



NON-COMPLIANCE NOTICE (NCN)

Owner:	City of Oklahoma City / Oklahoma City Water Utilities Trust	Date Issued:	04/29/2021
Contractor:	Archer Western Construction	Carollo Project No.:	10949A.30
Project Name:	WT-0159 Draper Water Treatment Plant, Various Improvements to Strengthen the Redundancy and Resiliency for Water Treatment and Storage	Notice No.:	002
Subject/Item:	120-Inch Pipe Installation (Floatation)	Spec/Dwg. Reference:	02312/ 02708

Pursuant to the Articles of the General Conditions of the Contract, you are hereby notified of the following non-compliance violation of the Contract			
Item:	Floatation of 120" FRPMP Pipe	Spec. Section:	02312 / 02708
Drawing No.:	11C02 – 11C03	Other:	Submittal 02312-003
Violation Detected By:	<input type="checkbox"/> Test <input checked="" type="checkbox"/> Inspection	Non-Compliance Detected By:	<input type="checkbox"/> Defective <input checked="" type="checkbox"/> Rejected
Non-Compliance Description			
<p>1. In accordance with Item 13, Paragraph D.1 of the Standard Provisions, we are notifying you of work we believe to be defective due to noncompliance with the Contract Documents.</p> <p>2. In accordance with Item 37 of the Special Provisions, please provide a corrective action plan to conform this work with the requirements of the contract documents. See specific requirements for corrective action plan listed below.</p> <p>3. Contractor provided Submittal S-02708-001C for Fiberglass Reinforced Polymer Mortar Pipe (FRPMP) and stated that buoyance calculations and anti-floatation work plan would be submitted under S-02312-003 for Controlled Low Strength Material (CLSM) – Pipe Floatation. Submittal was Approved with Comments. See Attachment A & B.</p> <p>4. On April 28, 2021, several sections of partially installed 120-inch pipe located in the clearwell area “floated” out of the trench and were displaced from original alignment. See Attachment C for photos. During the 3-day period of April 26 through 28, approximately 2.55 inches of rain was received (Mesonet, Norman Station) with 2.02 inches falling on April 28, 2021.</p> <p>5. The pipe fully separated from the FRP coupling in at least one location. See Attachment C for photo.</p> <p>6. The concrete encasement surrounding the pipe on the south edge of the Diversion structure was not fully cured at the time of the incident and was damaged. See Attachment C for photo.</p>			
Corrective Action Required			
<p>7. In accordance with Specification 03300 (3.13), contractor is required to remove and replace or repair all non-conforming and defective work.</p>			

8. AS PER MEETING WITH TOM CROWLEY AND JOEY COBURN (4/29/2021), DO NOT DO ANY WORK OR DISTURB THE PIPE UNTIL CAROLLO, HOBAS, STRAUB, AND ARCHER WESTERN AGREE ON THE ASSESSMENT APPROACH.
9. Contractor shall prepare and submit a written plan to outline the methods of repair, specifically addressing the following:
 - a. Document total number of pipe segments and couplings which were affected and removed.
 - b. Provide drawing (using shop drawing is acceptable) indicating which specific segments were affected.
 - c. Provide survey of the pipe invert from the 72" meter vault crossing to the Diversion structure. Document extent of uplift.
 - d. Provide inspection method and documentation for all removed pipe which will be reinstalled indicating that there is no observed damage to any area of the pipe.
 - 1) Provide comprehensive photo documentation of each section of pipe and coupling.
 - 2) Document number of damaged pipe sections which cannot be reinstalled due to damage.
 - 3) Carollo and Hobas must jointly inspect pipe and couplings with Archer Western team. If any item is damaged, it will need to be fixed or replaced in accordance with the manufacturer recommendations.
 - e. The reuse of Hobas FRP and/or Straub Couplings must be assessed and agreed to by all parties.
 - f. Provide a plan for removal and replacement of concrete encasement at Diversion Structure.
 - g. Provide a planned solution to correct the problem which will need to be agreed upon by Carollo, Hobas, Straub and Archer Western, prior to starting any work.
 - h. Provide a schedule for the corrective actions.
 - 1) Track actual time of repair/reinstallation and provide summary of project schedule impacts.
 - i. Provide a final report, also with photos of the reinstalled pipe, including every joint, showing pipe reinstallation.
10. All time associated with Carollo staff and Carollo's subcontracted inspector will be tracked and billed to the Contractor, as specified in the Contract documents.

Acknowledgement by Contractor

Defective work shall be corrected. Rejected work shall be removed and replaced with work that is not defective. All costs made necessary thereby shall be borne by the Contractor. Payment will not be made for defective or rejected work until amended. Contractor shall notify inspector when defective or rejected work is amended.

