

1.12. TAPS FOR VENTS, DRAINS, INSTRUMENTATION AND ANY OTHER MONITORING DEVICES ARE PROVIDED AS 1" OR 2" THREADOLET/SOCKOLET UNLESS NOTED OTHERWISE. SIZE REDUCTION TO ACTUAL INSTRUMENT SIZING IS NOT FURNISHED BY UCC.

1.13. TRENCHES MUST BE WELL DRAINED AND KEPT AS DRY AS POSSIBLE. SLOPE BOTTOM OR GUTTER TO DRAIN. TRENCHES AND/OR COVER PLATES ARE BY OTHERS.

1.14. NOT ALL DESIGN DRAWINGS LISTED ON THE DRAWING REFERENCE LIST MAY HAVE MATERIAL INCLUDED AS PART OF THE WORK SCOPE. SEE CONTRACT DOCUMENTS FOR COMPLETE SUMMARY OF MATERIAL THAT IS TO BE INCLUDED. BILLS OF MATERIAL MAY BE PROVIDED FOR THOSE SYSTEMS WHERE DESIGN ONLY HAS BEEN PROVIDED. THESE BILLS OF MATERIAL ARE PROVIDED FOR REFERENCE ONLY AND ARE NOT TO BE USED FOR THE PURCHASING OF MATERIAL. PROCURER OF MATERIAL IS TO VERIFY SCOPE MATERIAL, SUITABILITY, QUANTITIES, AND CONFORMANCE TO PROJECT SPECIFICATIONS.

1.15. USE KNIFEGATE INSTALLATION KIT IF OPERATOR(S) FOR KNIFEGATE(S) CANNOT BE INSTALLED SUCH THAT THE OPERATOR IS 45 DEGREES OR GREATER TO VERTICAL. SEE INSTALLATION INSTRUCTIONS FOR KNIFEGATES AND UCC DRAWING 3-1717-101 FOR DETAILS.

1.16. INSPECT CONVEYOR LINES REGULARLY. IF WEAR IS FOUND ON THE INSIDE OF THE PIPING TO EITHER SIDE, TOP, OR BOTTOM, THE PIPE SECTION SHOULD BE ROTATED IN 90° TO 135° INCREMENTS, DEPENDING ON THE WEAR PATTERN, TO INCREASE SERVICE LIFE.

1.17. CONVEYOR PIPE EXPANSION JOINT SETTING SHOWN ON DESIGN DRAWINGS ASSUME PIPE TEMPERATURE AT INSTALLATION IS 70° F. EXPANSION JOINT SETTINGS SHOULD BE FIELD ADJUSTED IF ACTUAL PIPE INSTALLATION TEMPERATURE VARIES MORE THAN ±10° FROM 70° F.

1.18. CONVEYOR PIPE CONNECTIONS MAY LOOSEN DUE TO TEMPERATURE CHANGES THAT WILL BE EXPERIENCED IN THE CONVEYOR PIPING SYSTEM. CONNECTIONS ARE TO BE PERIODICALLY INSPECTED IN ACCORDANCE WITH CONNECTION INSTALLATION INSTRUCTIONS #91140.

2.0 PIPING INSTALLATION NOTES

2.1. CUSTOMER TO CHECK CLEARANCE AND ACCESSIBILITY OF UCC EQUIPMENT AND LAYOUT TO AVOID INTERFERENCES WITH EQUIPMENT NOT FURNISHED BY UCC AND NOT SHOWN ON THE CONTRACT DESIGN DRAWINGS.

2.2. VALVE OPERATORS ARE TO BE ORIENTATED IN THE FIELD DURING INSTALLATION TO ACCOMMODATE ACCESS, OPERATION, AND POSSIBLE FIELD OBSTRUCTIONS. FOLLOW UCC - APPLICATION, INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS (SHIPPED WITH ASSEMBLY) FOR DETERMINING SUPPORT REQUIREMENTS FOR THOSE VALVES REQUIRING ADDITIONAL ACTUATOR SUPPORT WHEN THE OPERATORS ARE NOT INSTALLED IN THE VERTICAL POSITION.

2.3. SCHEDULE WALL PIPE (CARBON & STAINLESS STEEL) - ALL SCHEDULE WALL PIPE THAT IS SUPPLIED IS TO BE FIELD CUT AND WELDED AS NECESSARY.

2.4. CONVENTIONAL FABRICATION TECHNIQUE IS TO HAVE BOLT HOLES OF PIPE FLANGES TO STRADDLE CENTERLINES (TWO-HOLED) FLANGES OF FIELD ROUTED PIPING ARE TO BE ORIENTATED AS REQUIRED.

2.5. FIELD FINISHED PAINTING TO BE BY OTHERS.

2.6. DUE TO SITE CONDITIONS AT TIME OF INSTALLATION, INSTALLING CONTRACTOR TO FIELD VERIFY DIMENSIONS PRIOR TO FIELD CUTTING AND/OR WELDING FOR FIT UP AND/OR INSTALLATION OF COMPONENTS.

2.7. PIPING INTERNAL SURFACES SHALL BE CLEANED TO REMOVE SCALE, SAND, WELD SPLATTER AND CUTTING CHIPS IN ACCORDANCE WITH THE REQUIREMENTS OF THE PIPING FABRICATION INSTITUTE STANDARD ES-5.

2.8. HDPE PIPING IS TO BE LAID ON FLAT SURFACE WITHOUT ANY PROTUBERANCES.

2.9. HDPE PIPING WILL MOVE SIGNIFICANTLY DUE TO THERMAL HEATING AND COOLING CYCLES. KEEP PIPING A MINIMUM OF 10' AWAY FROM ANY OBSTACLES TO PREVENT DAMAGE TO THE OBSTACLE OR PIPE.

2.10. THERMAL GROWTH/CONTRACTION CYCLE OF HDPE PIPING MUST BE CONSIDERED DURING INSTALLATION. 100'-0" OF PIPE WILL CHANGE 1" IN LENGTH FOR EVERY 10° F CHANGE IN TEMPERATURE.

2.11. RADIUSES SHOWN ON THE HDPE PIPING LAYOUT ARE MINIMUM XX' IN THE YARD AND MINIMUM XX" AT THE ANCHOR POINT LOCATIONS. THESE RADIUSES AND LOCATIONS WHERE SHOWN HAVE BEEN SELECTED TO ACCOMMODATE THE ANTICIPATED PIPE MOVEMENTS.

2.12. ANCHOR AND GUIDE LOCATIONS MUST BE MAINTAINED TO PERMIT HDPE PIPING TO MOVE AS DESIGNED.

2.13. TIME AND THERMAL CYCLES HDPE PIPING MAY SHIFT FROM ORIGINAL INSTALLED POSITION. RELOCATE AS NECESSARY. POSITION SHOWN ON DESIGN DRAWINGS ARE CONSIDERED AT 70° F.

2.14. MATERIAL TO BE BLACK HDPE USED FOR THE MANUFACTURE OF POLYETHYLENE PIPE, TUBE AND FITTINGS SHALL BE HIGH DENSITY POLYETHYLENE MEETING ASTM D3350, DESIGNATION PE4710.

2.15. 4" IPS AND LARGER PIPING TO BE MANUFACTURED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM F714 AND AWWA C906.

2.16. PIPING PRESSURE RATING SHALL BE MARKED IN ACCORDANCE WITH ASTM F714 AND/OR AWWA C906.

2.17. FABRICATED PIPE FITTINGS TO BE FABRICATED TO SAME PRESSURE RATING AS CONNECTED PIPE.

2.18. PIPING JOINTS TO BE MADE USING HEAT FUSION METHOD UNLESS ALTERNATE METHOD IS REQUIRED. BRANCH CONNECTIONS TO BE MADE USING SADDLES, FITTINGS, OR TEES.

2.19. FLANGE CONNECTIONS TO BE MADE USING FLANGE ADAPTERS WITH CARBON STEEL BACKING RINGS.

2.20. REFERENCE THE PLASTIC PIPE INSTITUTE HANDBOOK OF POLYETHYLENE PIPE FOR ADDITIONAL INSTALLATION PARAMETERS.

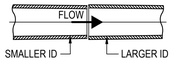
2.21. HDPE PIPE SHALL BE HANDLED AND STORED IN ACCORDANCE WITH MANUFACTURER GUIDELINES AND STANDARD PRACTICES FOR HDPE PIPE.

2.22. HDPE MATERIALS:
PIPE PER: ASTM D3350, CELL CL. PE445574C, PIPE DESIGNATION PE4710, DR-XX WALL, AND PER ASTM F714 AND AWWA C906

2.23. CIRCUMFERENTIAL OFFSET BETWEEN CENTERLINES OF ADJOINING PIPING COMPONENTS IS TO BE 1/16" OR LESS. SEE INSTALLATION INSTRUCTIONS #91140 FOR ASSEMBLY OF COUPLINGS.

2.24. CENTERLINE ALIGNMENT OF ADJACENT PIPE LENGTHS/COMPONENTS BEING CONNECTED MUST BE MAINTAINED. PIPE ENDS MAY BE SHIMMED TO ACCOMPLISH CENTERLINE ALIGNMENT.

2.25. NUVALOY PIPE TOLERANCES FOR MANUFACTURING RESULTS IN ONE END OF THE PIPE LENGTH BEING SLIGHTLY LARGER THAN THE OTHER. THIS IS TO FACILITATE REMOVAL OF PIPE LENGTH FROM THE MOLD WHEN PIPE IS MANUFACTURED. WHEN INSTALLING NUVALOY PIPE THE SMALLER ID END OF A PIPE SECTION IS TO DISCHARGE INTO THE LARGER ID END OF THE DOWNSTREAM PIPE SECTION. PLAN FIELD CUTS OF NUVALOY PIPE TO SUPPORT THIS PRACTICE. SEE SKETCH BELOW.



2.26. ALIGNMENT RING AND OR CLAMP(S) FOR THE PLAIN END PIPE CONNECTION ARE TO BE FITTED ON TO THE PIPE PRIOR TO ALIGNING PIPE ENDS. LOCATE ALIGNMENT RING AND OR CLAMP(S) TO EITHER SIDE OF THE PIPE ENDS, LEAVING THE PIPE ENDS CLEAR FOR VISUAL INSPECTION.

2.27. WHEN INSTALLING CONVEYOR PIPE, DO NOT APPLY THE FINAL TORQUE ON ANY CONNECTIONS UNTIL ALL THE CONNECTIONS IN THE PIPE RUN ARE INSTALLED AND SECURED. SEE INSTALLATION INSTRUCTIONS #91140 FOR ADDITIONAL INFORMATION.

2.28. NUVALOY PIPE IS FURNISHED IN STANDARD 18'-0" LENGTHS UNLESS NOTED OTHERWISE. WHERE NON-STANDARD LENGTHS ARE SHOWN ON CONVEYOR DRAWINGS, IT WILL BE NECESSARY TO FIELD CUT NUVALOY PIPE. FIELD CUT SECTIONS SHALL BE MEASURED AND FIELD ADJUSTED AS FIELD CONDITIONS DICTATE, ESPECIALLY WHERE LONG STRAIGHT RUNS OF PIPE EXIST. FIELD CUT PIPE SHALL BE SELECTED FROM THE SHORTEST AVAILABLE PIECE. FAILURE TO DO SO MAY RESULT IN EXCESS WASTAGE. THIS MAY REQUIRE THE INSTALLING CONTRACTOR TO PROCURE ADDITIONAL PIPING MATERIAL. SEE INSTALLATION INSTRUCTIONS #730703 FOR FIELD CUTTING PROCEDURE FOR NUVALOY PIPE.

2.29. WHEN FIELD CUTTING NUVALOY PIPE, REFER TO PIPE CONNECTION DETAILS FOUND IN THE INSTRUCTION MANUAL TO IDENTIFY GAPS REQUIRED FOR GASKETS AND/OR ALIGNING RINGS.

2.30. SEE INSTALLATION INSTRUCTIONS #91141 FOR FIELD CUTTING PROCEDURE FOR BASALT LINED CONVEYOR PIPE.

CONVEYOR PIPE DATA

NOMINAL PIPE SIZE	DURITE® D			NUVALOY® N			NOMINAL PIPE SIZE
	O.D.	LINEAR WEIGHT		O.D.	LINEAR WEIGHT		
		EMPTY	WASH OR SLURRY		EMPTY	WASH OR SLURRY	
INCHES	INCHES	lb/ft	lb/ft	INCHES	lb/ft	lb/ft	INCHES
1	NOT AVAILABLE			NOT AVAILABLE			1
1.5	NOT AVAILABLE			NOT AVAILABLE			1.5
2	NOT AVAILABLE			NOT AVAILABLE			2
2.5	NOT AVAILABLE			NOT AVAILABLE			2.5
3	4.5	35	40	NOT AVAILABLE			3
4	5.50	45	54	5.00	21	30	4
5	6.50	50	64	6.00	27	41	5
6	7.75	70	90	7.10	35	55	6
7	8.87	90	117	8.37	52	79	7
8	9.62	100	135	9.05	54	87	8
9	11.00	120	164	10.33	63	107	9
10	11.87	130	185	11.10	63	113	10
11	12.87	130	196	12.20	68	134	11
12	14.00	155	234	13.20	79	155	12
14	15.75	190	297	15.30	100	213	14

NOTE: PIPE WEIGHT PER FT. DOES NOT INCLUDE WEIGHT OF FLANGES OR MECHANICAL CONNECTION.

PIPING DRAWING INDEX

UCC DRAWING NUMBER	DRAWING TITLE
C-55650-05-001	GENERAL NOTES AND REFERENCE DRAWINGS
C-55650-05-002	GENERAL NOTES AND REFERENCE DRAWINGS
C-55650-05-003	PLAN, SECTION, AND DETAIL FLY ASH NUVEYOR® VACUUM SYSTEM HOPPER AREA UNIT 1
C-55650-05-004	PLAN, SECTION, AND DETAIL FLY ASH NUVEYOR® VACUUM SYSTEM HOPPER AREA UNIT 1
C-55650-05-005	PLAN, SECTION, AND DETAIL FLY ASH AIR VACUUM SYSTEM FILTER SEPARATOR TO EXHAUSTERS UNIT 1
C-55650-05-006	PLAN, SECTION, AND DETAIL FLY ASH AIR VACUUM SYSTEM EXHAUSTERS DISCHARGE TO DUCT UNIT 1
C-55650-05-007	PLAN, SECTION, AND SILO VENT PIPING VENT FAN TO DUCT TIE-IN UNIT 1
C-55650-05-008	PLAN, SECTION, AND SILO VENT PIPING VENT FAN TO DUCT TIE-IN UNIT 1

3.0 WELDING REQUIREMENT

3.1. WELDING OF PIPE TO BE EXECUTED IN ACCORDANCE WITH ASME B31.1, CHAPTER 5.

3.2. MAXIMUM ALLOWABLE ANGULAR DEFLECTION OF INSTALLED PIPE IS 1° OVER 50'-0" OR 0.1 DEGREE.

ALIGNMENT AND GAP FOR BUTT WELDING PIPE

FOR SINGLE WELDED JOINTS, THE EXCESS ROOT PENETRATION SHALL BE LIMITED TO THE LESSER OF 1/8" OR 25% OF THE NOMINAL WALL THICKNESS OF THE THINNER COMPONENT BEING JOINED, DOWN TO 1/2" WALL THICKNESS. FOR ANY NOMINAL WALL THICKNESS LESS THAN 1/2" THE EXCESS PENETRATION SHALL BE LIMITED 1/16".

4.0 LASER SCAN AND PLANT DATUM

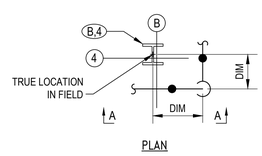
4.1. DIMENSIONS OF EXISTING STRUCTURES, EQUIPMENT, AND PIPING ARE BASED ON LASER SCANS AND MAY DIFFER FROM EARLIER DRAWINGS. IN THE CASE OF CONFLICTING DIMENSIONS, THE LASER SCAN SHALL GOVERN.

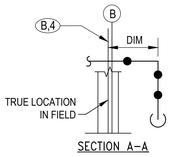
4.2. LASER SCANNING PROVIDES AN ACCURATE REPRESENTATION OF THE SITE CONDITIONS AT THE TIME OF THE SCAN. LOCATIONS OF CRITICAL DESIGN POINTS (HOPPER OUTLETS, DUCT CONNECTIONS, BOILER INTERFACES, ETC.) WHOSE LASER SCANNED LOCATIONS ARE AFFECTED BY TEMPERATURE MAY NEED TO BE FIELD VERIFIED.

4.3. LASER SCAN FOR THIS CONTRACT WAS PERFORMED BY (UCC/OTHERS) ON 10/05/2024.

4.4. ELEVATIONS AND DIMENSIONS (COORDINATES) REFERENCED ON EXISTING STATION DRAWINGS OR OTHER DOCUMENTS MAY DIFFER. CONTRACTOR TO INSTALL PIPING, PER UCC 2D DRAWINGS.

4.5. ELLIPSE DESIGNATES REFERENCE COLUMN FROM WHICH PIPE LOCATION IS TO BE MEASURED FROM AND WHEN COLUMN LOCATION IS BASED UPON THE LASER SCAN.





UCC REGISTRATIONS AND TRADEMARKS	SYMBOL	UCC REGISTRATIONS AND TRADEMARKS	SYMBOL
ACCUFLOC	TM	JETPULSION	®
ACCUFUSE	TM	M-PACT	TM
ACCUpHIX	TM	MAX - LP	TM
CDR	TM	MultiDAC	TM
COBRA	TM	NUMAFLEX	TM
DAC	TM	NUVA FEEDER	®
DAX	TM	NUVALOY	®
DEPAC	®	NUVASEAL	TM
DFC	TM	PAX	TM
DURA-CORE	TM	SFC	TM
DURALOY	TM	SPARTAN	TM
DURITE	®	STRYKER	TM
DUR-ROK	TM	SWITCHBLADE	TM
ecopod	TM	TIGER	TM
EXCEN-CRUSHER	TM	TITAN	TM
HDCC	TM	TRITON	TM
HDSS	TM	UCC	®
HYDROCURE	TM	VAX	TM
HYDROVEYOR	®	VIPER	®
INFINITY	TM		

SAFETY NOTE:
REFER TO UCC DOCUMENT NO. 721005 LOCATED IN THE UCC O&M MANUAL, "SYSTEMS AND EQUIPMENT SAFETY INSTRUCTIONS", FOR IMPORTANT SAFETY CONSIDERATIONS WHEN PERSONNEL ARE NEAR THE SYSTEM EQUIPMENT FOR ANY REASON.

NOTES

GENERAL NOTES INDEX

MECHANICAL DRAWING(S) INDEX	M-55650-05-001
STRUCTURAL DRAWING(S) INDEX	S-55650-05-001

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
0	ISSUED FOR CONSTRUCTION	02/14/2025	DSK			

THIS DRAWING SHALL NOT BE CONSIDERED A CERTIFIED DOCUMENT UNLESS UCC ENVIRONMENTAL (UCC) APPROVAL SIGNATURES OR INITIALS ARE PRESENT IN THE REVISION BOX.

THIS DRAWING IS AN UNPUBLISHED COPYRIGHTED WORK CONTAINING PROPRIETARY INFORMATION OF UCC, AND IS LOANED FOR USE IN THE CONDUCT OF COMPANY BUSINESS ONLY. THIS COPY HAS BEEN PROVIDED ON THE BASIS OF STRICT CONFIDENTIALITY AND WITH THE EXPRESS UNDERSTANDING THAT EXCEPT IN THE CONDUCT OF UCC BUSINESS, IT MAY NOT BE REPRODUCED, OR REVEALED TO ANY PERSON, IN WHOLE OR IN PART, WITHOUT EXPRESS WRITTEN PERMISSION FROM UCC, WHICH IS THE SOLE OWNER OF COPYRIGHT AND ALL OTHER RIGHTS THEREIN, BY RECEIVING THIS DRAWING, THE RECIPIENT AGREES TO RETURN IT UPON REQUEST.

THE INSTALLATION AND OPERATION OF UCC EQUIPMENT, IN ACCORDANCE WITH APPROVED PLANS AND OPERATING INSTRUCTIONS, SHALL BE THE SOLE RESPONSIBILITY OF THE PURCHASER, UNLESS OTHERWISE SPECIFIED BY CONTRACT.

MODIFICATION TO UCC EQUIPMENT AND STRUCTURES TO AVOID FIELD OBSTRUCTIONS, CORRECTIONS DUE TO MINOR DRAWING DISCREPANCIES WITH FIELD CONDITIONS, AND/OR MINOR FABRICATION MISFITS ARE CONSIDERED NORMAL ERECTION AND INSTALLATION OPERATIONS AND ARE NOT CHARGEABLE TO UCC. WE WILL NOT ACCEPT BACK CHARGES FOR ANY WORK PERFORMED IN THE FIELD UNLESS APPROVED BY UCC'S FIELD SERVICE DEPARTMENT.

SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE

GENERAL NOTES AND REFERENCE DRAWINGS
PIPING

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
C-55650-05-001	0

PIPE SUPPORT CONTRACT DESIGN DRAWINGS

10.0 GENERAL NOTES - PIPE SUPPORTS

10.1. DO NOT SCALE DESIGN DRAWINGS. USE FIGURE DIMENSIONS ONLY.
10.2. ALL CHANGES IN DIRECTION GENERALLY REQUIRE AN ANCHOR IN A CONVEYING SYSTEM.
10.3. ALL CONVEYOR PIPING SYSTEMS UTILIZE MECHANICAL JOINTS, EACH REQUIRING ONE GUIDE AND ONE SUPPORT ON EACH SIDE OF THE MECHANICAL JOINT, EXCEPT AT FITTING LOCATIONS.
10.4. EACH MECHANICAL JOINT IN A RISER REQUIRES A GUIDE BENEATH THE JOINT.
10.5. PIPE SUPPORTS ARE GENERALLY LOCATED 1'-6" TO 3'-0" FROM THE CENTERLINE OF THE ADJACENT MECHANICAL JOINT.
10.6. EXPANSION JOINTS WILL REQUIRE A GUIDE UPSTREAM AND ANCHOR DOWNSTREAM. EXPANSION JOINTS LOCATED MID-WAY BETWEEN ANCHOR POINTS WILL REQUIRE A GUIDE BOTH UP AND DOWNSTREAM.
10.7. CONVEYOR LINE GATES GENERALLY ARE TO BE ISOLATED FROM CONVEYOR PIPING THERMAL GROWTH.
10.8. PIPE SECTIONS ARE TOGGLED TO ACCOMMODATE THE DIFFERENTIAL LATERAL AND VERTICAL MOVEMENTS THAT MAY BE IMPOSED ON THE PIPING. DEPENDING ON PIPE LENGTH AND MOVEMENT, TOGGLE PIPE SECTIONS MAY REQUIRE SPRING HANGER(S). ANCHORS UPSTREAM AND DOWNSTREAM ARE REQUIRED TO BE SUPPORTED FROM SEPARATE STRUCTURES.
10.9. PIPE SUPPORTS SYSTEMS UNDER COLLECTION HOPPERS USUALLY USE HANGER RODS ATTACHED TO THE COLLECTION HOPPER, ONE ON EITHER SIDE OF THE ASH INTAKE. SPRING HANGERS WILL BE REQUIRED WHEN THE DIFFERENTIAL MOVEMENT BETWEEN THE ATTACHMENT POINT AND THE PIPE EXCEEDS 1/8".
10.10. RUBBER EXPANSION JOINTS LOCATED BY ROTATING EQUIPMENT ARE USED TO ISOLATE PIPING SYSTEM FROM ROTATING EQUIPMENT. NO LOADS ARE TO BE IMPOSED ON ROTATING EQUIPMENT NOZZLES FROM THE PIPING SYSTEM. CONTROL RODS PROVIDED WITH THE EXPANSION JOINT ARE TO BE "LOCKED OUT" SUCH THAT THERE IS NO COMPRESSION, EXTENSION OR LATERAL OFFSET ALLOWED OF THE RUBBER EXPANSION JOINT. PIPING OPPOSITE THE RUBBER EXPANSION JOINT FROM THE ROTATING EQUIPMENT IS TO BE ANCHORED. THE ANCHOR SHOULD BE DESIGNED TO WITHSTAND THE PRESSURE, MOMENTUM, AND THERMAL LOADS ON THE PIPING ISOLATED BY THE RUBBER EXPANSION JOINT. CONTROL RODS MUST BE IN POSITION DURING ROTATING EQUIPMENT OPERATION.
10.11. SUPPORT STRUCTURE/RACK STEEL MOVEMENTS ARE NOT CONSIDERED.
10.12. SUPPORT LOCATIONS INDICATED ON THE PIPING DRAWINGS ARE APPROXIMATE. ACTUAL PIPE SUPPORT LOCATION MAY VARY UP TO +/- 1'-0" FROM LOCATION INDICATED. SEE SUPPORT DETAIL DRAWINGS FOR FINAL LOCATION.
10.13. PIPE SUPPORTS SHALL BE DESIGNED TO PROVIDE ADEQUATE CLEARANCE FOR INSTALLATION AND MAINTENANCE OF CONNECTIONS.
10.14. HANGER RODS AND ATTACHMENT HARDWARE FOR PRESSURE VESSELS ARE FURNISHED AS PART OF PRESSURE VESSEL ASSEMBLY DRAWINGS.
10.15. THE FOLLOWING SERVICES AND STRUCTURES/MATERIALS ARE NOT FURNISHED BY UCC:
- CONCRETE
- CONCRETE REINFORCING STEEL
- EMBEDDED STEEL IN CONCRETE
- FIELD FINISH PAINT
- GROUT
- SMALL BORE SUPPORTS
- CONSTRUCTION CONSUMABLES
- AUXILIARY STEEL BEYOND 3'-0" (BUILDING AREA)

13.0 LOAD ANALYSIS

13.1. ALL CONSTRUCTION SHALL BE PERFORMED IN CONFORMANCE WITH THE BUILDING CODE AND DESIGN CODES REFERENCED BELOW. UNLESS NOTED OTHERWISE, THE PROJECT DOCUMENTS REFER TO THE FOLLOWING CODES AND STANDARDS:
- ASME CODE FOR POWER PIPING ASME B31.1-2022
- 2018 INTERNATIONAL BUILDING CODE (IBC)
- MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES ASCE 7-16
- "MANUAL FOR STEEL CONSTRUCTION", FOURTEENTH EDITION (AISC 360-10)
- BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE ACI 318-14
- "PIPE HANGERS AND SUPPORTS - MATERIAL, DESIGN, MANUFACTURE, SELECTION, APPLICATION & INSTALLATION" (ANSI/MSS SP-58-2018)
- "PIPE HANGERS AND SUPPORTS - SELECTION AND APPLICATION" (ANSI/MSS SP-69-2003)

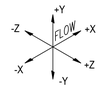
13.2. SUPPORT LOADING IS PROVIDED FOR 2 ½" NOMINAL AND ABOVE PIPING SEGMENTS. PIPING 2" NOMINAL AND SMALLER IS CONSIDERED SMALL BORE PIPING AND IS NOT ANALYZED.
13.3. SUPPORT LOADS INCLUDE PIPE AND CONVEYING MATERIAL WEIGHT, ICE, PRESSURE, THERMAL EXPANSION/COMPRESSION, FRICTION, WIND, AND SEISMIC.
13.4. WORST CASE LOADING IS PROVIDED FOR EACH SUPPORT.
13.5. SUPPORT DEAD LOADS CONSIST OF THE WEIGHT OF PIPE, CONVEYING MATERIAL, INSULATION, AND ALL PIPING COMPONENTS. THE PLUGGED DESIGN ASH LOAD IN THE PIPE IS TAKEN AS 100% FULL. RISERS ARE PLUGGED AT THE BOTTOM 10'-0" ONLY. THE OPERATING DESIGN ASH LOAD IN THE PIPE IS TAKEN AS:
- 10% FULL FOR VACUUM AND PRESSURE SYSTEMS.
- 50% FULL FOR DENSE PHASE SYSTEMS.
- 100% FULL FOR SLUICE SYSTEMS.

13.6. ICE LOADING APPLIES TO OUTDOOR PIPE ONLY. A 1" THICK COATING ALONG THE PIPE CIRCUMFERENCE IS CONSIDERED FOR ANALYSIS.
13.7. SUPPORT THERMAL LOADS CONSIST OF THE FORCES REQUIRED TO CAUSE A DISPLACEMENT IN EXPANSION JOINTS (ACTUATION FORCE) AND STATIC FRICTION. THE COEFFICIENT OF FRICTION IS CONSIDERED TO BE:
- 0.6 FOR CARBON STEEL PIPE ON STEEL.
- 0.4 FOR CAST IRON PIPE ON STEEL.

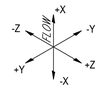
13.8. WIND LOADS:
- WIND SPEED: 120 MPH
- EXPOSURE CATEGORY: C

13.9. SEISMIC LOADS:
- SITE CLASSIFICATION: D
- IMPORTANCE FACTOR: 1.0
- RISK CATEGORY: III
- SEISMIC DESIGN CATEGORY: A
- ANALYSIS METHOD USED: ASCE 7-16 SECTION 1.4

13.10. RESOLUTION OF LOADS TO INTERFACE OF PIPE SUPPORT DESIGNS IS NOT INCLUDED.
13.11. LOADS ARE REPORTED IN LOCAL COORDINATES AT THE CENTERLINE OF PIPE. WHEN PIPE RUNS CHANGE DIRECTION FROM HORIZONTAL TO VERTICAL, THE COORDINATE SYSTEM SHALL ROTATE AROUND THE Z-Z AXIS. COORDINATE SYSTEM IS AS SHOWN:



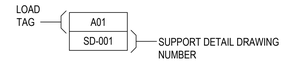
HORIZONTAL



VERTICAL

14.0 PIPE SUPPORT DESIGN

14.1. SUPPORT DESIGNS ARE PROVIDED FOR 2 ½" NOMINAL AND ABOVE PIPING SEGMENTS. PIPING 2" NOMINAL AND SMALL IS CONSIDERED SMALL BORE PIPING AND IS NOT INCLUDED.
14.2. PIPE SUPPORTS ARE DESIGNED FOR AN INTERFACE POINT NOT TO EXCEED 3'-0" FROM THE PIPE CENTER LINE.
14.3. UCC ASSUMES THAT EXISTING STRUCTURES ARE SOUND. IT IS THE OWNER'S OBLIGATION TO PERFORM A THOROUGH REVIEW OF THE EXISTING STRUCTURE (I.E. FIELD SURVEY, STRUCTURAL CALCULATIONS, ETC.) TO ENSURE THAT IT IS ADEQUATE TO SUPPORT THE NEW EQUIPMENT AS SHOWN ON THE CONTRACT DRAWINGS. REINFORCEMENT OF EXISTING STRUCTURES IS THE RESPONSIBILITY OF THE OWNER.
14.4. INTERFACE OF PIPE SUPPORTS WITH STEEL UTILIZES FIELD WELDED CONNECTIONS DESIGN FOR ADJUSTABILITY IN THE FIELD.
14.5. PIPING WILL NOT BE HUNG FROM U-BOLTS IN LOCATIONS OF THERMAL GROWTH.
14.6. PIPE SUPPORT DETAIL DRAWINGS ARE NOT CONSIDERED STRUCTURAL DRAWINGS AND ARE NOT REQUIRED TO BE SEALED BY A LICENSED PROFESSIONAL ENGINEER.
14.7. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
14.8. BASE PLATES SHALL BE GROUTED USING 5-STAR DP EPOXY GROUT OR FOX INDUSTRIES FOX PACK 1700 HS EPOXY GROUT OR APPROVED EQUAL IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION.
14.9. DO NOT SCALE DESIGN DRAWINGS. USE FIGURE DIMENSIONS ONLY.
14.10. PIPE SUPPORTS ARE IDENTIFIED ON THE PIPING DRAWINGS AND ARE TAGGED INDICATING THE SUPPORT LOAD TAG AND DETAIL IDENTIFIER (SUPPORT DETAIL DRAWING) AS SHOWN IN THE SUPPORT TAG NUMBER BELOW:



15.0 SUPPORT FABRICATION

15.1. PIPE SUPPORT STEEL AND HARDWARE SHALL BE COATED PER THE PIPING AND PIPE SUPPORT COATING SCHEDULE.
15.2. SURFACES WITHIN 2" OF ANY FIELD WELD AND 6" OF ANY FIELD CUT ARE TO BE LEFT UNPAINTED AND COATED WITH A WELDABLE PRIMER.
15.3. WEEP HOLES WILL NOT BE PROVIDED ON SEALED, HOLLOW PAINTED SECTIONS IN ORDER TO PROTECT THE INTERIOR FROM CORROSION.
15.4. MATERIAL SOURCED FROM THE U.S. IS PREFERRED. FOREIGN SOURCED MATERIAL IS ACCEPTABLE PROVIDED THE MATERIAL MEETS ALL APPLICABLE ASTM STANDARDS.

16.0 SUPPORT INSTALLATION

16.1. ALL BOLTS SHALL BE SNUG-TIGHT UNLESS SPECIFICALLY NOTED OTHERWISE. BOLTING SHALL CONFORM TO THE PROVISIONS OF THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS "SPECIFICATIONS FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS", UNLESS NOTED OTHERWISE ON DETAIL DRAWINGS. U-BOLT NUTS SHALL BE INSTALLED SNUG-TIGHT.
16.2. DUE TO SITE CONDITIONS AT TIME OF INSTALLATION, INSTALLING CONTRACTOR TO FIELD VERIFY DIMENSIONS PRIOR TO FIELD CUTTING AND/OR WELDING FOR FIT UP AND/OR INSTALLATION OF COMPONENTS.
16.3. WELDING PER UCC GENERAL WELDING SPECIFICATION 98009 OR OWNER'S SPECIFICATION. USE WHICHEVER IS MORE STRINGENT. WELD PROCEDURES AND WELDER QUALIFICATION TEST REPORTS SHALL BE SUBMITTED TO UCC FOR ALL NON-PREQUALIFIED WELDS PER AWS D1.1.
- WELDING ELECTRODES SHALL BE E70 LOW HYDROGEN AND HAVE A MINIMUM STRENGTH OF 70 KSI.
- WHEN WELDING STAINLESS STEEL TO CARBON STEEL, USE E309 TYPE ELECTRODES.

16.4. TOUCH UP PAINTING FOR FIELD WELDING GALVANIZED MATERIAL IS THE RESPONSIBILITY OF THE FIELD PAINTING CONTRACTOR.
16.5. REPAIR DAMAGED AND UNCOATED AREAS OF GALVANIZED STRUCTURAL STEEL, WELDS, ETC USING ZINC BASED ALLOYS PER ASTM A780 ANNEX A1 OR A3.
16.7. IT SHALL BE THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO COORDINATE THE PIPE SUPPORT DRAWINGS WITH THE STRUCTURAL AND CONVEYOR DRAWINGS, AS WELL AS ANY OTHER APPLICABLE TRADES, AND TO NOTIFY THE OWNER AND RESPONSIBLE ENGINEER OF ANY DISCREPANCIES BETWEEN THE DRAWINGS FOR RESOLUTION PRIOR TO PROCEEDING WITH THE WORK. DO NOT ASSUME THAT EITHER OF THE DRAWINGS OR SPECIFICATIONS TAKE PRECEDENCE.
16.8. THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. UNLESS OTHERWISE INDICATED, THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION.
16.9. PERISHABLE CONSTRUCTION MATERIAL TO BE USED BEFORE SHELF LIFE EXPIRES.

PIPING AND PIPE SUPPORT COATING SCHEDULE

EQUIPMENT	FINISH	COMMENTS
CARBON STEEL NUTS AND BOLTS	NONE	LIGHT MACHINING OIL FILM
CAST FLANGE CLAMPS	NONE	DUCTILE IRON, WILL HAVE SURFACE RUST
CAST IRON PIPE	NONE	DUCTILE IRON, WILL HAVE SURFACE RUST
CAST IRON FITTINGS	NONE	DUCTILE IRON, WILL HAVE SURFACE RUST
CARBON STEEL PIPE	NONE	MILL FINISH WILL RUST IF STORED OUTDOORS
FABRICATED PIPE SUPPORT HARDWARE	HOT DIP GALVANIZED	IF ITEM IS NOT AVAILABLE IN HDG ITEM WILL BE ZINC PLATED
CAST PIPE SUPPORT HARDWARE	NONE	DUCTILE IRON, WILL HAVE SURFACE RUST
PIPE SUPPORT STEEL	PRIMER	PER 4505-1, HIGH TEMP
SILO AREA AUX STEEL	PRIMER	PER 4505-1, LOW TEMP

SUPPORT SYMBOLS

2D DRAWINGS (PLAN)	2D DRAWINGS (ELEV)	3D MODEL	ISOMETRIC	SYMBOL LEGEND
				ANCHOR SUPPORT - TO PREVENT MOVEMENT IN ANY DIRECTION.
				GUIDE SUPPORT - TO SUPPORT WEIGHT OF PIPE AND PREVENT LATERAL MOVEMENT (¼" GAP UN)
				PLAIN SUPPORT - TO SUPPORT WEIGHT OF PIPE FROM BELOW.
			SEE PLAIN SUPPORT	ROD HANGER - TO SUPPORT WEIGHT OF PIPE FROM ABOVE.
				ROLLER SUPPORT - TO SUPPORT WEIGHT OF PIPE FROM BELOW AND PREVENT FRICTION ALONG THE LENGTH OF THE PIPE.
				SPRING HANGER - TO SUPPORT WEIGHT OF PIPE FROM ABOVE AND ACCOMMODATE VERTICAL/LATERAL MOVEMENT.
				LINE STOP - TO PREVENT MOVEMENT ALONG THE PIPE AXIS.

SAFETY NOTE:
REFER TO UCC DOCUMENT NO. 721005 LOCATED IN THE UCC O&M MANUAL, "SYSTEMS AND EQUIPMENT SAFETY INSTRUCTIONS", FOR IMPORTANT SAFETY CONSIDERATIONS WHEN PERSONNEL ARE NEAR THE SYSTEM EQUIPMENT FOR ANY REASON.

NOTES

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
0	ISSUED FOR CONSTRUCTION	02/14/2025	DSK			

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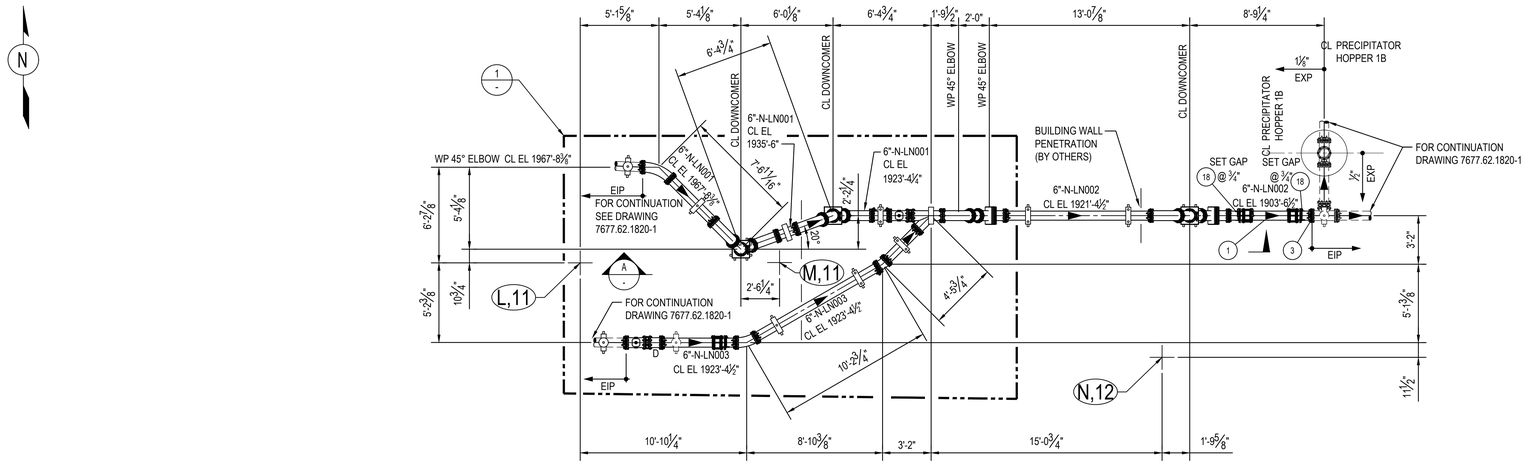
SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE
GENERAL NOTES AND REFERENCE DRAWINGS
PIPE SUPPORTS

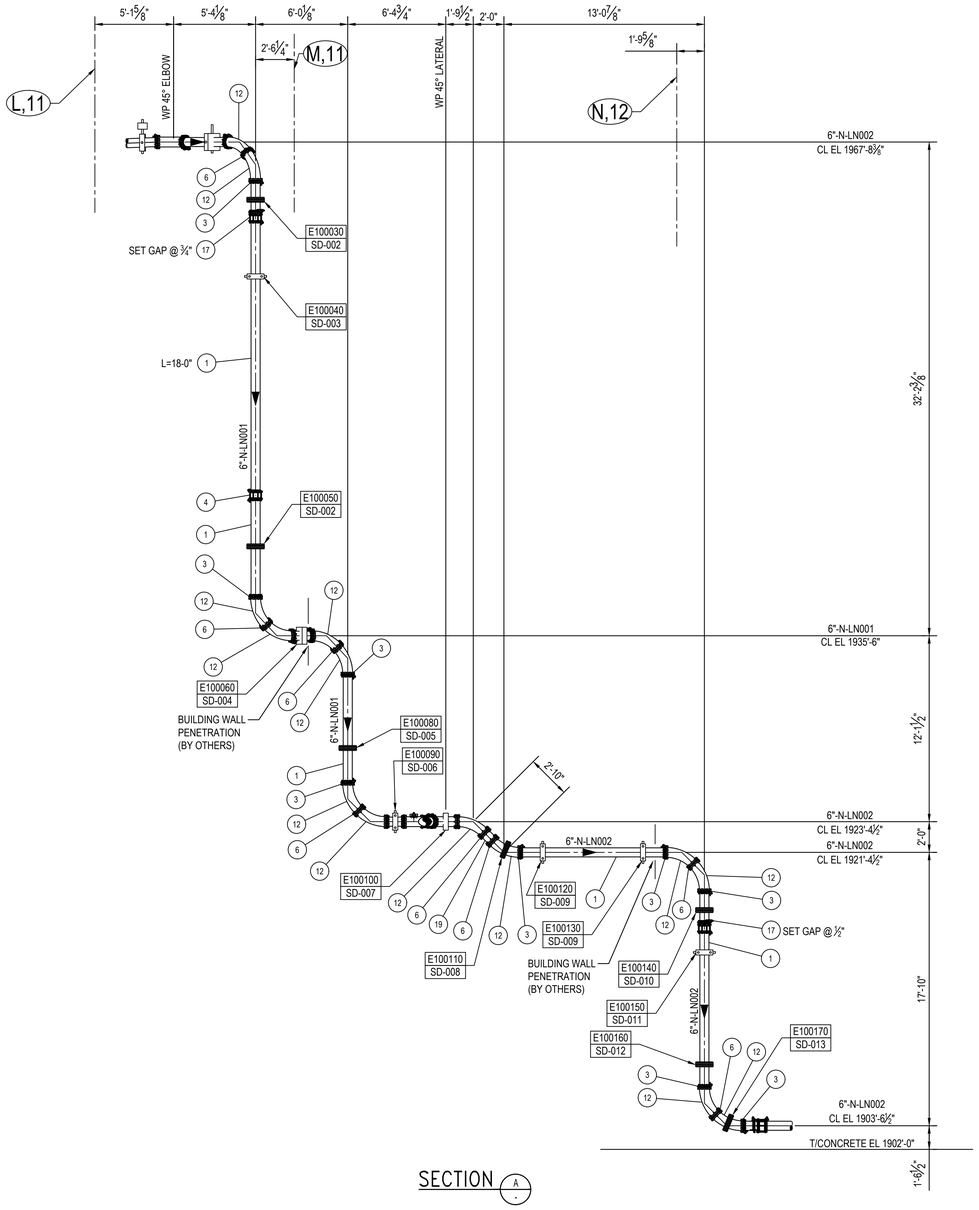
PLANT NAME
HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

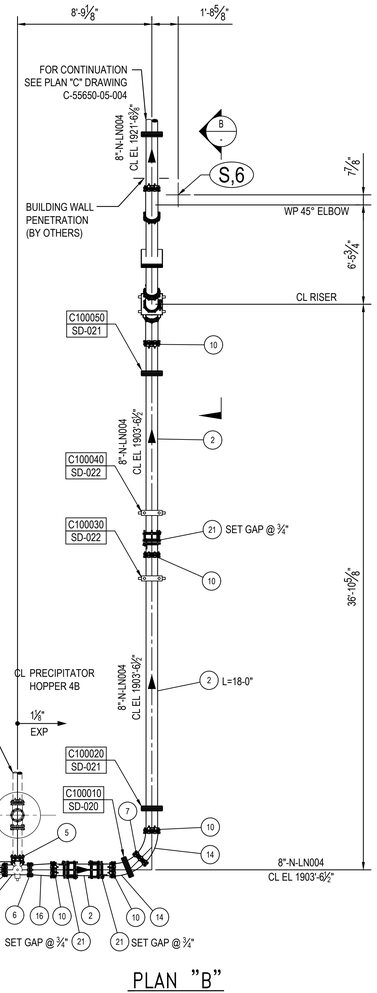
DRAWING NUMBER	REVISION
C-55650-05-002	0



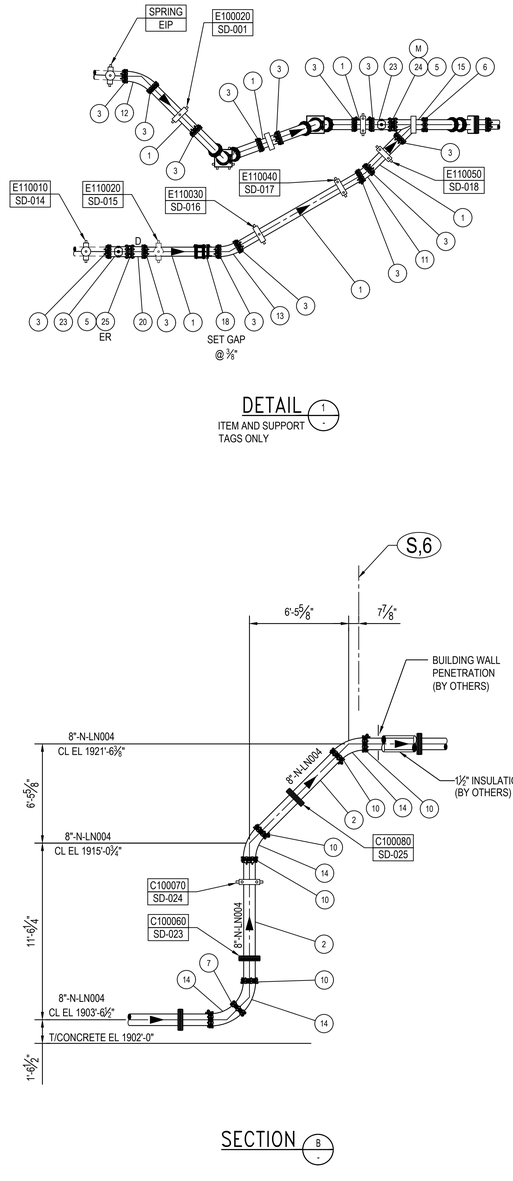
PLAN "A"



SECTION (A)



PLAN "B"



DETAIL (1)

ITEM AND SUPPORT TAGS ONLY

SECTION (B)

BILL OF MATERIALS

ID	DWG NO	PART NO	QTY	DESCRIPTION
1		174003	90'-0"	6" NUVALOY PIPE PE
2		174005	162'-0"	8" NUVALOY PIPE PE
3	2-1701-4015	1701-4015-3	25	6" B NUV-BEV CONNECTION LT ZP
4	3-1701-4020	1701-4020-3Y	1	6" AA NUV-NUV LOCKING CONNECTION LT ZP
5	2-1701-3117	1701-3117-2-69L	3	6" 69 BEV-KNIFE GATE-BEV CONNECTION
6	2-1701-467, 474	1701-469-19L	10	6" 19 BEV-BEV CONNECTION LT ZP
7	2-1701-467, 474	1701-471-19L	4	8" 19 BEV-BEV CONNECTION LT ZP
8	3-1701-4020	1701-4020-5Y	4	8" AA NUV-NUV LOCKING CONNECTION LT ZP
9	2-1701-291,296	1701-295	1	8" NUV-150#/STL (LOCKING) CONNECTION ZP
10	2-1701-4015	1701-4015-5	14	8" B NUV-BEV CONNECTION LT ZP
11	SK-1710-7	17036	1	6" 15° DURITE ELBOW LONG RADIUS SOLID
12	SK-1710-175	170561	15	6" 45° DURITE ELBOW SLUICE
13	SK-1710-174	170560	1	6" 30° DURITE ELBOW SOLID
14	SK-1938	170130	10	8" 45° DURITE ELBOW SLUICE
15	SK-1711-23	170502	1	6" DURITE LATERAL SOLID
16	SK-1716-19, 40	171643	1	8" X 6" DURITE REDUCER 1'-5 3/4" LONG
17	4-1730-116,123	1730-118-1	2	6" NUVALOY EXPANSION JOINT EXT W/ STOP
18	4-1730-116,123	1730-118	3	6" NUVALOY EXPANSION JOINT SS WITH STOP
19		174106-90	1	6" DURITE PIPE BE 0'-8 3/4" LG
20		174106-100	1	6" DURITE PIPE BE 0'-9 3/4" LG
21	4-1730-116,123	1730-120	6	8" NUVALOY EXPANSION JOINT SS WITH STOP
22	2-170076	170076	1	6" X 6" X 6" OUTLET TEE W/BE
23	SK-1715-57,59	1715-59-1	2	6" DURITE HAND HOLE EXTENDED W/2" NPT PLUG
24		REFERENCE	2	6" 40D KNIFE GATE CYLINDER OPERATOR
25		REFERENCE	1	6" EXISTING RELOCATED KNIFE GATE

NOTES

1. FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE DRAWING C-55650-05-001 AND C-55650-05-002.
2. BILL OF MATERIAL INCLUDES MATERIAL SHOWN ON DRAWINGS C-55650-05-003 & C-55650-05-004.
3. SUPPORT LOCATIONS SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS MAY VARY UP TO ±1'-0" FROM LOCATIONS INDICATED. SEE SUPPORT DETAIL DRAWINGS FOR FINAL LOCATION.
4. FOR PIPE SUPPORT LOADS, SEE DOCUMENT CL-55650-05-001, CL-55650-05-002, & CL-55650-05-003.
5. DIMENSIONS OF EXISTING STRUCTURES, EQUIPMENT AND PIPING ON THIS DRAWING ARE BASED ON LASER SCANS DATED 10/05/2024 AND MAY DIFFER FROM EARLIER DRAWINGS. IN THE CASE OF CONFLICTING DIMENSIONS, THE LASER SCANS SHALL GOVERN.
6. LASER SCANNING PROVIDES AN ACCURATE REPRESENTATION OF THE SITE CONDITIONS AT THE TIME OF THE SCAN. LOCATIONS OF CRITICAL DESIGN POINTS (HOPPER OUTLETS, DUCT CONNECTIONS,

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
0	ISSUED FOR CONSTRUCTION	02/14/2025	DSK			

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SCALE	1/4"-1'-0"	DRAWING SIZE	5

DRAWING TITLE

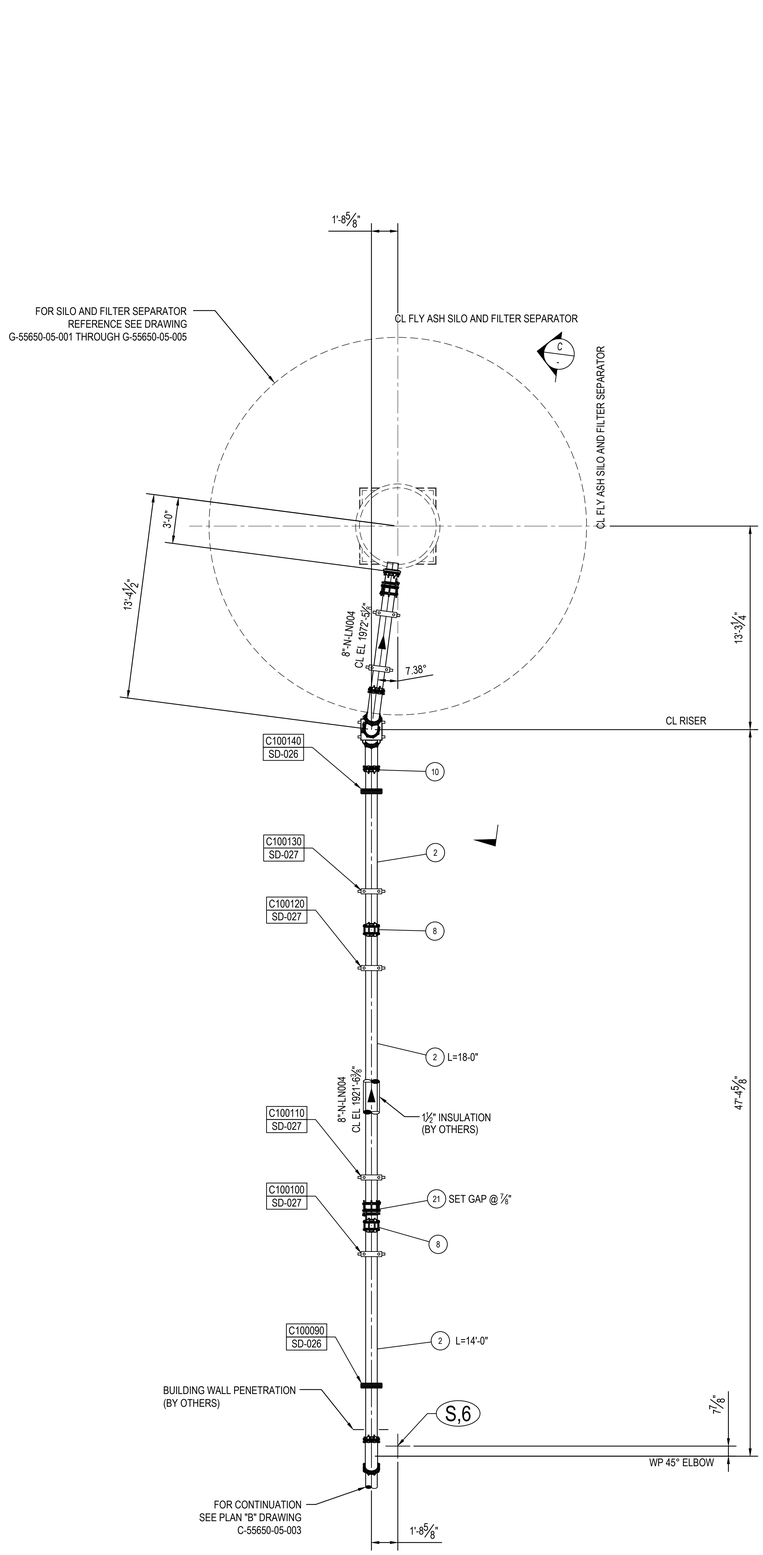
PLAN, SECTION AND DETAIL
FLY ASH NUVEYOR® VACUUM SYSTEM
HOPPER AREA
UNIT 1

PLANT NAME

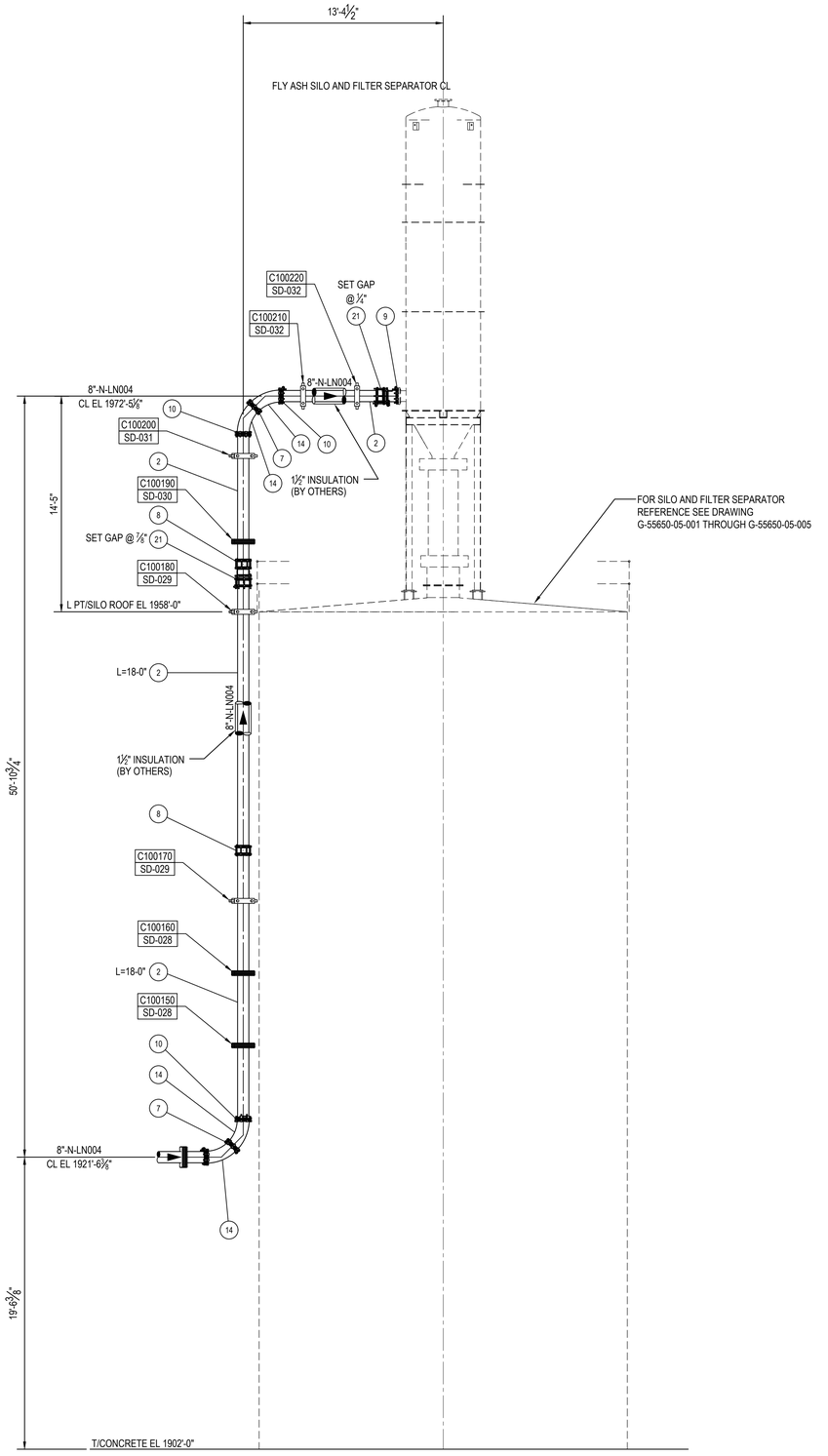
HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
C-55650-05-003	0



PLAN "C"



SECTION C

NOTES

1. FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE DRAWING C-55650-05-001 AND C-55650-05-002.
2. FOR BILL OF MATERIAL SEE DRAWING C-55650-05-003.
3. SUPPORT LOCATIONS SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS MAY VARY UP TO ±1'-0" FROM LOCATIONS INDICATED. SEE SUPPORT DETAIL DRAWINGS FOR FINAL LOCATION.
4. FOR PIPE SUPPORT LOADS, SEE DOCUMENT CL-55650-05-003.
5. DIMENSIONS OF EXISTING STRUCTURES, EQUIPMENT AND PIPING ON THIS DRAWING ARE BASED ON LASER SCANS DATED 10/05/2024 AND MAY DIFFER FROM EARLIER DRAWINGS. IN THE CASE OF CONFLICTING DIMENSIONS, THE LASER SCANS SHALL GOVERN.
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SCALE	1/4"-1'-0"	DRAWING SIZE	5

DRAWING TITLE

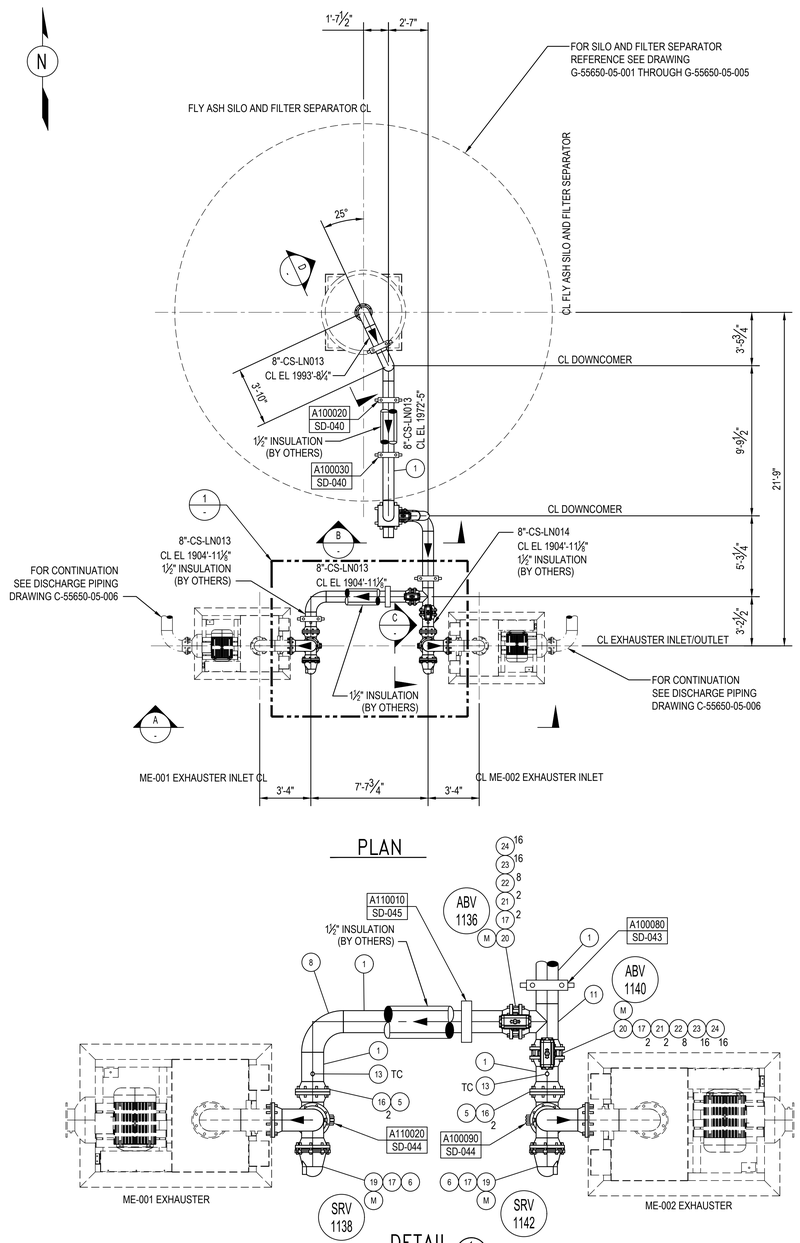
PLAN, SECTION AND DETAIL
FLY ASH NUVEYOR® VACUUM SYSTEM
HOPPER AREA
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

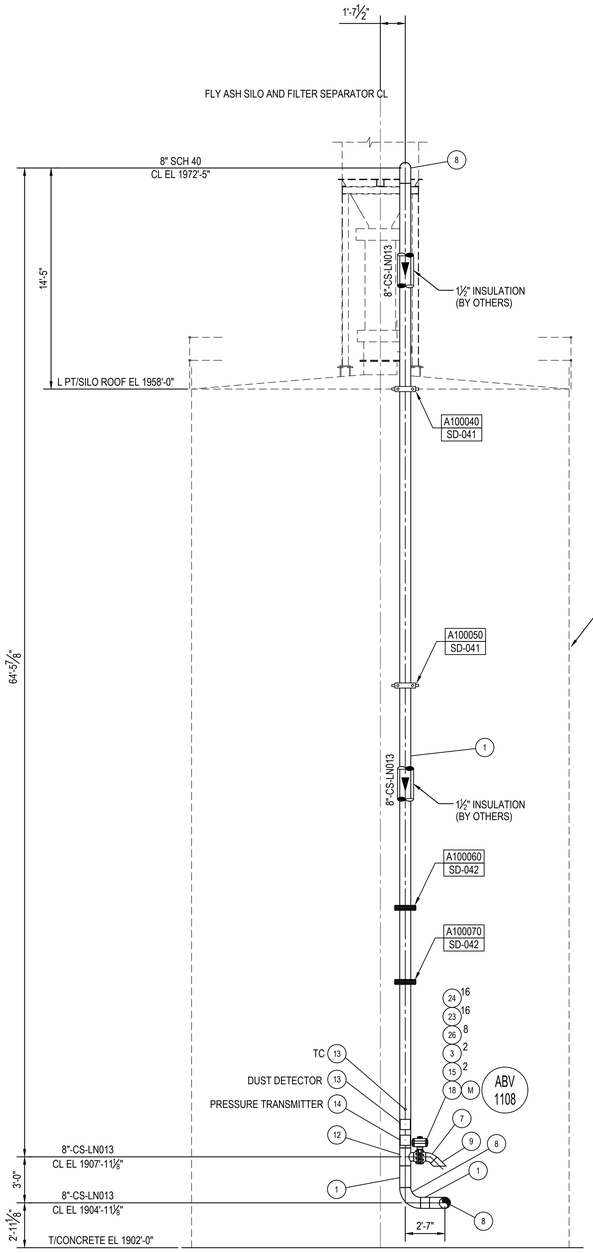
DRAWING NUMBER	REVISION
C-55650-05-004	0



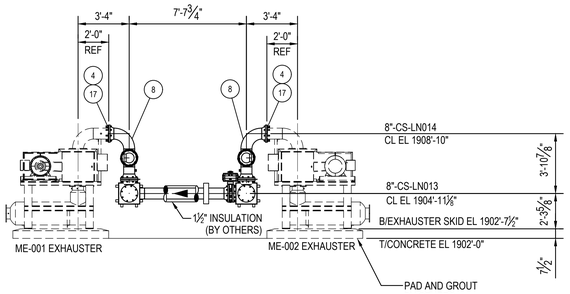
PLAN

DETAIL 1

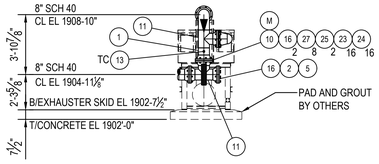
SCALE: ½" = 1'-0"
ITEM AND SUPPORT
TAGS ONLY



SECTION B

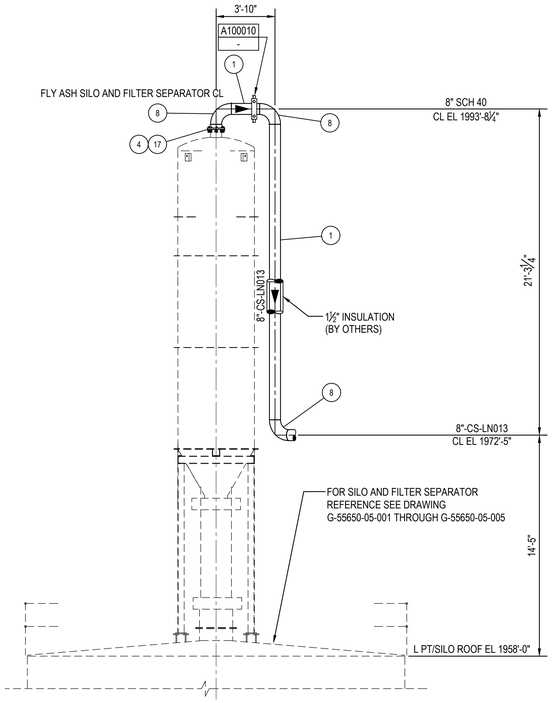


SECTION A



SECTION C

TYP (2) PLACES
ONE AS SHOWN
ONE OPPOSITE HAND



SECTION D

BILL OF MATERIALS

ID	DWG NO	PART NO	QTY	DESCRIPTION
1		179219-080-40	110'-0"	8" SCH 40 PIPE CS A53 GR B DR
2		171897-080	2	8" 150# RF BLIND FLG A105
3		408723-5	2	6" 150# FULL FACE GASKET
4	2-1701-1170	1701-1170-5J	3	8" 150#/STL-150#/STL CONNECTION
5	2-1701-1170	1701-1170-5R	6	8" 150#/STL-150#/STL CONNECTION
6	2-1701-318,327	1701-324-3L	2	8" 3 BEV-150#,STL CONN
7		171049-060-39	1	6" 90° SCH 40 LR ELBOW A234
8		171049-080-39	9	8" 90° SCH 40 LR ELBOW A234
9	2-326216	326216-6	1	6" BIRD SCREEN - SLIP ON PIPE SLEEVE
10		REFERENCE	2	8" WIRE BASKET STRAINER FOR 150# FLANGE
11		171268-08008004	5	8" SCH 40 STR TEE A234
12		171268-08006004	1	8" X 6" SCH 40 RED TEE A234
13		176062-080-010	6	8" x 1" 3000# THREDOLET A105
14		176062-080-020	1	8" x 2" 3000# THREDOLET A105
15		176778-060-40-2-1	2	6" 150# FF WN SCH 40 FLG A105
16		176778-080-40-1-1	10	8" 150# RF WN SCH 40 FLG A105
17		176778-080-40-2-1	9	8" 150# FF WN SCH 40 FLG A105
18		REFERENCE	1	6" BRAY BUTTERFLY VALVE A/C OPERATED
19		REFERENCE	2	8" RELIEF VALVE
20		REFERENCE	2	8" BRAY BUTTERFLY VALVE A/C OPERATED
21		408723-6	4	8" 150# FULL FACE GASKET
22		462026-07-750	16	3/4" X 7 1/2" LG FULL THRD STUD A193
23		460234-750	80	3/4" - 10 HEAVY HEX NUT A194
24		463003-18	80	3/4" - SAE WASHER
25		408888-080	2	8" 150# RING GASKET
26		462026-07-700	8	3/4" X 7" LG FULL THRD STUD A193
27		462026-07-550	16	3/4" X 5 1/2" LG FULL THRD STUD A193

NOTES

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3. FOR PIPE SUPPORT LOADS, SEE DOCUMENT CL-55650-05-004.
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REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
0	ISSUED FOR CONSTRUCTION	02/14/2025	DSK			

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SCALE	1/4"-1'-0"	DRAWING SIZE	5

DRAWING TITLE

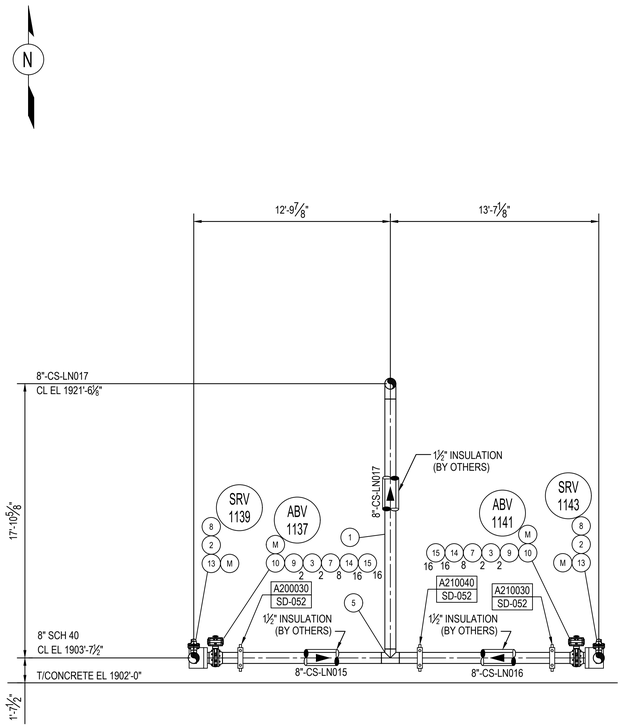
PLAN, SECTION AND DETAIL
FLY ASH AIR VACUUM SYSTEM
FILTER SEPARATOR TO EXHAUSTERS
UNIT 1

PLANT NAME

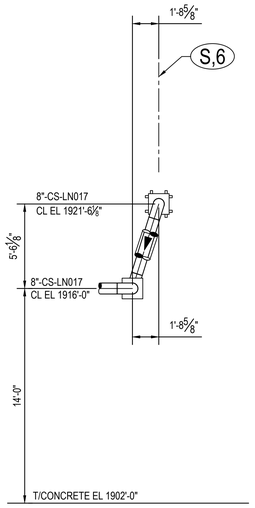
HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

ucc environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

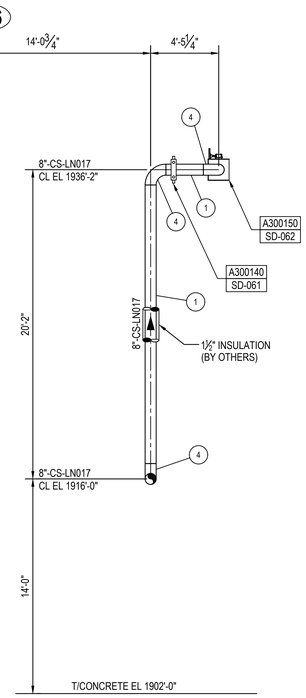
DRAWING NUMBER	REVISION
C-55650-05-005	0



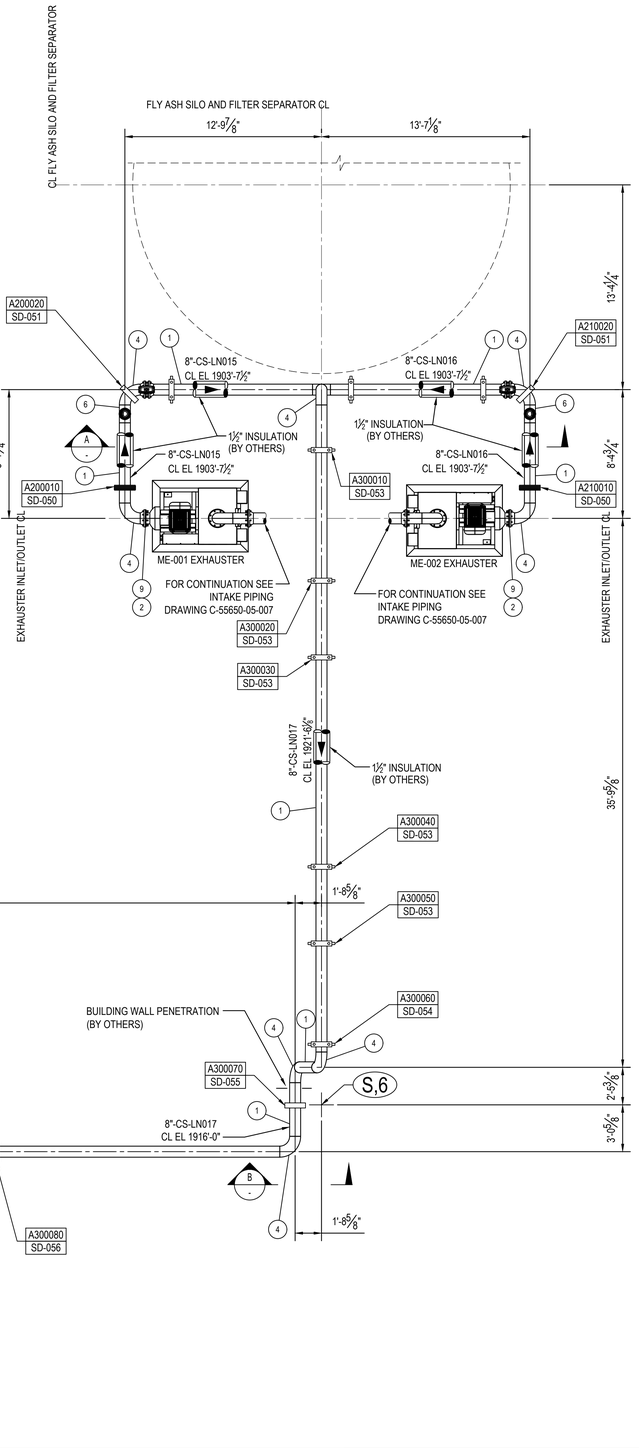
SECTION A

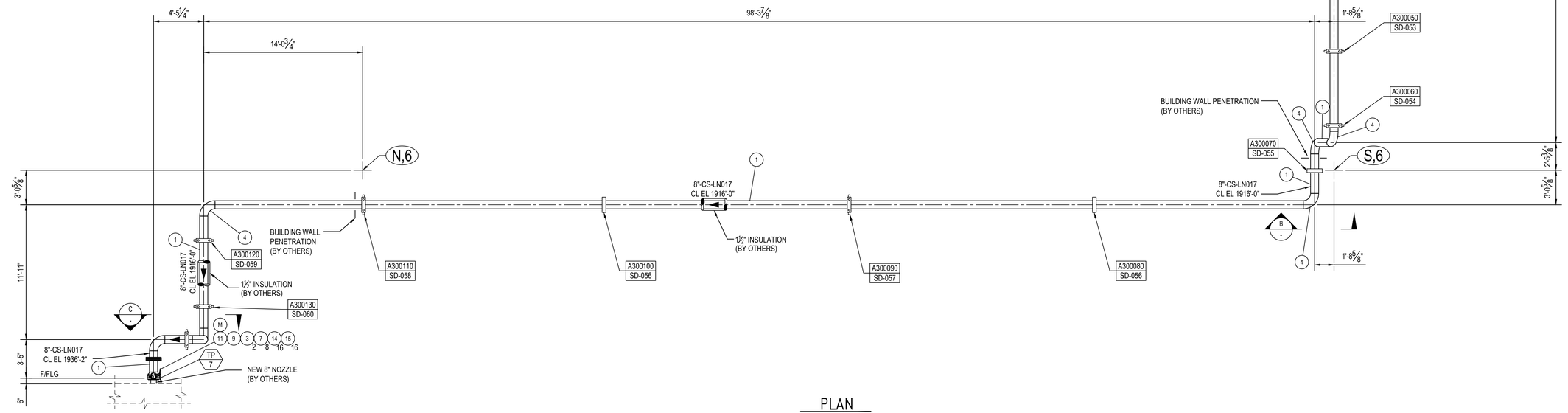


SECTION B



SECTION C





PLAN

BILL OF MATERIALS

ID	DWG NO	PART NO	QTY	DESCRIPTION
1		179219-080-40	240'-0"	8" SCH 40 PIPE CS A53 GR B DR
2		1701-320-3L	2	4" 3 BEV-150#,STL CONN
3		408723-6	6	8" 150# FULL FACE GASKET
4		171049-080-39	12	8" 90° SCH 40 LR ELBOW A234
5		171268-08008004	1	8" SCH 40 STR TEE A234
6		171268-08004004	2	8" X 4" SCH 40 RED TEE A234
7		462026-07-750	24	3/4" X 7 1/2" LG FULL THRD STUD A193
8		176778-040-40-1-1	2	4" 150# RF WN SCH 40 FLG A105
9		176778-080-40-2-1	7	8" 150# FF WN SCH 40 FLG A105
10		REFERENCE	2	8" BRAY SERIES 40 BUTTERFLY VALVE A/C OPERATED
11		REFERENCE	2	8" MANUAL BUTTERFLY VALVE
13		REFERENCE	2	4" RELIEF VALVE
14		460234-750	48	3/4" - 10 HEAVY HEX NUT A194
15		463003-18	48	3/4" - SAE WASHER

NOTES

1. FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE DRAWING C-55650-05-001 AND C-55650-05-002.
2. SUPPORT LOCATIONS SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS MAY VARY UP TO ±1'-0" FROM LOCATIONS INDICATED. SEE SUPPORT DETAIL DRAWINGS FOR FINAL LOCATION.
3. FOR PIPE SUPPORT LOADS, SEE DOCUMENT CL-55650-05-005.
4. DIMENSIONS OF EXISTING STRUCTURES, EQUIPMENT AND PIPING ON THIS DRAWING ARE BASED ON LASER SCANS DATED 10/05/2024 AND MAY DIFFER FROM EARLIER DRAWINGS. IN THE CASE OF CONFLICTING DIMENSIONS, THE LASER SCANS SHALL GOVERN.
5. LASER SCANNING PROVIDES AN ACCURATE REPRESENTATION OF THE SITE CONDITIONS AT THE TIME OF THE SCAN. LOCATIONS OF CRITICAL DESIGN POINTS (HOPPER OUTLETS, DUCT CONNECTIONS, BOILER INTERFACES, ETC.) WHOSE LASER SCANNED LOCATIONS ARE AFFECTED BY TEMPERATURE MAY NEED TO BE FIELD VERIFIED.

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
0	ISSUED FOR CONSTRUCTION	02/14/2025	DSK			

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SCALE	1/4"-1'-0"	DRAWING SIZE	5

DRAWING TITLE

PLAN, SECTION AND DETAIL
FLY ASH AIR VACUUM SYSTEM
EXHAUSTERS DISCHARGE TO DUCT
UNIT 1

PLANT NAME

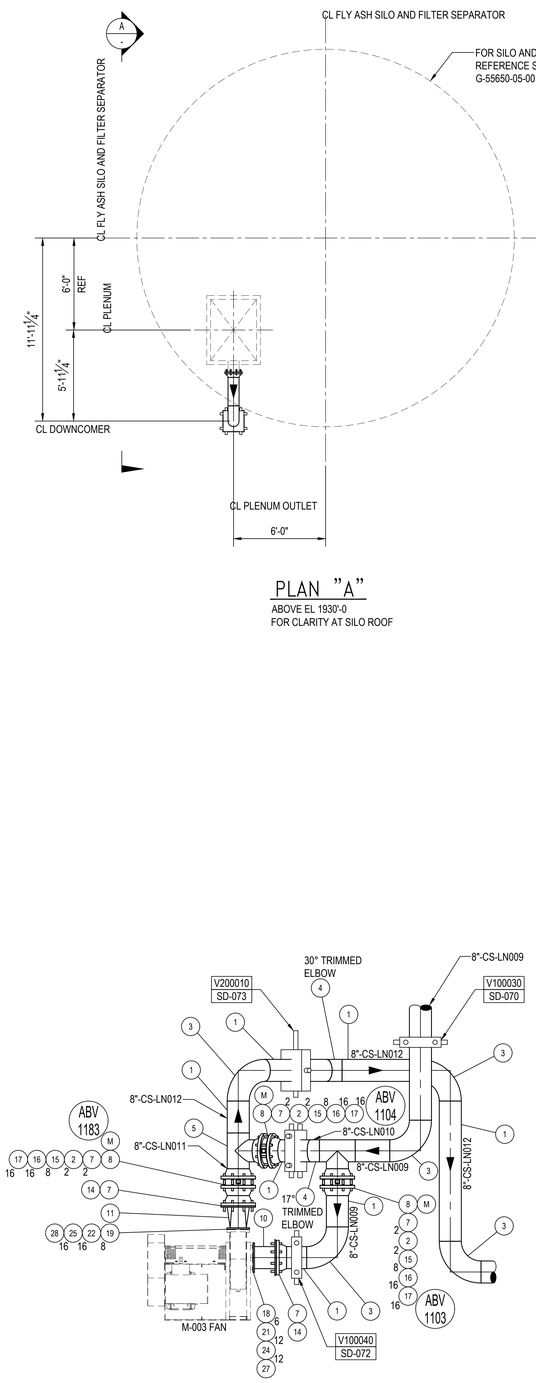
HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

ucc environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
C-55650-05-006	0

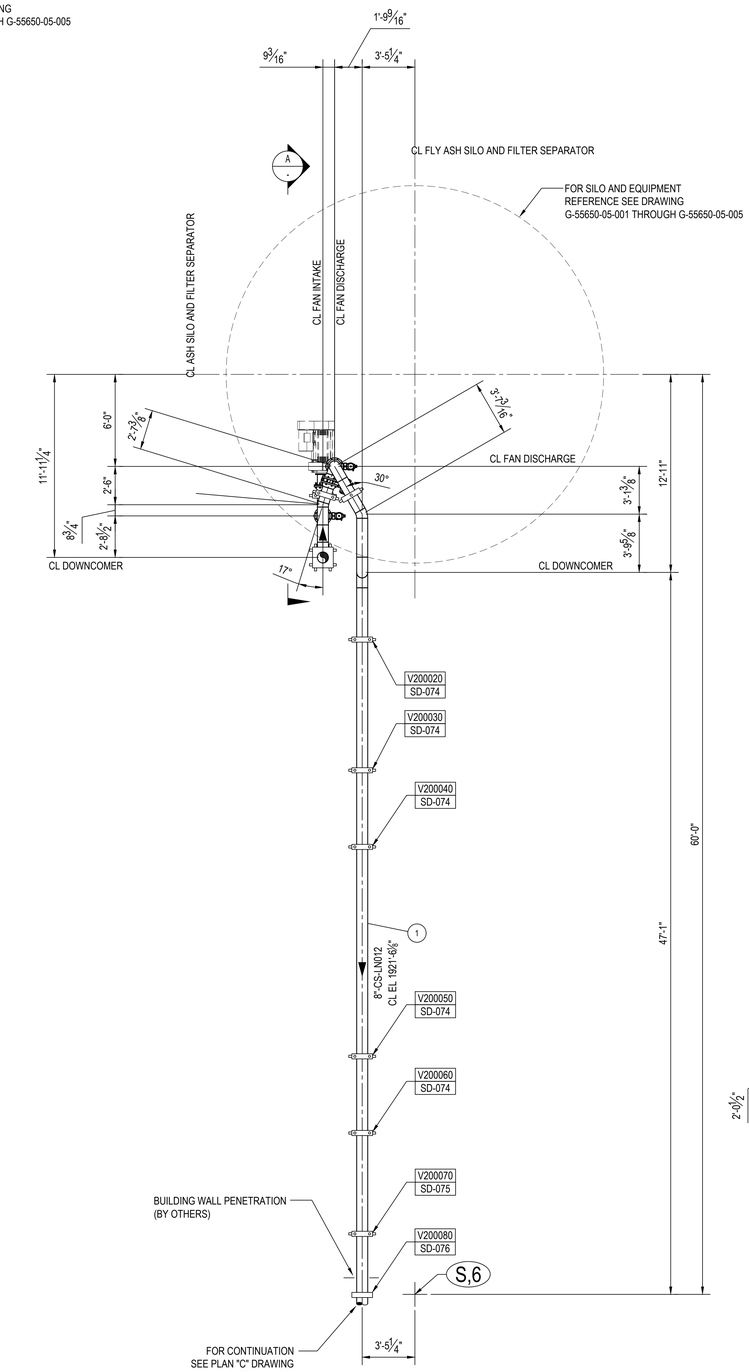
PLAN "A"