Prepared By:	Tom Crowley, PE; Greg Gould, PE; Gary Sagehorn, PE, SE	Date:	04/29/2021
Received By:		Date:	



NON-COMPLIANCE NOTICE (NCN)

Owner:	City of Oklahoma City / Oklahoma City Water Utilities Trust	Date Issued:	12/27/2022
Contractor:	Archer Western Construction	Carollo Project No.:	10949A.30
Project Name:	WT-0159 Draper Water Treatment Plant, Various Improvements to Strengthen the Redundancy and Resiliency for Water Treatment and Storage	Notice No.:	004
Subject/Item:	Ammoniators, PRV's, Vacuum Regulating Valve Non-compliance	Spec/Dwg. Reference:	11261/P&ID's

Pursuant to the Articles of the General Conditions of the Contract, you are hereby notified of the following non-compliance violation of the Contract			
Item:	Vacuum Ammonia System	Spec. Section:	11261- Gas Ammonia System
Drawing No.:	00G09, DCM 48, 86N05-86N07	Other:	Commissioning and testing
Violation Detected By:	<input type="checkbox"/> Test <input checked="" type="checkbox"/> Inspection	Non-Compliance Detected By:	<input checked="" type="checkbox"/> Defective <input type="checkbox"/> Rejected
Non-Compliance Description			
Corrective Action Required			
<ol style="list-style-type: none">1. Respond fully to submittal comments and resubmit on new vacuum ammoniators. Include the resubmitted information in the formal substitution request as required by the contract documents.2. Engage DeNora to assess the events of 12/18 and 12/22 to determine the cause of liquid forming downstream of the Denora provided PRV. Propose solutions for engineer to review.3. Engage Denora to assess the vacuum ammonia system and regulating valves for leaks and propose solutions for engineer to review.4. As requested by NCN04, provide qualified Denora technician on-site during the vacuum testing and operational testing of the 120-inch contactor.			
Acknowledgement by Contractor			
Defective work shall be corrected. Rejected work shall be removed and replaced with work that is not defective. All costs made necessary thereby shall be borne by the Contractor. Payment will not be made for defective or rejected work until amended. Contractor shall notify inspector when defective or rejected work is amended.			
Prepared By:	Thomas Crowley, PE	Date:	12/27/2022
Received By:		Date:	XX/XX/XXXX

SUBMITTAL REVIEW

DATE: 12/27/2022 **JOB NO.:** 10949A.20 **SPECIFICATION SECTION:** 11261

CLIENT: City of Oklahoma City / Oklahoma City Water Utilities Trust

ATTENTION: David Nine, Skylar Skaggs, Joey Colburn, Zach Biggs, Eric Maraconda

SUBMITTAL NAME: Capital Controls Series 4100B Ammonia Feed Cabinets- Substitution request
pending

REVIEWED BY: Tom Crowley, Casey Leaf

SUBMITTAL REVIEW

Review is for general compliance with contract documents. No responsibility is assumed by Carollo for correctness of quantities, dimensions, and details. No deviation or variation is approved unless specifically accepted in these review comments. Refer to specification section 01330 for additional requirements. The Contractor shall assume full responsibility for coordination with all other trades and deviations from contract requirements.

s-01759-002

	Approved	No Exceptions Taken
	Approved	Make Corrections Noted
X	Approved	Confirm Corrections Noted (Resubmit)
	Not Approved	Correct and Resubmit (Resubmit)
	Not Approved	Rejected (Resubmit)
		Receipt Acknowledged (Filed for Record)

Comments:

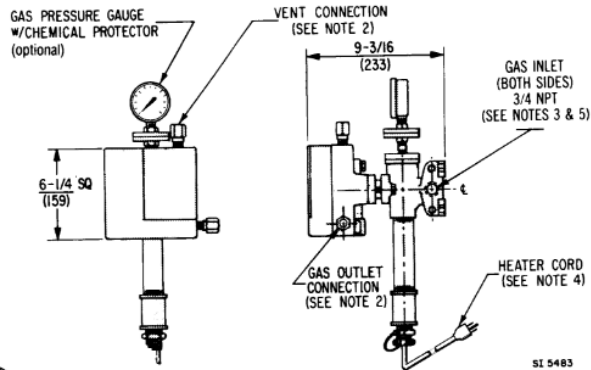
1. Ammoniators are acceptable and may be released for manufacture and delivery FOB jobsite.
2. Please see attachment A, chemical compatibility databases indicate BUNA-N is "Good" for chemical resistance to anhydrous ammonia, please confirm compatibility and respond to why EPDM was not considered.
3. Please clarify on the vacuum switches (low and excessive) are these meant to be integral with the ammoniators and these are spare parts or are these to be mounted outside of the unit. If integral to the unit and spare part, this is what is desired as part of the substitution request. It appears that this has an alarm signal associated with these vacuum switches, please integrate these as part of the substitution request into the P&ID's (attachment B) and provide/install wires and programming per substitution request.
4. Please note the warranty as specified in section 01770, Table 01770-1 should be from the date established for final completion. Coordinate with contractor on the start date for the warranty to be anticipated.