ABOVE EL 1930'-0
FOR CLARITY AT SILO ROOF



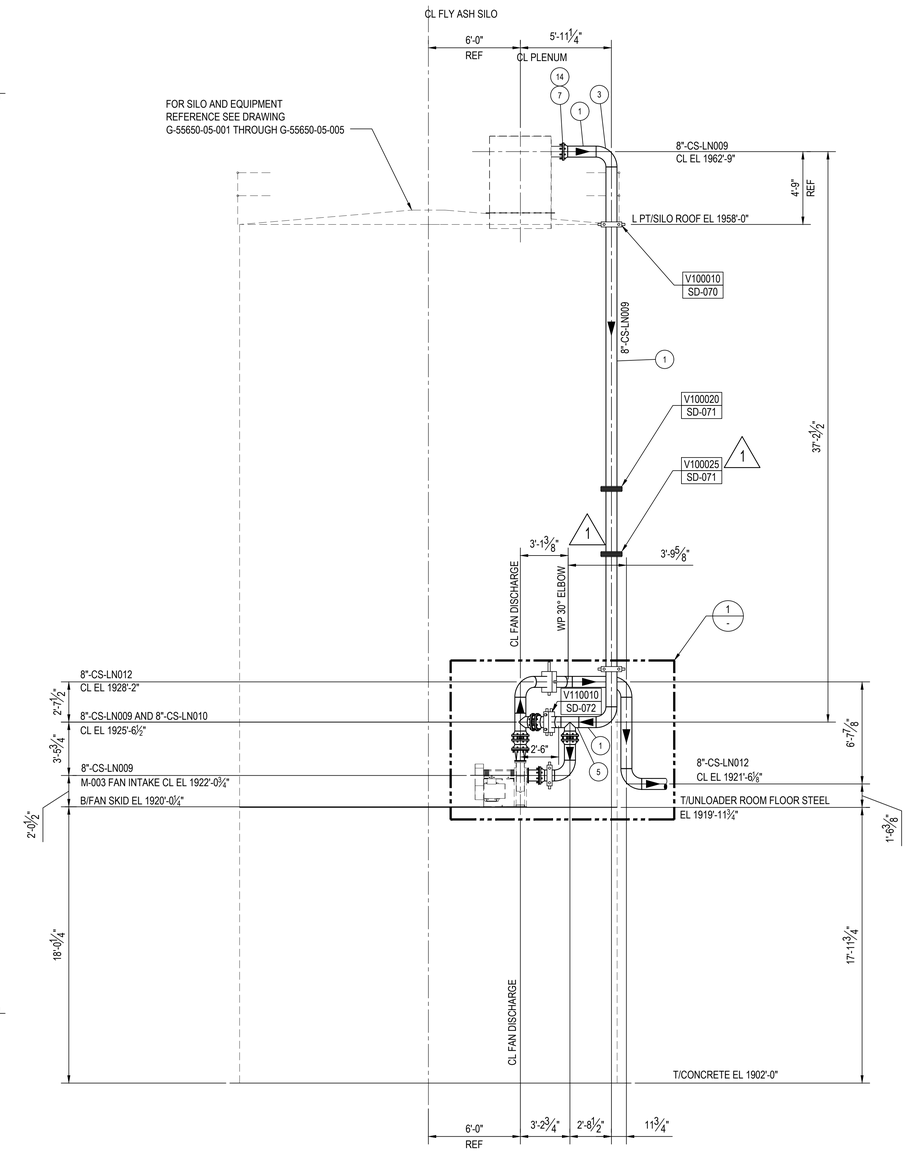
DETAIL (1/-)

SCALE: ½" = 1'-0"
ITEM AND SUPPORT
TAGS ONLY



PLAN "B"

BELOW EL 1930'-0
SILO ROOF PIPING REMOVED FOR CLARITY



SECTION (A/-)

BILL OF MATERIALS

ID	DWG NO	PART NO	QTY	DESCRIPTION
1		179219-080-40	240'-0"	8" SCH 40 PIPE CS A53 GR B DR
2		408723-6	6	8" 150# FULL FACE GASKET
3		171049-080-39	13	8" 90° SCH 40 LR ELBOW A234
4		171050-080-40	2	8" 45° STD WT LR ELBOW A234
5		171268-08008004	2	8" SCH 40 STR TEE A234
6		176062-080-010	1	8" x 1" 3000# THREDOLET A105
7		176778-080-40-2-1	12	8" 150# FF WN SCH 40 FLG A105
8		REFERENCE	3	8" BRAY SERIES 40 BUTTERFLY VALVE A/C OPERATED
9		REFERENCE	1	8" MANUAL BUTTERFLY VALVE
10		C-55650-05-D001	1	8" 150# - VENT FAN INLET ADAPTOR
11		C-55650-05-D002	1	8" 150# - VENT FAN RECTANGULAR OUTLET ADAPTOR
12		C-55650-05-D003	2	8" 150# - DAMPER RECTANGULAR INLET/OUTLET ADAPTOR
13		REFERENCE	1	10" RADIAL VANE DAMPER
14	2-1701-1170	1701-1170-5J	5	8" 150#/STL-150#/STL CONNECTION
15		462026-07-750	32	3/4" X 7 1/2" LG FULL THRD STUD A193
16		460234-750	64	3/4" - 10 HEAVY HEX NUT A194
17		463003-18	64	3/4" - SAE WASHER
18		462026-02-300	6	5/16" X 3" LG FULL THRD STUD A193
19		462026-01-300	8	1/4" X 3" LG FULL THRD STUD A193
20		462026-03-300	32	3/8" X 3" LG FULL THRD STUD A193
21		460234-313	12	5/16" - 10 HEAVY HEX NUT A194
22		460234-250	16	1/4" - 10 HEAVY HEX NUT A194
23		460234-375	64	3/8" - 10 HEAVY HEX NUT A194
24		463003-7	12	5/16" - SAE WASHER
25		463003-5	16	1/4" - SAE WASHER
26		463003-9	64	3/8" - SAE WASHER
27		59999-04-002	1	FAN INLET GASKET
28		59999-04-003	1	FAN DISCHARGE GASKET
29		59999-04-004	2	DAMPER GASKET

NOTES

1. FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE DRAWING C-55650-05-001 AND C-55650-05-002.
2. BILL OF MATERIAL INCLUDES MATERIAL SHOWN ON DRAWINGS C-55650-05-007 & C-55650-05-008.
3. SUPPORT LOCATIONS SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS MAY VARY UP TO ±1'-0" FROM LOCATIONS INDICATED. SEE SUPPORT DETAIL DRAWINGS FOR FINAL LOCATION.
4. FOR PIPE SUPPORT LOADS, SEE DOCUMENT CL-55650-05-006.
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REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
1	REVISED TO ADD SUPPORT SYMBOL AND TAG	03/20/2025	MWR			
0	ISSUED FOR CONSTRUCTION	02/14/2025	DSK	MWR	MWR	MY

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SCALE	1/4"-1'-0"	DRAWING SIZE	5

DRAWING TITLE

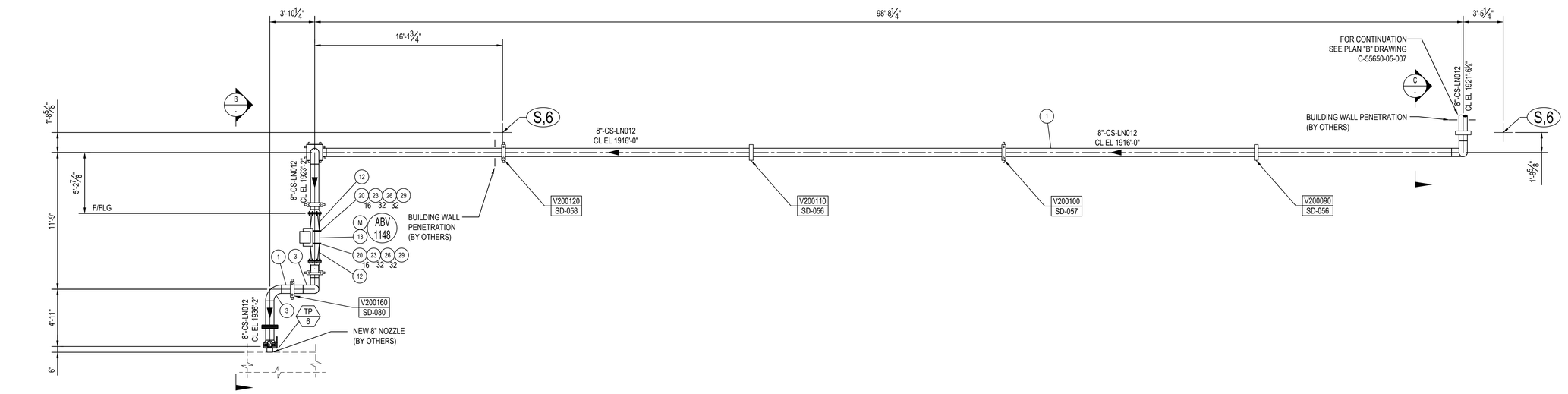
PLAN, SECTION AND DETAIL
SILO VENT PIPING
VENT FAN TO DUCT TIE-IN
UNIT 1

PLANT NAME

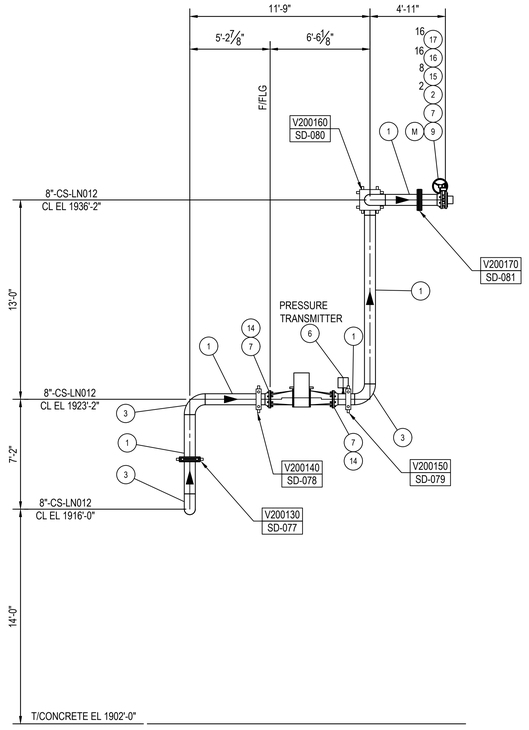
HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

ucc environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

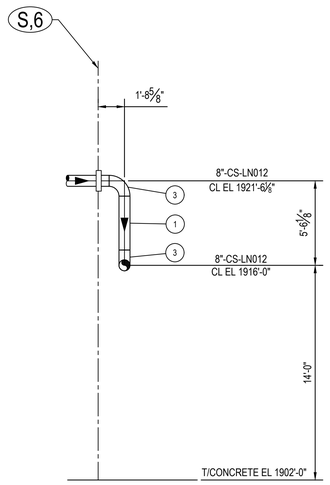
DRAWING NUMBER	REVISION
C-55650-05-007	1



PLAN "C"



SECTION B



SECTION C

NOTES

1. FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE DRAWING C-55650-05-001 AND C-55650-05-002.
2. FOR BILL OF MATERIAL SEE DRAWING C-55650-05-007.
3. SUPPORT LOCATIONS SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS MAY VARY UP TO ±1'-0" FROM LOCATIONS INDICATED. SEE SUPPORT DETAIL DRAWINGS FOR FINAL LOCATION.
4. FOR PIPE SUPPORT LOADS, SEE DOCUMENT CL-55650-05-006.
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REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
0	ISSUED FOR CONSTRUCTION	02/14 2025	DSK			

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SCALE	1/4"-1'-0"	DRAWING SIZE	5

DRAWING TITLE

PLAN, SECTION AND DETAIL
SILO VENT PIPING
VENT FAN TO DUCT TIE-IN
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

ucc environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
C-55650-05-008	0

Customer: HASTINGS UTILITIES
Plant Site: WHELAN ENERGY CENTER
Location: HASTINGS, NEBRASKA
UCC Contract Number: 55650-05

Document Number: EL-55650-05-001
Revision: D
Issue Date: 2/25/2025
Designed By/Checked By: RJN / MY

UNIT 1 I/O List

Tag	Full Description	I/O Type	P&ID	Calibrated Range	Eng Units	Signal Range	Voltage Level
1ASB-LT-1250	SILO LEVEL TRANSMITTER	AI	M-55650-05-005	0 - 48	in	4 - 20mA	
1ASB-LS-1251	SILO HIGH LEVEL SWITCH	DI	M-55650-05-005				DRY
1ASB-PT-1252	SILO PRESSURE TRANSMITTER	AI	M-55650-05-005	0 - 15	in H2O	4 - 20mA	
1ASB-SV-1100	T/S ASH FEED VALVE SOLENOID	DO	M-55650-05-005				120VAC
1ASB-ZS-1253	T/S FULL UP LIMIT SWITCH	DI	M-55650-05-005				DRY
1ASB-ZS-1254	T/S SLACK CABLE LIMIT SWITCH	DI	M-55650-05-005				DRY
1ASB-SV-1101	T/S VENT LINE ISOLATION VALVE SOLENOID	DO	M-55650-05-005				120VAC
1ASB-ZS-1255	T/S VENT LINE ISOLATION VALVE OPEN LIMIT	DI	M-55650-05-005				DRY
1ASB-SV-1102	SILO VACUUM RELIEF GATE SOLENOID (N/O)	DO	M-55650-05-005				120VAC
1ASB-ZS-1256	SILO VACUUM RELIEF GATE OPEN LIMIT	DI	M-55650-05-005				DRY
1ASB-ZS-1257	SILO VACUUM RELIEF GATE CLOSE LIMIT	DI	M-55650-05-005				DRY
1ASB-SV-1103	SILO VENT LINE ISOLATION GATE SOLENOID	DO	M-55650-05-005				120VAC
1ASB-ZS-1258	SILO VENT LINE ISOLATION GATE OPEN LIMIT	DI	M-55650-05-005				DRY
1ASB-ZS-1259	SILO VENT LINE ISOLATION GATE CLOSE LIMIT	DI	M-55650-05-005				DRY
1ASB-SV-1104	SILO VENT FAN BYPASS VALVE SOLENOID (N/O)	DO	M-55650-05-005				120VAC
1ASB-ZS-1260	SILO VENT FAN BYPASS VALVE OPEN LIMIT	DI	M-55650-05-005				DRY
1ASB-ZS-1261	SILO VENT FAN BYPASS VALVE CLOSE LIMIT	DI	M-55650-05-005				DRY
1ASB-SV-1183	SILO VENT FAN DISCHARGE VALVE SOLENOID	DO	M-55650-05-005				120VAC
1ASB-ZS-1293	SILO VENT FAN DISCHARGE VALVE OPEN LIMIT	DI	M-55650-05-005				DRY
1ASB-ZS-1292	SILO VENT FAN DISCHARGE VALVE CLOSE LIMIT	DI	M-55650-05-005				DRY
M-001	T/S HOIST UP	DO	M-55650-05-005				DRY
M-001	T/S HOIST DOWN	DO	M-55650-05-005				DRY
M-002	T/S VENT FAN MOTOR RUN	DO	M-55650-05-005				DRY
M-002	T/S VENT FAN MOTOR RUNNING	DI	M-55650-05-005				DRY
M-003	SILO VENT FAN MOTOR RUN	DO	M-55650-05-005				DRY
M-003	SILO VENT FAN MOTOR RUNNING	DI	M-55650-05-005				DRY
1ASB-PS-1262	F/S LOW PRESSURE SWITCH	DI	M-55650-05-006				DRY
1ASB-DD-1263	F/S DUST DETECTED	DI	M-55650-05-006				DRY
PNL-003	F/S PULSE VALVES AUTO	DI	M-55650-05-006				DRY
PNL-003	TRANSFER HOPPER VALVES AUTO	DI	M-55650-05-006				DRY
PNL-003	F/S CONTROL PANEL ENABLED	DI	M-55650-05-006				DRY
PNL-003	PULSE CLEAN OVERRIDE	DO	M-55650-05-006				DRY
PNL-003	PULSE VALVE ON LIGHT	DO	M-55650-05-006				120VAC
PNL-003	FILTER HIGH D.P. LIGHT	DO	M-55650-05-006				120VAC
1ASB-PT-1264	F/S FILTER BAG D.P. TRANSMITTER (LOCATED IN PNL-002)	AI	M-55650-05-006	0 - 20	in WC	4 - 20mA	
1ASB-PT-1256	MECHANICAL EXHAUSTER PRESSURE TRANSMITTER	AI	M-55650-05-006	0 - 20	in Hg	4 - 20mA	
1ASB-LS-1266	F/S FILTER BODY LEVEL	DI	M-55650-05-006				DRY
1ASB-LS-1267	F/S TRANSFER HOPPER LEVEL	DI	M-55650-05-006				DRY
1ASB-SV-1108	SILO VENT LINE RELIEF VALVE SOLENOID (N/O)	DO	M-55650-05-006				120VAC
1ASB-ZS-1268	SILO VENT FAN BYPASS VALVE OPEN LIMIT	DI	M-55650-05-006				DRY
1ASB-ZS-1269	SILO VENT FAN BYPASS VALVE CLOSE LIMIT	DI	M-55650-05-006				DRY
1ASB-SV-1109	F/S TRANSFER HOPPER TOP GATE SOLENOID (N/O)	DO	M-55650-05-006				120VAC
1ASB-SV-1110	F/S TRANSFER HOPPER BOTTOM GATE SOLENOID	DO	M-55650-05-006				120VAC
1ASB-SV-1112	F/S UPPER EQUALIZING VALVE SOLENOID (N/O)	DO	M-55650-05-006				120VAC

Tag	Full Description	I/O Type	P&ID	Calibrated Range	Eng Units	Signal Range	Voltage Level
1ASB-SV-1113	F/S LOWER EQUALIZING VALVE SOLENOID	DO	M-55650-05-006				120VAC
1ASB-PS-1270	FLUIDIZING AIR PRESSURE SWITCH	DI	M-55650-05-007				DRY
1ASB-SV-1126	FLUIDIZING AIR SUPPLY SOLENOID	DO	M-55650-05-007				120VAC
1ASB-PT-1271	FLUE GAS DUCT PRESSURE TRANSMITTER	AI	M-55650-05-008	0 - 15	in H2O	4 - 20mA	
1ASB-ZS-1291	RADIAL FAN DAMPER ACTUATOR CLOSE COMMAND	DO	M-55650-05-008				DRY
1ASB-ZS-1290	RADIAL FAN DAMPER ACTUATOR OPEN COMMAND	DO	M-55650-05-008				DRY
1ASB-TS-1272	MECHANICAL EXHAUSTER DISCHARGE TEMPERATURE SWITCH	DI	M-55650-05-008				DRY
M-004	MECHANICAL EXHAUSTER MOTOR RUN	DO	M-55650-05-008				DRY
M-004	MECHANICAL EXHAUSTER MOTOR RUNNING	DI	M-55650-05-008				DRY
M-005	SOUND ENCLOSURE VENT FAN MOTOR RUN	DO	M-55650-05-008				DRY
1ASB-ABV-1136	MECHANICAL EXHAUSTER ISOLATION VALVE SOLENOID	DO	M-55650-05-008				120VAC
1ASB-ZS-1273	MECHANICAL EXHAUSTER ISOLATION VALVE OPEN LIMIT	DI	M-55650-05-008				DRY
1ASB-ZS-1274	MECHANICAL EXHAUSTER ISOLATION VALVE CLOSE LIMIT	DI	M-55650-05-008				DRY
1ASB-ABV-1137	MECHANICAL EXHAUSTER DISCHARGE VALVE SOLENOID	DO	M-55650-05-008				120VAC
1ASB-ZS-1275	MECHANICAL EXHAUSTER DISCHARGE VALVE OPEN LIMIT	DI	M-55650-05-008				DRY
1ASB-ZS-1276	MECHANICAL EXHAUSTER DISCHARGE VALVE CLOSE LIMIT	DI	M-55650-05-008				DRY
1ASB-TS-1277	MECHANICAL EXHAUSTER DISCHARGE TEMPERATURE SWITCH	DI	M-55650-05-008				DRY
M-006	MECHANICAL EXHAUSTER MOTOR RUN	DO	M-55650-05-008				DRY
M-006	MECHANICAL EXHAUSTER MOTOR RUNNING	DI	M-55650-05-008				DRY
M-007	SOUND ENCLOSURE VENT FAN MOTOR RUN	DO	M-55650-05-008				DRY
1ASB-ABV-1140	MECHANICAL EXHAUSTER ISOLATION VALVE SOLENOID	DO	M-55650-05-008				120VAC
1ASB-ZS-1278	MECHANICAL EXHAUSTER ISOLATION VALVE OPEN LIMIT	DI	M-55650-05-008				DRY
1ASB-ZS-1279	MECHANICAL EXHAUSTER ISOLATION VALVE CLOSE LIMIT	DI	M-55650-05-008				DRY
1ASB-ABV-1141	MECHANICAL EXHAUSTER DISCHARGE VALVE SOLENOID	DO	M-55650-05-008				120VAC
1ASB-ZS-1280	MECHANICAL EXHAUSTER DISCHARGE VALVE OPEN LIMIT	DI	M-55650-05-008				DRY
1ASB-ZS-1281	MECHANICAL EXHAUSTER DISCHARGE VALVE CLOSE LIMIT	DI	M-55650-05-008				DRY

DIGITAL INPUTS:	36
DIGITAL OUTPUTS:	29
ANALOG INPUTS:	5
ANALOG OUTPUTS:	0

Customer: Hasting Utilities
Plant Site: Whelan Energy Center
Location: Hastings, Nebraska
UCC Contract Number: 55650-05

Drawing Number: EL-55650-05-002
Revision: A
Issue Date: 10/29/2024
Designed By/Checked By: RJN/MY

Power Distribution Electrical Load List

Equipment Description	P&ID Document	Equipment Tag	Device Type	Nominal System Voltage (*4)	Nominal Equipment Utilization Voltage (*4)	Phase (1 OR 3)	Frequency (Hz)	Motor Service Factor	Load	Load Units	Equip Design Amps (*3)	Operation (*1)	Design Load (kVA)	Controller Integral to Equipment	Controller Type (*2)	Location of Equipment Served	Notes / Comments
TELESCOPIC SPOUT	M-55650-05-005	N/A	MOTOR	480	460	3	60	1.15	1.00	HP	2.1	CONT	1.7	NO	FVR	UNLOADING ROOM	
TELESCOPIC SPOUT VENT FAN	M-55650-05-005	FAN-002	MOTOR	480	460	3	60	1.15	7.50	HP	11.0	INT	9.1	NO	FVNR	UNLOADING ROOM	
SILO VENT FAN	M-55650-05-005	FAN-003	MOTOR	480	460	3	60	1.15	7.50	HP	11.0	INT	9.1	NO	FVNR	UNLOADING ROOM	
MECHANICAL EXHAUSTER A	M-55650-05-008	ME-001	MOTOR	480	460	3	60	1.15	40.00	HP	52.0	CONT	43.2	NO	FVNR	GROUND	
MECHANICAL EXHAUSTER B	M-55650-05-008	ME-002	MOTOR	480	460	3	60	1.15	40.00	HP	52.0	NR	43.2	NO	FVNR	GROUND	
MECHANICAL EXHAUSTER A ENCLOSURE SILO ENCLOSURE FAN	M-55650-05-008	M-005	MOTOR	480	460	3	60	1.15	0.75	HP	1.6	CONT	1.3	NO	FVNR	GROUND	
MECHANICAL EXHAUSTER B ENCLOSURE SILO ENCLOSURE FAN	M-55650-05-008	M-007	MOTOR	480	460	3	60	1.15	0.75	HP	1.6	NR	1.3	NO	FVNR	GROUND	

Total Connected System kVA:	109.16	NOMINAL SYSTEM REFERENCE VOLTAGE:	480
Total Connected System AMPS @System Voltage and Phase:	131.30	SYSTEM PHASE:	3
Total Operating System kVA:	64.60		
Total Operating System AMPS @Reference Voltage and Phase:	77.70		

General Note: This list is produced with the maximum system load allowed by operation. Load may be less during different sequences of operation and some loads may change state (example: NR may be operational). Equipment or Instrumentation powered by a UCC-supplied panel will be accounted for in that panel's load. Total load data is represented in an ideal situation where phases are equally balanced between all phases at the Nominal System Reference Voltage.

(*1) INTER = Intermittent (Operating Less Than 3 Hours), CONT = Continuous (Operating 3 Hours or More), NR = Not Running (Spare), FEED = Feeder to Sub Panel (See Separate Load List)
(*2) FVNR = Full Voltage Non-Reversing, FVR = Full Voltage Reversing, CON = Contactor, VFD = Variable Frequency Drive, MAN = Manual Switch, SS = Soft Starter, NA = Not Applicable
(*3) Motors rated over 1000V will have custom starters associated with them. These shall be selected based on the operation required. Ampere ratings is an estimate and nameplate rating should be confirmed.
(*4) Nominal System Voltage references the source supply voltage as defined in IEEE Std 141-1993 Table 3-1 or site specific nominal voltage reference. Nominal Utilization Voltage references the equipment rating for voltage as defined in IEEE Std 141-1993 and from the manufacturer's data.
FOR ADDITIONAL DETAILS REGARDING EQUIPMENT REFER TO SPECIFIC EQUIPMENT DESIGN DOCUMENTATION.

Customer: Hasting Utilities
Plant Site: Whelan Energy Center
Location: Hastings, Nebraska
UCC Contract Number: 55650-05

Drawing Number: EL-55650-05-002
Revision: A
Issue Date: 10/29/2024
Designed By/Checked By: RJN/MY

Power Distribution Electrical Load List

Equipment Description	P&ID Document	Equipment Tag	Device Type	Nominal System Voltage (*4)	Nominal Equipment Utilization Voltage (*4)	Phase (1 OR 3)	Frequency (Hz)	Motor Service Factor	Load	Load Units	Equip Design Amps (*3)	Operation (*1)	Design Load (kVA)	Controller Integral to Equipment	Controller Type (*2)	Location of Equipment Served	Notes / Comments
PADDLE WHEEL LEVEL DETECTOR	M-55650-05-005	LSH-001	INST	120	115	1	60	NA	5.00	W	0.0	CONT	0.0	NA	NA	SILO ROOF	
TELESCOPIC SPOUT LOCAL CONTROL PANEL	M-55650-05-005	PNL-001	OTHER	120	115	1	60	NA	0.11	A	0.1	CONT	0.0	NA	NA	DRIVE THROUGH TRUCK BAY	
FILTER SEPARATOR DUST DETECTOR	M-55650-05-006	DD-001	INST	120	115	1	60	NA	3.00	W	0.0	CONT	0.0	NA	NA	SILO ROOF	
FILTER SEPARATOR WINTERIZING KIT	M-55650-05-006	FLT-001	HEATER	120	120	1	60	NA	150.00	W	1.3	CONT	0.2	NA	NA	SILO ROOF	
FILTER SEPARATOR PULSE TIMER PANEL	M-55650-05-006	PNL-002	OTHER	120	115	1	60	NA	2.50	A	2.5	CONT	0.3	NA	NA	SILO ROOF	
FILTER SEPARATOR LOCAL PANEL	M-55650-05-006	PNL-003	OTHER	120	115	1	60	NA	2.60	A	2.6	CONT	0.3	NA	NA	SILO ROOF	
FILTER BODY LEVEL PROBE	M-55650-05-006	LS-002	INST	120	115	1	60	NA	5.00	VA	0.0	CONT	0.0	NA	NA	SILO ROOF	
TRANSFER HOPPER LEVEL PROBE	M-55650-05-006	LS-003	INST	120	115	1	60	NA	5.00	VA	0.0	CONT	0.0	NA	NA	SILO ROOF	
DAMPER ELECTRIC ACTUATOR	M-55650-05-008	FV-014	MOTOR	120	115	1	60	NA	1.80	A	1.8	CONT	0.2	YES	FVR	LATER	
MECHANICAL EXHAUSTER A MOTOR HEATER	M-55650-05-008	M-004	HEATER	120	120	1	60	NA	75.00	W	0.6	CONT	0.1	NA	NA	GROUND	
MECHANICAL EXHAUSTER B MOTOR HEATER	M-55650-05-008	M-006	HEATER	120	120	1	60	NA	75.00	W	0.6	NR	0.1	NA	NA	GROUND	
													0.0				

Total Connected System kVA:	1.16
Total Connected System AMPS @System Voltage and Phase:	9.67
Total Operating System kVA:	1.08
Total Operating System AMPS @Reference Voltage and Phase:	9.04

NOMINAL SYSTEM REFERENCE VOLTAGE:	120
SYSTEM PHASE:	1

General Note: This list is produced with the maximum system load allowed by operation. Load may be less during different sequences of operation and some loads may change state (example: NR may be operational). Equipment or Instrumentation powered by a UCC-supplied panel will be accounted for in that panel's load. Total load data is represented in an ideal situation where phases are equally balanced between all phases at the Nominal System Reference Voltage.

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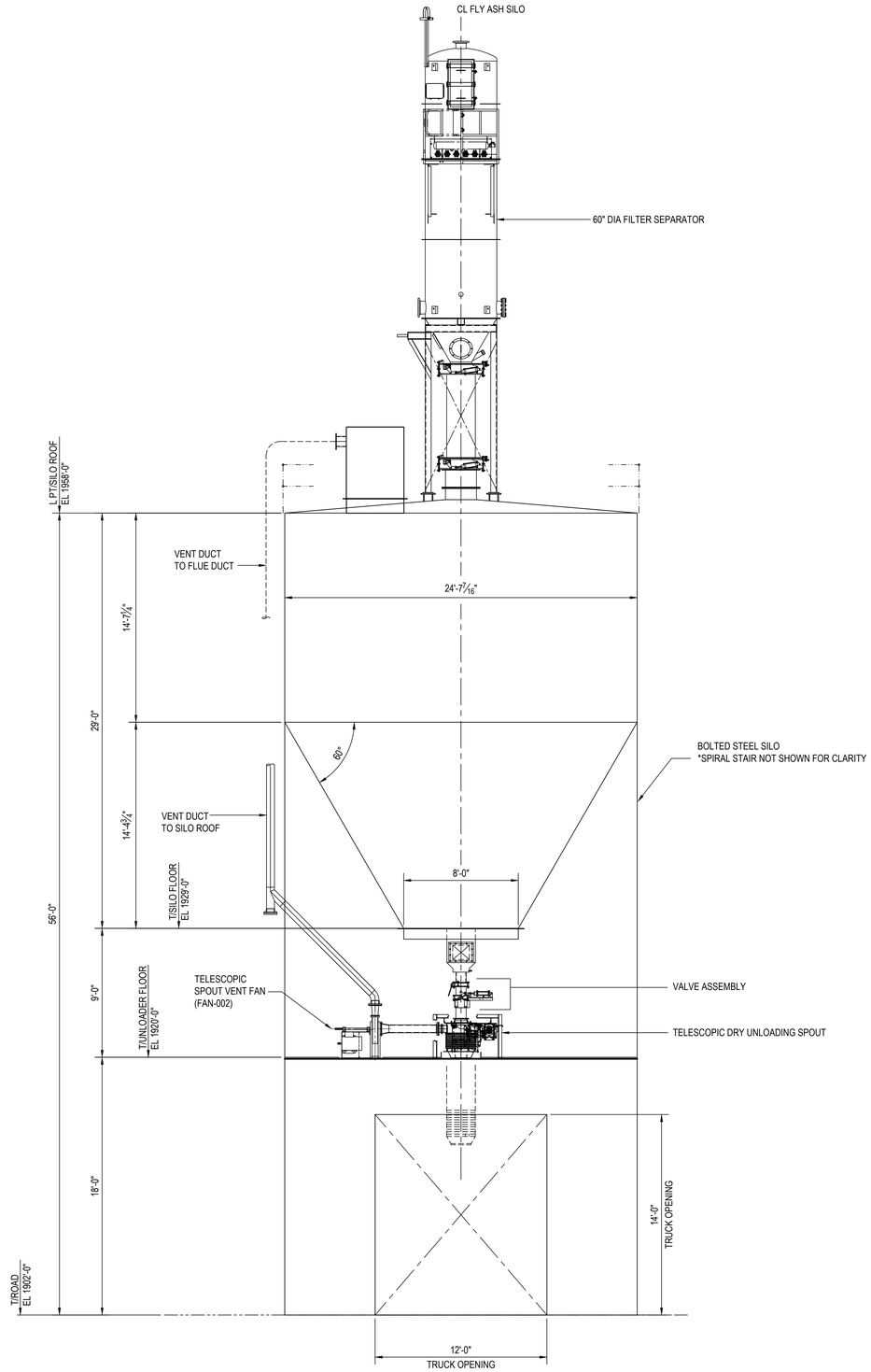
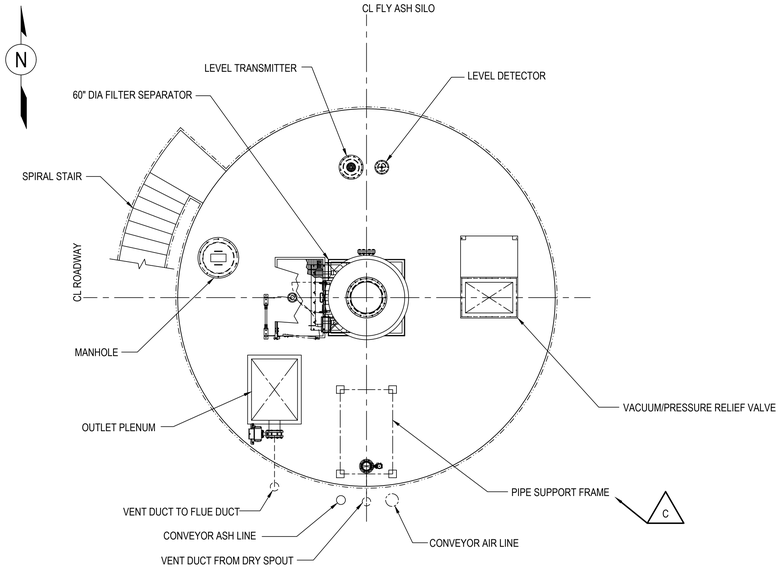
FOR ADDITIONAL DETAILS REGARDING EQUIPMENT REFER TO SPECIFIC EQUIPMENT DESIGN DOCUMENTATION.

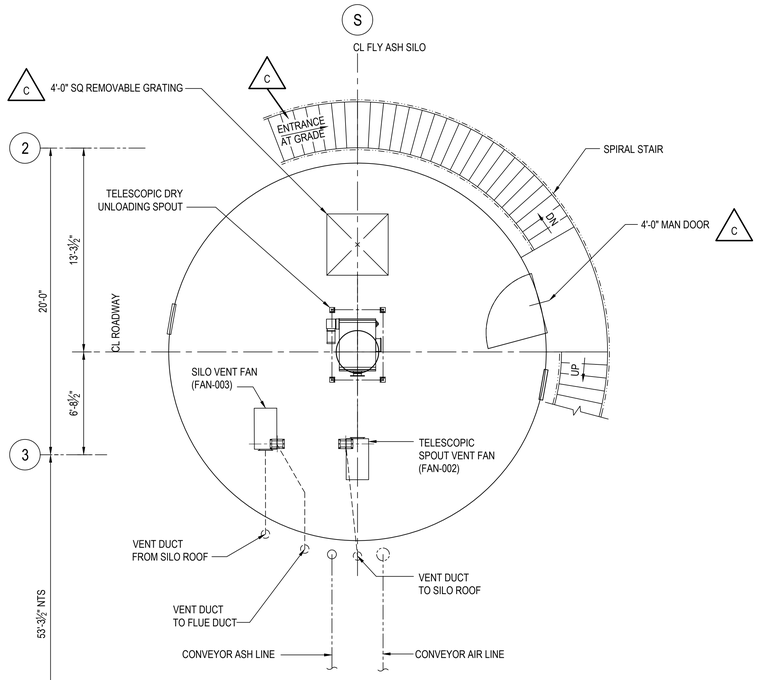


EAST ELEVATION

LOOKING WEST



ROOF PLAN



UNLOADER FLOOR PLAN

SILO FOUNDATION LOADS	
LOAD TYPE	TOTAL
DEAD	285 K
LIVE	73 K
MATERIAL	1555 K
WIND SHEAR	58 K
WIND OVERTURNING MOMENT	2850 K*FT
SEISMIC SHEAR	73 K
SEISMIC OVERTURNING MOMENT	3555 K*FT

NOTES:
1. LOADS ARE PRELIMINARY, NOT TO EXCEED
2. LOADS ARE UNFACTORED, WIND AND SEISMIC LOADS ARE AT STRENGTH LEVEL
3. LOADS ARE APPLIED AT THE BOTTOM OF BASE PLATE
4. VERTICAL LOADS (Y) ARE POSITIVE DOWNWARD
5. SHEAR LOADS (X/Z) ARE APPLIED IN THE DIRECTION OF THE EVENT
6. SILO IS DESIGNED FOR MATERIAL CONTENT DENSITY OF 110 PCF

NOTES

- FOR GENERAL NOTES REF DRAWING S-55650-05-001
- FOR DRAWING INDEX REF DRAWING S-55650-05-002
- FOR EQUIPMENT LOCATIONS & DETAILS REF DRAWINGS G-55650-05-002 THRU -005

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
C	ISSUED FOR USE	12/20/2024	CMB	CA		
B	GENERAL REVISION RE-ISSUED FOR APPROVAL	11/13/2024	CMB	CA	MJP	CDT
A	ISSUED FOR APPROVAL	10/15/2024	CMB	CA	MJP	MY

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SCALE	1/4"=1'-0"	DRAWING SIZE	5

DRAWING TITLE

GENERAL ARRANGEMENT OF FLY ASH SILO
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

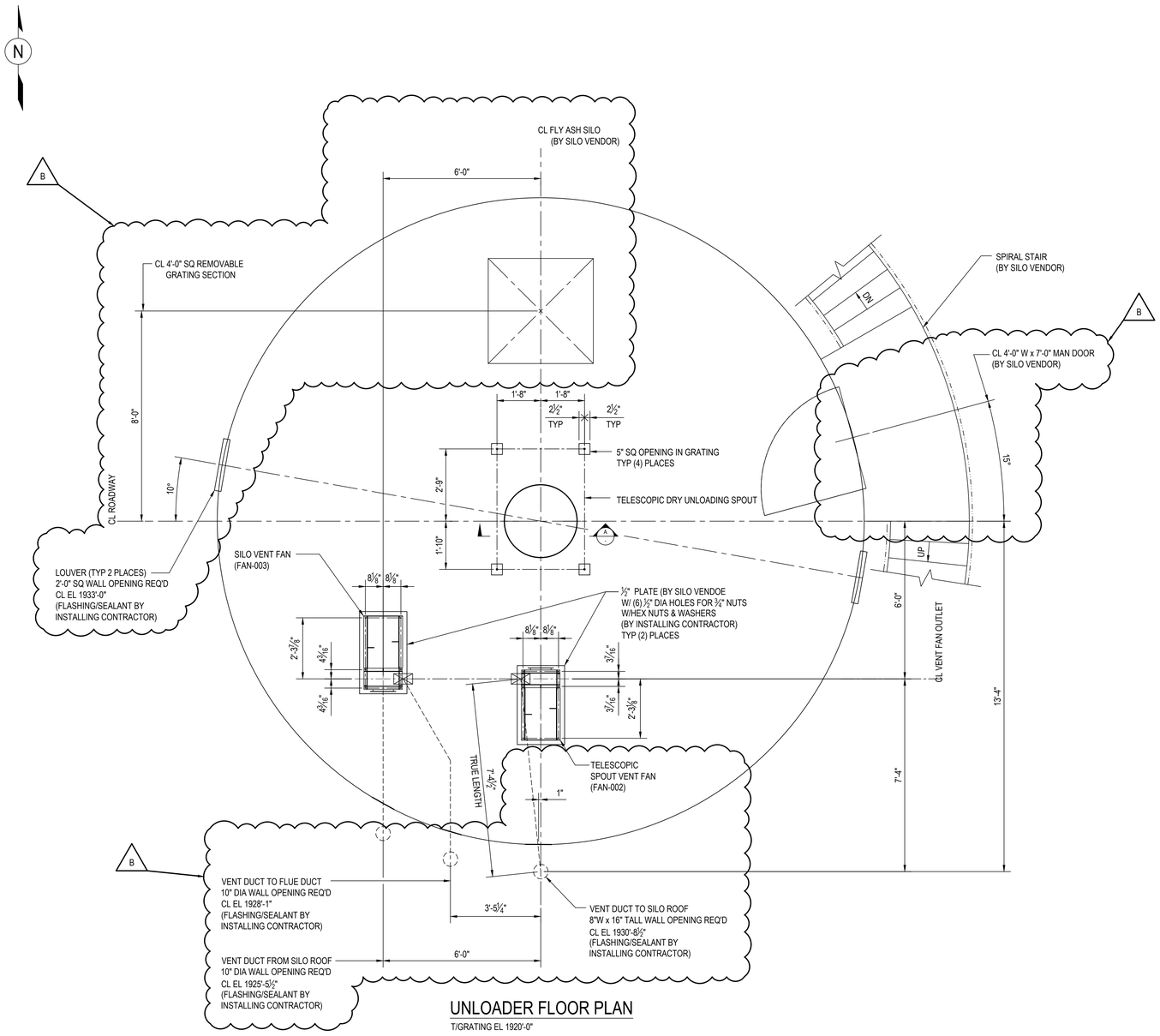
DRAWING NUMBER	REVISION
G-55650-05-001	C

BILL OF MATERIAL

ITEM* A-B-N G-05-002-	DRAWING NUMBER	PART NUMBER	QTY	DESCRIPTION
1	4-3811-10	3811-10-4	4	FLUIDIZING TRAY 12" X 24" (TYPE C)

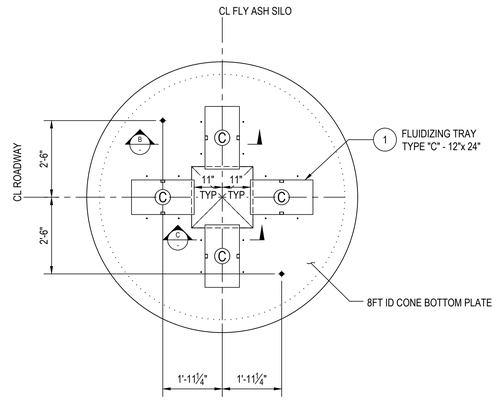
NOTES

- FOR GENERAL NOTES REF DRAWING S-55650-05-001
- FOR DRAWING INDEX REF DRAWING S-55650-05-002
- FOR GENERAL ARRANGEMENT REF DRAWING G-55650-05-001



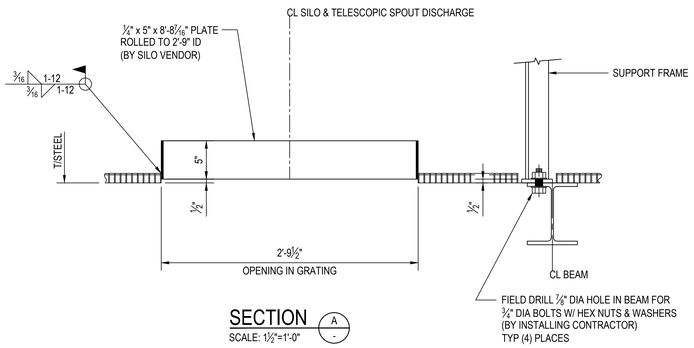
UNLOADER FLOOR PLAN

T/GRATING EL 1920'-0"



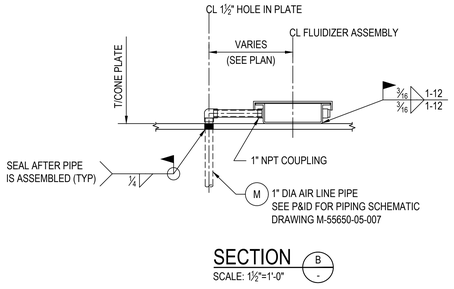
SILO FLOOR PLAN

T/PLATE EL 1929'-0"



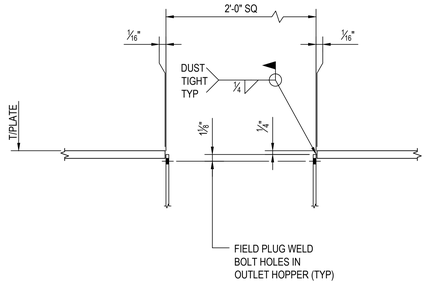
SECTION A

SCALE: 1½"=1'-0"



SECTION B

SCALE: 1½"=1'-0"



SECTION C

SCALE: 3"=1'-0"

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
B	ISSUED FOR USE	12/20 2024	CMB	CA		
A	ISSUED FOR APPROVAL	11/13 2024	CMB	CA	MJP	CDT

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SCALE	1/2"=1'-0"	DRAWING SIZE	5