* Unless otherwise specified, the start of the warranty period should be the date of acceptance of Work (Project WT-0159) by the City of Oklahoma City Council. AD3

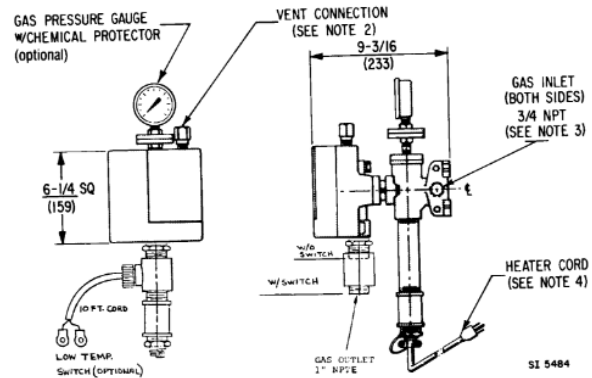
5. Please provide a statement verifying compatibility with the previously provided vacuum regulating valves and PRV. It appears that the vacuum regulator associated with this cabinet is different than that provided originally, please provide compatibility statements as part of the substitution request:

VACUUM REGULATOR — DIMENSIONS & CONNECTIONS

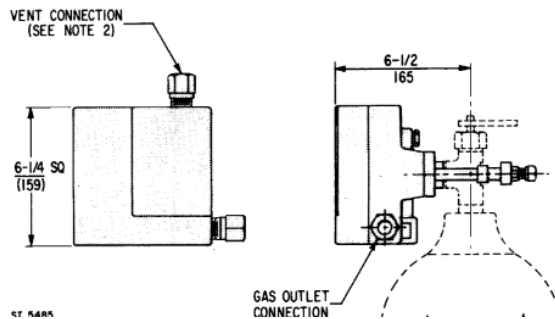
Wall or Ton Container Mounted — 500 lb/day (10 kg/h) Maximum



Wall Mounted — 1000 and 2000 lb/day (20 and 39 kg/h)



Cylinder Mounted - 100 lb/day (2 kg/h) Maximum



NOTES:

1. All dimensions are in inches (mm).
2. Adapter provided for 1/2-inch tubing.
3. One side provided with a plug. Other side provided with adapter for union nut coupling.
4. 10-foot (3m) long cord and three pin plug.
5. For ton container mounting, the manifold is attached to the ton container gas valve using a yoke connection provided with the chlorinator.

6. Is the information on the FX4400 still valid, the letter provided in the cover stated that this model was discontinued.
7. Please cross-out/excise all no-relevant information particularly as it relates to the materials of construction. This is the problem with the last submittals as this information was not specific for ammonia. The City will not accept the submittal documentation this way. Please confirm and resubmit along with substitution request.
8. Please confirm that ammonia flow tubes and floats are calibrated and display ACTUAL ammonia flow up to 1000 ppd/unit.
9. Please confirm 20:1 turndown which means each ammoniator has a range of 50-1000 ppd.
10. Please confirm operating temperature is gas temperature for the chloromatic valve.
11. Please confirm that existing power wires and circuit breakers will be compatible and can be reused to feed these new ammoniators (part of substitution request):

Electrical Requirements

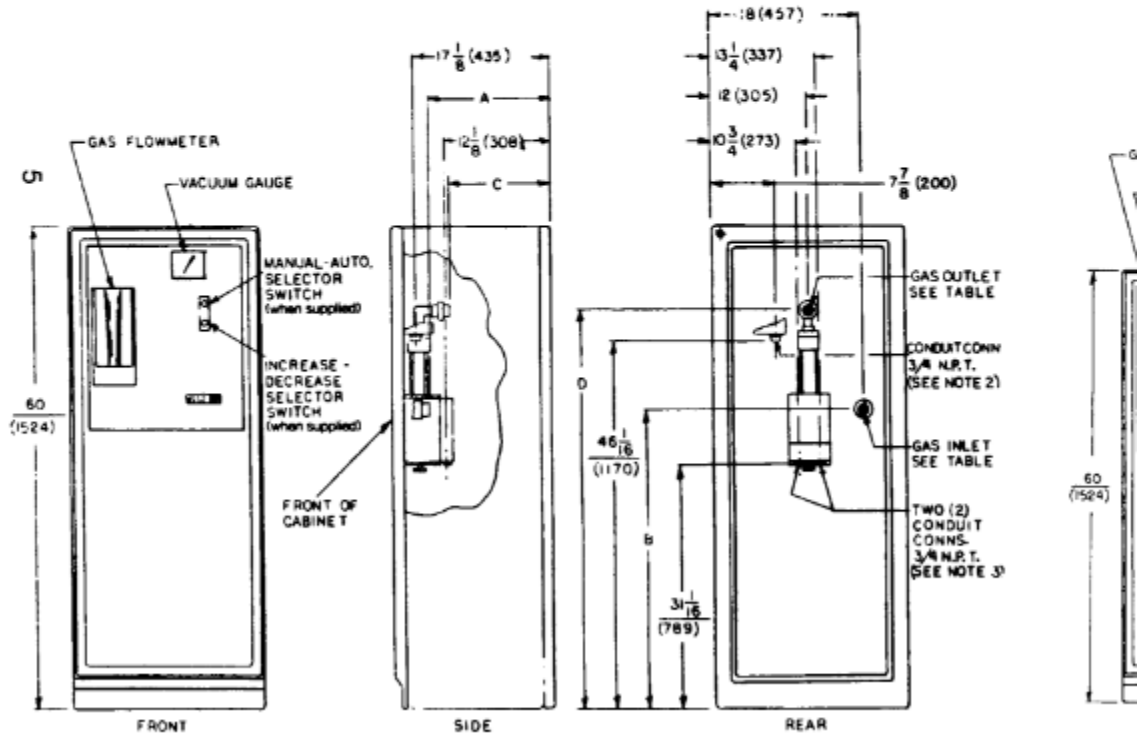
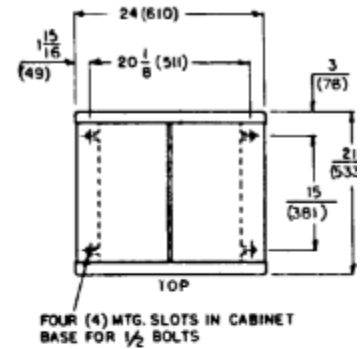
For gas inlet heater 0.25 A at 120 V ac, 0.13 A at 240 V ac. For *Chloromatic* valve 0.3 A at 120 V ac; 0.15 A at 240 V ac.

12. Please field verify that ammoniators will fit in the existing space (see attachment C) and include in substitution requests.

NOTES

1. All dimensions are in inches (mm are in parentheses)
2. Use for interconnections to loss of and/or excess vacuum alarm.
3. Use for signal input, signal output, valve limit alarm and power supply - refer to manufacturing data for power requirements.
4. Minimum clearance of 18" (457) must be provided in front and rear of cabinet.

MAXIMUM CAPACITY	GAS INLET AND OUTLET DIMENSIONS				
	CONN SIZE	A	B	C	D
500 lb/day (90 kg/h)	1/2 NPT x 5/8 ELBOW	12 1/2 (317)	37 1/2 (953)	4 7/16 (367)	48 1/2 (1232)
2000 lb/day (39 kg/h)	1" NPT	14 1/8 (359)	37 1/2 (953)	11 7/16 (290)	49 3/16 (1249)



Automatic Control Module

13. Please verify selection of model as series 4140B. We want the ability to control these remotely. We do not need the controller as we will not be controlling on ammonia residual just a dose ratio in the scada with free ammonia feedback for adjustment of the signal to the ammoniator from the pLC. However, we do want the feedback on the ammoniator flow setting back to scada. It seems that the literature was not very clear on whether this was available in the unit, please provide additional clarification/information.
14. Please verify for the flow tube what the 8330 designation is. We read that the top feed rate is 975 ppd or is the top feed rate 1000 ppd. It makes a difference regarding the redundancy/number of on-line units.
15. Please verify for the parts list the materials of construction for each part, we expect that ammoniators with materials resistant to ammonia will be ordered/fabricated. Please update this list with material selection to confirm compatibility.

16. Please be advised that formal substitution request is required and therefore we anticipate the submittal should be revised to include the substitution request as outlined in Section 1600- Product Requirements. A snippet of these requirements/expectations associated with the substitution request is provided below for your convenience:

1.06 SUBSTITUTIONS

- A. Formal substitution request procedure:
 - 1. Submit a written formal substitution request to Engineer for each proposed substitution within 30 days of effective date of Contract.
 - 2. Engineer will return initial opinion and request for additional information within 30 days.
 - 3. Engineer will notify Contractor in writing of decision to accept or reject the substitution request within 30 days of receiving required information.
- B. Formal substitution request contents:
 - 1. Provide Substitution Request Form as specified in this Section.
 - 2. Manufacturer's literature including:
 - a. Manufacturer's name and address.
 - b. Product name.
 - c. Product description.
 - d. Reference standards.
 - e. Certified performance and test data.
 - f. Operation and maintenance data.
 - 3. Samples, if applicable.
 - 4. Shop drawings, if applicable.
 - 5. Reference projects where the product has been successfully used:
 - a. Name and address of project.
 - b. Year of installation.
 - c. Year placed in operation.
 - d. Name of product installed.
 - e. Point of contact: Name and phone number.
 - 6. Itemized comparison of the proposed substitution with product specified including a list of significant variations:
 - a. Design features.
 - b. Design dimensions.
 - c. Installation requirements.
 - d. Operations and maintenance requirements.
 - 7. Define impacts:
 - a. Impacts to construction schedule.
 - b. Impacts to other contracts.
 - c. Impacts to other work or products.
 - d. Impact to Contract Sum:
 - 1) Do not include costs under separate contracts.
 - 2) Do not include Engineer's costs for redesign or revision of Contract Documents.
 - 3) Required license fees or royalties.
 - e. Availability of maintenance services and sources of replacement materials.

8. Contractor represents the following:
 - a. Contractor shall pay associated costs for the Engineer to evaluate the substitution.
 - b. Contractor bears the burden of proof of the equivalency of the proposed substitution.
 - c. Proposed substitution does not change the design intent and will have equal performance to the specified product.
 - d. Proposed substitution is equal or superior to the specified product.
 - e. Contractor will provide the warranties or bonds that would be provided on the specified product on the proposed substitution, unless Owner requires a Special Warranty.
 - f. Contractor will coordinate installation of accepted substitution into the Work and will be responsible for the costs to make changes as required to the Work.
 - g. Contractor waives rights to claim additional costs caused by proposed substitution which may subsequently become apparent.
- C. Substitutions will not be considered for acceptance under the following conditions:
 1. No formal substitution request is made.
 2. The substitution is simply implied or indicated on shop drawings or product data submittals.
 3. The formal substitution request is submitted by a subcontractor or supplier.
- D. Substitution requests submitted after the deadline will not be considered unless the following evidence is submitted to the Engineer:
 1. Proof that the specified product is unavailable for reasons beyond the control of the Contractor.
 - a. Reasons may include manufacturing discontinued, bankruptcy, labor strikes, or acts of God.
 - b. Contractor placed or attempted to place orders for the specified products within 10 days after the effective date of the Agreement.
 - c. The formal substitution request is submitted to Engineer within 10 days of the Contractor discovering the specified product cannot be obtained.
- E. Engineer's decision on a substitution requests will be final and binding.
 1. Approved substitutions will be incorporated into the Contract Documents with a Change Order.
 2. Requests for time extensions and additional costs based on submission of, approval of, or rejection of substitutions will not be allowed.