DRAWING TITLE

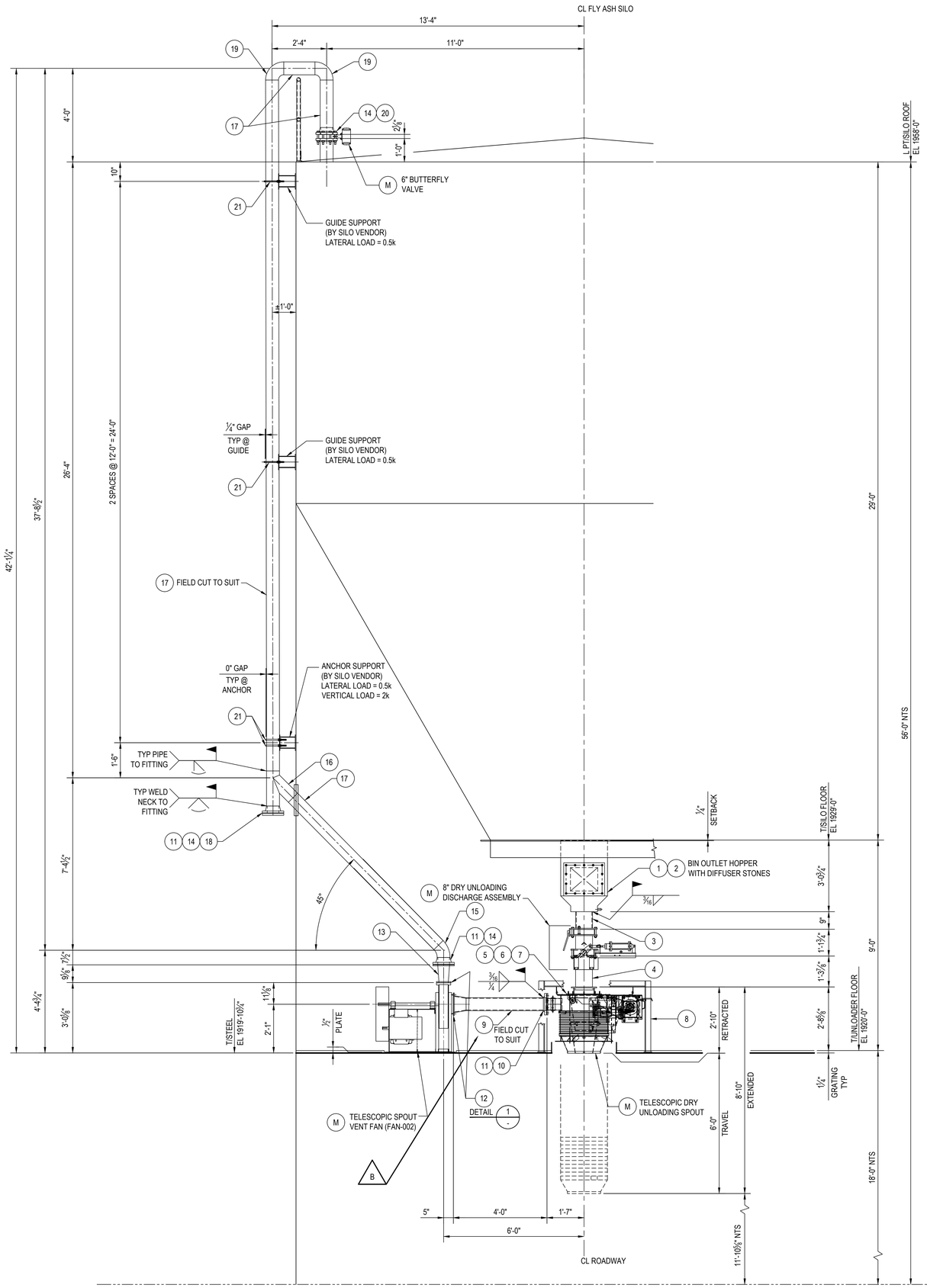
SILO FLOOR & UNLOADING FLOOR
EQUIPMENT PLANS & SECTIONS
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

ucc environmental
2100 NORBIAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
G-55650-05-002	B



PARTIAL SILO ELEVATION

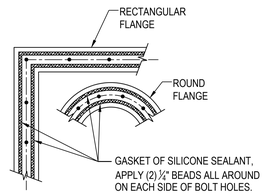
LOOKING WEST

BILL OF MATERIAL

ITEM A-B-N G-05-003-	DRAWING NUMBER	PART NUMBER	QTY	DESCRIPTION
1		23509-3400	1	BIN OUTLET HOPPER; DIM A= 34IN
2	2-2339-150	2339-150	1	DIFUSSER STONE ASSEMBLY
3		27341-00900	1	8" OUTLET ADAPTOR PIPE; DIM A = 9IN
4		27341-01800	1	8" OUTLET ADAPTOR PIPE; DIM A = 18IN
5	2-2414-81	2414-81	1	8" SPOUT INLET W/ EXPANSION JOINT
6		46301-375	8	3/8"-16 HEX NUTS
7		46255-8	8	3/8" PLAIN WASHERS
8		24363-37	1	TELESCOPIC SPOUT FRAME SUPPORT; DIM A = 37"
9	D-55650-05-001	55650-05-001	1	TELESCOPIC SPOUT FAN INLET ADAPTOR
10		171839-060	1	6-150# FLANGE SO, RF
11	2-1701-1170	1701-1170-3L	3	6" CONN 150# ANSI TO 1/2" PL FLANGE
12		45507-7	2	SILICONE SEALANT
13	D-55650-05-002	55650-05-002	1	TELESCOPIC SPOUT FAN OUTLET ADAPTOR
14		176778-060-30-1-1	3	6" ANSI WELD NECK, RF FLANGE
15		171050-060-40	1	6" - 45 DEG ELBOW, ASTM A234, GRADE B
16		171135-060-03	1	6" - 45 DEG LATERAL
17		176002-060-30	55	LN FT 6" STD WT PIPE, ASTM A-38, GRADE B, FIELD CUT
18		171887-060	1	6" ANSI BLINDFLANGE
19		171049-060-40	2	6" - 90 DEG ELBOW, ASTM A234 GR B
20	2-1701-1112,1115	1701-1113	1	6" CONN 150# ANSI FLG - BFLY VALVE - 150# ANSI FLG
21		463206-2-0702-062-37	4	U-BOLT W/NUTS & WASHERS

NOTES

- FOR GENERAL NOTES REF DRAWING S-55650-05-001
- FOR DRAWING INDEX REF DRAWING S-55650-05-002
- FOR GENERAL ARRANGEMENT REF DRAWING G-55650-05-001



DETAIL 1

SCALE: NONE
SILCONE GASKET

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
B	ISSUED FOR USE	12/20/2024	CMB	CA		
A	ISSUED FOR APPROVAL	11/13/2024	CMB	CA	MJP	CDT

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SCALE	1/2"=1'-0"	DRAWING SIZE	5

DRAWING TITLE

SILO UNLOADING EQUIPMENT ELEVATION
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

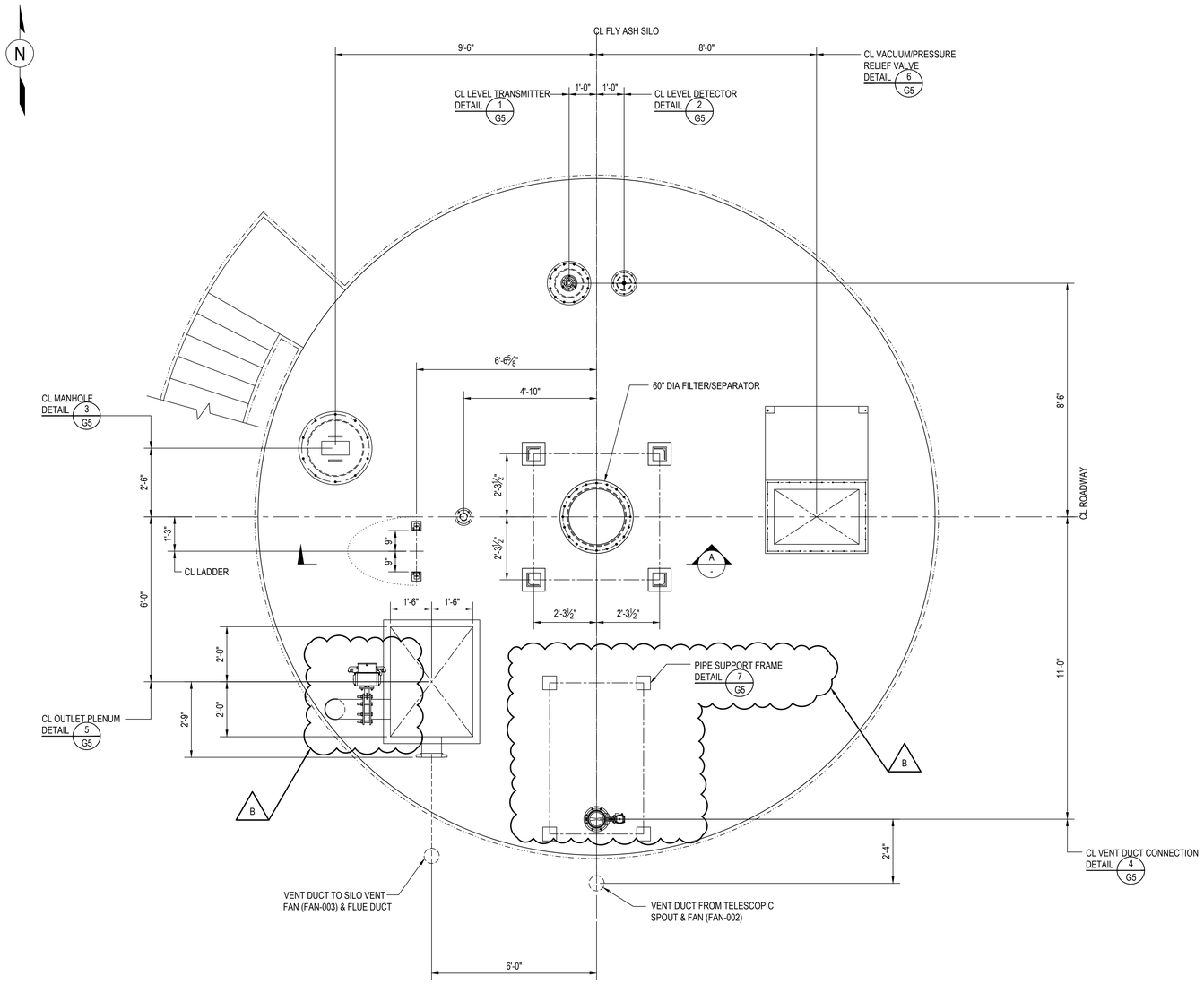
ucc environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER

G-55650-05-003

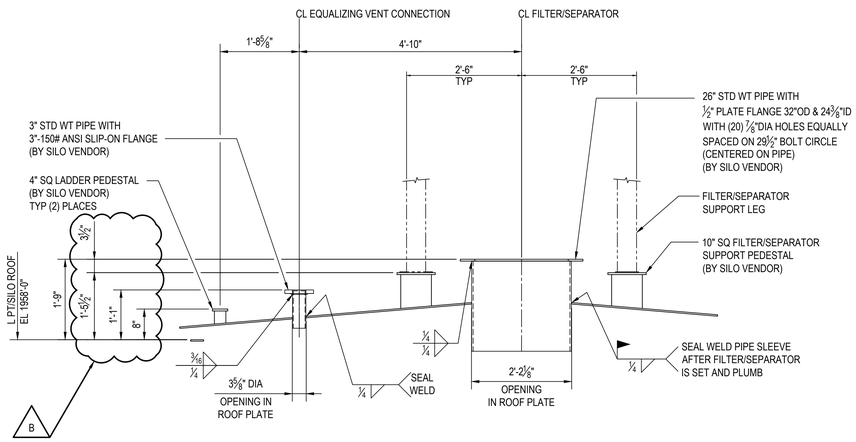
REVISION

B



ROOF PLAN

LP EL 1958'-0"



SECTION A -

SCALE: ¾"=1'-0"
60"DIA FILTER/SEPARATOR
(SEE PLAN FOR ORIENTATION)

NOTES

- FOR GENERAL NOTES REF DRAWING S-55650-05-001
- FOR DRAWING INDEX REF DRAWING S-55650-05-002
- FOR GENERAL ARRANGEMENT REF DRAWING G-55650-05-001
- FOR VENT DUCT TO SILO VENT FAN (FAN-003) & FLUE DUCT REF DRAWING C-55650-05-LATER

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
B	ISSUED FOR USE	12/20/2024	CMB	CA		
A	ISSUED FOR APPROVAL	11/13/2024	CMB	CA	MJP	CDT

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SCALE	1/2"=1'-0"	DRAWING SIZE	5

DRAWING TITLE

SILO ROOF EQUIPMENT PLAN & SECTION
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

ucc environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

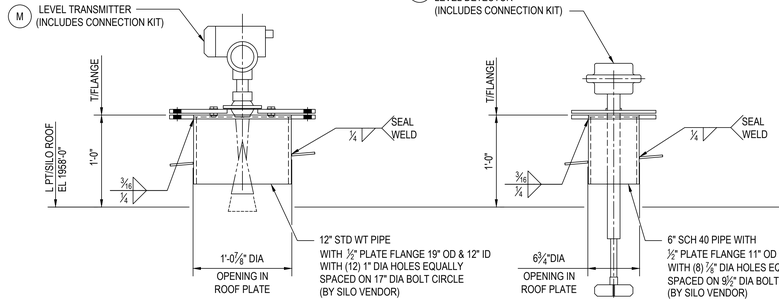
DRAWING NUMBER	REVISION
G-55650-05-004	B

BILL OF MATERIAL

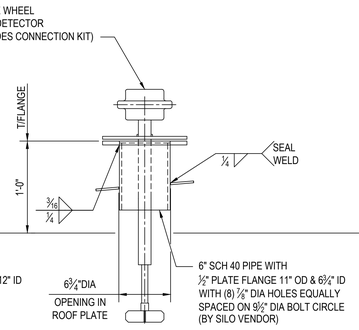
ITEM# A-B-N G-05-005-	DRAWING NUMBER	PART NUMBER	QTY	DESCRIPTION
1	3-2338-24	2338-24	1	24" MANHOLE WITH COVER
2		45507-7	4	SILICONE SEALANT
3	2-1701-1112/1115	1701-1115-1	1	8" CONN 150# ANSI FLG - BFLY VALVE - 150# ANSI FLG
4		174735	1	8" ELBOW WITH BIRD SCREEN

NOTES

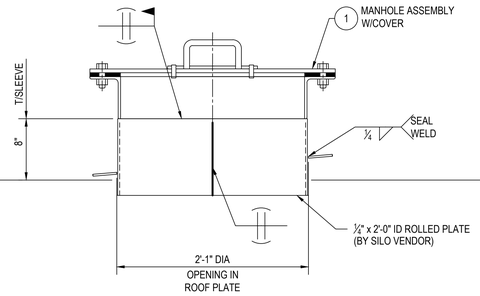
- FOR GENERAL NOTES REF DRAWING S-55650-05-001
- FOR DRAWING INDEX REF DRAWING S-55650-05-002
- FOR GENERAL ARRANGEMENT REF DRAWING G-55650-05-001



DETAIL 1 G4
SCALE: 1½"=1'-0"
LEVEL TRANSMITTER



DETAIL 2 G4
SCALE: 1½"=1'-0"
LEVEL DETECTOR



DETAIL 3 G4
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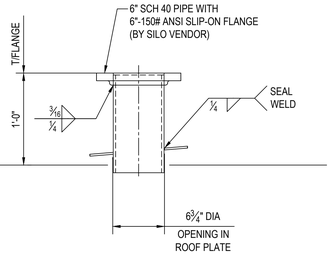
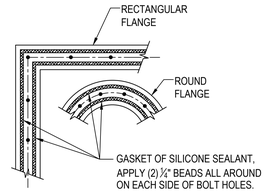
MANHOLE

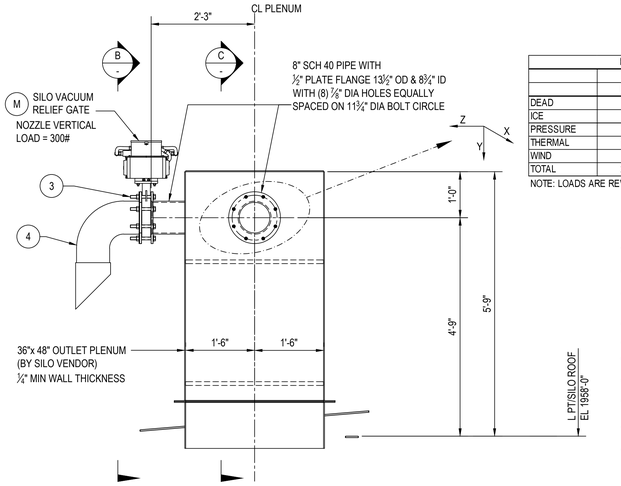


DETAIL 4 G4
SCALE: 1½"=1'-0"
VENT DUCT CONNECTION



DETAIL 8 -
SCALE: NONE
SILCONE GASKET

B

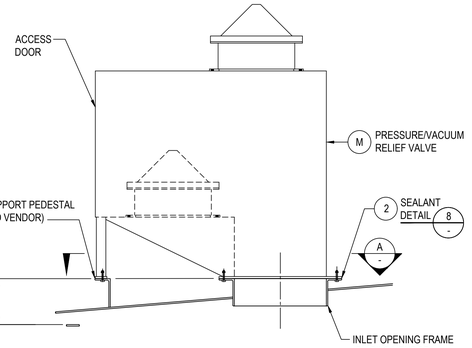


DETAIL 5 G4
SCALE: ¾"=1'-0"
OUTLET PLENUM
(SEE PLAN FOR ORIENTATION)

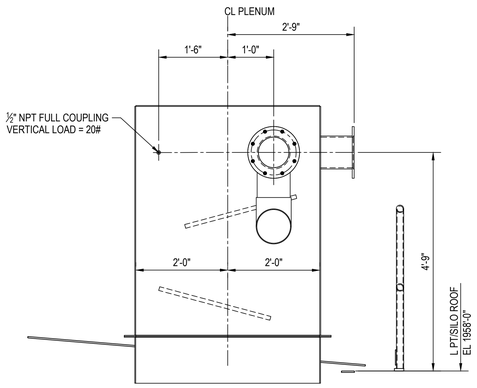
PLENUM VENT DUCT NOZZLE LOADS

	Fx	Fy	Fz	Mx	My	Mz
	lbs	lbs	lbs	ft-lbs	ft-lbs	ft-lbs
DEAD	0	150	0	40	0	0
ICE	0	100	0	25	0	0
PRESSURE	0	0	0	0	0	0
THERMAL	150	4300	0	0	0	13650
WIND	50	50	50	0	125	0
TOTAL	200	4600	50	65	125	13650

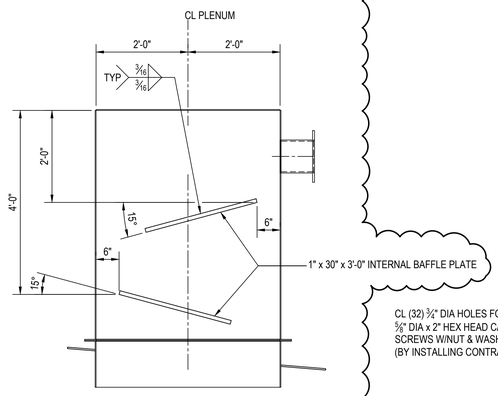
NOTE: LOADS ARE REVERSIBLE



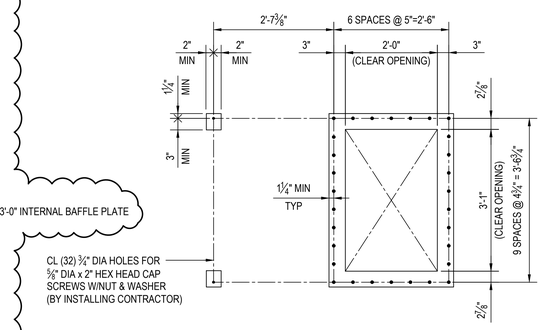
DETAIL 6 G4
SCALE: ¾"=1'-0"



SECTION B -
SCALE: ¾"=1'-0"
OUTLET PLENUM

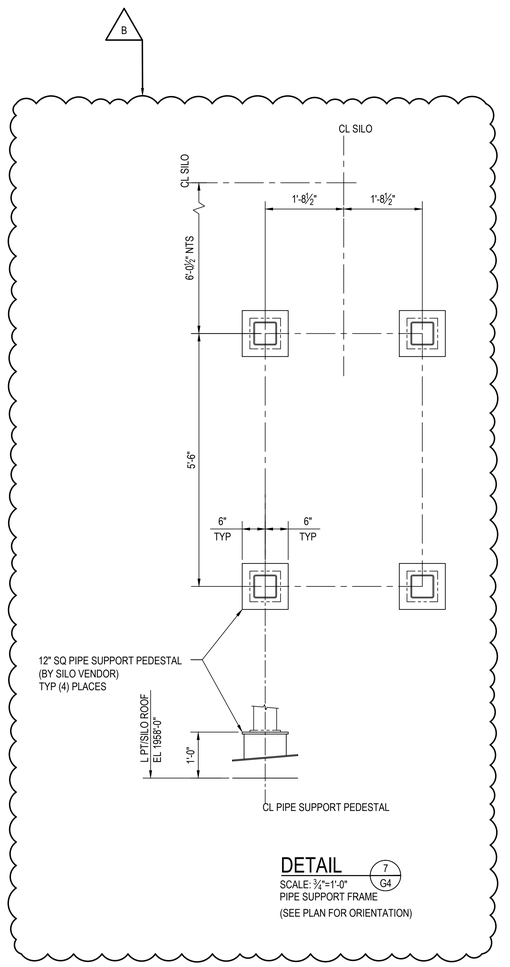


SECTION C -
SCALE: ¾"=1'-0"
OUTLET PLENUM



SECTION A -
SCALE: ¾"=1'-0"
PRESSURE/VACUUM RELIEF VALVE
(SEE PLAN FOR ORIENTATION)

B



DETAIL 7 G4
SCALE: ¾"=1'-0"
PIPE SUPPORT FRAME
(SEE PLAN FOR ORIENTATION)

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
B	ISSUED FOR USE	12/20 2024	CMB	CA		
A	ISSUED FOR APPROVAL	11/13 2024	CMB	CA	MJP	CDT

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SCALE	1 1/2"=1'-0"	DRAWING SIZE	5

DRAWING TITLE

SILO ROOF EQUIPMENT DETAILS
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

ucc environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
G-55650-05-005	B

CONTRACT PROCESS AND INSTRUMENTATION DIAGRAMS

GENERAL NOTES

THESE ARE SCHEMATIC DIAGRAMS ONLY AND ARE NOT MEANT TO BE PHYSICAL INSTALLATION DRAWINGS. FOR ACTUAL EQUIPMENT ARRANGEMENT AND LOCATION OF CONNECTIONS, SEE DESIGN DRAWINGS IN THE REFERENCE LIST.

MATERIAL SUPPLY

ONLY MATERIAL MARKED WITH ONE OF THE FOLLOWING SYMBOLS IS FURNISHED BY UCC:

- (4) MATERIAL FURNISHED BY UCC AS COVERED BY THIS DRAWING. NUMBER IN CIRCLE REFERS TO SEQUENCE NUMBER ON THE BILL OF MATERIAL.
- (C) MATERIAL FURNISHED BY UCC AS PART OF A CONVEYOR AND SERVICE PIPING DRAWING (DRAWING SERIES PREFIX C)
- (E) MATERIAL FURNISHED BY UCC AS PART OF AN ELECTRICAL DRAWING (DRAWING SERIES PREFIX E)
- (M) MATERIAL FURNISHED BY UCC AS PART OF A P & ID OR CONTRACT ASSEMBLY DRAWING (DRAWING SERIES PREFIX M)
- (S) MATERIAL FURNISHED BY UCC AS PART OF A STRUCTURAL DRAWING (DRAWING SERIES PREFIX S AND G)
- (X) MATERIAL FURNISHED BY UCC THAT IS TYPICALLY NOT SHOWN ON A DRAWING, i.e. SPARE PARTS

NOT BY UCC: (GC) MATERIAL FURNISHED BY GENERAL INSTALLING CONTRACTOR

MATERIAL FURNISHED ON THE CONTRACT DRAWINGS WILL BE IDENTIFIED BY A UNIQUE ALPHANUMERIC IDENTIFICATION NUMBER MADE UP FROM THE DRAWING CLASSIFIER, DRAWING SEQUENTIAL NUMBER, AND SEQUENTIAL ITEM NUMBER AS LISTED ON THE BILL OF MATERIAL OR EQUIPMENT LIST, i.e.

M - 10 - 001 - 4

- M: DRAWING CLASSIFIER
- 10: UCC CONTRACT NUMBER
- 001: DRAWING SEQUENTIAL NUMBER
- 4: SEQUENCE NUMBER ON BILL OF MATERIAL

EXISTING EQUIPMENT

"EIP" DENOTES EXISTING IN PLACE
"ER" DENOTES EXISTING EQUIPMENT RELOCATED

TP 1 DENOTES CUSTOMER TIE POINT OR INTERFACE POINT CONNECTION

OPERATING NOTES

ALL INSTRUMENTS MUST BE CALIBRATED BY PLANT PERSONNEL BEFORE SYSTEM OPERATION.

BEFORE ATTEMPTING TO OPERATE ANY OF THE EQUIPMENT OR SYSTEMS, REVIEW ALL DRAWINGS, READ AND UNDERSTAND THE OPERATING INSTRUCTIONS, INDIVIDUAL EQUIPMENT INSTRUCTIONS AND THE SAFETY INSTRUCTIONS CONTAINED IN THE INSTRUCTION MANUAL TO BECOME FAMILIAR WITH THE OPERATION OF THE SYSTEM(S) AND EQUIPMENT.

ALL RELIEF VALVES, REGULATORS, PRESSURE, FLOW, AND TEMPERATURE SWITCHES, ETC., MUST BE SET FOR THE VALUES CALLED FOR ON THE P&ID'S AND SHOULD ONLY BE CHANGED BY QUALIFIED PERSONNEL. ALL INSTRUMENTATION SETTINGS, INCLUDING ITEMS THAT HAVE BEEN FACTORY SET, MUST BE VERIFIED IN THE FIELD BEFORE THE EQUIPMENT IS PLACED INTO SERVICE.

ALL MANUALLY OPERATED GATES MUST BE POSITIONED, AS CALLED FOR ON THE DESIGN DRAWINGS OR IN THE OPERATING INSTRUCTIONS, BEFORE PLACING THE SYSTEM IN OPERATION.

ADEQUATE COMPRESSED AND INSTRUMENT AIR PRESSURE AND FLOW, AS CALLED FOR ON THE DESIGN DRAWINGS, MUST BE AVAILABLE BEFORE PLACING THE SYSTEM IN OPERATION.

ADEQUATE WATER PRESSURE AND FLOW, AS CALLED FOR ON THE DESIGN DRAWINGS, MUST BE AVAILABLE BEFORE PLACING THE SYSTEM IN OPERATION.

THE SOUND PRESSURE LEVEL OF EQUIPMENT SUPPLIED BY UCC WAS DETERMINED ON A TEST STAND OR AT AN ACTUAL INSTALLATION AND CORRECTED FOR BACKGROUND NOISE. INSTALLED EQUIPMENT SOUND PRESSURE LEVEL MAY BE HIGHER DUE TO MANY VARIABLES OF WHICH UCC HAS NO KNOWLEDGE AND OVER WHICH UCC HAS NO CONTROL. SOUND PRESSURE LEVELS ARE DEPENDENT ON THE AMBIENT CONDITIONS SUCH AS THE DISTANCE OF THE EQUIPMENT FROM ADJACENT WALLS, NOISE REFLECTIVE PROPERTIES OF MATERIAL IN THE VICINITY OF THE EQUIPMENT, BACKGROUND NOISE, ETC.

PACKAGED EQUIPMENT

INSTRUMENTATION, VALVING AND PIPING INTERNAL TO PACKAGED/SKIDDED EQUIPMENT IS NOT TAGGED OR SHOWN IN ITS ENTIRETY UNLESS IT IS DIRECTLY CONTROLLED AND/OR MONITORED BY THE FURNISHED CONTROL SYSTEM. FOR COMPLETE DETAILS, REFERENCE THE UCC OPERATION & MAINTENANCE INSTRUCTION MANUAL.

ELECTRICAL NOTES

CONTROL INPUTS AND OUTPUTS SHOWN ON THESE DRAWINGS (FOR PANELS, VARIABLE FREQUENCY DRIVE'S, AND INSTRUMENTS/DEVICES) MAY OR MAY NOT REPRESENT THE EXACT QUANTITIES OF INPUTS AND OUTPUTS ON EACH DEVICE. INPUT AND OUTPUT DETAILS ARE SHOWN ON OTHER CONTRACT DOCUMENTS.

MOTORS THAT ARE REQUIRED TO REVERSE IN THE PROCESS ARE INDICATED ON THE DRAWINGS. THE EXCEPTION TO THIS ARE MOTORS DRIVEN BY A VARIABLE FREQUENCY DRIVE (VFD); THEY ARE NOT INDICATED AS REVERSING, BUT THE PROCESS MAY REQUIRE THAT VFD OPERATE THEM IN REVERSE.

INSULATION, HEAT TRACING, AND PERSONNEL PROTECTION

UCC HEAT TRACING AND INSULATION RECOMMENDATIONS ARE FOR GUIDANCE ONLY. ACTUAL FIELD CONDITIONS, ASH CHARACTERISTICS, AND PLANT PERSONNEL PROTECTION POLICIES MAY REQUIRE ADDITIONAL EQUIPMENT. UCC IS NOT RESPONSIBLE FOR COSTS ASSOCIATED WITH ADDITIONAL EQUIPMENT.

PORTIONS OF UCC PIPE AND EQUIPMENT MAY EXCEED 140°F DURING OPERATION. APPROPRIATE PRECAUTIONS SHOULD BE TAKEN. PERSONNEL PROTECTION REQUIREMENTS SHOULD BE REVIEWED PER PLANT POLICY. ANY NECESSARY PERSONNEL PROTECTION IS NOT DESIGNED OR FURNISHED BY UCC.

WHERE WATER PIPING, EQUIPMENT CONTAINING WATER, OR PIPING WITH CONDENSATION IS EXPOSED TO FREEZING WEATHER, INSULATE AND HEAT TRACE AS NECESSARY. INSULATION AND HEAT TRACING DESIGN AND SUPPLY IS NOT BY UCC.

WHERE SOLENOID VALVES ARE FREQUENTLY EXPOSED TO TEMPERATURES BELOW ZERO, INSULATE AND HEAT TRACE AS NECESSARY. INSULATION AND HEAT TRACING IS NOT BY UCC.

WATER SUPPLY NOTES

PARTICLE SIZE OF ANY SEDIMENT IN THE WATER SUPPLY MUST NOT EXCEED 1/32".
USE A STRAINER IN THE SUPPLY LINE(S) IF NECESSARY TO LIMIT PARTICLE SIZE.

COMPRESSED AIR NOTES

THE QUALITY REQUIREMENTS FOR COMPRESSED AIR ARE DEPENDENT ON ITS USAGE, INDIVIDUAL EQUIPMENT REQUIREMENTS, AND THE EQUIPMENT'S LOCATION.

CLEAN, DRY COMPRESSED INSTRUMENT QUALITY AIR

THE REQUIREMENTS FOR CLEAN, DRY COMPRESSED INSTRUMENT AIR ARE AS FOLLOWS:

- 0-1 PPM OIL OR HYDROCARBON BY WEIGHT OR VOLUME.
- 3 MICRON MAXIMUM PARTICLE SIZE.
- DEW POINT AT LINE PRESSURE AT LEAST 18°F BELOW MINIMUM AMBIENT TEMPERATURE TO WHICH ANY PART OF THE COMPRESSED AIR SYSTEM IS EXPOSED. UNDER NO CIRCUMSTANCES SHOULD THE DEW POINT EXCEED 35°F.
- THE AIR IS TO BE FREE OF ALL CORROSIVE CONTAMINANTS AND FLAMMABLE OR TOXIC GASES.
- NOTE: IF INSTRUMENT AIR IS USED TO OPERATE THE AIR CYLINDER OPERATORS, AN OIL MIST LUBRICATOR MAY NEED TO BE INSTALLED UPSTREAM OF THE AIR CYLINDERS THAT OPERATE SEVERAL TIMES A MINUTE. THE OIL MIST LUBRICATOR PROVIDES A MEANS OF LUBRICATING THE SOLENOID AIR VALVES AND AIR CYLINDERS TO EXTEND SERVICE INTERVALS.
- OIL MIST LUBRICATORS, IF DESIRED, ARE NOT PROVIDED BY UCC. IF THERE ARE ANY QUESTIONS, CONSULT UCC FOR ASSISTANCE.

CLEAN, DRY COMPRESSED AIR

THE REQUIREMENTS FOR CLEAN, DRY COMPRESSED AIR ARE AS FOLLOWS:

- CLEAN, DRY COMPRESSED REFERS TO PLANT AIR (SERVICE AIR). PLANT AIR IS TYPICALLY USED FOR AIR TOOLS, AIR CYLINDER OPERATORS, SOOT BLOWING, AND OTHER PLANT USES. PLANT AIR MAY CONTAIN OIL AND MOISTURE, MOST OF WHICH IS REMOVED BY INSTALLING A 50 MICRON AIR FILTER WITH DRAIN IN THE COMPRESSED AIR BRANCH LINE/S UPSTREAM OF THE AIR CYLINDER OPERATORS. THE SMALL QUANTITY OF MOISTURE AND OIL THAT IS NOT REMOVED BY THE AIR FILTER PROVIDES LUBRICATION FOR THE SOLENOIDS AND AIR CYLINDERS.
- THE MAXIMUM SOLID PARTICLE SIZE SHOULD NOT EXCEED 100 MICRONS AT THE COMPRESSOR DISCHARGE.
- THE AIR IS TO BE FREE OF ALL CORROSIVE CONTAMINANTS AND FLAMMABLE OR TOXIC GASES.
- HEAT TRACING AND INSULATION, IF REQUIRED TO PREVENT MOISTURE FROM FREEZING IN THE AIRLINES IS NOT BY UCC.
- SEE NOTE UNDER "CLEAN, DRY COMPRESSED INSTRUMENT AIR" ABOVE, IF INSTRUMENT AIR IS USED TO OPERATE THE AIR CYLINDERS.

SIZING OF ALL COMPRESSED AIR MAIN AND BRANCH SUPPLY LINES TO PROVIDE THE AIR FLOW QUANTITY AND PRESSURE REQUIREMENTS SHOWN ON THE DRAWING AT THE VARIOUS EQUIPMENT LOCATIONS IS NOT BY UCC.

AIR USAGE FOR ACTUATOR SIZING PURPOSES IS BASED ON THE MAXIMUM PRESSURE SHOWN ON THE P&ID'S FOR THE ACTUATOR. COMPRESSED AIR SUPPLY PRESSURE EXCEEDING 100 PSIG MAY DAMAGE SOME EQUIPMENT FURNISHED BY UCC. UCC SUGGESTS A PRESSURE REGULATING DEVICE, NOT FURNISHED BY UCC, IF REQUIRED, BE INSTALLED UPSTREAM OF UCC EQUIPMENT.

FILTER/SEPARATOR IS DESIGNED FOR 80 PSIG MINIMUM. OPERATION OF PULSE CLEANED FILTERS USING COMPRESSED AIR BELOW 80 PSIG SERIOUSLY AFFECTS THE FILTER CLEANING EFFICIENCY. CLEANING EFFICIENCY CANNOT BE GUARANTEED AT PRESSURE BELOW 80 PSIG.

PIPING NOTES

LOCATE TEST OR MONITORING CONNECTIONS IN APPROXIMATE LOCATION SHOWN ON THE DRAWINGS. THEY SHOULD BE AT LEAST 10 PIPE DIAMETERS DOWNSTREAM AND AT LEAST 2 PIPE DIAMETERS UPSTREAM OF ANY PIPE FITTINGS, ORIFICE OR VALVE IF POSSIBLE. THESE CONNECTION LOCATIONS ARE ONLY SHOWN FOR REPRESENTATION AND ARE NOT FURNISHED BY UCC UNLESS SHOWN ON THE BILLS OF MATERIAL.

ALTHOUGH GRAPHICALLY SHOWN AS TC, A RECOMMENDED TEST CONNECTION WOULD INCORPORATE A 1/4" BALL VALVE WITH PIPE PLUG (UNLESS NOTED).

ALL PIPING MUST BE DESIGNED AND INSTALLED IN ACCORDANCE WITH GENERALLY ACCEPTED PIPING PRACTICES, STANDARDS AND APPLICABLE CODES.

ALL PIPING MUST BE BLOWN CLEAN OF ALL RUST, SCALE, DEBRIS, ETC. BEFORE CONTROL COMPONENTS ARE OPERATED.

ACTUAL PIPING LENGTH, NUMBER OF FITTINGS AND ELEVATION LIFTS MUST BE CHECKED AND SIZES INCREASED WHERE NECESSARY TO GIVE THE FLOW AND PRESSURE REQUIRED AT THE END USE EQUIPMENT.

UNIONS OR FLANGES MUST BE USED, AS REQUIRED BY FIELD CONDITIONS, TO ALLOW REMOVAL OF ALL VALVES, NOZZLES AND DEVICES FOR INSPECTION, MAINTENANCE OR REPLACEMENT.

COMPRESSED AIR, WATER SUPPLY AND DRAIN PIPE SIZES SHOWN ARE BASED ON U.S. STANDARD STEEL PIPE UNLESS OTHERWISE NOTED AND ARE MINIMUM SIZES RECOMMENDED. IF HEAVIER PIPE OR TUBING IS USED, IT SHOULD HAVE EQUAL OR GREATER ID.

AIR LINES THAT RUN TO END USE EQUIPMENT ARE TO BE TAKEN FROM THE TOP OF THE SUPPLY HEADERS. HEADERS AND BRANCHES ARE TO BE PITCHED DOWNWARD IN THE DIRECTION OF FLOW AND ARE TO BE PROVIDED WITH A DRIP LEG AT THE END, ALONG WITH A TRAP OR DRAIN VALVE.

HIGH PRESSURE AIR PIPING FROM PRESSURE RELIEF VALVES MUST BE VENTED TO ATMOSPHERE AWAY FROM PERSONNEL. FOR PIPE RUNS LESS THAN 25 FEET, THE PIPE DIAMETER MUST BE INCREASED 1" OVER THE RELIEF VALVE OUTLET DIAMETER. FOR LONGER RUNS, CALCULATIONS MUST BE MADE TO DETERMINE THE PIPE DIAMETER TO BE USED.

VALVE NOTES

"S" SHOWN NEAR THE KNIFE GATE INDICATES SEAT SIDE OF THE VALVE
"FLC" SHOWN NEAR THE KNIFE GATE INDICATES FLOW CONE
"WL" SHOWN NEAR THE KNIFE GATE INDICATES WEAR LINER

ALL CONTROL EQUIPMENT SHOULD BE LOCATED IN A CONVENIENT AND ACCESSIBLE LOCATION FOR OPERATION, ADJUSTMENT AND MAINTENANCE.

VALVE OPERATORS ARE TO BE ORIENTATED IN THE FIELD DURING INSTALLATION TO ACCOMMODATE ACCESS, OPERATION, AND POSSIBLE FIELD OBSTRUCTIONS. FOLLOW MANUFACTURER'S APPLICATION, INSTALLATION, OPERATION, & MAINTENANCE INSTRUCTIONS FOR DETERMINING SUPPORT REQUIREMENTS FOR THOSE VALVES REQUIRING ADDITIONAL ACTUATOR SUPPORT WHEN THE OPERATORS ARE NOT INSTALLED IN THE VERTICAL POSITION.

WHEN VALVES OR EQUIPMENT ARE NOT FULLY ASSEMBLED, ALL SOLENOID VALVES MUST BE MOUNTED AS CLOSE TO THE CONTROLLED EQUIPMENT AS POSSIBLE (WITHIN 24 INCHES) TO MINIMIZE PRESSURE LOSSES.

WHEN VALVES ARE NOT FULLY ASSEMBLED, FLEXIBLE HOSES MUST BE INSTALLED TO ALLOW FOR CYLINDER MOVEMENT DURING VALVE ACTUATION, WHERE REQUIRED.

WHEN VALVES ARE USED FOR "ON-OFF" SERVICE THAT ARE NOT FULLY ASSEMBLED, SPEED CONTROL VALVES MUST BE INSTALLED IN THE AIR LINES CONNECTED TO THE PNEUMATIC OPERATORS, UNLESS NOTED OTHERWISE ON THE DRAWINGS. SPEED CONTROL VALVES ARE USED TO MINIMIZE EXCESSIVE VALVE SHOCK AND WATER HAMMER. INSTALL SPEED CONTROL VALVES SO FLOW ARROWS POINT AWAY FROM CYLINDERS.

ADJUST SPEED CONTROL VALVES TO GIVE THE FASTEST OPERATION OF THE VALVE/GATES POSSIBLE (UNLESS NOTED) WITHOUT CAUSING UNDUE SHOCK.

LOW POINT DRAIN AND HIGH POINT VENT VALVE AND PIPING NOTES

PIPING SYSTEM LOW POINT DRAIN AND HIGH POINT VENT VALVES AND PIPING, LOCAL OR GLOBAL, ARE NOT LOCATED OR FURNISHED BY UCC UNLESS SHOWN ON THE BILLS OF MATERIAL.
ADDITIONAL DRAIN AND VENT COMPONENTS MAY BE NECESSARY DEPENDENT ON THE ACTUAL PIPE ROUTING TO FULLY DRAIN THE PIPE LINES FOR MAINTENANCE, FREEZE PROTECTION, ETC. AND TO FULLY VENT THE PIPE LINES WHEN REFILLING. EVALUATION OF THE PIPING SYSTEM TO QUANTIFY, LOCATE AND SUPPLY THE DRAIN AND VENT COMPONENTS IS NOT BY UCC.

IF UCC HAS SUPPLIED THE DRAIN AND VENT PIPING MATERIAL, FIELD DRILLING AND WELDING WILL BE NECESSARY FOR ADDED DRAIN AND VENT CONNECTIONS.