17.

Attachment A – Chemical Compatibility

Chemical Compatibility Database

CHEMICAL SELECTED : Ammonia, anhydrous


 SHARE  PRINT

MATERIAL	COMPATIBILITY
ABS plastic	D - Poor
Acetal (Delrin®)	D - Poor
Aluminum	A ¹ - Excellent
Brass	D - Poor
Bronze	D - Poor
Buna N (Nitrile)	B - Good
Carbon graphite	A - Excellent
Carbon Steel	B - Good

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Ratings - Chemical Effect

A - Excellent

B - Good: Minor Effect, slight corrosion, or discoloration.  Chat with an Expert

C - Fair: Moderate Effect, not recommended for continuous use. Softening or loss of strength, and swelling may occur.

D - Severe Effect: Not recommended for any use.

E - Information not available.

Explanation of Footnotes


1-Satisfactory to 72°F (22°C)

2-Satisfactory to 120°F (48°C)

ACCEPT COOKIES

Carpenter 20	A - Excellent
Cast iron	A - Excellent
Ceramic Al2O3	N/A
Ceramic magnet	N/A
ChemRaz (FFKM)	B - Good
Copper	D - Poor
CPVC	A ¹ - Excellent
EPDM	A - Excellent
Epoxy	A - Excellent
Fluorocarbon (FKM)	D - Poor
Hastelloy-C®	B - Good
Hypalon®	D - Poor
Hytrel®	D - Poor
Kalrez	A - Excellent
Kel-F®	A - Excellent


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ACCEPT COOKIES

LDPE	B ² - Good
Natural rubber	D - Poor
Neoprene	A - Excellent
NORYL®	B ¹ - Good
Nylon	A ¹ - Excellent
Polycarbonate	D - Poor
Polyetherether Ketone (PEEK)	A - Excellent
Polypropylene	A - Excellent
Polyurethane	D - Poor
PPS (Ryton®)	A ¹ - Excellent
PTFE	A - Excellent
PVC	A ² - Excellent
PVDF (Kynar®)	A - Excellent
Silicone	C - Fair
stainless steel - 304	A - Excellent

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ACCEPT COOKIES

stainless steel - 316	A ² - Excellent
Titanium	C - Fair

WARNING

The information in this chart has been supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for appropriate chemical compatibility. Before permanent installation, test the equipment with the chemicals and under the specific conditions of your application.

Ratings of chemical behavior listed in this chart apply at a 48-hr exposure period. Cole-Parmer has no knowledge of possible effects beyond this period. Cole-Parmer does not warrant (neither express nor implied) that the information in this chart is accurate or complete or that any material is suitable for any purpose.

DANGER

Variations in chemical behavior during handling due to factors such as temperature, pressure, and concentrations can cause equipment to fail, even though it passed an initial test.

SERIOUS INJURY MAY RESULT

Use suitable guards and/or personal protections when handling chemicals.

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Organics



Solvents



Inorganics



Cole-Parmer | 625 East Bunker Ct Vernon Hills, IL 60061 United States

Telephone: 1-800-323-4340, 1-847-549-7600 | Fax: 1-847-247-2929 | Email: sales@coleparmer.com

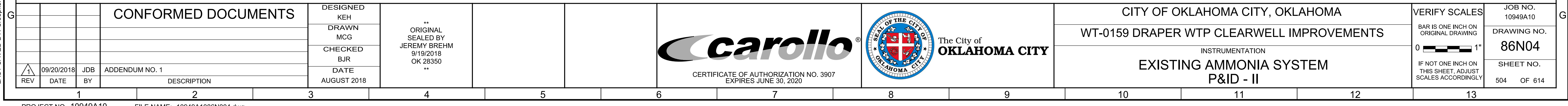
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ACCEPT COOKIES

Attachment B- Ammonia System P&ID's



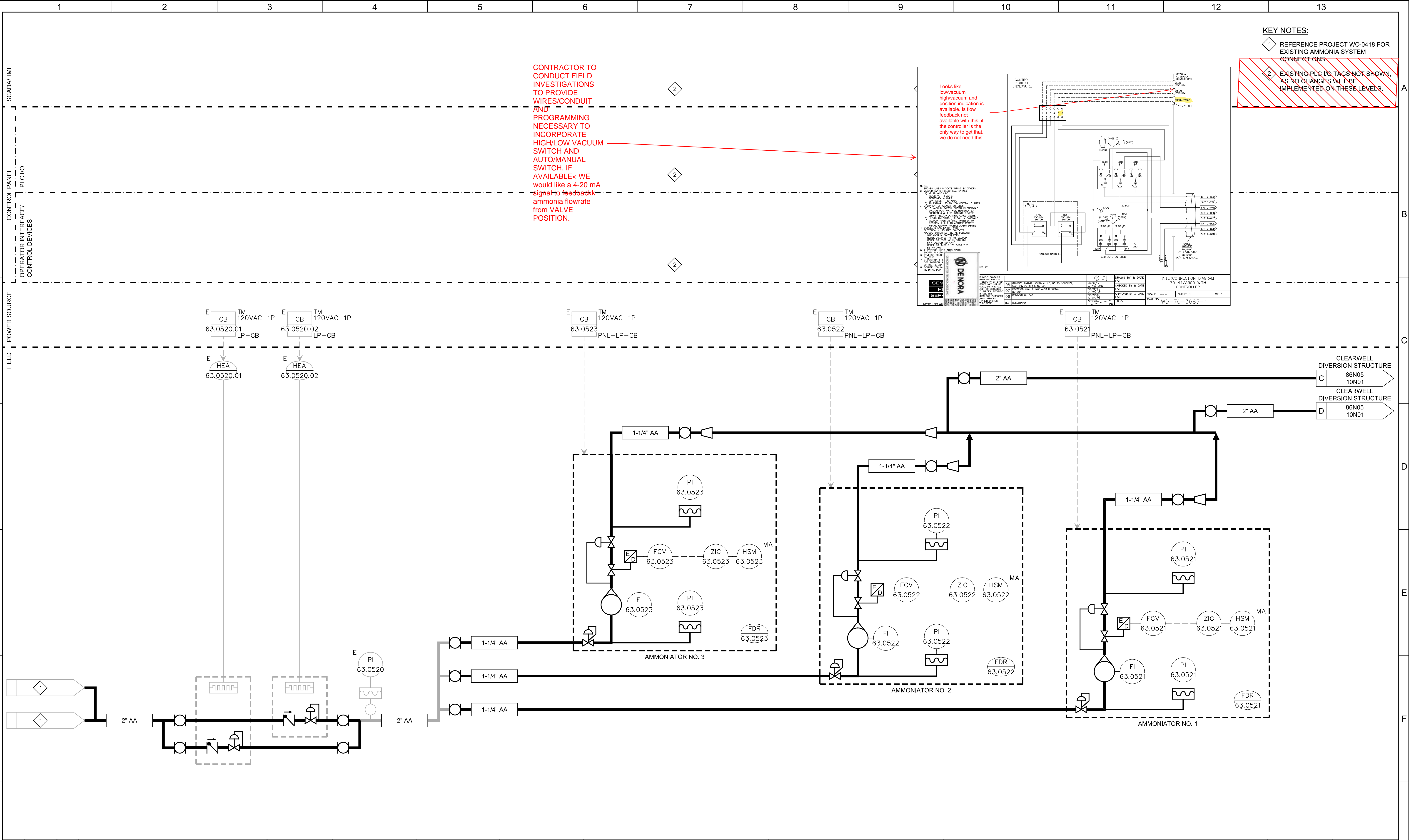


Plot Date: 14-NOV-2018 11:12:42 AM

User: svcFW

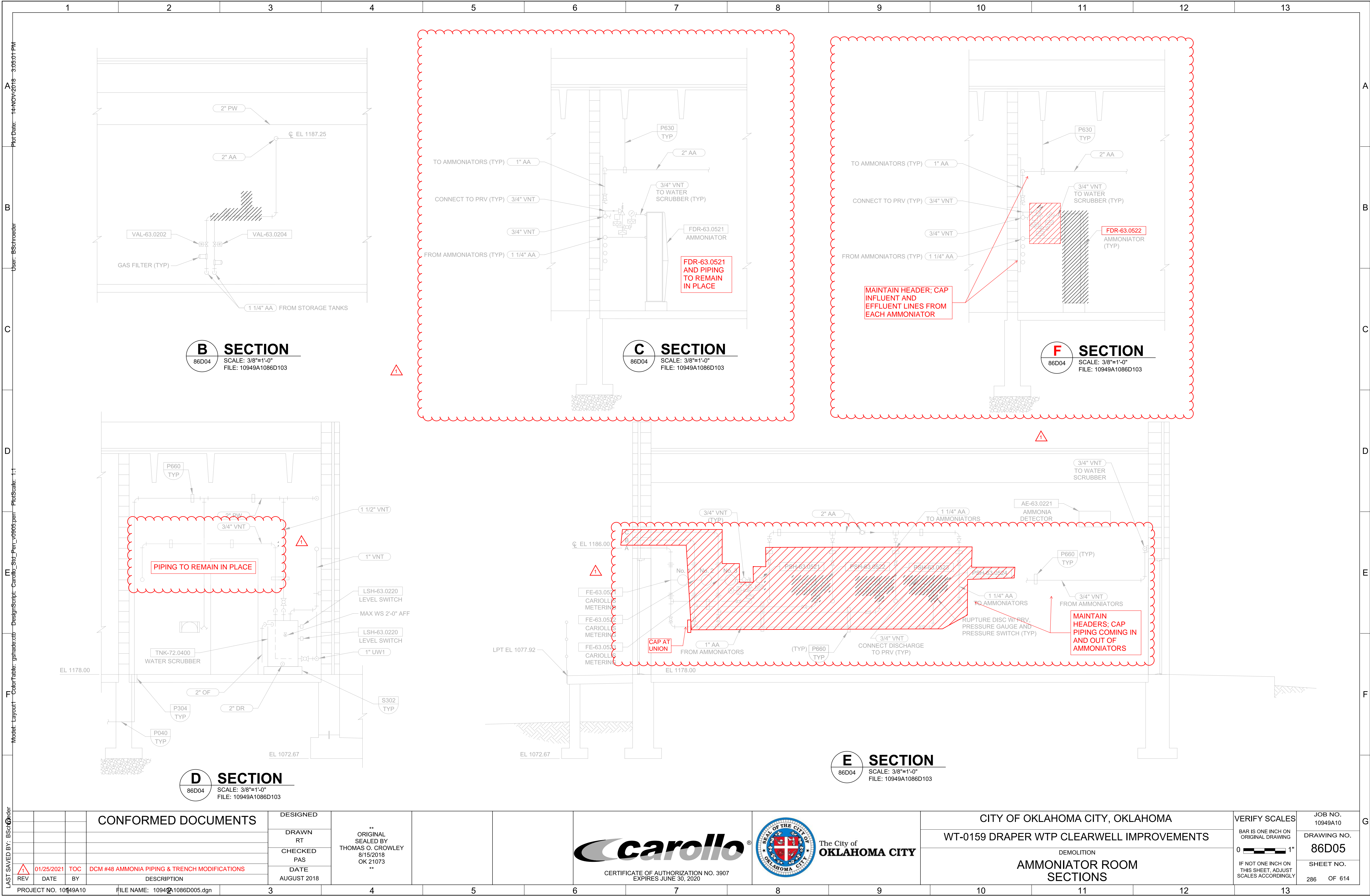
Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo_Sld_Pen_v0905.pen PlotScale: 1:1