ABBREVIATIONS LIST

ACI	ACTIVATED CARBON INJECTION
ACFM	ACTUAL CUBIC FEET PER MINUTE @ PRESS. & TEMP.
AL	AIR LINE PIPE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
ASSY	ASSEMBLY
B	BASALT
BC	BOLT CIRCLE
B/M	BILL OF MATERIAL
°C	DEGREES CELSIUS
CFM	CUBIC FOOT PER MINUTE
CI	CAST IRON
CL	CENTERLINE
CO	CLEANOUT
CONN	CONNECTION
CPVC	CHLORINATED POLYVINYL CHLORIDE
CS	CARBON STEEL
CU	CUBIC
CU FT	CUBIC FEET
CU IN	CUBIC INCH
D	DURITE® PIPE
DC	DURA-CORE™
DL	DURALOY™ PIPE
DI	DUCTILE IRON
DIA	DIAMETER
DN	DIAMETER NOMINAL
DR	DUR-ROK® PIPE
DSI	DRY SORBENT INJECTION
DWG	DRAWING
EIP	EXISTING IN PLACE
EL	ELEVATION
ER	EXISTING RELOCATED
°F	DEGREES FAHRENHEIT
FGD	FLUE GAS DESULFURIZATION
FL	FLOOR LEVEL
FLG	FLANGE
FF	FLAT FACE
FO	FAIL OPEN
FPT	FEMALE PIPE THREAD
FRP	FIBERGLASS REINFORCED PLASTIC
FT	FOOT
GL	GRADE LEVEL
GPM	GALLONS PER MINUTE
h	HOUR
HDPE	HIGH-DENSITY POLYETHYLENE
Hz	HERTZ
HP	HORSEPOWER
HPU	HYDRAULIC POWER UNIT
HYDR	HYDRAULIC
ICFM	INLET CUBIC FEET PER MINUTE @ PRESS. & TEMP.
ID	INSIDE DIAMETER
IN	INCH
in Hg	INCHES OF MERCURY
IN LB	INCH-POUND
kPa	KILOPASCAL
kW	KILOWATT
lbs	POUNDS
LS	LIMIT SWITCH
m	METER
MATL	MATERIAL
MAX	MAXIMUM
MIN	MINIMUM
min	MINUTE
mm	MILLIMETER
MSL	MEAN SEA LEVEL
MT	METRIC TON
N	NUVALOY® PIPE
N/A	NOT APPLICABLE
Nm^3/h	NORMAL CUBIC METERS PER HOUR
N/C	NORMALLY CLOSED
NF	NOT FURNISHED
NO.	NUMBER
N/O	NORMALLY OPEN
NPT	NATIONAL PIPE TAPER (THREADED)
NTE	NOT TO EXCEED
NTS	NOT TO SCALE
OD	OUTSIDE DIAMETER
ODP	OPEN DRIP PROOF
PAC	POWDER ACTIVATION CARBON
Ph	PHASE
pH	HYDROGEN-ION CONCENTRATION
PLC	PROGRAMMABLE LOGIC CONTROLLER
PN	PART NUMBER
PPM	PARTS PER MILLION
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSID	POUNDS PER SQUARE INCH DIFFERENTIAL
PSIG	POUNDS PER SQUARE INCH GAUGE
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
REF	REFERENCE
REQD	REQUIRED
RF	RAISED FACE
RPM	REVOLUTIONS PER MINUTE
s	SECONDS
SCFM	STANDARD CUBIC FOOT PER MINUTE @ 14.7 PSIG & 68°F
SCH	SCHEDULE
SI	INTERNATIONAL SYSTEM OF UNITS
sp	STATIC PRESSURE
SP	STEEL PIPE
SS	STAINLESS STEEL
SSPC	STEEL STRUCTURES PAINTING COUNCIL
STD	STANDARD
STL	STEEL
T	U.S. SHORT TON (2000 LB)
TC	TEST CONNECTION
TDH	TOTAL DYNAMIC HEAD
TEFC	TOTALLY ENCLOSED FAN COOLED
3Ph	THREE PHASE
TYP	TYPICAL
V	VOLTS
W/	WITH
WC	WATER COLUMN
WG	WATER GAUGE
W/O	WITHOUT
WP	WEATHERPROOF

STANDARD SYMBOLS

&	AND
	SQUARE
=	EQUAL
"	INCH
'	FOOT
Ø	DIAMETER
#	POUND OR NUMBER

MECHANICAL DRAWING INDEX	
DRAWING	TITLE
M-55650-05-001	P&I DIAGRAM , GENERAL NOTES , UNIT 1
M-55650-05-002	P&I DIAGRAM , STANDARD SYMBOLS , UNIT 1
M-55650-05-003	KEY PROCESS DIAGRAM , FLY ASH NUVEYOR® VACUUM SYSTEM, UNIT 1
M-55650-05-004	P&I DIAGRAM , FLY ASH NUVEYOR® VACUUM SYSTEM, HOPPER AREA , UNIT 1
M-55650-05-005	P&I DIAGRAM , FLY ASH NUVEYOR® VACUUM AND UNLOADING SYSTEM, SILO AREA , UNIT 1
M-55650-05-006	P&I DIAGRAM , FILTER/SEPARATOR - CONTINUOUS OPERATION , UNIT 1
M-55650-05-007	P&I DIAGRAM , BIN FLUIDIZING SYSTEM , UNIT 1
M-55650-05-008	P&I DIAGRAM , MECHANICAL EXHAUSTERS , UNIT 1
M-55650-05-009	P&I DIAGRAM , COMPRESSED AIR, FLY ASH NUVEYOR® VACUUM SYSTEM, UNIT 1
MI-55650-05-001	OPERATING INSTRUCTIONS FOR FLY ASH NUVEYOR® VACUUM SYSTEM, UNIT 1

DRAWING REFERENCE LIST:

STRUCTURAL DRAWING S-55650-05-001, G-55650-05-001
CONVEYOR AND SERVICE PIPING DRAWING C-55650-05-001
LOGIC DRAWING L-55650-05-001 (C)

UCC ENVIRONMENTAL (UCC) REGISTRATIONS AND TRADEMARKS

DEPAC® DENSE PHASE ASH CONVEYING SYSTEM
DURITE® (PIPE / FITTINGS)
EXCEN-CRUSHER™ CLINKER GRINDER
HYDROVEYOR® ASSEMBLY
JETPULSION® PUMP ASSEMBLY
NUVA FEEDER® ASSEMBLY (POSITIVE PRESSURE PNEUMATIC SYSTEM)
NUVALOY® (ABRASION RESISTANT PIPE)
NUVASEAL®
NUVEYOR® VACUUM SYSTEM
UCC®
VIPER® MILL
ACCUFLOC™
ACCUFUSE™
ACCUpHIX™
CDR™ (CONTINUOUS DEWATERING & RECIRCULATION)
COBRA™ II LANCE
DAC™ (DRY ASH CONVEYOR)
DAX™ (DRY ASH EXTRACTOR)
DFC™ (DRY FLIGHT CONVEYOR)
DURA-CORE™ II (CERAMIC-TILE PIPE / FITTINGS)
DURALOY™ (PIPE / FITTINGS/CUSTOM FABRICATIONS)
DUR-ROK™ (BASALT-LINED PIPE / FITTINGS)
ecopod™ (MODULAR DSI SYSTEM)
HDCC™ (HIGH DENSITY CONDITIONED CONVEYANCE SYSTEM)
HDSS™
HYDROCURE™
INFINITY™ SWING HAMMER
INFINITY™ COAL CRUSHER SCREENS
MAX-LP™ (MECHANICAL ASH EXTRACTOR LOW-PROFILE)
Mobile-MAX™ BOTTOM ASH AND TRANSPORT WATER TREATMENT SYSTEM
M-PACT™ II (MODULAR ACTIVATED CARBON INJECTION SYSTEM)
MultiDAC™ DENSE PHASE POSITIVE PRESSURE SYSTEM
NUMAFLEX™ (FITTINGS / BOTTOM ASH HOSE)
PAX™ (PNEUMATIC ASH EXTRACTOR DRY BOTTOM ASH VACUUM SYSTEM)
SFC™ (SUBMERGED FLIGHT CONVEYOR)
SPARTAN™ FITTINGS (DURITE H)
STRYKER™ PRECIPITATOR HAMMERS
SWITCHBLADE™ FGD AGITATOR
TIGER™ VALVE
TITAN™ EQ SWING DISC VENT VALVE
TITAN™ HP VALVE (HIGH PRESSURE)
TITAN™ LP VALVE (LOW PRESSURE)
TRITON™ FGD AGITATOR
VAX™ (VIBRATORY ASH EXTRACTOR)

SAFETY NOTE:
REFER TO UCC DOCUMENT NO. 721005, "SYSTEMS AND EQUIPMENT SAFETY INSTRUCTIONS", LOCATED IN THE UCC O&M MANUAL, FOR IMPORTANT SAFETY CONSIDERATIONS WHEN PERSONNEL ARE NEAR THE SYSTEM EQUIPMENT FOR ANY REASON.

NOTES

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
C	REVISED PER UCC REVIEW	03/13/2025	MY	CDT		
B	REVISED AS PER CUSTOMER COMMENTS	12/03/2024	MM	MY	CDT	MY
A	INITIAL ISSUE	10/15/2024	MY	CDT	CDT	MY

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SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE
P & I DIAGRAM
GENERAL NOTES
UNIT 1

PLANT NAME
HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER M-55650-05-001
REVISION C

PIPING
CONVEYING
SERVICE
SIGNALS
PNEUMATIC
ELECTRICAL
HYDRAULIC
HEAT TRACING
THERMAL INSULATION
CLEAN-OUT TEE
TEST CONNECTION 1/4" UNLESS NOTED
REDUCER
PIPE CAP
PIPE PLUG
UNION
FLOW LIMITER
ORIFICE
ORIFICE UNION
FLEXIBLE HOSE
EXPANSION JOINT
DUST CHECK ASSEMBLY
COMPRESSED AIR MUFFLER
SILENCER
TELLTALE DRAIN
NOZZLE
GATE OR OTHER IN-LINE TYPE VALVE NOT OTHERWISE IDENTIFIED
PLUG VALVE
BUTTERFLY VALVE OR DAMPER
GLOBE VALVE
BALANCE VALVE
N/O
N/C
BALL VALVE
PINCH VALVE
ECCENTRIC PLUG VALVE
CHECK VALVE
FLOW DIRECTION
SPEED CONTROL VALVE (RESTRICTED FLOW AWAY FROM CYLINDER)
SCV
RF
PRESSURE RELIEF VALVE
RIGHT ANGLE
STRAIGHT-THROUGH
VACUUM RELIEF VALVE
BIN VACUUM/ PRESSURE RELIEF
AIR OR WATER PRESSURE REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP
AIR OR WATER PRESSURE REDUCING REGULATOR, EXTERNAL TAP AND REMOTE SIGNAL
PRESSURE REDUCING REGULATOR SELF CONTAINED
PRESSURE-REDUCING REGULATOR WITH INTERNAL OUTLET PRESSURE RELIEF VALVE, AND OPTIONAL PRESSURE INDICATOR
PG
QUICK EXHAUST
IN
OUT
EXH
FO
OPERATOR SIDE
3-WAY VALVE
4-WAY VALVE 2 POSITION, FAIL OPEN TO PATHS P-A AND B-E
A
B
P
E
LINE SWITCH
SOLENOID OPERATOR
SOLENOID WITH MANUAL OPERATOR
MANUAL OPERATOR
FAIL OPEN
EXTERNAL PILOT SUPPLY
VALVE WITH MULTIPLE OPERATORS STACKED (BOTH OPERATORS MUST GIVE SIGNAL TO ACTUATE VALVE)
MOTOR OPERATOR
DIAPHRAGM ACTUATOR
POSITIONER
CYLINDER OPERATOR
DOUBLE-ACTING
SINGLE-ACTING
RACK & PINION ROTARY TYPE
ROTARY VANE ACTUATOR
POWER CHAMBER OPERATOR
RUPTURE DISK OR SAFETY HEAD FOR PRESSURE RELIEF
RUPTURE DISK OR SAFETY HEAD FOR VACUUM RELIEF
DIAPHRAGM SEAL
PANEL MOUNTED INSTRUMENT
FLOW SWITCH
FLOW METER OR ROTAMETER
LIMIT SWITCH OPEN POSITION
LIMIT SWITCH CLOSED POSITION
DUST DETECTOR
PRESSURE SWITCH
SINGLE SWITCH
DUAL SWITCH
PRESSURE TRANSMITTER
OR
* WITH INDICATOR
PRESSURE INDICATOR
DIFFERENTIAL PRESSURE SWITCH
TEMPERATURE SWITCH
TEMPERATURE INDICATOR
LEVEL SWITCH CAPACITANCE, RADIO FREQUENCY (RF), FLOAT, VIBRATING TYPE
LEVEL SWITCH PADDLE WHEEL TYPE
LEVEL TRANSMITTER
RADIOACTIVE OR SONIC TYPE LEVEL TRANSMITTER
ULTRASONIC/RADAR LEVEL INDICATOR
RADIOACTIVE DENSITY METER
SONIC-TYPE VELOCITY METER CONTROLLER
HYDROVEYOR EXHAUSTER
JETPULSION PUMP
CENTRIFUGAL PUMP
FAN
BLOWER, MECHANICAL EXHAUSTER OR COMPRESSOR
SUMP PUMP
DRY SORBENT MILL
ROTARY FEEDER
CRUSHER
AIR INTAKE
DIFFUSER FEEDER (UPPER OR LOWER)
NUVA FEEDER ASSEMBLY (PRESSURE SYSTEM)
WITH HOPPER LEVEL PROBE AND VIBRATOR
HOPPER PROBE
HOPPER VIBRATOR
WITHOUT HOPPER LEVEL PROBE OR VIBRATOR
FLY ASH INTAKE (VACUUM SYSTEM)
FLY ASH INTAKE WITH HOPPER VIBRATOR AND LEVEL PROBE
HYDRAULIC RESERVOIR
PNEUMATIC RESERVOIR
INPUT TO PLC OR DCS DISCRETE OR ANALOG
OUTPUT FROM PLC OR DCS DISCRETE OR ANALOG
MOTOR
VARIABLE SPEED MOTOR
AIR FILTER OR STRAINER
FILTER - SEPARATOR WITH MANUAL DRAIN
FILTER - SEPARATOR WITH AUTOMATIC DRAIN
DRAIN
AIR LUBRICATOR
DEBRIS SCREEN
FLOW
BIRD SCREEN
AGITATOR
EMERGENCY EYE WASH AND SHOWER
EMERGENCY EYE WASH
EMERGENCY SHOWER
CHEMICAL DRUM
CHEMICAL TOTE
CHEMICAL METERING DIAPHRAGM PUMP
METERING PUMP
PISTON PUMP
PROGRESSIVE CAVITY PUMP
STATIC MIXER

** SEE NOTE 2 (TYP)

NOTES

1. FOR GENERAL NOTES AND REFERENCE SEE DRAWING M-55650-05-001.
2. SYMBOLS ARE IN ACCORDANCE WITH ISA STANDARD S5.1, ASA 732.11, OR USAS Y32.10 UNLESS MARKED WITH **.
3. THE "RF" USED IN THE SPEED CONTROL VALVES SIGNIFIES RESTRICTED FLOW.
4. THE STANDARD TAGGING PREFIXES USED ARE:
   - DD - DUST DETECTOR
   - DE - DENSITY ELEMENT - RECEIVER
   - DX - DENSITY - RADIOACTIVE SOURCE
   - FG - FLOW INDICATOR
   - FCV - FLOW CONTROL VALVE
   - FO - FLOW ORIFICE
   - FICV - FLOW INDICATOR WITH CONTROL VALVE
   - FS - FLOW SWITCH
   - FSCV - FLOW SWITCH WITH CONTROL VALVE
   - FV - AUTOMATIC VALVE
   - FY - SOLENOID AIR VALVE
   - LE - LEVEL ELEMENT
   - LS - LEVEL SWITCH
   - LT - LEVEL TRANSMITTER
   - LX - LEVEL - RADIOACTIVE SOURCE
   - M - MOTOR ACTUATOR
   - PCV - PRESSURE CONTROL VALVE
   - PDS - PRESSURE DIFFERENTIAL SWITCH
   - PG - PRESSURE INDICATOR
   - PS - PRESSURE SWITCH
   - PSE - PRESSURE RELIEF RUPTURE DISK
   - PSV - PRESSURE SAFETY VALVE
   - PIT - PRESSURE INDICATING TRANSMITTER
   - PT - PRESSURE TRANSMITTER
   - SCV - SPEED CONTROL VALVE
   - SIC - SPEED INDICATING CONTROLLER
   - SJ - SPEED SCANNER
   - ST - SPEED TRANSMITTER
   - TG - TEMPERATURE INDICATOR
   - TS - TEMPERATURE SWITCH
   - ZSO - LIMIT SWITCH - OPEN
   - ZSC - LIMIT SWITCH - CLOSED

   FOR ADDITIONAL SUFFIXES REFER TO TABLE 1.

TABLE 1
MEANINGS OF IDENTIFICATION LETTERS
THIS TABLE APPLIES ONLY TO THE FUNCTIONAL IDENTIFICATION OF INSTRUMENTS.

	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED/INITIATING VARIABLE	VARIABLE MODIFIER	READOUT/PASSIVE FUNCTION	OUTPUT/ACTIVE FUNCTION	FUNCTION MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	CLOSE
D	USER'S CHOICE	DIFFERENCE, DIFFERENTIAL			DEVIATION
E	VOLTAGE		SENSOR, PRIMARY ELEMENT		
F	FLOW, FLOW RATE	RATIO			
G	USER'S CHOICE		GLASS, GAUGE, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT		INDICATE		
J	POWER		SCAN		
K	TIME, SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	USER'S CHOICE				MIDDLE, INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		OPEN
P	PRESSURE		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE, TOTALIZE	INTEGRATE, TOTALIZE		
R	RADIATION		RECORD		RUN
S	SPEED, FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL, PROBE		
X	UNCLASSIFIED	X-AXIS	ACCESSORY DEVICES, UNCLASSFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE, PRESENCE	Y-AXIS		AUXILIARY DEVICES	
Z	POSITION, DIMENSION	Z-AXIS, SAFETY INSTRUMENTED SYSTEM		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

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REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
A	INITIAL ISSUE	10/15/2024	MY	CDT		

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SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE
P & I DIAGRAM
STANDARD SYMBOLS
UNIT 1

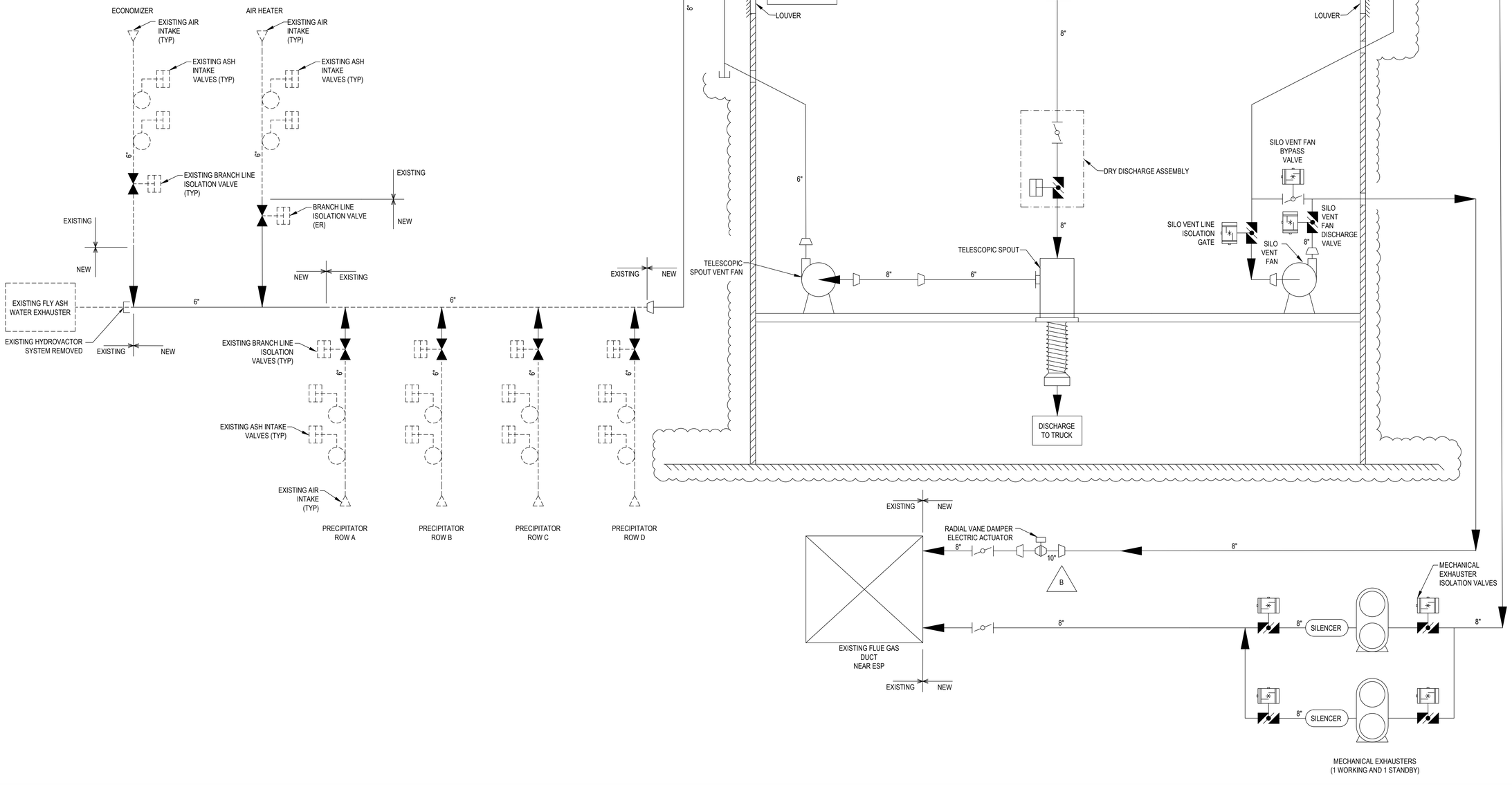
PLANT NAME
HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

ucc environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER
M-55650-05-002

REVISION
A

X:\55650\55650-05\13 - PLANT 3D\P&ID\M-55650-05-002_A_.DWG



NOTES

1. FOR GENERAL NOTES AND REFERENCES SEE DRAWING M-55650-05-001.

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
B	REVISED AS PER CUSTOMER COMMENTS	12/03 2024	MM	MY		
A	INITIAL ISSUE	10/15 2024	MY	CDT	CDT	MY

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SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE

KEY PROCESS DIAGRAM
FLY ASH NUVEYOR® VACUUM SYSTEM
UNIT 1

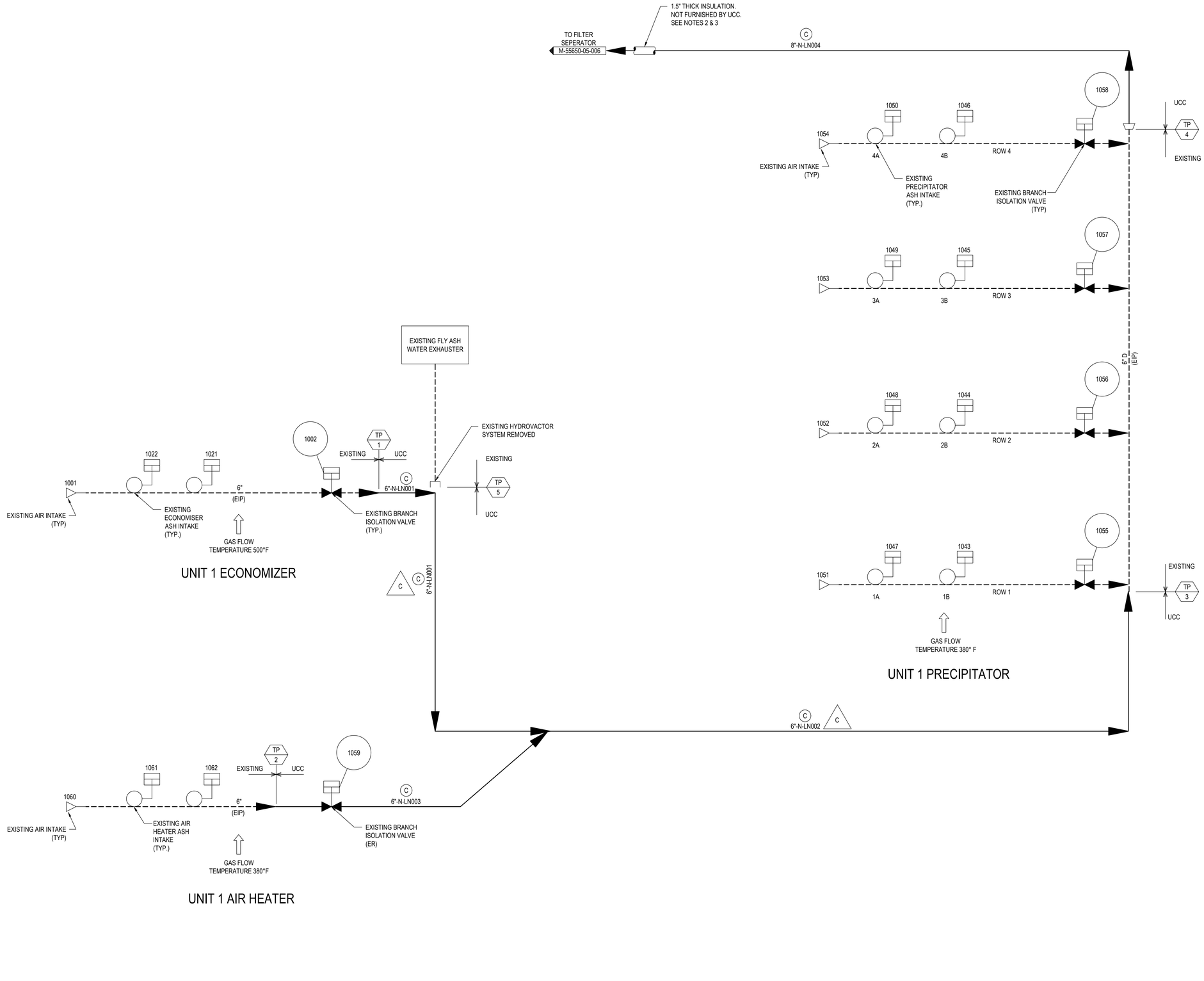
PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER: M-55650-05-003

REVISION: B



NOTES

1. FOR GENERAL NOTES AND REFERENCES SEE DRAWING M-55650-05-001.
2. DESIGN OF INSULATION WAS BASED ON MINERAL FIBER THERMAL CONDUCTIVITY OF 0.27 (BTU*IN/FT2*HR*F), ALUMINUM CLADDING TO BE PROVIDED FOR WEATHER PROTECTION AND PERSONNEL AS NECESSARY. SUPPLY OF INSULATION WRAPPED AROUND EXPANSION JOINT MUST ALLOW EXPANSION JOINTS TO MOVE FREELY. MECHANICAL JOINTS AND PIPE SUPPORTS ON PIPING DO NOT REQUIRE INSULATION.
3. INSULATION REQUIREMENT FOR THE LINE BEGINS AFTER LEAVING THE BUILDING

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
C	REVISED PER UCC REVIEW	02/24/2025	MY	CDT		
B	REVISED AS PER CUSTOMER COMMENTS	12/03/2024	MM	MY	CDT	MY
A	INITIAL ISSUE	10/15/2024	MY	CDT	CDT	MY

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SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE

P & I DIAGRAM
FLY ASH NUVEYOR® VACUUM SYSTEM
HOPPER AREA
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
M-55650-05-004	C

ITEM* A-B-N M-05-005-	DRAWING NUMBER	PART NUMBER	QTY	DESCRIPTION
1	3-2326-31	2326-31-3-3-1-0-0-0-00	1	DISCHARGE-ASSY,8"DRY UNLD
2		55650-05-M201	1	SPOUT,TELESCOPIC
3		55650-05-M202	1	FAN-VENT, TELESCOPIC SPOUT W/MOTOR
4		197052-10-6-12	2	VALVE - BUTTERFLY, 8", AC, SAV, LS, N/O
5		197052-2-6-12	1	VALVE - BUTTERFLY, 6", AC, SAV, LS, N/C
6	SK-2346-25	2346-25-1	1	VENT-PRESSURE & VACUUM RELIEF
7		34635-0-0-0-1-1-1-003-030	1	INDICATOR-LEVEL,RADAR,2-WIRE
8	3-3403-41	3403-41	1	INDICATOR-LVL,120V,60HZ,A=48"
9		340487-2113-000-0051	1	TRANSMITTER-GP,0"-5",H2O
10	SK-3401-99	3401-99	1	ADAPTER-SILO ASH LEVEL INDICATOR
11		197052-3-6-12	2	VALVE - BUTTERFLY, 8", AC, SAV, LS, N/C
12	5-2417-8	2417-8	1	PANEL-CONTROL,TELE SPT & FAN
13		55650-05-M203	1	FAN-VENT, SILO W/MOTOR
14		55650-05-M206	2	LOUVER-PARALLEL, VENTILATION

NOTES

1. FOR GENERAL NOTES AND REFERENCES SEE DRAWING M-55650-05-001.
2. TELESCOPIC SPOUT LOCAL CONTROL PANEL TO BE LOCATED AT GRADE LEVEL.
3. VALVES, MOTORS, AND LIMIT SWITCHES ASSOCIATED WITH THE TELESCOPIC SPOUT AND TELESCOPIC SPOUT VENT FAN ARE WIRED DIRECTLY TO THE TELESCOPIC LOCAL CONTROL PANEL.
4. THROTTLE VALVE TO PROVIDE A MAXIMUM FLOW RATE OF 200 CU FT/MIN
5. INSPECT RELIEF VALVE MONTHLY TO ENSURE DISC MOVES FREELY
6. RTV BOLT SLOTS TO ENSURE WATER TIGHT INSTALLATION. THE FOLLOWING PARAMETERS FOR THE SILO LEVEL TRANSMITTER HAVE BEEN PRE-PROGRAMMED AT THE FACTORY:
   LANGUAGE LOCAL = ENGLISH
   APPLICATION TYPE = STEEL
   PARAMETER LENGTH UNIT = FEET
   OPERATION = LEVEL
   CONN HEIGHT ABOVE BOTTOM OF SILO ROOF = 0.33 FT
   HIGH CALIBRATION POINT = 3 FT
   LOW CALIBRATION POINT = 30 FT
   RATE = SLOW (0.1 M/MIN)
7. OVERFILLING TRUCK WILL CAUSE EXCESSIVE CARRYOVER AND PREMATURE WEAR OF THE VENT SYSTEM COMPONENTS.
8. FOR PRESSURE TRANSMITTER SETTINGS SEE OPERATING INSTRUCTIONS MI-55650-05-001.

TELESCOPIC SPOUT VENT LINE ISOLATION GATE 6" BUTTERFLY VALVE, AIR CYLINDER OPERATED FULLY ASSEMBLED WITH SOLENOID AND LIMIT SWITCHES. FOR COMPRESSED AIR SEE DRAWING M-55650-05-009

ABV 1101 · ZS 1255

TO FILTER SEPARATOR M-55650-05-006

FROM FILTER SEPARATOR M-55650-05-006

RADAR LEVEL TRANSMITTER SEE NOTE 6 — LT 1250 — AI

PADDLE WHEEL LEVEL DETECTOR 120VAC/1PH/60HZ — LS 1251

12" FLANGED CONNECTION

6" FLANGED CONNECTION

PRESSURE / VACUUM RELIEF VALVE SET AT -2"WC +8"WC SEE NOTE 5 — SRV 1105

ZS 1256 · ZS 1257 · ABV 1102

SILO VACUUM RELIEF GATE 8" BUTTERFLY VALVE, AIR CYLINDER OPERATED FULLY ASSEMBLED WITH SOLENOID AND LIMIT SWITCHES. FOR COMPRESSED AIR SEE DRAWING M-55650-05-009

8"-CS-LN009

PRESSURE TRANSMITTER WITH READOUT SEE NOTE 8 — PT 1252 — AI

-BV-1107 — 1/2" — GC

MANHOLE

OUTLET PLENUM

6"-CS-LN008

FLY ASH STORAGE SILO
5200 CU FT
VSL-001

SEE DRAWING M-55650-05-007 FOR FLUIDIZING SYSTEM

-VNT-001 — 14 MANUAL LOUVER

-VNT-002 — 14 MANUAL LOUVER

8"-CS-LN005

1/2" NPT CONN. WITH PIPE PLUG

CLEANOUT CONNECTION

DRY DISCHARGE ASSEMBLY, INCLUDES 8" MANUAL ROTARY DISC GATE AND 8" TELESCOPIC SPOUT ASH FEED VALVE AIR CYLINDER OPERATED ROTARY DISC WITH SOLENOID FOR COMPRESSED AIR SEE DRAWING M-55650-05-009

-BV-1106 — 1 SEE NOTES 3 & 4

ABV 1100

8"-CS-LN005

FULL UP LIMIT SWITCH · SLACK CABLE LIMIT SWITCH

ZS 1253 · ZS 1254

3 TELESCOPIC SPOUT VENT FAN MOTOR 7.5 HP, 460 V/3Ph/ 60 Hz, TEFC, 3600 RPM, 213T FRAME, WITH 1.15 S.F.

TELESCOPIC SPOUT VENT FAN SIZED FOR 1000 CFM AT 18" S.P. 9" CONN. — 3

-M-002 — -FAN-002

8"-CS-LN007 · 6"-CS-LN006

2 HOIST MOTOR, REVERSING 1 HP, 460 V/3Ph/60 Hz, TEFC,1800 RPM, WITH 1.15 S.F. — -M-001 — 120VAC/1PH/60HZ

UNLOADER ROOM FLOOR
DRIVE THROUGH TRUCK BAY

-TCH-001 — 2 TELESCOPIC SPOUT

12 -PNL-001 — 120VAC/1PH/60HZ

TELESCOPIC SPOUT LOCAL CONTROL PANEL SEE NOTE 2

ZS 1258 · ZS 1259 · ABV 1103

SILO VENT LINE ISOLATION GATE 8" BUTTERFLY VALVE, AIR CYLINDER OPERATED FULLY ASSEMBLED WITH SOLENOID AND LIMIT SWITCHES FOR COMPRESSED AIR SEE DRAWING M-55650-05-009

ABV 1104 · ZS 1260 · ZS 1261

SILO VENT FAN BYPASS VALVE 8" BUTTERFLY VALVE, AIR CYLINDER OPERATED FULLY ASSEMBLED WITH SOLENOID AND LIMIT SWITCHES FOR COMPRESSED AIR SEE DRAWING M-55650-05-009

8"-CS-LN010

8"-CS-LN012

SILO VENT FAN DISCHARGE VALVE 8" BUTTERFLY VALVE, AIR CYLINDER OPERATED FULLY ASSEMBLED WITH SOLENOID AND LIMIT SWITCHES FOR COMPRESSED AIR SEE DRAWING M-55650-05-009

ABV 1183 · ZS 1292 · ZS 1293

8"-CS-LN011

13 SILO VENT FAN SIZED FOR 1405 CFM AT 12" S.P. 9" CONN.

8"-CS-LN009

-FAN-003 — -M-003

SILO VENT FAN MOTOR 7.5 HP, 460 V/3Ph/60 Hz, TEFC, 3600 RPM, 213T FRAME, WITH 1.15 S.F.

TO FLUE GAS DUCT M-55650-05-008

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
C	REVISED AS PER CUSTOMER COMMENTS	02/24/2025	MY	CDT		
B	GENERAL REVISION	12/03/2024	FST	MY	CDT	MY
A	INITIAL ISSUE	10/15/2024	MY	CDT	CDT	MY

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MODIFICATION TO UCC EQUIPMENT AND STRUCTURES TO AVOID FIELD OBSTRUCTIONS, CORRECTIONS DUE TO MINOR DRAWING DISCREPANCIES WITH FIELD CONDITIONS, AND/OR MINOR FABRICATION MISFITS ARE CONSIDERED NORMAL ERECTION AND INSTALLATION OPERATIONS AND ARE NOT CHARGEABLE TO UCC. WE WILL NOT ACCEPT BACK CHARGES FOR ANY WORK PERFORMED IN THE FIELD UNLESS APPROVED BY UCC'S FIELD SERVICE DEPARTMENT.

SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE

P & I DIAGRAM
FLY ASH NUVEYOR® VACUUM AND UNLOADING SYSTEM
SILO AREA
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

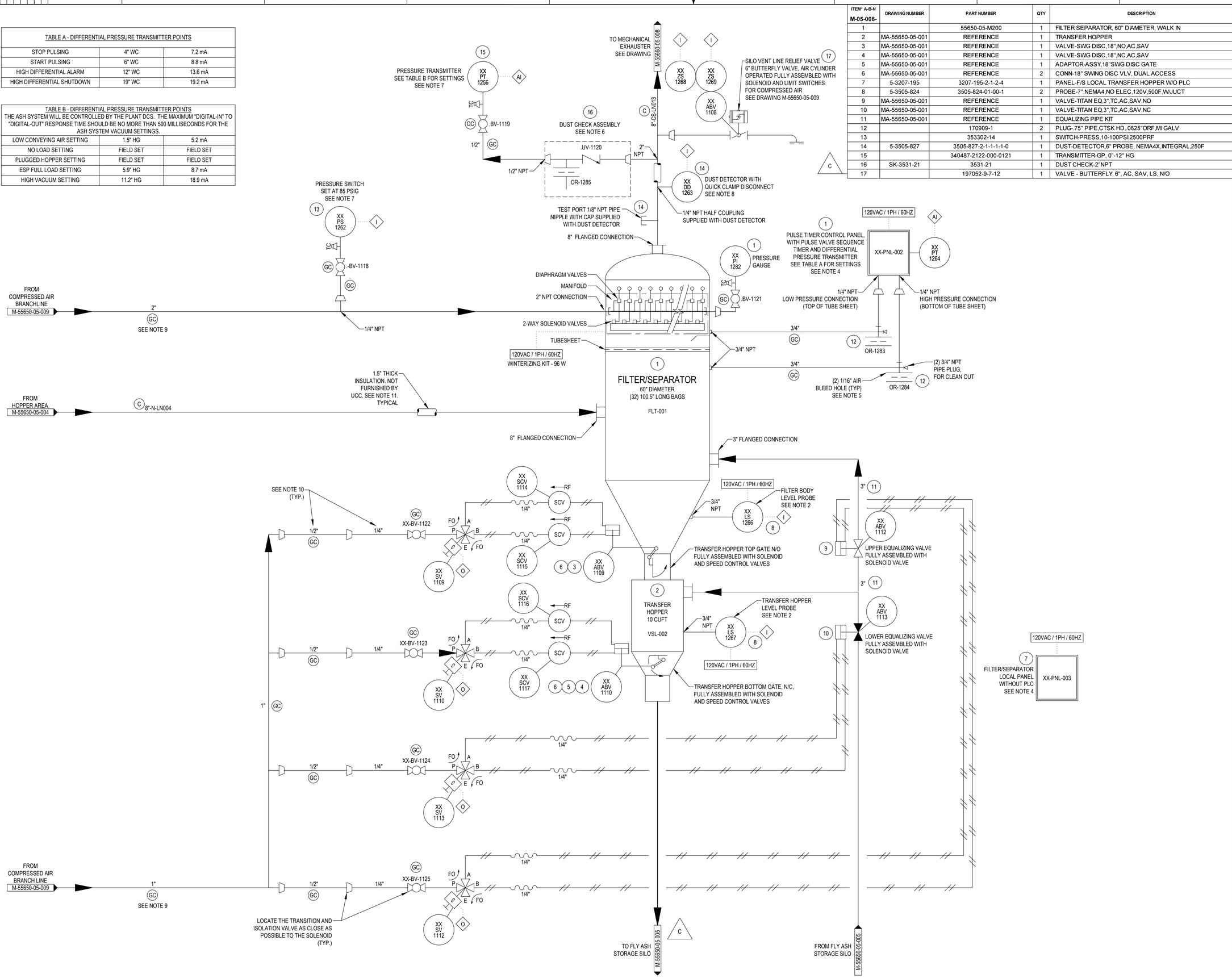
ucc environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER: M-55650-05-005

REVISION: C

TABLE A - DIFFERENTIAL PRESSURE TRANSMITTER POINTS		
STOP PULSING	4" WC	7.2 mA
START PULSING	6" WC	8.8 mA
HIGH DIFFERENTIAL ALARM	12" WC	13.6 mA
HIGH DIFFERENTIAL SHUTDOWN	19" WC	19.2 mA

TABLE B - DIFFERENTIAL PRESSURE TRANSMITTER POINTS THE ASH SYSTEM WILL BE CONTROLLED BY THE PLANT DCS. THE MAXIMUM "DIGITAL-IN" TO "DIGITAL-OUT" RESPONSE TIME SHOULD BE NO MORE THAN 500 MILLISECONDS FOR THE ASH SYSTEM VACUUM SETTINGS.		
LOW CONVEYING AIR SETTING	1.5" HG	5.2 mA
NO LOAD SETTING	FIELD SET	FIELD SET
PLUGGED HOPPER SETTING	FIELD SET	FIELD SET
ESP FULL LOAD SETTING	5.9" HG	8.7 mA
HIGH VACUUM SETTING	11.2" HG	18.9 mA



ITEM* A-B-N M-05-006-	DRAWING NUMBER	PART NUMBER	QTY	DESCRIPTION
1		55650-05-M200	1	FILTER SEPARATOR, 60" DIAMETER, WALK IN
2	MA-55650-05-001	REFERENCE	1	TRANSFER HOPPER
3	MA-55650-05-001	REFERENCE	1	VALVE-SWG DISC,18",NO,AC,SAV
4	MA-55650-05-001	REFERENCE	1	VALVE-SWG DISC,18",NC,AC,SAV
5	MA-55650-05-001	REFERENCE	1	ADAPTOR-ASSY,18"SWG DISC GATE
6	MA-55650-05-001	REFERENCE	2	CONN-18" SWING DISC VLV, DUAL ACCESS
7	5-3207-195	3207-195-2-1-2-4	1	PANEL-F/S LOCAL TRANSFER HOPPER W/O PLC
8	5-3505-824	3505-824-01-00-1	2	PROBE-7",NEMA4,NO ELEC,120V,500F,W/JUCT
9	MA-55650-05-001	REFERENCE	1	VALVE-TITAN EQ,3",TC,AC,SAV,NO
10	MA-55650-05-001	REFERENCE	1	VALVE-TITAN EQ,3",TC,AC,SAV,NC
11	MA-55650-05-001	REFERENCE	1	EQUALIZING PIPE KIT
12		170909-1	2	PLUG-.75" PIPE,CTSK HD,.0625"ORF,MI GALV
13		353302-14	1	SWITCH-PRESS,10-100PSI,2500PRF
14	5-3505-827	3505-827-2-1-1-1-1-0	1	DUST-DETECTOR,6" PROBE, NEMA4X,INTEGRAL,250F
15		340487-2122-000-0121	1	TRANSMITTER-GP, 0"-12" HG
16	SK-3531-21	3531-21	1	DUST CHECK-2"NPT
17		197052-9-7-12	1	VALVE - BUTTERFLY, 6", AC, SAV, LS, N/O

NOTES

1. FOR GENERAL NOTES AND REFERENCES SEE DRAWING M-55650-05-001.
2. IF INSULATION IS REQUIRED, DISH OUT THE INSULATION AROUND THE TWO LEVEL PROBES. THIS IS TO AVOID OVERHEATING THE ELECTRONICS OF THESE LEVEL PROBES.
3. CONDENSATION MAY OCCUR IN THE FILTER/SEPARATOR, EQUALIZING VALVES/PIPING, THE AIRLINE PIPING, AND EVEN IN THE MECHANICAL EXHAUSTER, WHEN TEMPERATURES DROP BELOW 50°F. THERE ARE MANY FACTORS THAT LEAD TO THE FORMATION OF CONDENSATION, SUCH AS: LOW AMBIENT TEMPERATURES, HIGH BOILER FLUE GAS DEW POINT TEMPERATURE, LOW ASH TEMPERATURES, AND LOW CONVEYING TEMPERATURES TO NAME A FEW. FOR CONDENSATION TO OCCUR, MOISTURE IN THE CONVEYING AIR AND ONE OR MORE OF THESE FACTORS MUST BE PRESENT. MOST SYSTEMS WILL NOT HAVE A PROBLEM WITH CONDENSATION, EVEN IF THE AMBIENT TEMPERATURE DROPS WELL BELOW FREEZING. THE MOST COMMON CAUSE FOR THE FORMATION OF CONDENSATION IN THE FILTER/SEPARATOR, AIRLINE, OR MECHANICAL EXHAUSTER IS OPERATING THE SYSTEM CONTINUOUSLY OR PERMITTING IT TO PULL A SIGNIFICANT QUANTITY OF BOILER FLUE GAS IN THE PRESENCE OF LOW AMBIENT TEMPERATURES.
   HEAT TRACING AND/OR INSULATION OF THE FILTER/SEPARATOR, EQUALIZING VALVES/PIPING, OR AIRLINE PIPING MAY BE REQUIRED TO PROTECT THE FILTER/SEPARATOR, EQUALIZING PIPING, AIRLINE, AND MECHANICAL EXHAUSTER FROM CORROSIVE CONDENSATION. THE NEED FOR HEAT TRACING AND INSULATION CAN NOT BE DETERMINED AHEAD OF TIME IN THE DESIGN STAGE. THE NEED IS BEST DETERMINED FROM EXPERIENCE AFTER THE SYSTEM HAS OPERATED FOR SOME PERIOD OF TIME. SHOULD PROBLEMS OCCUR WITH CONDENSATION, CONTACT UCC FOR ASSISTANCE. IF HEAT TRACING OR INSULATION IS INSTALLED, THE AIR TEMPERATURE AT THE MECHANICAL EXHAUSTER MUST BE MONITORED TO ENSURE THAT THE DIFFERENTIAL TEMPERATURE ACROSS THE EXHAUSTER AND THE EXHAUSTER DISCHARGE TEMPERATURE DO NOT EXCEED THE OPERATING LIMITATIONS AS SPECIFIED BY THE EXHAUSTER MANUFACTURER. THIS IS PARTICULARLY IMPORTANT DURING THE WARMER MONTHS. DESIGN, SUPPLY, AND INSTALLATION OF HEAT TRACING AND INSULATION IS NOT BY UCC.
4. LOCATE THE LOCAL CONTROL PANEL IN AN ACCESSIBLE AREA NEAR THE FILTER/SEPARATOR.
5. INSTALL ORIFICE IN CROSS IN HORIZONTAL RUN OF PIPE. INSTALL POINTING DOWN.
6. LOCATE AND MOUNT THE DUST CHECK ASSEMBLY NEXT TO THE AIRLINE NEAR THE VACUUM PRODUCING EQUIPMENT IN ACCORDANCE WITH THE NOTES SHOWN ON DRAWING SK-3531-21. BE SURE TO INSTALL THE CHECK VALVE HORIZONTALLY WITH THE ORIFICE FACING DOWN.
7. THE MOUNTING LOCATION CHOSEN MUST BE READILY ACCESSIBLE FOR MOUNTING AND ADJUSTING THE PRESSURE TRANSMITTER AND SWITCH. THE PRESSURE TRANSMITTER AND SWITCH (INSTRUMENTS) ARE TO BE INDEPENDENTLY SUPPORTED SO NO VIBRATION IS TRANSMITTED TO THE INSTRUMENTS. MOUNT THE PRESSURE TRANSMITTER AS CLOSE AS POSSIBLE TO THE DUST CHECK ASSEMBLY; WITHIN 10 FEET.
8. LOCATE DUST DETECTOR IN AN ACCESSIBLE LOCATION NEAR THE TRANSMITTER IN A STRAIGHT RUN OF PIPE, 10 PIPE DIAMETERS DOWNSTREAM OF ANY CHANGE IN DIRECTION.
9. ALL COMPRESSED AIR PIPING IS DESIGNED AND FIELD ROUTED BY OTHERS.
10. ALL LINE SIZES UP TO THE SOLENOID VALVES ARE BASED ON STANDARD STEEL PIPE INNER DIAMETERS. IF TUBING IS USED IN LIEU OF STEEL PIPE, THE TUBE INNER DIAMETER MUST BE GREATER THAN OR EQUAL TO THE EQUIVALENT STANDARD STEEL PIPE INNER DIAMETER.
11. DESIGN OF INSULATION WAS BASED ON MINERAL FIBER THERMAL CONDUCTIVITY OF 0.27 (BTU*IN/FT2*HR*F). ALUMINUM CLADDING TO BE PROVIDED FOR WEATHER PROTECTION AND PERSONNEL AS NECESSARY. SUPPLY OF INSULATION WRAPPED AROUND EXPANSION JOINT MUST ALLOW EXPANSION JOINTS TO MOVE FREELY. MECHANICAL JOINTS AND PIPE SUPPORTS ON PIPING DO NOT REQUIRE INSULATION.

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
C	REVISED PER UCC REVIEW	02/24/2025	MY	CDT		
B	REVISED PER CUSTOMER COMMENTS	12/03/2024	FST	MY	CDT	MY
A	INITIAL ISSUE	10/15/2024	HH	MY	CDT	MY

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SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE

P & I DIAGRAM
FILTER/SEPARATOR - CONTINUOUS OPERATION
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

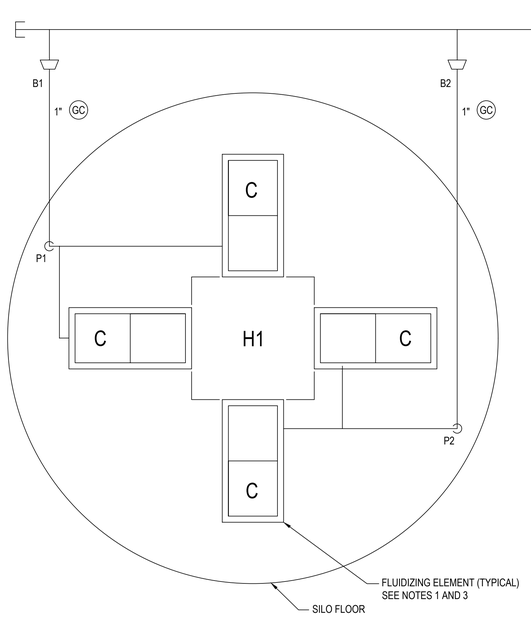
UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
M-55650-05-006	C

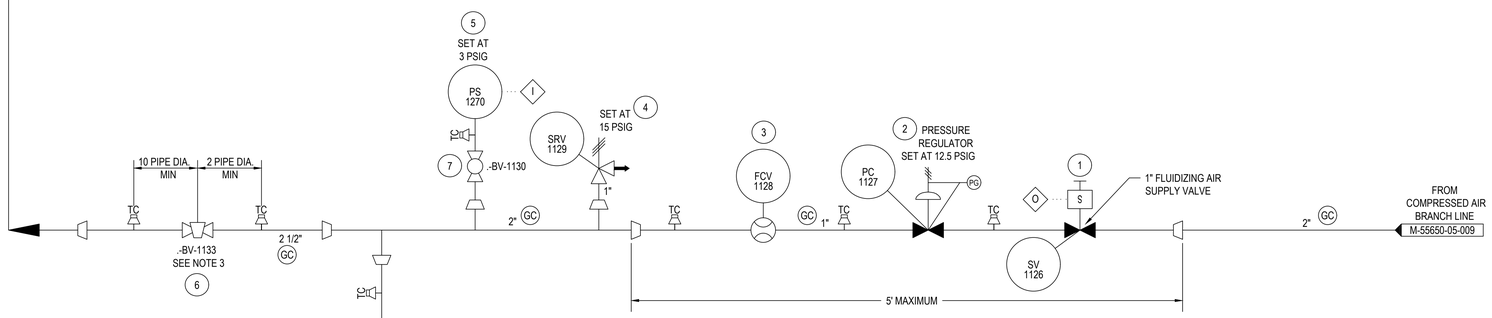
ITEM* A-B-N M-05-007-	DRAWING NUMBER	PART NUMBER	QTY	DESCRIPTION
1		196025-8	1	VALVE - SAV, 1.00" NPT, 2-WAY, N/C, H, 120/60
2		44325-12	1	REGULATOR - AIR PRESSURE, 1.0" NPT, 5-50PSIG
3		34295-104	1	FLOW LIMITER-7.3GPM,1"NPTF
4		195750-2	1	VALVE - RELIEF, 1", 15 PSIG,BRZ,ASME
5		340913-1	1	SWITCH-PRESS,30"HG-20 PSI,1 SWITCH
6		197098-4	1	VALVE - PLUG, FLANGED, 2.5", W/O OPERATOR
7		196831-1-2	1	VALVE - BALL, 0.25",MAN,BRZ
8		196831-4-2	1	VALVE - BALL, 0.75",MAN,BRZ
9		196831-5-2	2	VALVE - BALL, 1.00",MAN,BRZ
10		190002-4	1	VALVE - SWING CHECK, 0.75" NPT
11		190002-5	2	VALVE - SWING CHECK, 1.0" NPT
12	SK-4003-31	40392-0219	1	PIPE-3/4",BEV,7/32"ORIFICE
13	SK-4003-31	40393-0219	2	UNION-ORF (1")NPT, .219 DIA
14	2-1727-4	1727-4-075-4	1	PIPING KIT-BIN OLT HPPR
15	2-1727-2	1727-2-10-4	2	PIPING KIT-FLUIDIZER,(2) TRAY

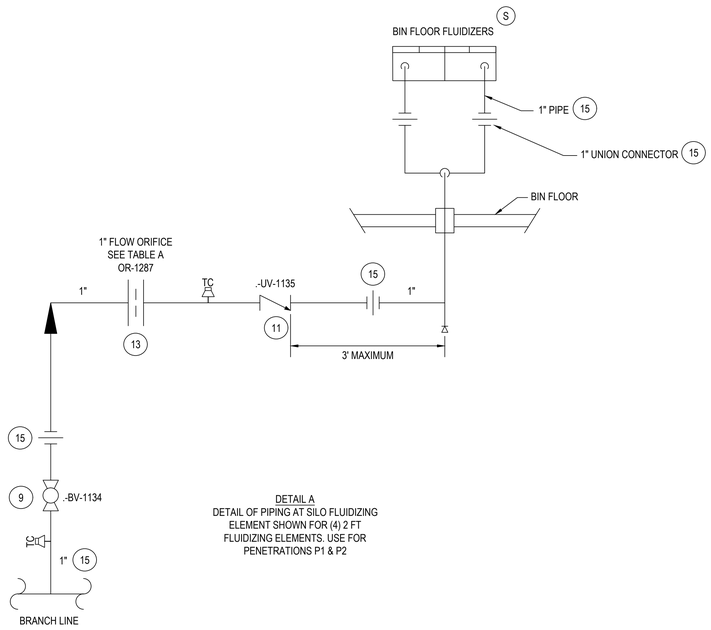
NOTES

1. FOR GENERAL NOTES AND REFERENCES SEE DRAWING M-55650-05-001.
2. THE FLUIDIZING ELEMENTS MUST BE CONNECTED TO EACH OF THE BRANCH LINES AS SHOWN. ALTHOUGH THE ACTUAL PIPE ROUTING MAY DIFFER FROM THIS DRAWING, THE FLUIDIZING ELEMENTS MUST BE CONNECTED TO THE CORRECT BRANCH LINE. SEE DETAIL A.
3. INSTALL PLUG VALVE WITH THE STEM POINTED UP. ADJUST PLUG VALVE TO PROVIDE A 1.5 PSIG DIFFERENTIAL PRESSURE ACROSS THE SILO OUTLET HOPPER FLUIDIZER FLOW LIMITER WHEN THE ASH SILO IS EMPTY. THIS PROVIDES APPROXIMATELY 1 PSIG MORE PRESSURE AT BIN OUTLET HOPPER DIFFUSING STONES WHEN THERE IS ASH IN THE SILO.
4. FLUIDIZING ELEMENTS MARKED WITH A "C" ARE 2 FT ASSEMBLIES.



UNIT 1 FLY ASH SILO 14' DIAMETER
WITH TRUNCATED CONE 8' DIAMETER





DETAIL A
DETAIL OF PIPING AT SILO FLUIDIZING ELEMENT SHOWN FOR (4) 2 FT FLUIDIZING ELEMENTS. USE FOR PENETRATIONS P1 & P2

TABLE A

PENETRATION LOCATION	BALL VALVE TAG	ORIFICE BOM ITEM NUMBER	ORIFICE TAG	CHECK VALVE TAG
H1	BV-1131	12	OR-1286	UV-1132
P1	BV-1134	13	OR-1287	UV-1135
P2	BV-1187	13	OR-1289	UV-1188

C

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
C	REVISED AS PER CUSTOMER COMMENTS	02/24/2025	MY	CDT		
B	REVISED AS PER CUSTOMER COMMENTS	12/03/2024	MM	MY	CDT	MY
A	INITIAL ISSUE	10/15/2024	MY	CDT	CDT	MY

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SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE
P & I DIAGRAM
BIN FLUIDIZING SYSTEM
UNIT 1

PLANT NAME
HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
M-55650-05-007	C

ITEM* A-B-N M-05-008-	DRAWING NUMBER	PART NUMBER	QTY	DESCRIPTION
1		55650-05-M204	2	EXHAUSTER-MECHANICAL, ROTARY, PD
2		55650-05-M205	2	MOTOR-ELECTRIC, 40HP
3	3-1957-22	1957-22-2	2	VALVE-RLF,VAC,8",316L,SS
4		326150-080	2	SCREEN-START UP,8",304SS
5		340916-2	2	SWITCH-TEMP,100-400 F
6		197051-3-7-12	4	VALVE - BUTTERFLY, 8", AC, SAV, LS, N/C
7		195741-4-030	2	VALVE-PRESS RLF,4",3.0 PSIG
8	SK-3531-21	3531-21	1	DUST CHECK-2"NPT
9		340487-2113-000-0251	1	TRANSMITTER-GP,0"-25",H2O
10	5-1949-56,63	1949-56	1	DAMPER ASSY-2BLD,AWV,A=9-1/2"
11		197054-3	2	VALVE - BUTTERFLY, 8", MANUAL

NOTES

1. FOR GENERAL NOTES AND REFERENCES SEE DRAWING M-55650-05-001.
2. DO NOT MOUNT INSTRUMENTS ON THE BLOWER, BASE OR PIPING.
3. RELIEF VALVE AIR INLET TO BE LOCATED AWAY FROM PERSONNEL, OR A USE PROTECTIVE BARRIER, SUCH AS A COARSE SCREEN OR GRID, THAT IS TO BE PROVIDED NOT BY UCC. VALVE TO BE POSITIONED WITH SPRING AND STEM HORIZONTAL. CHECK RELIEF VALVE MONTHLY TO ENSURE THAT DISC MOVES FREELY.
4. THE DEBRIS SCREEN SHOULD BE PERIODICALLY CLEANED DURING THE FIRST FEW HOURS OF OPERATION. THE SCREEN SHOULD BE REMOVED AFTER DANGER FROM DEBRIS IS OVER, TYPICALLY ONE WEEK OF REGULAR SERVICE.
5. ALL BLOWER ACCESSORIES AND AIR PIPELINES UPSTREAM OF THE INLET EXPANSION JOINT AND DOWNSTREAM OF THE DISCHARGE EXPANSION JOINT MUST BE INDEPENDENTLY SUPPORTED, ALIGNED AND SECURED SO THAT NO FORCES ARE TRANSMITTED TO THE BLOWER. ALL PIPING AND ACCESSORIES MUST BE SECURED FIRMLY SO THAT EXCESS VIBRATION DOES NOT DAMAGE THE INLET OR DISCHARGE EXPANSION JOINTS.
6. THE SOUND PRESSURE LEVEL OF EQUIPMENT SUPPLIED BY UCC WAS DETERMINED ON A TEST STAND OR AT AN ACTUAL INSTALLATION AND CORRECTED FOR BACKGROUND NOISE. VALUES QUOTED AS MEETING CONTRACT SPECIFICATIONS IN NO WAY IMPLY A GUARANTEED INSTALLED SOUND PRESSURE LEVEL DUE TO MANY VARIABLES OF WHICH UCC HAS NO KNOWLEDGE AND OVER WHICH UCC HAS NO CONTROL. SOUND PRESSURE LEVELS ARE DEPENDENT ON THE AMBIENT CONDITIONS SUCH AS THE DISTANCE OF THE EQUIPMENT FROM ADJACENT WALLS, NOISE REFLECTIVE PROPERTIES OF EQUIPMENT IN THE VICINITY OF THE BLOWER, BACKGROUND NOISE, ETC.
7. THE MOUNTING LOCATION CHOSEN MUST BE READILY ACCESSIBLE FOR MOUNTING AND ADJUSTING THE PRESSURE TRANSMITTER. THE PRESSURE TRANSMITTER (INSTRUMENTS) ARE TO BE INDEPENDENTLY SUPPORTED SO NO VIBRATION IS TRANSMITTED TO THE INSTRUMENTS. MOUNT THE PRESSURE TRANSMITTER AS CLOSE AS POSSIBLE TO THE DUST CHECK ASSEMBLY; WITHIN 10 FEET.
8. DEBRIS SCREEN AND CLEAN OUT TEE TO BE LOCATED NEXT TO EACH OTHER TO FACILITATE SCREEN CLEANING. IF POSSIBLE MOUNT DEBRIS SCREEN IN A VERTICAL SECTION OF PIPE, HOWEVER, CONSIDER ACCESS TO CLEAN OUT WHEN LOCATING. DEBRIS SCREEN TO BE LOCATED AS CLOSE TO EXHAUSTER WITHIN THE CONSTRAINTS IMPOSED BY THE PHYSICAL PIPING SYSTEM. WITHIN 24" IS CONSIDERED IDEAL.
9. THE SOUND ENCLOSURE VENT FAN SHOULD BE OPERATED AS FOLLOWS:
   THE SOUND ENCLOSURE VENT FAN WILL AUTOMATICALLY TURN ON WHEN THE EXHAUSTER IS STARTED. ONCE THE EXHAUSTER IS SHUT DOWN, THE SOUND ENCLOSURE VENT FAN WILL AUTOMATICALLY TURN OFF AFTER A TIME DELAY SET AT MIN.
10. DESIGN OF INSULATION WAS BASED ON MINERAL FIBER THERMAL CONDUCTIVITY OF 0.27 (BTU*IN/FT2*HR*F). ALUMINUM CLADDING TO BE PROVIDED FOR WEATHER PROTECTION AND PERSONNEL AS NECESSARY. SUPPY OF INSULATION AND CLADDING IS BY OTHERS. INSULATION WRAPPED AROUND EXPANSION JOINTS MUST ALLOW EXPANSION JOINTS TO MOVE FREELY. MECHANICAL JOINTS AND PIPE SUPPORTS ON PIPING DO NOT REQUIRE INSULATION.
11. FOR PRESSURE TRANSMITTER SETTINGS SEE OPERATING INSTRUCTIONS MI-55650-05-001.

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
C	REVISED PER UCC REVIEW	02/24 2025	MY	CDT		
B	REVISED PER CUSTOMER COMMENTS	12/03 2024	FST	MY	CDT	MY
A	INITIAL ISSUE	10/15 2024	MY	CDT	CDT	MY

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SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE

P & I DIAGRAM
MECHANICAL EXHAUSTERS
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

ucc environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
M-55650-05-008	C

ITEM* A-B-N M-05-009-	DRAWING NUMBER	PART NUMBER	QTY	DESCRIPTION
1		44324-12	4	FILTER-AIR,1"NPT, W/SIGHT GLASS

NOTES

1. FOR GENERAL NOTES AND REFERENCES SEE DRAWING M-55650-05-001
2. ALL COMPRESSED AIR PIPING IS DESIGNED AND FIELD ROUTED BY OTHERS.
3. LOCATE THE AIR FILTER NEAR THE EQUIPMENT TO BE OPERATED FOR EACH AREA.
4. ALL LINE SIZES UP TO THE SOLENOID VALVES ARE BASED ON STANDARD STEEL PIPE ID'S. IF TUBING IS USED IN LIEU OF STEEL PIPE, THE TUBE ID MUST BE GREATER THAN OR EQUAL TO THE EQUIVALENT STANDARD STEEL PIPE ID.
5. INSULATION SHALL BE INSTALLED ON ALL COMPRESSED AIR PIPING EXPOSED TO EXTERIOR AMBIENT TEMPERATURES.

ALL INSTRUMENT AIR PIPING AND VALVING NOT DESIGNED OR FURNISHED BY UCC

INSTRUMENT AIR PIPING WITHIN 200 FT OF THE EQUIPMENT SIZED BY UCC AS SHOWN, BUT NOT FURNISHED BY UCC

TO FILTER/SEPARATOR
36 SCFM
CONTINUOUS DEMAND

M-55650-05-006

CLEAN, DRY COMPRESSED INSTRUMENT AIR
90 TO 100 PSIG
36 SCFM CONTINUOUS DEMAND

GC 2" GC .BV-1149 GC 1" TC 1 FLT-002 SEE NOTE 3 TC GC 2"

SILO ROOF AREA

(1) 6" TELESCOPIC SPOUT VENT LINE ISOLATION GATE, BUTTERFLY VALVE, N/C AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-005
VALVE TAG(S): ABV-1101
SOLENOID TAG(S): SV-1101

1/4" 1/4" RF SCV SCV 1163 SV 1101 SCV 1164 A B FO E O FO 1/4"P S GC .BV-1153

TO FILTER/SEPARATOR
TRANSFER VALVE SET 35 SCFM
MAX INTERMITTENT DEMAND
FOR 2 SECONDS

M-55650-05-006 1" GC

(1) 8" SILO VACUUM RELIEF GATE BUTTERFLY VALVE, N/O AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-005
VALVE TAG(S): ABV-1102
SOLENOID TAG(S): SV-1102

C

1/4" 1/4" RF SCV SCV 1165 SV 1102 SCV 1166 A B FO E O FO 1/4"P S GC .BV-1154

(1) 6" SILO VENT LINE RELIEF GATE, BUTTERFLY VALVE, N/O AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-006
VALVE TAG(S): ABV-1108
SOLENOID TAG(S): SV-1108

1/4" 1/4" RF SCV SCV 1167 SV 1108 SCV 1168 A B FO E O FO 1/4"P S GC .BV-1155

CLEAN, DRY COMPRESSED INSTRUMENT AIR
80 TO 100 PSIG
35 SCFM CONTINUOUS DEMAND
130 SCFM MAXIMUM INTERMITTENT DEMAND
FOR 2 SECONDS

GC 2" GC .BV-1150 GC 1" TC 1 FLT-003 SEE NOTE 3 TC GC 2"

SILO ROOF AREA

(1) 8" TELESCOPIC ASH FEED VALVE, BUTTERFLY VALVE, N/C AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-005
VALVE TAG(S): ABV-1100
SOLENOID TAG(S): SV-1100

RF SCV SCV SCV 1169 1/4" 1/4" SCV 1170 SV 1100 A B FO E O FO 1/4"P S GC .BV-1156

(1) 8" SILO VENT LINE ISOLATION GATE, BUTTERFLY VALVE, N/C AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-005
VALVE TAG(S): ABV-1103
SOLENOID TAG(S): SV-1103

1/4" 1/4" RF SCV SCV SCV 1171 SV 1103 SCV 1172 A B FO E O FO 1/4"P S GC .BV-1157

(1) 8" SILO VENT FAN BYPASS VALVE, BUTTERFLY VALVE, N/O AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-005
VALVE TAG(S): ABV-1104
SOLENOID TAG(S): SV-1104

1/4" 1/4" RF SCV SCV SCV 1173 SV 1104 SCV 1174 A B FO E O FO 1/4"P S GC .BV-1158

(1) 8" SILO VENT FAN DISCHARGE VALVE, BUTTERFLY VALVE, N/C AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-005
VALVE TAG(S): ABV-1183
SOLENOID TAG(S): SV-1183

1/4" 1/4" RF SCV SCV SCV 1185 SV 1183 SCV 1184 A B FO E O FO 1/4"P S GC .BV-1166

C

TO BIN
FLUIDIZING SYSTEM
35 SCFM
CONTINUOUS DEMAND

M-55650-05-007 2" GC

GC 2" GC .BV-1151 GC 1" TC 1 FLT-004 SEE NOTE 3 TC GC 2"

SILO UNLOADING FLOOR AREA

(1) 8" EXHAUSTER SUCTION VALVES, BUTTERFLY VALVE, N/C AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-008
VALVE TAG(S): ABV-1136
SOLENOID TAG(S): SV-1136

1/4" 1/4" RF SCV SCV SCV 1175 SV 1136 SCV 1176 A B FO E O FO 1/4"P S GC .BV-1161

(1) 8" EXHAUSTER SUCTION VALVES, BUTTERFLY VALVE, N/C AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-008
VALVE TAG(S): ABV-1140
SOLENOID TAG(S): SV-1140

C C 1/4" 1/4" RF SCV SCV SCV 1179 SV 1140 SCV 1180 A B FO E O FO 1/4"P S GC .BV-1159

(1) 8" EXHAUSTER DISCHARGE VALVES, BUTTERFLY VALVE, N/C AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-008
VALVE TAG(S): ABV-1137
SOLENOID TAG(S): SV-1137

1/4" 1/4" RF SCV SCV SCV 1177 SV 1137 SCV 1178 A B FO E O FO 1/4"P S GC .BV-1162

(1) 8" EXHAUSTER DISCHARGE VALVES, BUTTERFLY VALVE, N/C AIR CYLINDER OPERATED
SEE DRAWING M-55650-05-008
VALVE TAG(S): ABV-1141
SOLENOID TAG(S): SV-1141

1/4" 1/4" RF SCV SCV SCV 1181 SV 1141 SCV 1182 A B FO E O FO 1/4"P S GC .BV-1160

GC 2" GC .BV-1152 GC 1" TC 1 FLT-005 SEE NOTE 3 TC GC 2"

MECHANICAL EXHAUSTER AREA

REV	DESCRIPTION	DATE	DSGN	CHKD	APPD (ENGR)	APPD (PROJ)
C	REVISED AS PER CUSTOMER COMMENTS	02/24/2025	MY	CDT		
B	REVISED PER CUSTOMER COMMENTS	12/03/2024	FST	MY	CDT	MY
A	INITIAL ISSUE	10/15/2024	MY	CDT	MY	CDT

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SCALE	NONE	DRAWING SIZE	5

DRAWING TITLE

P & I DIAGRAM
COMPRESSED AIR
FLY ASH NUVEYOR® VACUUM SYSTEM
UNIT 1

PLANT NAME

HASTINGS UTILITIES
WHELAN ENERGY CENTER
HASTINGS, NEBRASKA

UCC environmental
2100 NORMAN DRIVE, WAUKEGAN, IL 60085

DRAWING NUMBER	REVISION
M-55650-05-009	C

Customer: HASTINGS UTILITIES
Plant Site: WHELAN ENERGY CENTER
Location: HASTINGS, NEBRASKA
UCC Contract Number: 55650-05
Customer PO Number: -

Issue Date: 2/24/2025
Revision: B
By: MY
UCC Drawing Number: ML-55650-05-001
Customer Drawing Number: -

UCC Valve List

	Tag Number	UCC Part Number	Description	P&ID Number	Pipeline Number	Manufacturer	Model	Valve Size	Valve Class	Connection Type	Body Material	Min Pressure	Max Pressure	Min Temperature	Max Temperature	Electrical Connection	Revision
1	1ASB-BV-1106	1956-239	ASH FEED VALVE	M-55650-05-005	8"-CS-LN005	UCC	1956-239	8"	N/A	FLANGE	CAST IRON	N/A	N/A	-50 °F	750 °F	N/A	A
2	1ASB-ABV-1100	1941-190-3-3-1-0-0-0-00	ASH FEED VALVE	M-55650-05-005	8"-CS-LN005	UCC	1941-190	8"	N/A	LUGGED	DUCTILE IRON	0 PSI	150 PSI	0° F	450° F	N/A	A
3	1ASB-SV-1100	1955-66	ASH FEED VALVE SOLENOID VALVE	M-55650-05-005	N/A	ASCO	JKB8342G001MS	1/4"	F	NPT	BRASS	0 PSI	125 PSI	32° F	125° F	1/2" NPT	A
4	1ASB-SCV-1169	19826-2	ASH FEED VALVE SPEED CONTROL VALVE	M-55650-05-005	N/A	DELTROL	F20B	1/4"	N/A	NPT	BRASS	0 PSI	2000 PSIG	-15° F	400° F	N/A	A
5	1ASB-SCV-1170	19826-2	ASH FEED VALVE SPEED CONTROL VALVE	M-55650-05-005	N/A	DELTROL	F20B	1/4"	N/A	NPT	BRASS	0 PSI	2000 PSIG	-15° F	400° F	N/A	A
6	1ASB-ABV-1101	197052-2-6-12	TELESCOPIC SPOUT VENT LINE ISOLATION VALVE	M-55650-05-005	6"-CS-LN008	BRAY	30-169	6"	150	Flange	CAST IRON	80 PSIG	100 PSIG	20 °F	250 °F	N/A	A
7	1ASB-SV-1101	197105-3	TELESCOPIC SPOUT VENT LINE ISOLATION VALVE SOLENOID VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
8	1ASB-SCV-1163	197105-3	TELESCOPIC SPOUT VENT LINE ISOLATION VALVE SPEED CONTROL VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
9	1ASB-SCV-1164	197105-3	TELESCOPIC SPOUT VENT LINE ISOLATION VALVE SPEED CONTROL VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
10	1ASB-ABV-1102	197052-10-6-12	SILO VACUUM RELIEF GATE	M-55650-05-005	N/A	BRAY	30-169	8"	150	Flange	CAST IRON	80 PSIG	100 PSIG	20 °F	250 °F	N/A	A
11	1ASB-SV-1102	197105-3	SILO VACUUM RELIEF GATE SOLENOID VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
12	1ASB-SCV-1165	197105-3	SILO VACUUM RELIEF GATE SPEED CONTROL VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
13	1ASB-SCV-1166	197105-3	SILO VACUUM RELIEF GATE SPEED CONTROL VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
14	1ASB-ABV-1103	197052-3-6-12	SILO VENT LINE ISOLATION GATE	M-55650-05-005	8"-CS-LN009	BRAY	30-169	8"	150	Flange	CAST IRON	80 PSIG	100 PSIG	20 °F	250 °F	N/A	A
15	1ASB-SV-1103	197105-3	SILO VENT LINE ISOLATION GATE SOLENOID VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
16	1ASB-SCV-1171	197105-3	SILO VENT LINE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
17	1ASB-SCV-1172	197105-3	SILO VENT LINE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
18	1ASB-ABV-1104	197052-10-6-12	SILO VENT FAN BYPASS VALVE	M-55650-05-005	8"-CS-LN010	BRAY	30-169	8"	150	Flange	CAST IRON	80 PSIG	100 PSIG	20 °F	250 °F	N/A	A
19	1ASB-SV-1104	197105-3	SILO VENT FAN BYPASS VALVE SOLENOID VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
20	1ASB-SCV-1173	197105-3	SILO VENT FAN BYPASS VALVE SPEED CONTROL VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
21	1ASB-SCV-1174	197105-3	SILO VENT FAN BYPASS VALVE SPEED CONTROL VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
22	1ASB-ABV-1183	197052-3-6-12	SILO VENT LINE ISOLATION GATE	M-55650-05-005	8"-CS-LN011	BRAY	30-169	8"	150	Flange	CAST IRON	80 PSIG	100 PSIG	20 °F	250 °F	N/A	A
23	1ASB-SV-1183	197105-3	SILO VENT LINE ISOLATION GATE SOLENOID VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
24	1ASB-SCV-1184	197105-3	SILO VENT LINE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
25	1ASB-SCV-1185	197105-3	SILO VENT LINE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-005	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
26	1ASB-SRV-1105	2346-21-1	SILO PRESSURE/VACUUM RELIEF VALVE	M-55650-05-005	N/A	UCC	2346-21	16"/12"	N/A	FLANGE	CARBON STEEL	5 INWC	8.5 INWC	-35° F	250 °F	N/A	A
27	1ASB-ABV-1108	197051-9-7-12	SILO VENT LINE RELIEF VALVE	M-55650-05-006	N/A	BRAY	30-656	6"	150#	NPT	CAST IRON	-14.2 PSI	150 PSI	-40° F	400° F	N/A	A
28	1ASB-SV-1108	197105-3	SILO VENT LINE RELIEF VALVE SOLENOID VALVE	M-55650-05-006	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
29	1ASB-SCV-1167	197105-3	SILO VENT LINE RELIEF VALVE SPEED CONTROL VALVE	M-55650-05-006	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
30	1ASB-SCV-1168	197105-3	SILO VENT LINE RELIEF VALVE SPEED CONTROL VALVE	M-55650-05-006	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
31	1ASB-ABV-1109	1221-102-10017A-000	TRANSFER HOPPER TOP GATE	M-55650-05-006	N/A	UCC	1221-102	18"	N/A	FLANGE	ASTM A36	-16 IN HG	20 PSIG	N/A	N/A	N/A	A
32	1ASB-SV-1109	196075-9	TRANSFER HOPPER TOP GATE SOLENOID VALVE	M-55650-05-006	N/A	ASCO	JKHX8344G074MFMO-27248	1/2"	H	NPT	BRASS	10 PSIG	150 PSIG	-40° F	180° F	1/2" NPT	A
33	1ASB-SCV-1114	19286-2	TRANSFER HOPPER TOP GATE SPEED CONTROL VALVE	M-55650-05-006	N/A	DELTROL	F20B	1/4"	N/A	NPT	BRASS	0 PSIG	2000 PSIG	-15° F	400° F	N/A	A
34	1ASB-SCV-1115	19286-2	TRANSFER HOPPER TOP GATE SPEED CONTROL VALVE	M-55650-05-006	N/A	DELTROL	F20B	1/4"	N/A	NPT	BRASS	0 PSIG	2000 PSIG	-15° F	400° F	N/A	A
35	1ASB-ABV-1110	1221-102-10018A-000	TRANSFER HOPPER BOTTOM GATE	M-55650-05-006	N/A	UCC	1221-102	18"	N/A	FLANGE	ASTM A36	-16 IN HG	20 PSIG	N/A	N/A	N/A	A
36	1ASB-SV-1110	196075-9	TRANSFER HOPPER BOTTOM GATE SOLENOID VALVE	M-55650-05-006	N/A	ASCO	JKHX8344G074MFMO-27248	1/2"	H	NPT	BRASS	10 PSIG	150 PSIG	-40° F	180° F	1/2" NPT	A
37	1ASB-SCV-1116	19286-2	TRANSFER HOPPER BOTTOM GATE SPEED CONTROL VALVE	M-55650-05-006	N/A	DELTROL	F20B	1/4"	N/A	NPT	BRASS	0 PSIG	2000 PSIG	-15° F	400° F	N/A	A
38	1ASB-SCV-1117	19286-2	TRANSFER HOPPER BOTTOM GATE SPEED CONTROL VALVE	M-55650-05-006	N/A	DELTROL	F20B	1/4"	N/A	NPT	BRASS	0 PSIG	2000 PSIG	-15° F	400° F	N/A	A
39	1ASB-ABV-1112	1952-97-21-2015-11-000000	FILTER/SEPARATOR UPPER EQUALIZING VALVE	M-55650-05-006	N/A	UCC	TITAN ®	3"	N/A	NPTF	DUCTILE IRON	-16 IN HG	50 PSIG	N/A	N/A	N/A	A
40	1ASB-SV-1112	196075-4	FILTER/SEPARATOR UPPER EQUALIZING VALVE SOLENOID VALVE	M-55650-05-006	N/A	ASCO	SUX8344G070MFM0-27248	1/4"	H	NPT	BRASS	10 PSIG	150 PSIG	-40° F	180° F	1/2" NPT	A
41	1ASB-ABV-1113	1952-97-21-2015-12-000000	FILTER/SEPARATOR LOWER EQUALIZING VALVE	M-55650-05-006	N/A	UCC	TITAN ®	3"	N/A	NPTF	DUCTILE IRON	-16 IN HG	50 PSIG	N/A	N/A	N/A	A
42	1ASB-SV-1113	196075-4	FILTER/SEPARATOR LOWER EQUALIZING VALVE SOLENOID VALVE	M-55650-05-006	N/A	ASCO	SUX8344G070MFM0-27248	1/4"	H	NPT	BRASS	10 PSIG	150 PSIG	-40° F	180° F	1/2" NPT	A
43	1ASB-UV-1120	190002-12	FILTER/SEPARATOR DUST CHECK VALVE	M-55650-05-006	N/A	NIBCO	T-413-B	3/4"	125#	NPT	BRONZE	0 PSI	200 PSI	0° F	400° F	N/A	A
44	1ASB-SV-1126	196025-8	FLUIDIZING SYSTEM INSTRUMENT AIR SOLENOID VALVE	M-55650-05-007	N/A	ASCO	JKHX8210G054AMO-15448	1"	H	NPTF	BRASS	0 PSI	150 PSI	32° F	125° F	1" NPT	A
45	1ASB-PC-1127	44325-12	FLUIDIZING SYSTEM INSTRUMENT AIR PRESSURE REGULATOR	M-55650-05-007	N/A	NORGREN	R17-801-RGEA-8M	1"	N/A	NPT	ALUMINUM	5 PSIG	50 PSIG	-30° F	175° F	N/A	A
46	1ASB-SRV-1129	195750-2	FLUIDIZING SYSTEM INSTRUMENT AIR PRESSURE RELIEF VALVE	M-55650-05-007	N/A	KUNKLE	6186FE	1"	N/A	NPT	BRONZE	0 PSI	150 PSI	-20° F	300° F	N/A	A
47	1ASB-BV-1133	197098-4	FLUIDIZING SYSTEM PLUG VALVE	M-55650-05-007	N/A	DeZURIK	PEC SERIES	2-1/2"	N/A	FLANGE	CAST IRON	-14.2 PSI	175 PSIG	-20° F	450° F	N/A	A
48	1ASB-BV-1130	196831-1-2	FLUIDIZING SYSTEM PRESSURE SWITCH ISOLATION VALVE	M-55650-05-007	N/A	APOLLO	77-141-01	1/4"	N/A	NPTF	BRONZE	-14.2 PSI	600 PSIG	-50° F	400° F	N/A	A
49	1ASB-BV-1131	196831-4-2	FLUIDIZING SYSTEM BIN OUTLET HOPPER H1 ISOLATION VALVE	M-55650-05-007	N/A	APOLLO	77-144-01	3/4"	N/A	NPTF	BRONZE	-14.2 PSI	600 PSIG	-50° F	400° F	N/A	A
50	1ASB-BV-1134	196831-5-2	FLUIDIZING SYSTEM PENETRATON P1 ISOLATION VALVE	M-55650-05-007	N/A	APOLLO	77-145-01	1"	N/A	NPTF	BRONZE	-14.2 PSI	600 PSIG	-50° F	400° F	N/A	A
51	1ASB-BV-1187	196831-5-2	FLUIDIZING SYSTEM PENETRATON P2 ISOLATION VALVE	M-55650-05-007	N/A	APOLLO	77-145-01	1"	N/A	NPTF	BRONZE	-14.2 PSI	600 PSIG	-50° F	400° F	N/A	B
52	1ASB-UV-1132	190002-4	FLUIDIZING SYSTEM BIN OUTLET HOPPER H1 CHECK VALVE	M-55650-05-007	N/A	STOCKHAM	B-345	3/4"	200#	NPT	BRONZE	0 PSI	400 PSI	0° F	150° F	N/A	A
53	1ASB-UV-1135	190002-5	FLUIDIZING SYSTEM PENETRATON P1 CHECK VALVE	M-55650-05-007	N/A	STOCKHAM	B-345	1"	200#	NPT	BRONZE	0 PSI	400 PSI	0° F	150° F	N/A	A
54	1ASB-UV-1188	190002-5	FLUIDIZING SYSTEM PENETRATON P2 CHECK VALVE	M-55650-05-007	N/A	STOCKHAM	B-345	1"	200#	NPT	BRONZE	0 PSI	400 PSI	0° F	150° F	N/A	B
55	1ASB-SRV-1138	1957-22	MECHANICAL EXHAUSTER A INLET VACUUM RELIEF VALVE	M-55650-05-008	8"-CS-LN013	UCC	1957-22	8"	150#	N/A	GRAY IRON	0 PSI	-9.8 PSI	-50° F	500° F	N/A	A
56	1ASB-SRV-1142	1957-22	MECHANICAL EXHAUSTER B INLET VACUUM RELIEF VALVE	M-55650-05-008	8"-CS-LN014	UCC	1957-22	8"	150#	N/A	GRAY IRON	0 PSI	-9.8 PSI	-50° F	500° F	N/A	A
57	1ASB-ABV-1136	197051-3-7-12	EXHAUSTER A SUCTION ISOLATION VALVE ISOLATION GATE	M-55650-05-008	8"-CS-LN013	BRAY	30-656	8"	150#	NPT	CAST IRON	-14.2 PSI	150 PSI	-40° F	400° F	N/A	A
58	1ASB-SV-1136	197105-3	EXHAUSTER A SUCTION ISOLATION VALVE ISOLATION GATE SOLENOID VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
59	1ASB-SCV-1175	197105-3	EXHAUSTER A SUCTION ISOLATION VALVE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
60	1ASB-SCV-1176	197105-3	EXHAUSTER A SUCTION ISOLATION VALVE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
61	1ASB-ABV-1137	197051-3-7-12	EXHAUSTER A DISCHARGE ISOLATION VALVE ISOLATION GATE	M-55650-05-008	8"-CS-LN015	BRAY	30-656	8"	150#	NPT	CAST IRON	-14.2 PSI	150 PSI	-40° F	400° F	N/A	A
62	1ASB-SV-1137	197105-3	EXHAUSTER A DISCHARGE ISOLATION VALVE ISOLATION GATE SOLENOID VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A

Customer: HASTINGS UTILITIES
Plant Site: WHELAN ENERGY CENTER
Location: HASTINGS, NEBRASKA
UCC Contract Number: 55650-05
Customer PO Number: -

Issue Date: 2/24/2025
Revision: B
By: MY
UCC Drawing Number: ML-55650-05-001
Customer Drawing Number: -

UCC Valve List

	Tag Number	UCC Part Number	Description	P&ID Number	Pipeline Number	Manufacturer	Model	Valve Size	Valve Class	Connection Type	Body Material	Min Pressure	Max Pressure	Min Temperature	Max Temperature	Electrical Connection	Revision
63	1ASB-SCV-1177	197105-3	EXHAUSTER A DISCHARGE ISOLATION VALVE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
64	1ASB-SCV-1178	197105-3	EXHAUSTER A DISCHARGE ISOLATION VALVE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
65	1ASB-ABV-1140	197051-3-7-12	EXHAUSTER B SUCTION ISOLATION VALVE ISOLATION GATE	M-55650-05-008	8"-CS-LN014	BRAY	30-656	8"	150#	NPT	CAST IRON	-14.2 PSI	150 PSI	-40° F	400° F	N/A	A
66	1ASB-SV-1140	197105-3	EXHAUSTER B SUCTION ISOLATION VALVE ISOLATION GATE SOLENOID VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
67	1ASB-SCV-1179	197105-3	EXHAUSTER B SUCTION ISOLATION VALVE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
68	1ASB-SCV-1180	197105-3	EXHAUSTER B SUCTION ISOLATION VALVE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
69	1ASB-ABV-1141	197051-3-7-12	EXHAUSTER B DISCHARGE ISOLATION VALVE ISOLATION GATE	M-55650-05-008	8"-CS-LN016	BRAY	30-656	8"	150#	NPT	CAST IRON	-14.2 PSI	150 PSI	-40° F	400° F	N/A	A
70	1ASB-SV-1141	197105-3	EXHAUSTER B DISCHARGE ISOLATION VALVE ISOLATION GATE SOLENOID VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
71	1ASB-SCV-1181	197105-3	EXHAUSTER B DISCHARGE ISOLATION VALVE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
72	1ASB-SCV-1182	197105-3	EXHAUSTER B DISCHARGE ISOLATION VALVE ISOLATION GATE SPEED CONTROL VALVE	M-55650-05-008	N/A	ASCO	JKH8551G403MMS	1/4"	H	NPT	BRASS	30 PSIG	150 PSIG	-40° F	140°F	1/2"NPT	A
73	1ASB-SRV-1139	195741-4-030	EXHAUSTER A PRESSURE RELIEF VALVE	M-55650-05-008	8"-CS-LN015	SUTORBILT	Weight Loaded 4"	4"	N/A	NPT	CAST IRON	N/A	N/A	N/A	N/A	N/A	A
74	1ASB-SRV-1143	195741-4-030	EXHAUSTER B PRESSURE RELIEF VALVE	M-55650-05-008	8"-CS-LN016	SUTORBILT	Weight Loaded 4"	4"	N/A	NPT	CAST IRON	N/A	N/A	N/A	N/A	N/A	A
75	1ASB-UV-1144	197054-3	EXHASUTER TO DUCT ISOLATION VALVE	M-55650-05-008	8"-CS-LN017	BRAY	30-656	8"	150#	NPT	CAST IRON	-14.2 PSI	150 PSI	-40° F	400° F	N/A	A
76	1ASB-UV-1145	197054-3	VENT LINE TO DUCT ISOLATION VALVE	M-55650-05-008	8"-CS-LN012	BRAY	30-656	8"	150#	NPT	CAST IRON	-14.2 PSI	150 PSI	-40° F	400° F	N/A	A
77	1ASB-UV-1146	190002-12	FLUE GAS DUCT PRESSURE TRANSMITTER DUST CHECK VALVE	M-55650-05-008	N/A	NIBCO	T-413-B	3/4"	125#	NPT	BRONZE	0 PSI	200 PSI	0° F	400° F	N/A	A
78	1ASB-ABV-1148	1949-48	DAMPER VALVE	M-55650-05-008	8"-CS-LN012	AWV	VC-51	10"	N/A	N/A	CARBON STEEL	0 INWC	24 INWC	N/A	300° F	N/A	A

Customer Name HASTINGS UTILITIES
Plant Site WHELAN ENERGY CENTER
Plant Location HASTINGS, NEBRASKA
UCC Contract Number 55650-05
Customer PO Number HU-2024-50

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Revision B
By KJL/MY
UCC Drawing Number ML-55650-05-002
Cust Drawing Number -