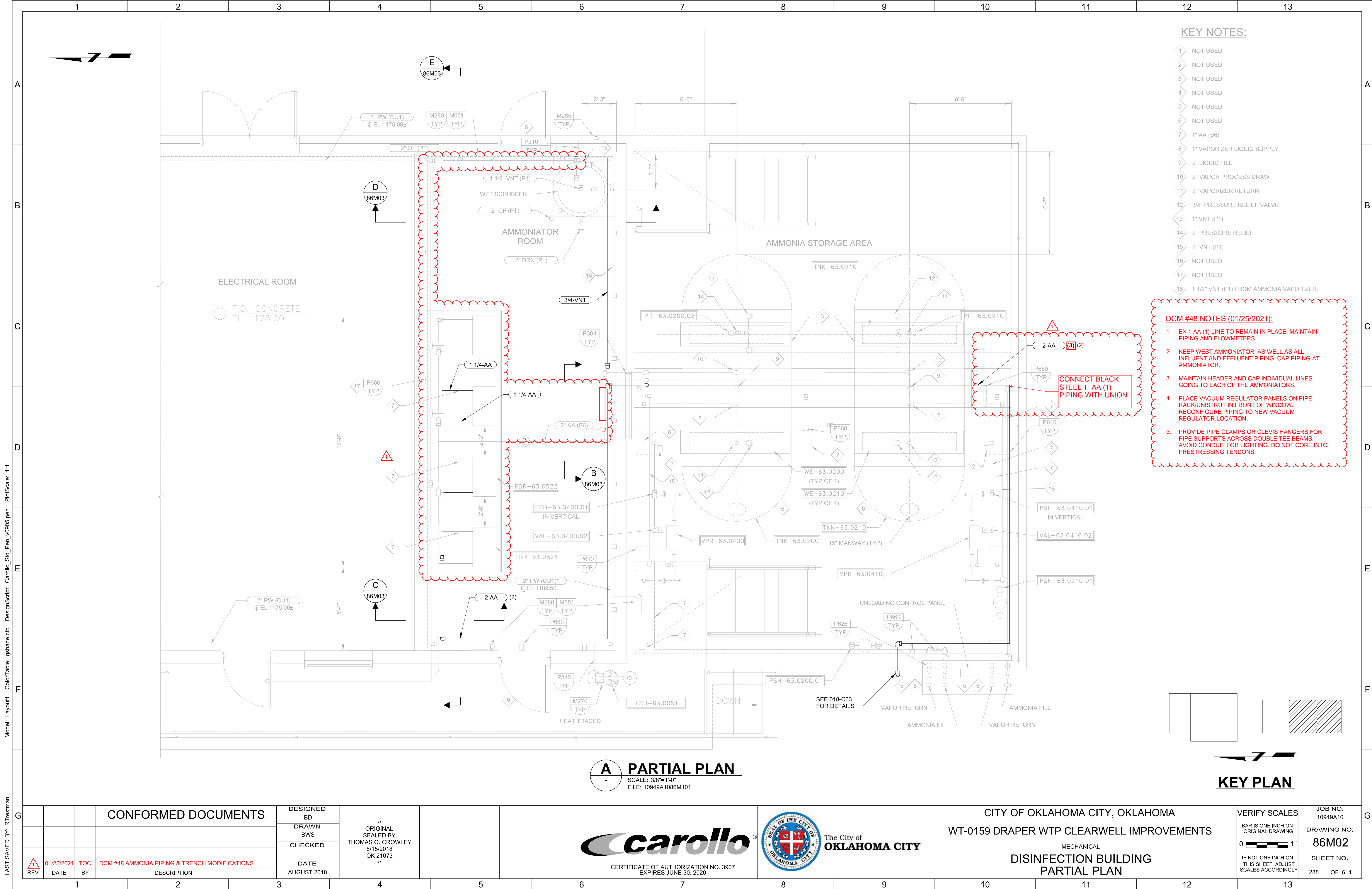
LAST SAVED BY: broepken



CONFORMED DOCUMENTS				DESIGNED KEH	** ORIGINAL SEALED BY JEREMY BREHM 9/19/2018 OK 28350 **							CITY OF OKLAHOMA CITY, OKLAHOMA			VERIFY SCALES	JOB NO. 10949A10
				DRAWN MCG								WT-0159 DRAPER WTP CLEARWELL IMPROVEMENTS			BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO.