UCC Instrument List

	Instrument Tag Number	P&ID Number	UCC Part Number	Operating Description	Instrument Type	Manufacturer	Model Number	Service	Range	Setpoint	Calibration	Electrical Conn. Size	Process Conn. Size	Voltage	Contact Rating (VA)	Revision
1	1ASB-ZS-1253	M-55650-05-005	PART OF 55650-05-M201	TELESCOPIC SPOUT FULL UP LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSPA	N/A	N/A	N/A	N/A	1/2" NPT	N/A	120 VAC	10 A	A
2	1ASB-ZS-1254	M-55650-05-005	PART OF 55650-05-M201	TELESCOPIC SPOUT SLACK CABLE LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSPA	N/A	N/A	N/A	N/A	1/2" NPT	N/A	120 VAC	10 A	A
3	1ASB-ZS-1256	M-55650-05-005	35502-15	SILO VACUUM RELIEF GATE VALVE OPEN LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	OPEN	N/A	1/2" NPT	N/A	120 VAC	10 A	A
4	1ASB-ZS-1257	M-55650-05-005	35502-15	SILO VACUUM RELIEF GATE VALVE CLOSED LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	CLOSED	N/A	1/2" NPT	N/A	120 VAC	10 A	A
5	1ASB-ZS-1260	M-55650-05-005	35502-15	SILO VENT FAN BYPASS VALVE OPEN LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	OPEN	N/A	1/2" NPT	N/A	120 VAC	10 A	A
6	1ASB-ZS-1261	M-55650-05-005	35502-15	SILO VENT FAN BYPASS VALVE CLOSED LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	CLOSED	N/A	1/2" NPT	N/A	120 VAC	10 A	A
7	1ASB-ZS-1255	M-55650-05-005	35502-15	TELESCOPIC SPOUT VENT LINE ISOLATION GATE OPEN LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	OPEN	N/A	1/2" NPT	N/A	120 VAC	10 A	A
8	1ASB-LT-1250	M-55650-05-005	34635-0-0-0-1-1-1-003-030	FLY ASH STORAGE SILO LEVEL TRANSMITTER	LEVEL TRANSMITTER	SIEMENS	SITRANS LR 580	AIR/ASH	3' - 30'	3 - 30 FT	FACTORY	1/2" NPT	12" 150# FLANGE	24 VDC	N/A	A
9	1ASB-LS-1251	M-55650-05-005	3403-41	FLY ASH STORAGE SILO LEVEL SWITCH	LEVEL SWITCH	BINDICATOR	LAR101050	AIR/ASH	N/A	3 FT	N/A	3/4" NPT	6" 150# FLANGE	120 VAC	N/A	A
10	1ASB-PT-1252	M-55650-05-005	340487-2113-000-0051	VACUUM SYSTEM SILO PRESSURE TRANSMITTER	PRESSURE TRANSMITTER	ROSEMOUNT	3051	AIR	0.5" - 5" H2O	SEE P&ID	FACTORY	1/2" NPT	1/2" NPT	10 - 55 VDC	N/A	B
11	1ASB-ZS-1258	M-55650-05-005	35502-15	SILO VENT LINE ISOLATION GATE VALVE OPEN LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	OPEN	N/A	1/2" NPT	N/A	120 VAC	10 A	A
12	1ASB-ZS-1259	M-55650-05-005	35502-15	SILO VENT LINE ISOLATION GATE VALVE CLOSED LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	CLOSED	N/A	1/2" NPT	N/A	120 VAC	10 A	A
13	1ASB-ZS-1292	M-55650-05-005	35502-15	SILO VENT FAN DISCHARGE VALVE CLOSED LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	CLOSED	N/A	1/2" NPT	N/A	120 VAC	10 A	A
14	1ASB-ZS-1293	M-55650-05-005	35502-15	SILO VENT FAN DISCHARGE VALVE OPEN LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	OPEN	N/A	1/2" NPT	N/A	120 VAC	10 A	A
15	1ASB-PI-1282	M-55650-05-006	PART OF 55650-05-M200	FILTER/SEPARATOR COMPRESSED AIR PRESSURE GAUGE	PRESSURE GAUGE	DAUGHTRIDGE	993 SERIES	AIR	0 - 160 PSIG	N/A	N/A	N/A	1/2" NPT	N/A	N/A	A
16	1ASB-PT-1264	M-55650-05-006	PART OF 55650-05-M200	FILTER/SEPARATOR DIFFERENTIAL PRESSURE TRANSMITTER	DIFFERENTIAL PRESSURE TRANSMITTER	DWYER	DCP200A	AIR	0" - 20" H2O	SEE P&ID	FACTORY	N/A	1/4" NPT	120 VAC	N/A	A
17	1ASB-LS-1266	M-55650-05-006	3505-824-01-00-1	FILTER/SEPARATOR LEVEL SWITCH	LEVEL SWITCH	DYNATROL	CL-10DJT-7	ASH	N/A	CONTACT	N/A	1/2" NPT	1/2" NPTF	120 VAC	2 A	A
18	1ASB-LS-1267	M-55650-05-006	3505-824-01-00-1	TRANSFER HOPPER LEVEL SWITCH	LEVEL SWITCH	DYNATROL	CL-10DJT-7	ASH	N/A	CONTACT	N/A	1/2" NPT	1/2" NPTF	120 VAC	2 A	A
19	1ASB-PS-1262	M-55650-05-006	353302-14	FILTER/SEPARATOR COMPRESSED AIR PRESSURE SWITCH	PRESSURE SWITCH	UNITED ELECTRIC	H100-702	AIR	N/A	85 PSIG	FACTORY	1/2" NPT	1/2" NPT	120 VAC	10 A	A
20	1ASB-DD-1263	M-55650-05-006	3505-827-2-1-1-1-1-0	FILTER/SEPARATOR DUST DETECTOR	DUST DETECTOR	FILTERSENSE	PM1 PRO	AIR/ASH	0 - 10,000 pA	N/A	FIELD	1/2" NPT	1" NPT	120 VAC	N/A	A
21	1ASB-PT-1256	M-55650-05-006	340487-2122-000-0121	VACUUM SYSTEM PRESSURE TRANSMITTER	PRESSURE TRANSMITTER	ROSEMOUNT	3051	AIR	0.5" - 12" HG	SEE P&ID	FACTORY	1/2" NPT	1/2" NPT	10 - 55 VDC	N/A	A
22	1ASB-ZS-1268	M-55650-05-006	35502-15	SILO VENT LINE RELIEF VALVE OPEN LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	OPEN	N/A	1/2" NPT	N/A	120 VAC	10 A	A
23	1ASB-ZS-1269	M-55650-05-006	35502-15	SILO VENT LINE RELIEF VALVE CLOSED LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	CLOSED	N/A	1/2" NPT	N/A	120 VAC	10 A	A
24	1ASB-PS-1270	M-55650-05-007	340913-1	FLUIDIZING SYSTEM PRESSURE SWITCH	PRESSURE SWITCH	UNITED ELECTRIC	J400-134	AIR	N/A	3 PSIG	FACTORY	3/4" NPT	1/4" NPT	125 VAC	1 A	A
25	1ASB-FCV-1128	M-55650-05-007	34295-104	FLUIDIZING SYSTEM FLOW LIMITER	FLOW LIMITER	GRISWOLD	3531H	AIR	1 - 14 PSI	N/A	N/A	1" NPTF	1" NPTF	N/A	N/A	A
26	1ASB-TS-1272	M-55650-05-008	340916-2	EXHAUSTER TEMPERATURE SWITCH	TEMPERATURE SWITCH	UNITED ELECTRIC	E400-3BS	AIR	N/A	260° F	FACTORY	3/4" NPT	1/2" NPT	125 VAC	1 A	A
27	1ASB-TS-1277	M-55650-05-008	340916-2	EXHAUSTER TEMPERATURE SWITCH	TEMPERATURE SWITCH	UNITED ELECTRIC	E400-3BS	AIR	N/A	260° F	FACTORY	3/4" NPT	1/2" NPT	125 VAC	1 A	A
28	1ASB-ZS-1273	M-55650-05-008	35502-15	EXHAUSTER ISOLATION VALVE OPEN LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	OPEN	N/A	1/2" NPT	N/A	120 VAC	10 A	A
29	1ASB-ZS-1274	M-55650-05-008	35502-15	EXHAUSTER ISOLATION VALVE CLOSED LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	CLOSED	N/A	1/2" NPT	N/A	120 VAC	10 A	A
30	1ASB-ZS-1275	M-55650-05-008	35502-15	EXHAUSTER DISCHARGE VALVE OPEN LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	OPEN	N/A	1/2" NPT	N/A	120 VAC	10 A	A
31	1ASB-ZS-1276	M-55650-05-008	35502-15	EXHAUSTER DISCHARGE VALVE CLOSED LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	CLOSED	N/A	1/2" NPT	N/A	120 VAC	10 A	A
32	1ASB-ZS-1278	M-55650-05-008	35502-15	EXHAUSTER ISOLATION VALVE OPEN LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	OPEN	N/A	1/2" NPT	N/A	120 VAC	10 A	A
33	1ASB-ZS-1279	M-55650-05-008	35502-15	EXHAUSTER ISOLATION VALVE CLOSED LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	CLOSED	N/A	1/2" NPT	N/A	120 VAC	10 A	A
34	1ASB-ZS-1280	M-55650-05-008	35502-15	EXHAUSTER DISCHARGE VALVE OPEN LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	OPEN	N/A	1/2" NPT	N/A	120 VAC	10 A	A
35	1ASB-ZS-1281	M-55650-05-008	35502-15	EXHAUSTER DISCHARGE VALVE CLOSED LIMIT SWITCH	LIMIT SWITCH	MICROSWITCH	LSQA6B134	N/A	N/A	CLOSED	N/A	1/2" NPT	N/A	120 VAC	10 A	A
36	1ASB-PT-1271	M-55650-05-008	340487-2113-000-0251	SILO TO FLUE GAS DUCT PRESSURE TRANSMITTER	PRESSURE TRANSMITTER	ROSEMOUNT	3051	AIR	0.5" - 25" H2O	SEE P&ID	FACTORY	1/2" NPT	1/2" NPT	10 - 55 VDC	N/A	B

Customer: HASTINGS UTILITIES
Plant Site: WHELAN ENERGY CENTER
Location: HASTINGS, NEBRASKA
UCC Contract Number: 55650-05
Customer PO Number: HU-2024-50

Issue Date: 1/20/2025
Revision: A
By: KJL
UCC Drawing Number: ML-55650-05-003
Customer Drawing Number: -

UCC Equipment List

	Tag Number	UCC Part Number	Description	P&ID Number	Manufacturer	Model	Flow Rate	Service	Operating Pressure	Operating Temperature	Voltage	Revision
1	TCH-001	55650-05-M201	TELESCOPIC SPOUT	M-55650-05-005	DCL	X24EV-06	200TPH	FLY ASH	0 PSIG	100 °F	460 VAC	A
2	FAN-002	55650-05-M202	TELESCOPIC SPOUT VENT FAN	M-55650-05-005	TCF	9B	1000 CFM	AIR	18" H2O	100 °F	460 VAC	A
3	FAN-003	55650-05-M203	SILO VENT FAN	M-55650-05-005	TCF	9B	1405 CFM	AIR	12" H2O	100 °F	460 VAC	A
4	VNT-001	55650-05-M206	VENTILATION LOUVER	M-55650-05-005	AWV	LE65C	596 - 1143 CFM	AIR	1" H2O	90 °F	N/A	A
5	VNT-002	55650-05-M206	VENTILATION LOUVER	M-55650-05-005	AWV	LE65C	596 - 1143 CFM	AIR	1" H2O	90 °F	N/A	A
6	FLT-001	55650-05-M200	FILTER/SEPARATOR	M-55650-05-006	IAC	100TB-FRWT-32:S6	4.29 TPH	FLY ASH	-5.8" HG	200 °F	N/A	A
7	VSL-002	3206-398-1	TRANSFER HOPPER	M-55650-05-006	UCC	10 CUFT	4.29 TPH	FLY ASH	-5.8" HG	200 °F	N/A	A
8	ME-001	55650-05-M204	MECHANICAL EXHAUSTER A	M-55650-05-008	UNIVERSAL BLOWER PAC	7L	1251 RPM	AIR	-5.8" HG	165 °F	460 VAC	A
9	ME-002	55650-05-M204	MECHANICAL EXHAUSTER B	M-55650-05-008	UNIVERSAL BLOWER PAC	7L	1251 RPM	AIR	-5.8" HG	165 °F	460 VAC	A
10	FAN-004	55650-05-M204	EXHAUSTER ENCLOSURE VENT FAN A	M-55650-05-008	ORION FANS	OA254AN-11-1	2700 RPM	AIR	1.14" H2O	165 °F	120 VAC	A
11	FAN-005	55650-05-M204	EXHAUSTER ENCLOSURE VENT FAN B	M-55650-05-008	ORION FANS	OA254AN-11-1	2700 RPM	AIR	1.14" H2O	165 °F	120 VAC	A

DESIGN NOTES:

1. JOB SITE LOCATION: Hastings, NE
   - 1.1 SITE COORD:

2. REFERENCES:
   - 2.1 TANK DIA. 24.62 ft HOPPER ANGLE = 60 Degrees HOPPER OUTLET = 96 in.
   - 2.2 STRUC CALCS: 2412006 Design By: CDC 3/10/2025
   - 2.3 GEOTECH: NONE
   - 2.4 IBC 2018 (ASCE 7-16) Occupancy Category III

3. WIND LOADS:
   - 3.1 WIND SPEED = 120 mph
   - 3.2 EXPOSURE C

4. SEISMIC VALUES:
   - 4.1 SEISMIC IMPORTANCE FACTOR: Ie = 1.25 SITE CLASS D
   - 4.2 Ss = 0.078
   - 4.3 S1 = 0.041
   - 4.4 Fa = 1.600
   - 4.5 Fv = 2.400
   - 4.6 TL = 12
   - 4.7 SDS = 0.083
   - 4.8 SD1 = 0.066
   - 4.9 Cs = 0.0347

5. DESIGN LOADS:
   - 5.1 ROOF LIVE/SNOW LOAD = 60 psf
   - 5.2 FLOOR LIVE LOAD = 100 psf
   - 5.3 ROOF EQUIPMENT LOAD = 15100 lbs
   - 5.4 HOPPER EQUIPMENT LOAD = 5000 lbs
   - 5.5 DESIGN PRESSURE: 12.12 in. WC VACUUM: 3.03 in. WC
   - 5.6 PRESSURE = 7oz
   - 5.7 VACUUM= 1.75oz
   - 5.8 MAXIMUM TEMPERATURE = 180F

1

6. TANK REACTIONS @ BASE OF TANK:

LOAD CASE	VERT. (k)	HORZ. (k)	MOMENT (k-ft)	LOAD/ft Shell (klf)
DL	134.7	-	-	1.74
DL + LL	210.8	-	-	2.73
DL + LL + Prod	1081.9	-	-	13.99
DL + 1WL	123.0	25.8	772.6	3.37
DL+LL+Prod+1WL	1081.9	25.8	772.6	15.61
DL+LL+Prod+S+0.7E	1081.9	30.4	1344.8	4.57
0.6DL + 0.7Prod + 0.7E	845.5	29.7	1299.1	4.47
DL + Seismic	1222.6	42.4	1855.9	5.64
1DL + 1WL	123.0	25.8	772.6	3.37

7. MATERIAL STORED: Fly Ash

   PRODUCT WT. 110 pcf
   ANGLE OF REPOSE 30°
   MASS FLOW

8. USABLE CAPACITY: 7919 cu.ft.

MATERIALS OF CONSTRUCTION:

DRAWING

1. SHEETS/PLATE ASTM 1011, A572, A656 FOR GRADE OF STEEL SEE SIDEWALL SHEETS ON TANK ELEVATIONS DRAWING
2. WBEAMS = ASTM A992
3. C CHANNEL = ASTM A572
4. ANGLE = ASTM A572
5. BOLTS = GR8.2 JS1000 COATING Fy = 120000 psi Fu = 150000 psi
6. GASKETS = EPDM
7. SEALANT = SIKAFLEX 201
8. TOP EAVE ANGLE TO BE L5x5x3/8 LLV (50000 psi)
9. BOTTOM ANGLE TO BE L3.5x2.5x0.375 (50 ksi)
10. ROOF RAFTERS TO BE C8X11.5 (50000 psi)
11. ROOF SHEETS TO BE 0.1875 in. (50 ksi)
12. HOPPER SHEETS TO BE 0.3125 in. (50 ksi) UPPER
    0.3125 in. (50 ksi) INT.

1

GENERAL NOTES:

1. SHELL BOLT TIGHTENING SPEC. = AISC SNUG TIGHT
   HORIZONTAL SHELL BOLT SPACING = 2.32 in.
2. VERTICAL SHELL BOLT SPACING = 2.32 in.
3. ALL FLANGES TO BE FACTORY LOCATED
4. THE FOLLOWING TESTS NEED TO BE APPLIED PER CUSTOMER INSTRUCTIONS:
   NONE

APPROVAL DRAWINGS

☐ APPROVED
☐ NOT APPROVED, REVISE AND RESUBMIT

SIGNATURE DATE

PLEASE MARK AND RETURN TO TARSCO BOLTED TANK

STANDARD TANK COLORS

1

- ☒ BUCKSKIN TAN (RAL 1014)
- ☐ COBALT BLUE (RAL 5011)
- ☐ CARIBBEAN BLUE (RAL 0000)
- ☐ ENVIRONMENTAL GREEN (RAL 7034)
- ☐ FOREST GREEN (RAL 6002)
- ☐ WHITE (RAL 9016)
- ☐ NON STANDARD COLOR BELOW:

UCC environmental

DOCUMENT REVIEW STATUS ENGINEERING RETURNS

- ☐ 7. FOR INFORMATION ONLY.
- ☑ 8. APPROVED.
- ☐ 9. CORRECT AS NOTED AND RESUBMIT.

UCC has reviewed this document for general compliance. The (Sub)Contractor or Supplier is still responsible for ensuring its accuracy and adherence to the Purchase Order, contract specifications, and relevant codes and standards.

BY MatPru DATE 3/17/2025

UCC Document No.: SV-55650-05-S001-00001
Rev.: B

UCC Contract: 55650-05
Hastings Utilities - Whelan Energy Center

UCC P/N: 55650-05-S001
FLY ASH BOLTED STEEL SILO

REVISION TABLE			
NO:	DATE:	BY:	REVISION:
1	3/4/2025	NA	UPDATED PER REDLINES

1

UCC Contract: 55650-05
Hastings Utilities - Whelan Energy Center
UCC P/N: 55650-05-S001
FLY ASH BOLTED STEEL SILO

Tarsco Bolted Tank
a TF Warren Company
5897 Hwy. 59, Goodman, MO 64843
www.tfwarren.com
866.700.2500

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UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONAL ± 1/16
ONE PLACE DECIMAL ±0.060
TWO PLACE DECIMAL ±0.030
THREE PLACE DECIMAL ±0.010

B

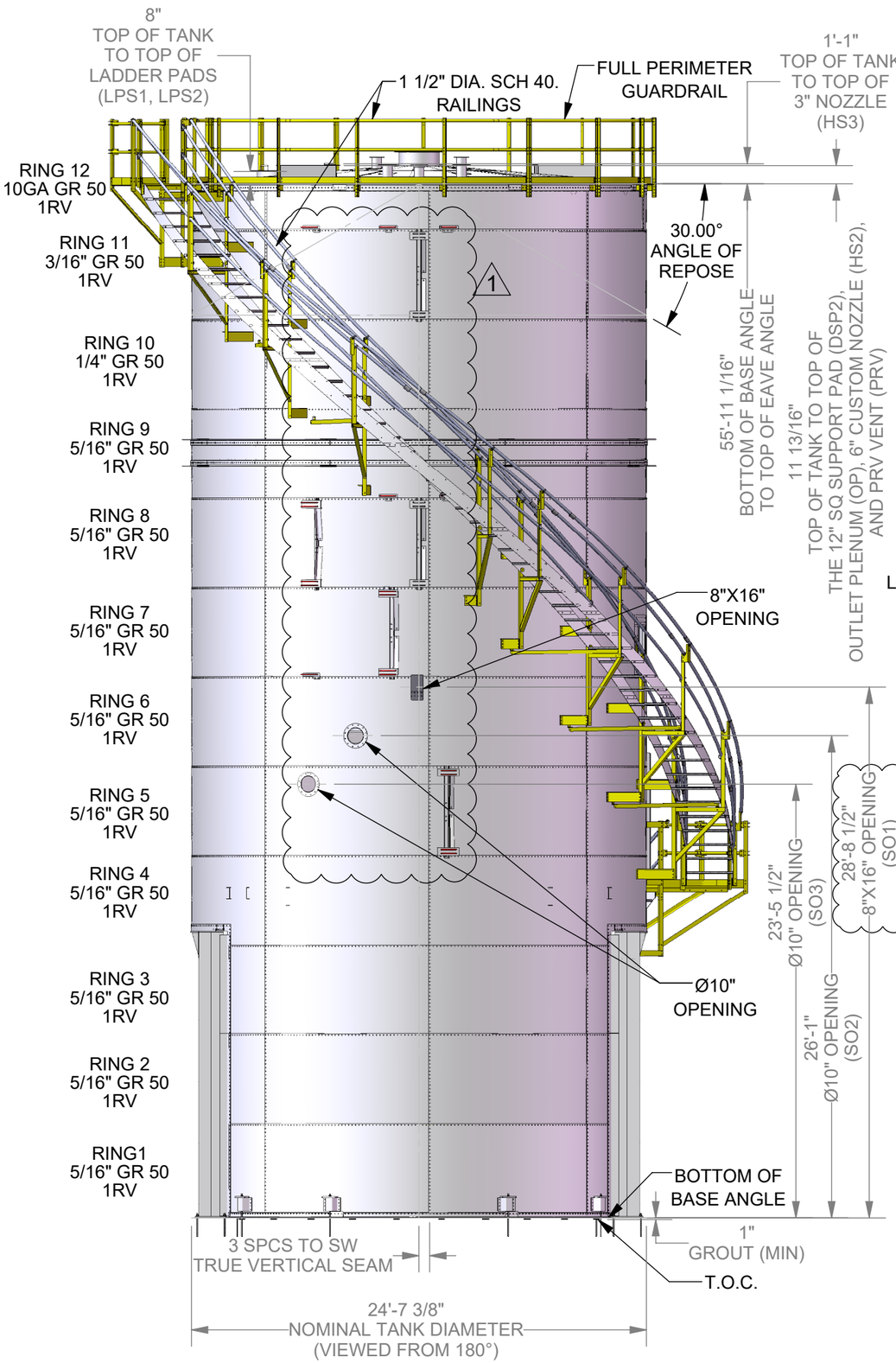
GENERAL NOTES

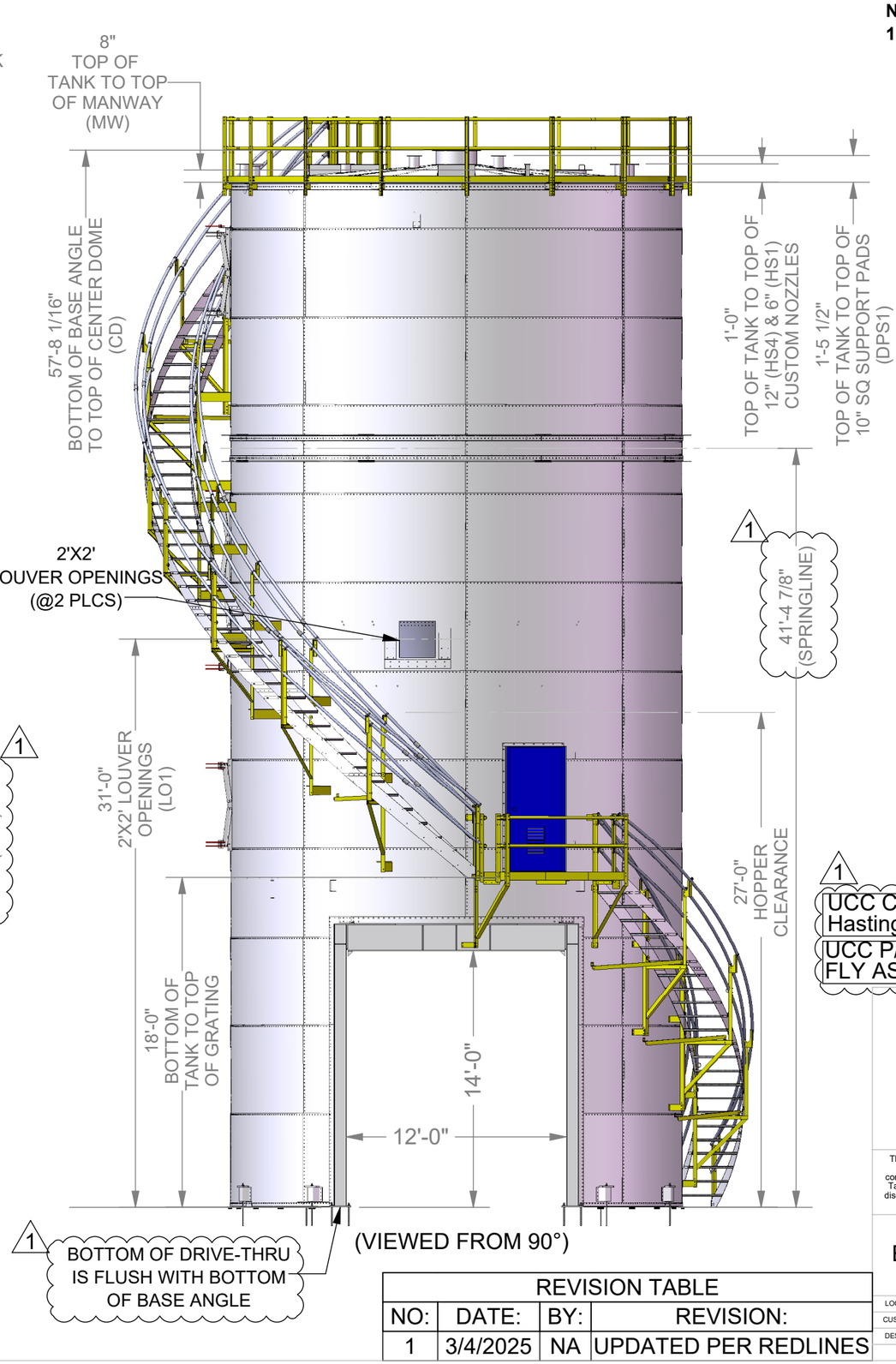
JOB #:	2412006-01CT
COVERAGE:	8 @ 116
TANK SIZE:	24.62' x 55.92'
INSULATION:	None
WEIGHT:	84,310 LBS.
COLOR:	RAL 1014
LOCATION:	Hastings, NE
CUSTOMER:	UCC Environmental
DESIGNER:	JQ 01/30/2025
PM:	JA

DO NOT SCALE DRAWING

S-00

REV. 1

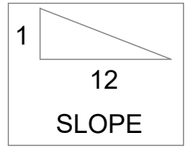




NOTE:

1. **ALL DIMENSIONS ARE MEASURED FROM BOTTOM OF BASE ANGLE, UNLESS SPECIFIED OTHERWISE**

NOT FOR CONSTRUCTION



1

UCC Contract: 55650-05
Hastings Utilities - Whelan Energy Center

UCC P/N: 55650-05-S001
FLY ASH BOLTED STEEL SILO

REVISION TABLE			
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B

ELEVATION VIEW

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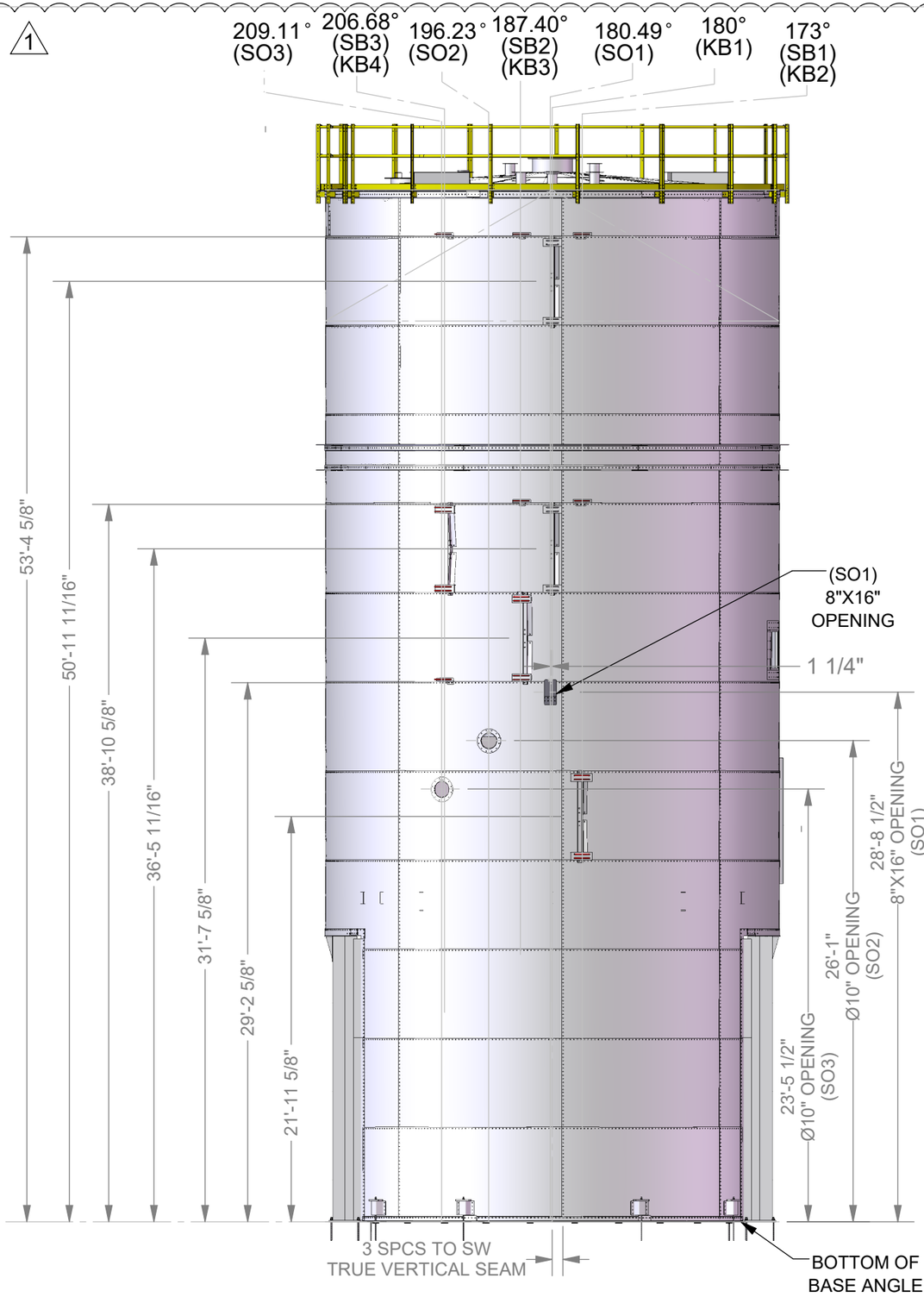
LOCATION:	Hastings, NE
CUSTOMER:	UCC Environmental
DESIGNER:	JQ 01/30/2025
PM:	JA
COLOR:	RAL 1014
	DO NOT SCALE DRAWING

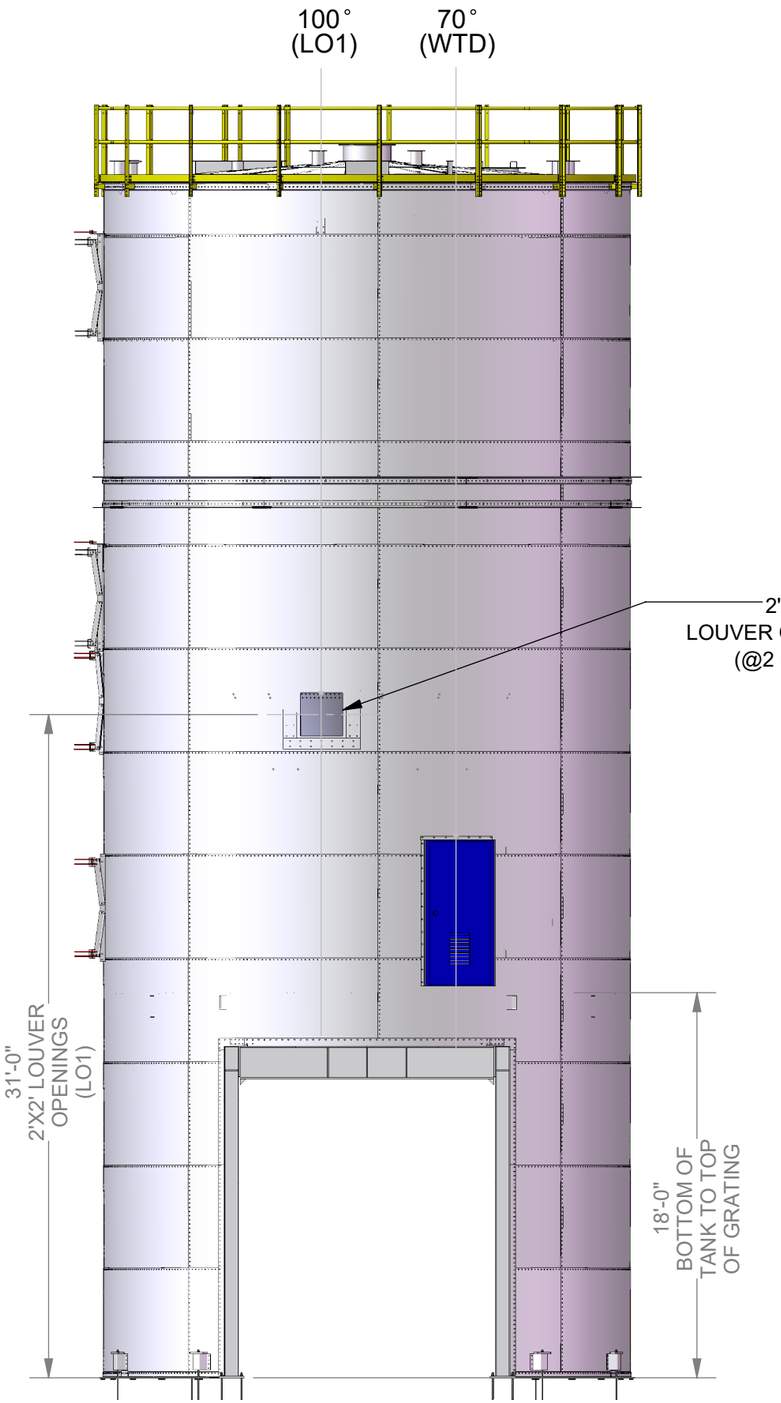
S-01A

REV. 1

1



(VIEWED FROM 180°)



(VIEWED FROM 90°)

NOTE:

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Hastings Utilities - Whelan Energy Center

UCC P/N: 55650-05-S001
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B

ELEVATION VIEW

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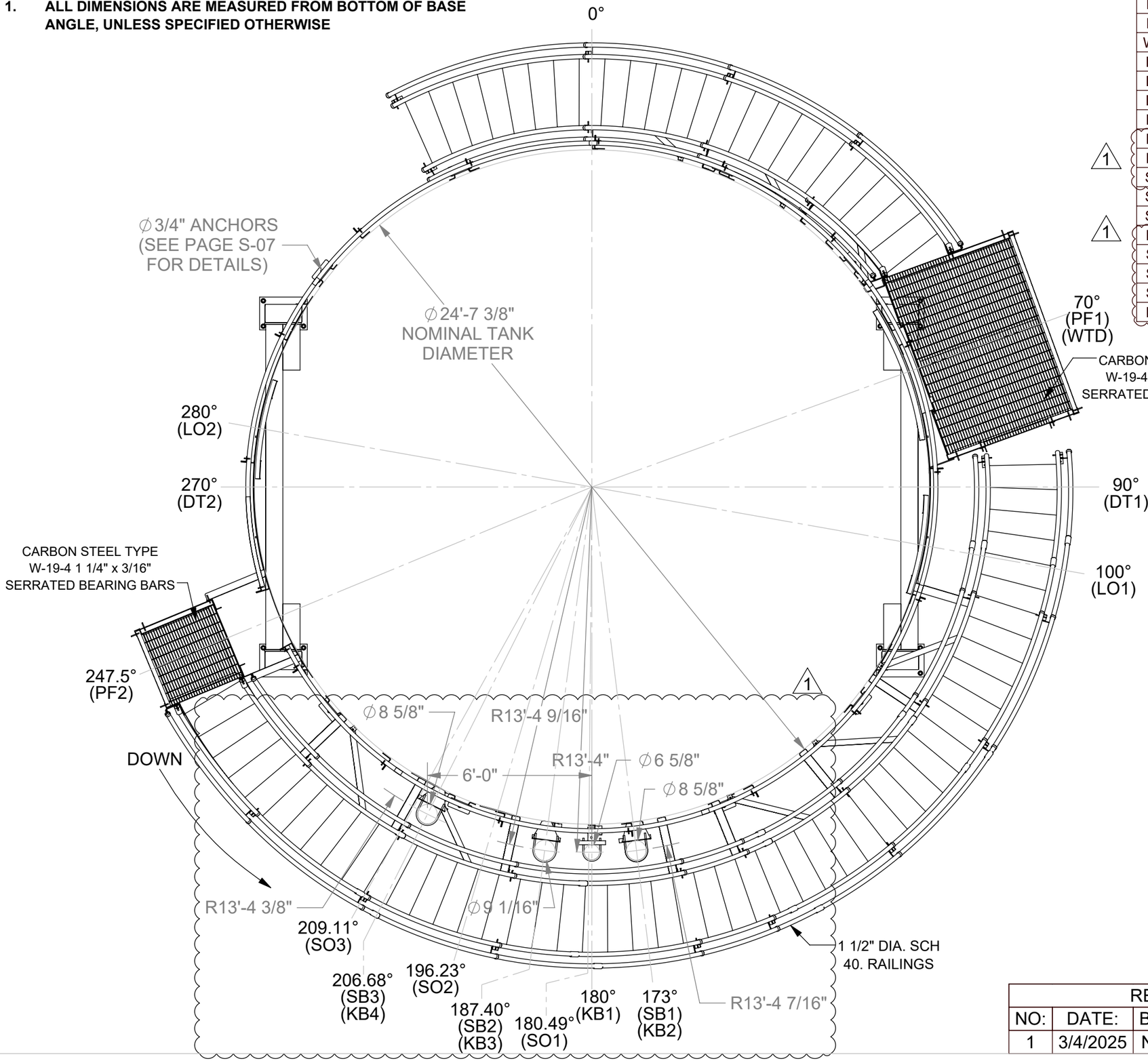
COVERAGE:	8 @ 116
TANK SIZE:	24.62' x 55.92'
INSULATION:	None
WEIGHT:	84,310 LBS.
COLOR:	RAL 1014

LOCATION:	Hastings, NE		
CUSTOMER:	UCC Environmental		DO NOT SCALE DRAWING
DESIGNER:	JQ	01/30/2025	S-01B
PM:	JA		

REV. 1

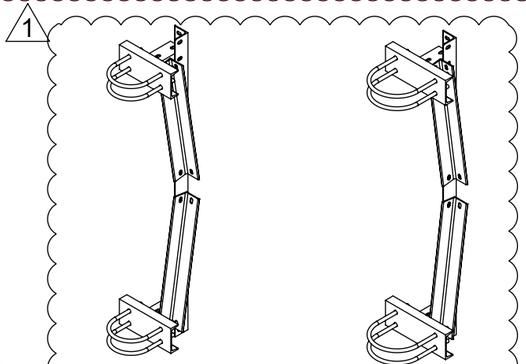
NOTE:

1. **ALL DIMENSIONS ARE MEASURED FROM BOTTOM OF BASE ANGLE, UNLESS SPECIFIED OTHERWISE**



MARK	SIZE	DECRIPTION	ORIENTATION	ELEVATION
PF1	5'x7'	PLATFORM #1	70°	18'-0"
PF2	3'x3'	PLATFORM #2	247.5°	55'-11 1/16"
WTD	4'x7'	WALK THRU DOOR - RIGHT HAND	70°	18'-0"
DT1	12'x14'	DRIVE THRU #1	90°	---
DT2	12'x14'	DRIVE THRU #2	270°	---
LO1	2'x2'	LOUVER OPENING #1	100°	31'-0"
LO2	2'x2'	LOUVER OPENING #2	280°	31'-0"
KB1	Ø6"	Ø 6" K-BRACE	180°	RINGS 8 & 11
KB2	Ø8"	Ø 8" K-BRACE	173°	RING 5
SO1	8"x16"	SIDEWALL OPEING #1	180.49°	28'-5 1/2"
SO2	Ø10"	SIDEWALL OPEING #2	196.23°	26'-1"
SO3	Ø10"	SIDEWALL OPEING #3	209.11°	23'-5 1/12"
KB3	Ø8"	Ø 8" K-BRACE	187.40°	RING 7
SB1	Ø8"	Ø 8" STANDOFF BRACKET #1	173°	TOP RING 8 & 11
SB2	Ø8"	Ø 8" STANDOFF BRACKET #2	187.40°	TOP RING 8 & 11
SB3	Ø8"	Ø 8" STANDOFF BRACKET #3	206.68°	TOP RING 6 & 11
KB4	Ø8"	Ø 8" K-BRACE	206.68°	RING 8

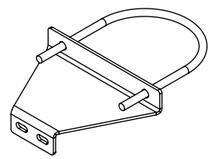
1



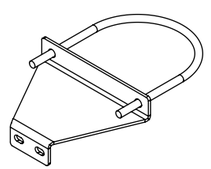
KB2 - KB3 - KB4
Ø8" K-BRACE

KB1
Ø6" K-BRACE

1



SB1 - SB3
Ø8" STANDOFF BRACKET



SB2
Ø8" STANDOFF BRACKET

UCC Contract: 55650-05
Hastings Utilities - Whelan Energy Center

UCC P/N: 55650-05-S001
FLY ASH BOLTED STEEL SILO

REVISION TABLE			
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1	3/4/2025	NA	UPDATED PER REDLINES

Tarsco Bolted Tank
a TF Warren Company
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www.tfwarren.com
866.700.2500

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ONE PLACE DECIMAL ±0.060
TWO PLACE DECIMAL ±0.030
THREE PLACE DECIMAL ±0.010

B

TANK ORIENTATION

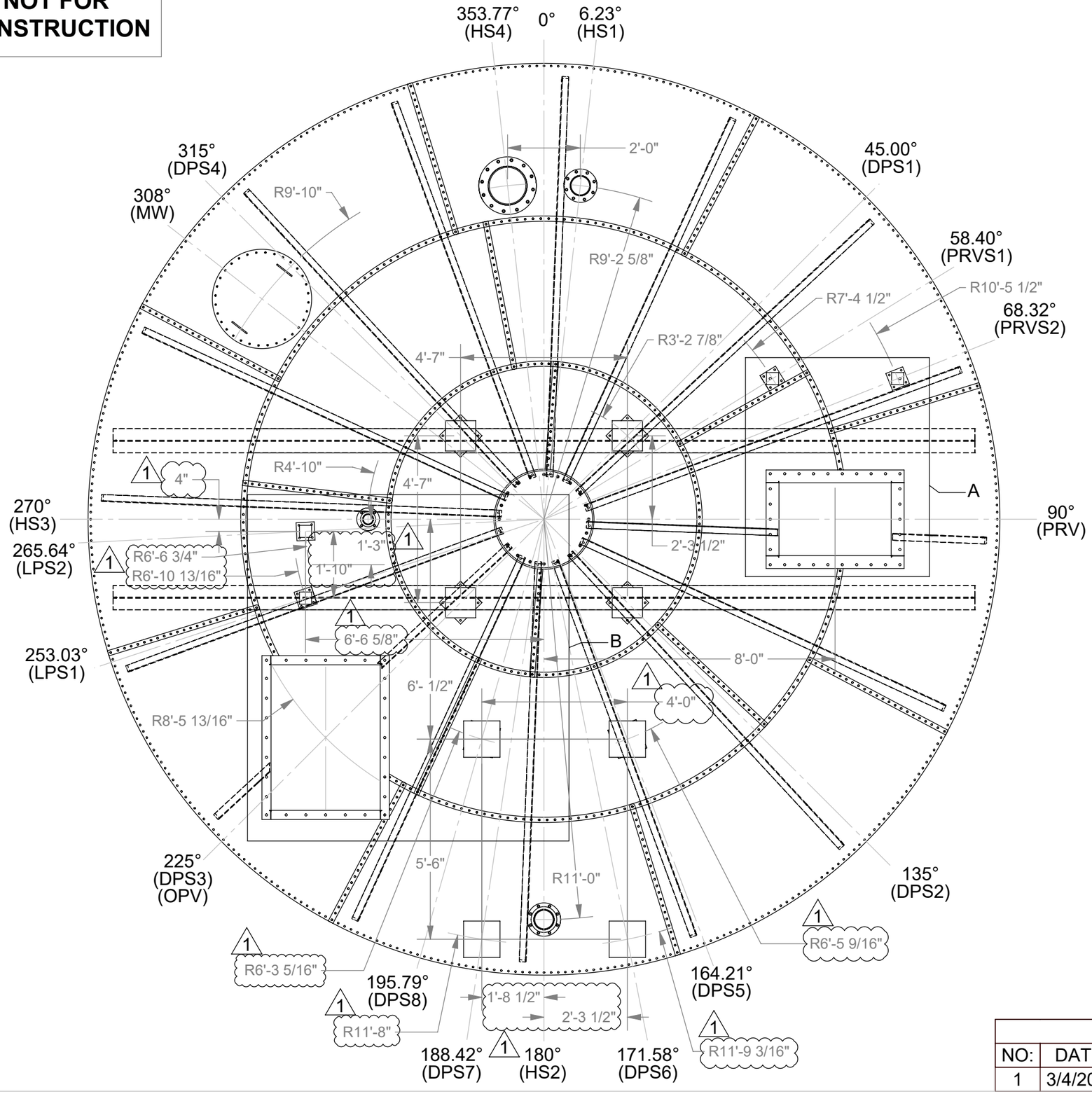
JOB #:	2412006-01CT
COVERAGE:	8 @ 116
TANK SIZE:	24.62' x 55.92'
INSULATION:	None
WEIGHT:	84,310 LBS.
COLOR:	RAL 1014
LOCATION:	Hastings, NE
CUSTOMER:	UCC Environmental
DESIGNER:	JQ 01/30/2025
PM:	JA

DO NOT SCALE DRAWING

S-02

REV. 1

NOT FOR CONSTRUCTION



MARK	SIZE	DECRIPTION	ORIENTATION	RADIUS
HS1	Ø6"	Ø6 HILLSIDE PIPEPOOL	6.23°	R9'-2 5/8"
HS2	Ø6"	Ø6 HILLSIDE PIPEPOOL	180°	R11'-0"
HS3	Ø3"	Ø3 HILLSIDE PIPEPOOL	270°	R4'-10"
HS4	Ø12"	Ø12 HILLSIDE PIPEPOOL	353.77°	R9'-2 5/8"
DPS1	10" SQ	DECK PAD SUPPORT	45.00°	R3'-2 7/8"
DPS2	10" SQ	DECK PAD SUPPORT	135°	R3'-2 7/8"
DPS3	10" SQ	DECK PAD SUPPORT	225°	R3'-2 7/8"
DPS4	10" SQ	DECK PAD SUPPORT	315°	R3'-2 7/8"
1 DPS5	12" SQ	DECK PAD SUPPORT	164.21°	R6'-5 9/16"
DPS6	12" SQ	DECK PAD SUPPORT	171.58°	R11'-9 3/16"
DPS7	12" SQ	DECK PAD SUPPORT	188.42°	R11'-8"
1 DPS8	12" SQ	DECK PAD SUPPORT	195.79°	R6'-3 5/16"
PRV	24"x37"	PRV VENT	90°	R 8'-0"
PRVS1	4"x4"	PRV SUPPORT PAD	58.40°	R7'-4 1/2"
PRVS2	4"x4"	PRV SUPPORT PAD	68.32°	R10'-5 1/2"
OPV	36"x48"	OUTLET PLENUM VENT	225°	R8'-5 13/16"
1 LPS1	4"x4"	LADDER PAD SUPPORT	253.03°	R6'-10 13/16"
LPS2	4"x4"	LADDER PAD SUPPORT	265.64°	R6'-6 3/4"
MW	Ø24"	MANWAY W/ LID	308°	R9'-10"

NOTE:

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UCC P/N: 55650-05-S001
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TWO PLACE DECIMAL ±0.030
THREE PLACE DECIMAL ±0.010

B

DECK ORIENTATION

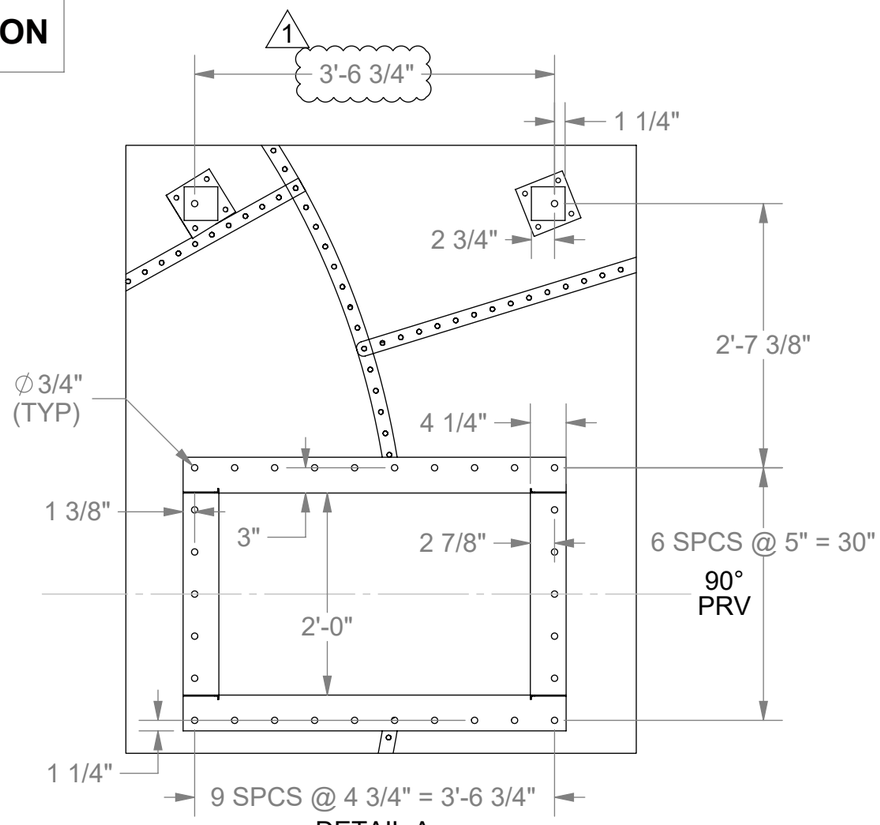
JOB #:	2412006-01CT
COVERAGE:	8 @ 116
TANK SIZE:	24.62' x 55.92'
INSULATION:	None
WEIGHT:	84,310 LBS.
COLOR:	RAL 1014
LOCATION:	Hastings, NE
CUSTOMER:	UCC Environmental
DESIGNER:	JQ 01/30/2025
PM:	JA

DO NOT SCALE DRAWING

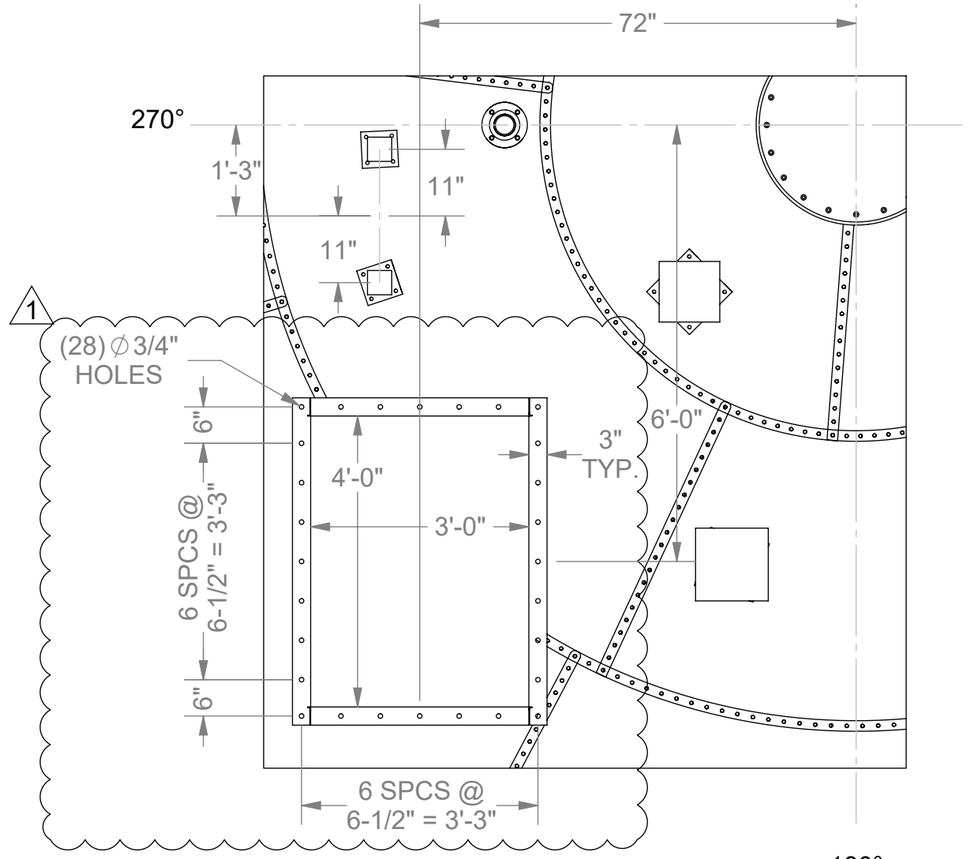
S-03

REV. 1

NOT FOR CONSTRUCTION

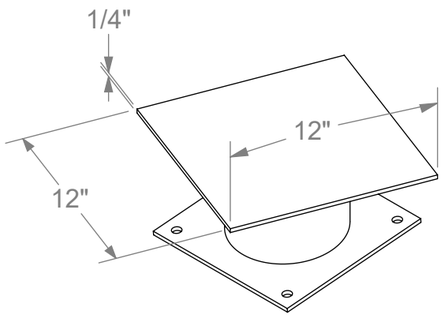


DETAIL A

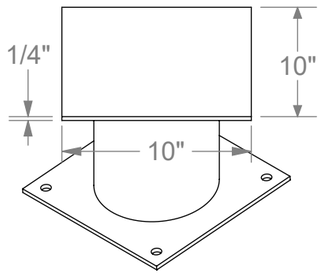


DETAIL B

180°



DPS5



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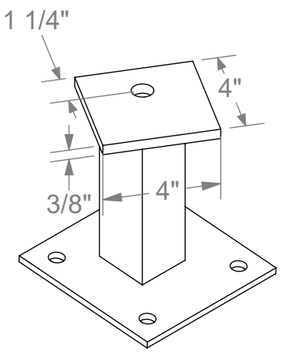
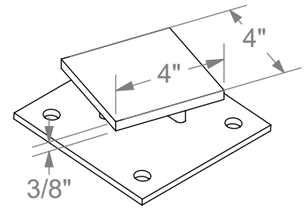


PRVS1



LPS1

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B

DECK APPURTENANCES

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INSULATION:	None
WEIGHT:	84,310 LBS.
LOCATION:	Hastings, NE
COLOR:	RAL 1014
CUSTOMER:	UCC Environmental
	DO NOT SCALE DRAWING
DESIGNER:	JQ 01/30/2025
PM:	JA

S-04

REV. 1

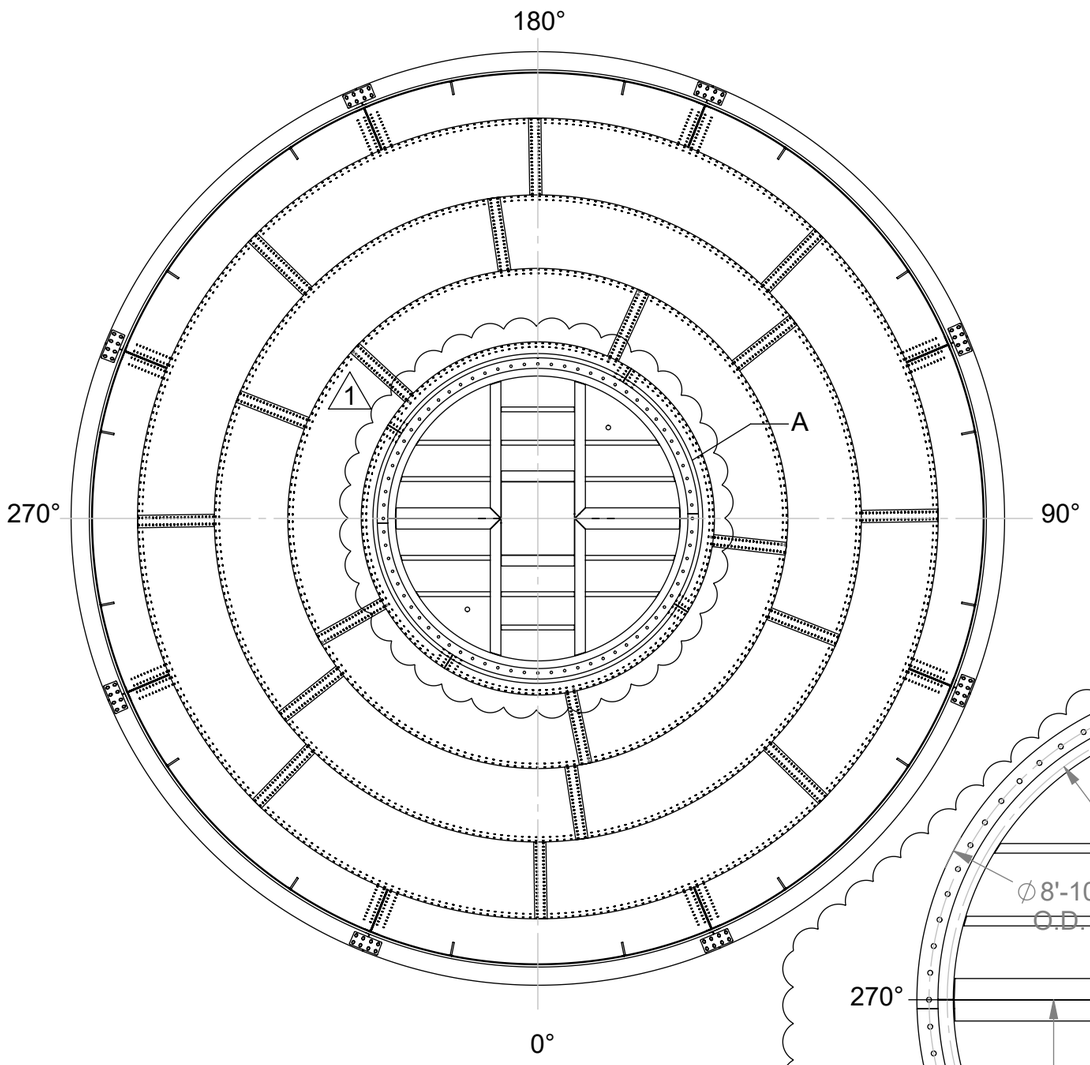
NOTE:

1. **ALL DIMENSIONS ARE MEASURED FROM BOTTOM OF BASE ANGLE, UNLESS SPECIFIED OTHERWISE**

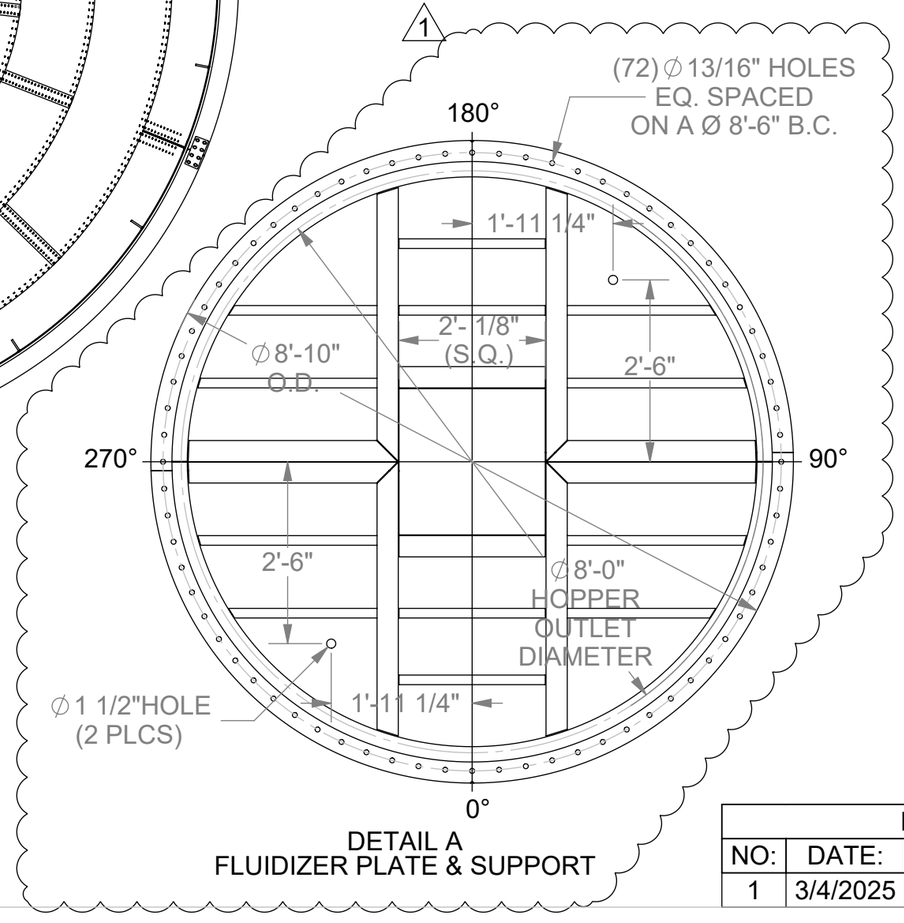
REVISION TABLE

NO:	DATE:	BY:	REVISION:
1	3/4/2025	NA	UPDATED PER REDLINES

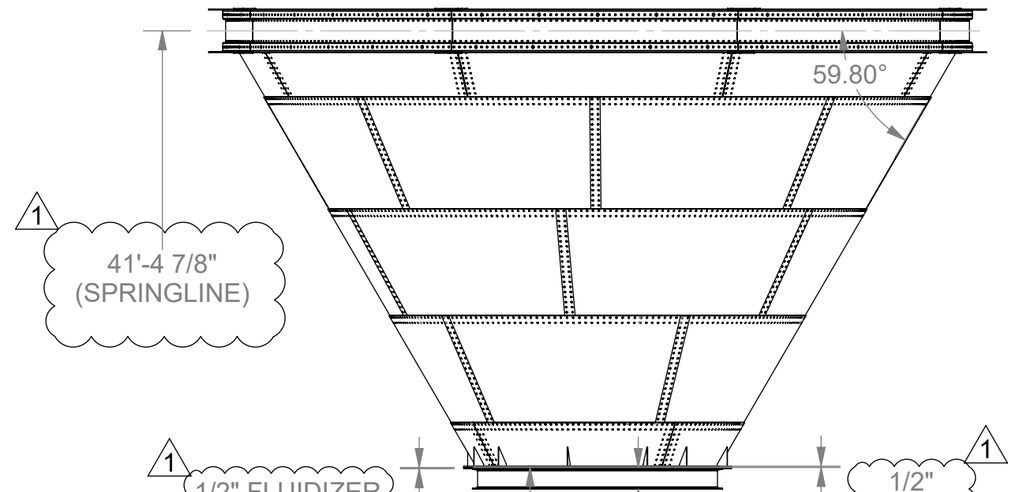
NOTES:
1. ALL DIMENSIONS ARE MEASURED FROM BOTTOM OF BASE ANGLE, UNLESS SPECIFIED OTHERWISE.
2. THE FLUIDIZER SUPPORT WILL BE MADE IN 2 PIECES WITH A SPLICE PLATE DOWN THE MIDDLE.

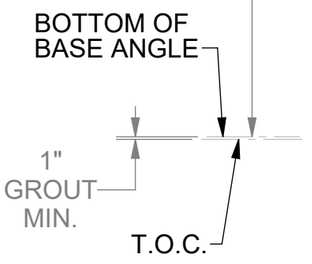


(AS VIEWED FROM THE BOTTOM LOOKING UP)



DETAIL A
FLUIDIZER PLATE & SUPPORT





REVISION TABLE			
NO:	DATE:	BY:	REVISION:
1	3/4/2025	NA	UPDATED PER REDLINES

1
UCC Contract: 55650-05
Hastings Utilities - Whelan Energy Center
UCC P/N: 55650-05-S001
FLY ASH BOLTED STEEL SILO

Tarsco Bolted Tank
a TF Warren Company
5897 Hwy. 59, Goodman, MO 64843
www.tfwarren.com
866.700.2500

This drawing and the information contained herein is submitted confidentially and is the property of Tarsco. It may not be duplicated, disclosed, or utilized without written consent from Tarsco.

UNLESS OTHERWISE SPECIFIED TOLERANCES:
FRACTIONAL ± 1/16
ONE PLACE DECIMAL ±0.060
TWO PLACE DECIMAL ±0.030
THREE PLACE DECIMAL ±0.010

B

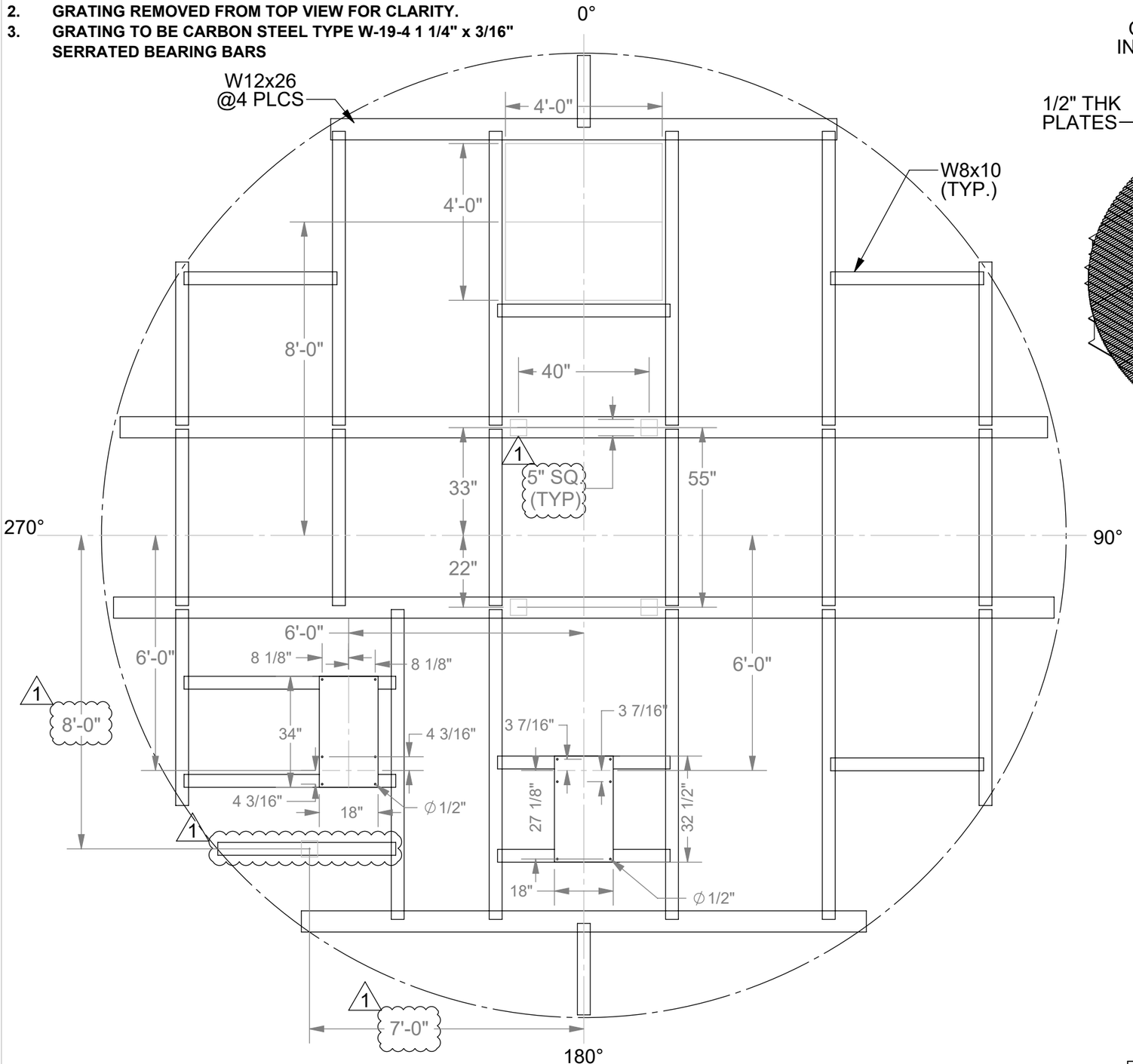
HOPPER LAYOUT

JOB #:	2412006-01CT
COVERAGE:	8 @ 116
TANK SIZE:	24.62' x 55.92'
INSULATION:	None
WEIGHT:	84,310 LBS.
COLOR:	RAL 1014

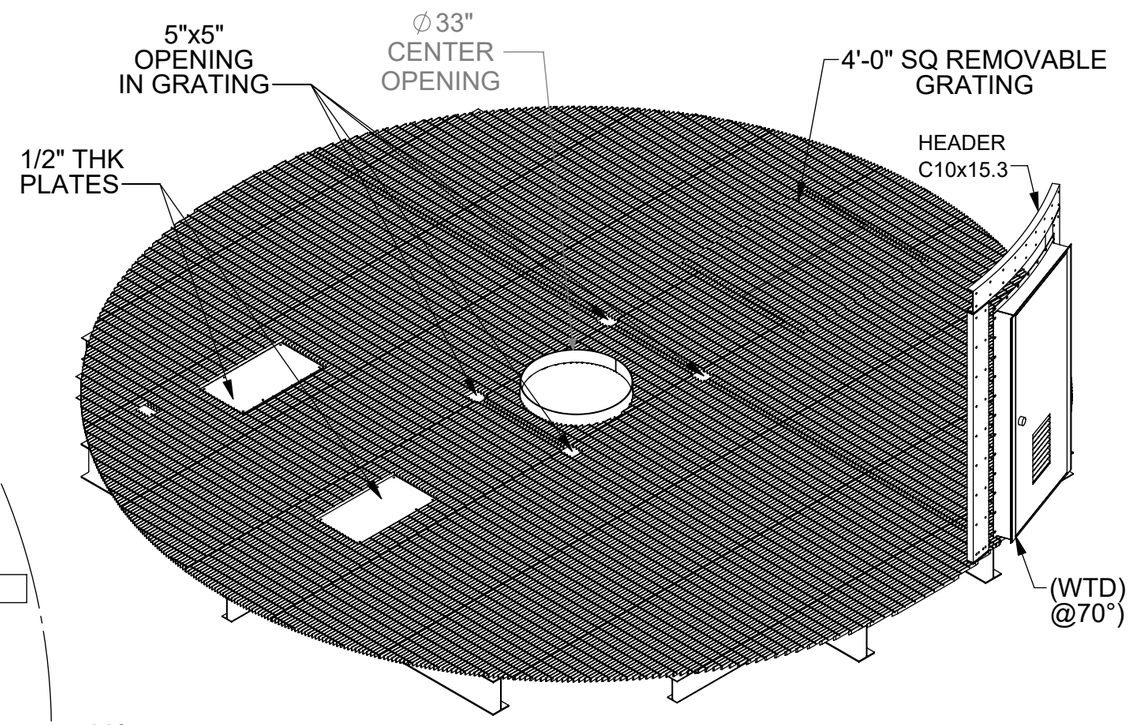
LOCATION:	Hastings, NE		
CUSTOMER:	UCC Environmental		DO NOT SCALE DRAWING
DESIGNER:	JQ	01/30/2025	S-05
PM:	JA		REV. 1

NOTE:

1. **ALL DIMENSIONS ARE MEASURED FROM BOTTOM OF BASE ANGLE, UNLESS SPECIFIED**
2. **GRATING REMOVED FROM TOP VIEW FOR CLARITY.**
3. **GRATING TO BE CARBON STEEL TYPE W-19-4 1 1/4" x 3/16" SERRATED BEARING BARS**



TOP VIEW
T/STL. EL: 17'- 10 3/4"



ISOMETRIC VIEW
T/GRT. EL: 18'-0"
T/STL. EL: 17'- 10 3/4"

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THREE PLACE DECIMAL ±0.010

B

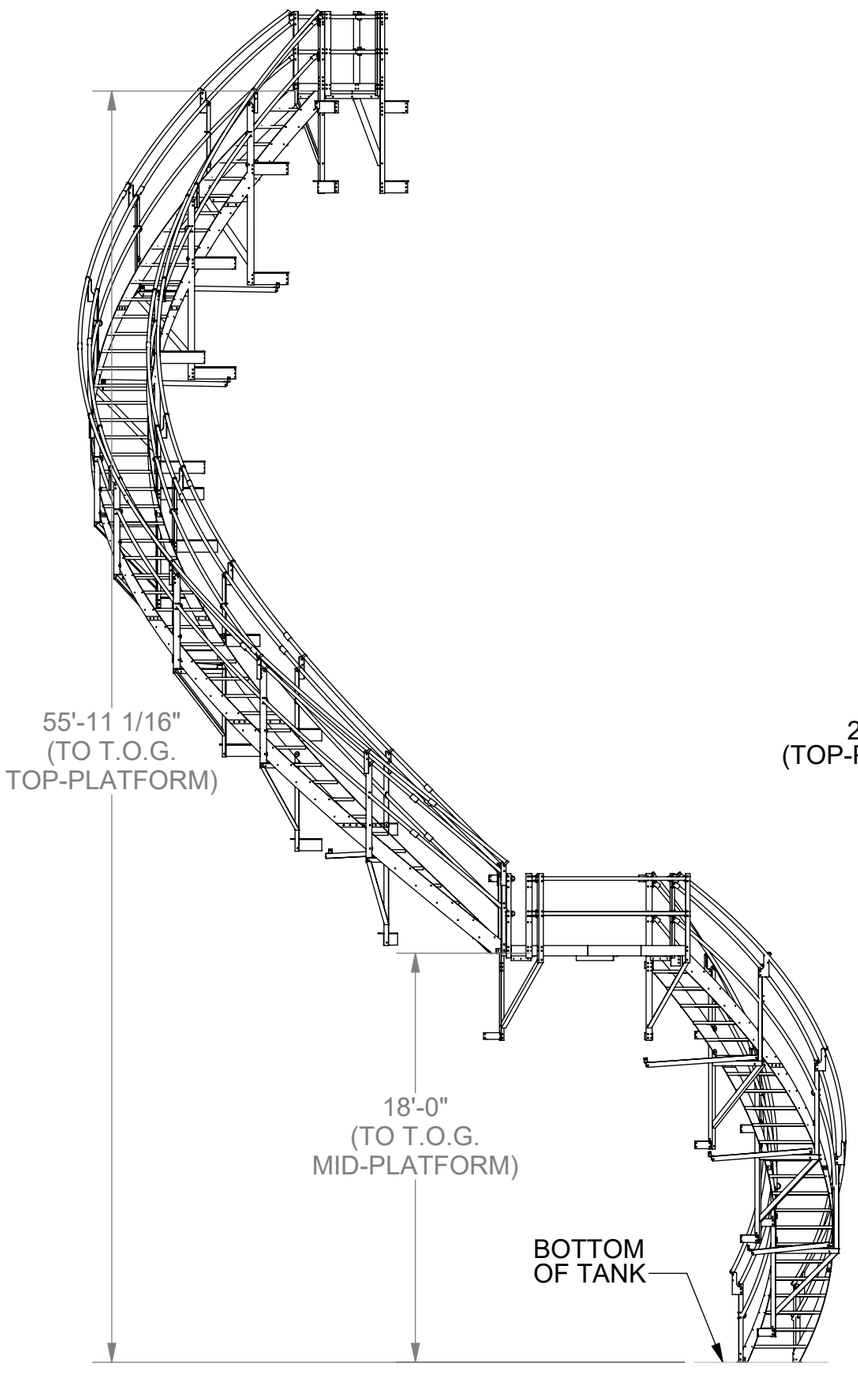
INTERIOR PLATFORM

JOB #:	2412006-01CT
COVERAGE:	8 @ 116
TANK SIZE:	24.62' x 55.92'
INSULATION:	None
WEIGHT:	84,310 LBS.
COLOR:	RAL 1014

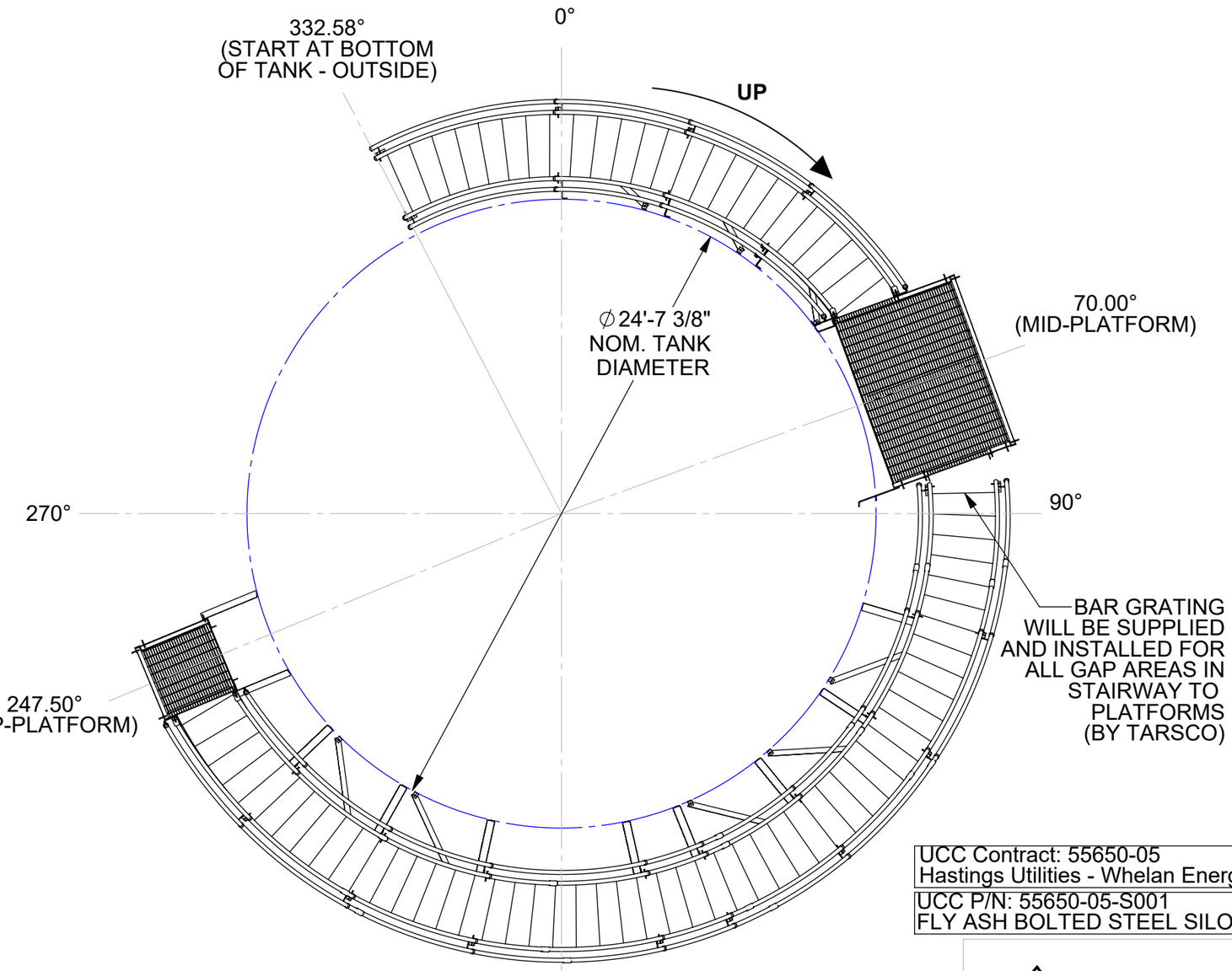
LOCATION:	Hastings, NE		
CUSTOMER:	UCC Environmental		DO NOT SCALE DRAWING
DESIGNER:	JQ	01/30/2025	S-06 REV. 1
PM:	JA		

1

NOTES:
1. ALL DIMENSIONS ARE FROM BOTTOM OF TANK.
2. PLATFORM ORENTATIONS AND ELEVATIONS MAY VARY AFTER FINAL DESIGN



SIDE VIEW



TOP VIEW

UCC Contract: 55650-05
Hastings Utilities - Whelan Energy Center

UCC P/N: 55650-05-S001
FLY ASH BOLTED STEEL SILO

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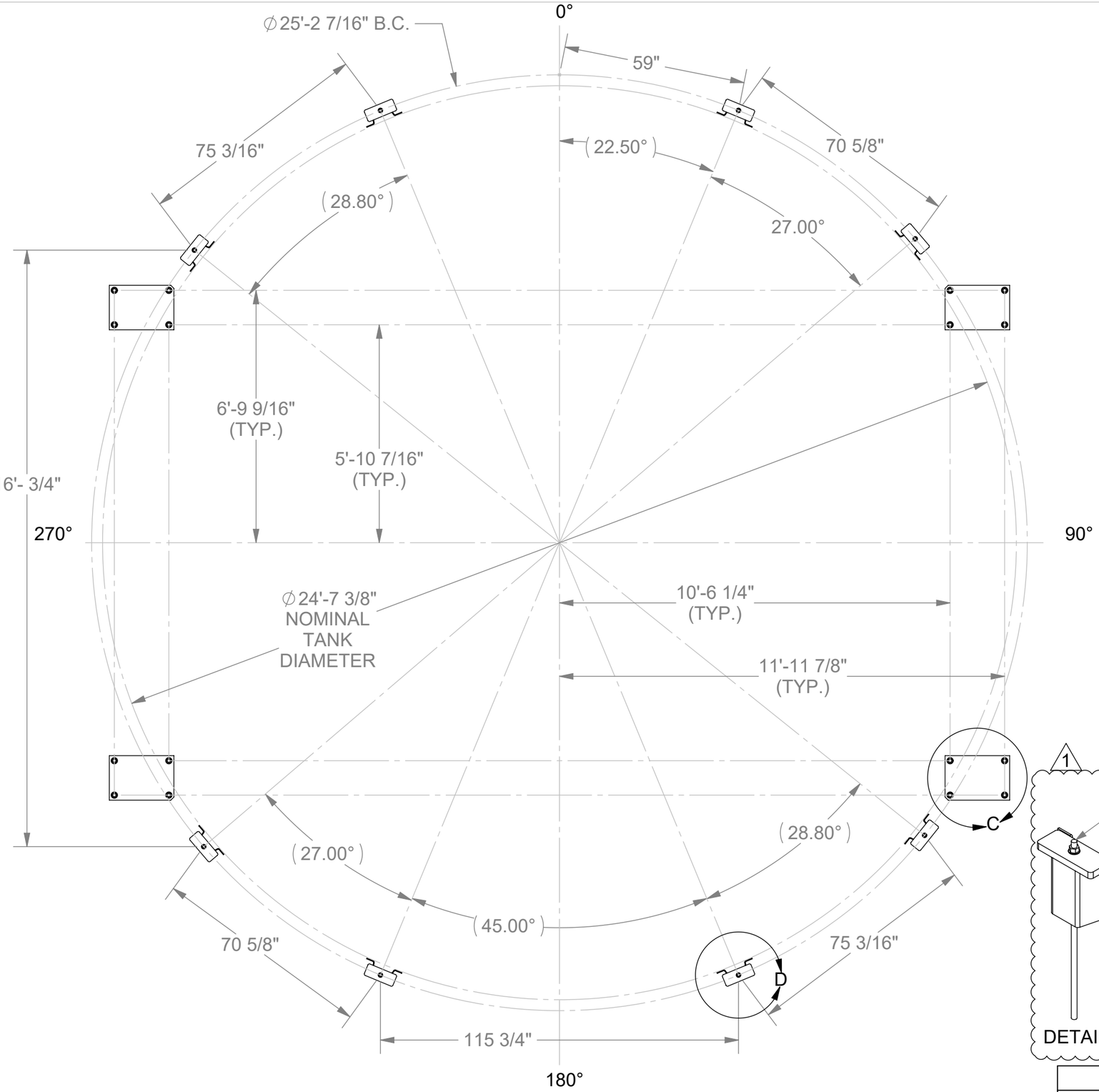
THREE PLACE DECIMAL ±0.010

B

SPIRAL STAIRS LAYOUT

JOB #:	2412006-01CT
COVERAGE:	8 @ 116
TANK SIZE:	24.62' x 55.92'
INSULATION:	None
WEIGHT:	84,310 LBS.
COLOR:	RAL 1014

LOCATION:	Hastings, NE		
CUSTOMER:	UCC Environmental		DO NOT SCALE DRAWING
DESIGNER:	JQ	01/30/2025	S-07
PM:	JA		REV. 1



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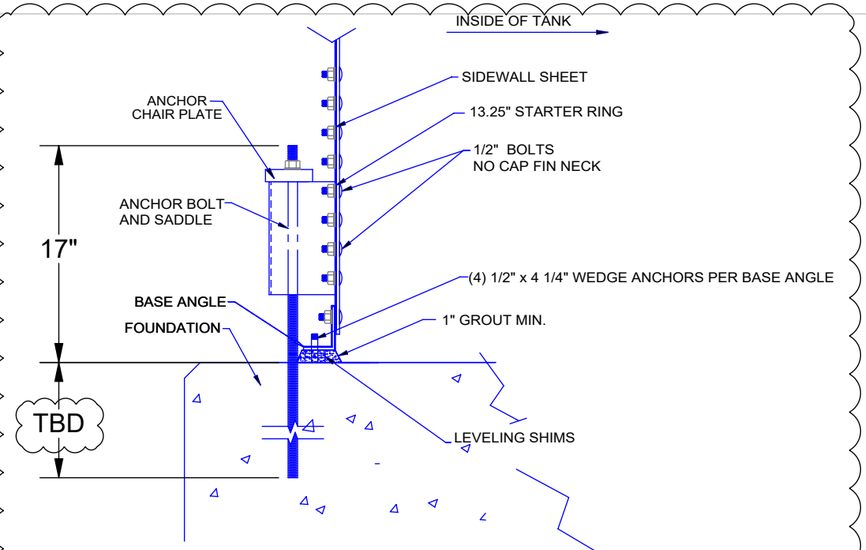


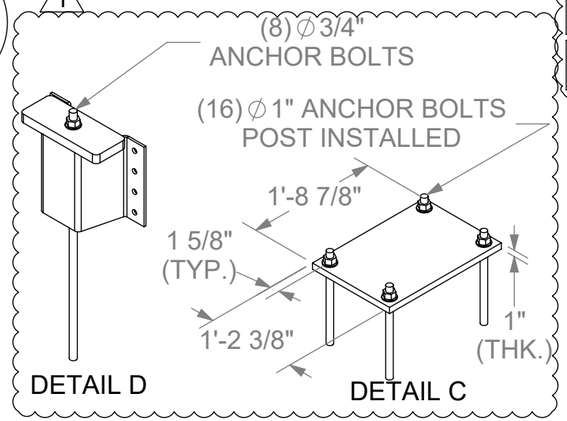
BOTTOM OF TANK WITH ANCHOR DETAIL

NOTE:
1" MIN. NON-SHRINKING NON-METALLIC GROUT BY OTHERS
ANCHOR BOLT EMBEDMENT TO BE DETERMINED BY THE FOUNDATION ENGINEER
HILTI STYLE ANCHOR BOLTS

ANCHOR BOLT LAYOUT

(8) 3/4" ANCHOR BOLTS POST INSTALLED
EQUALLY SPACED UNLESS OTHERWISE NOTED
SPACED ON A 25'-2 7/16" B.C. BOLT GRADE IS F1554-36
NOTE: VERIFY ANCHOR BOLT LAYOUT W/ LATEST
ISSUE OF TARSCO CONSTRUCTION DRAWINGS.

1



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THREE PLACE DECIMAL ±0.010

B

ANCHOR LAYOUT

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TANK SIZE:	24.62' x 55.92'
INSULATION:	None
WEIGHT:	84,310 LBS.
COLOR:	RAL 1014

LOCATION:	Hastings, NE		
CUSTOMER:	UCC Environmental		DO NOT SCALE DRAWING
DESIGNER:	JQ	01/30/2025	S-08
PM:	JA		

REV. 1