				CHECKED BJR											0 1"	86N05
				DATE AUGUST 2018											IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	SHEET NO.
1	2	3	4	5	6	7	8	9	10	11	12	13				505 OF 614

Attachment C – Ammonia System Layouts (current)



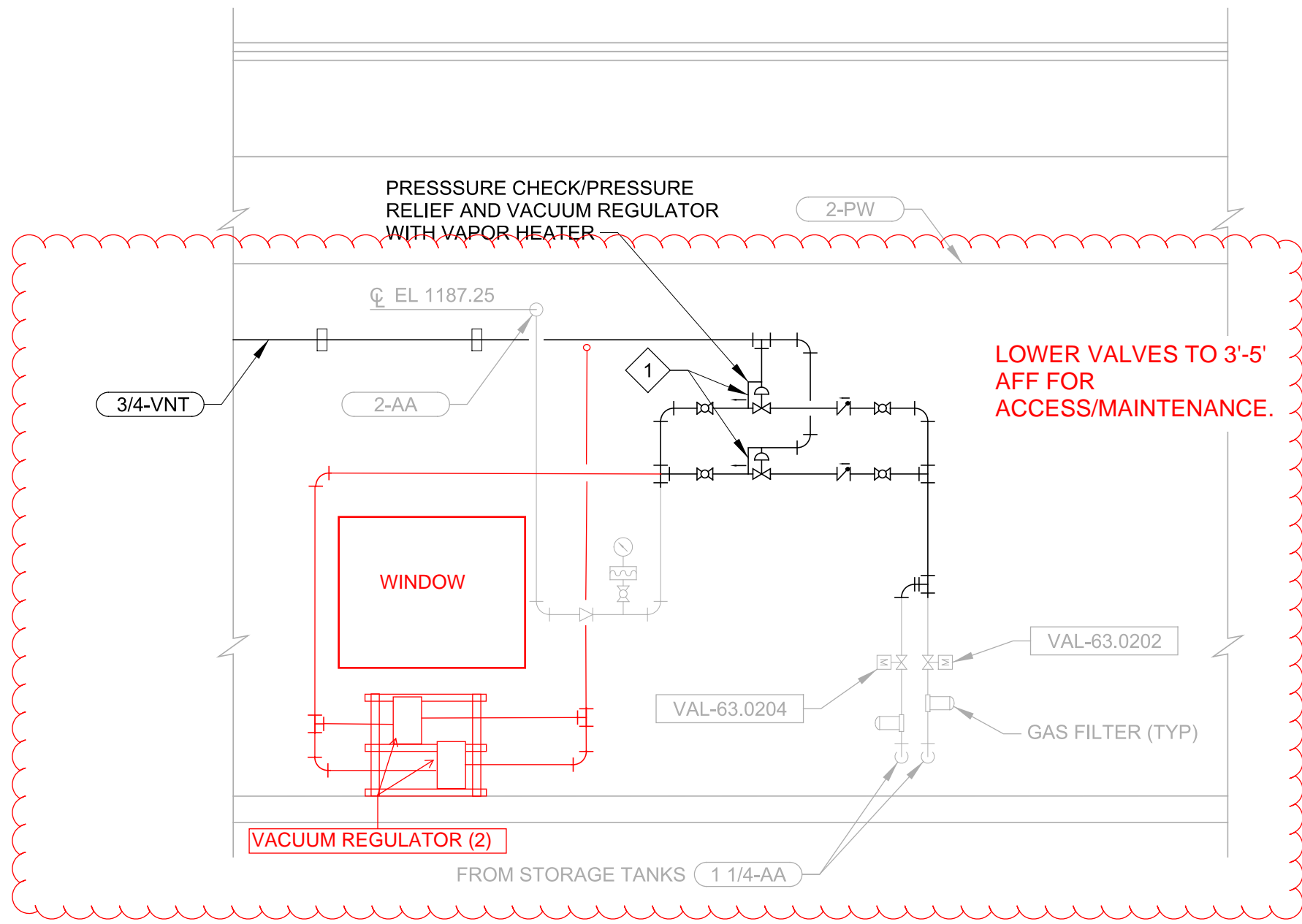


Plot Date: 15-NOV-2018 2:23:52 PM

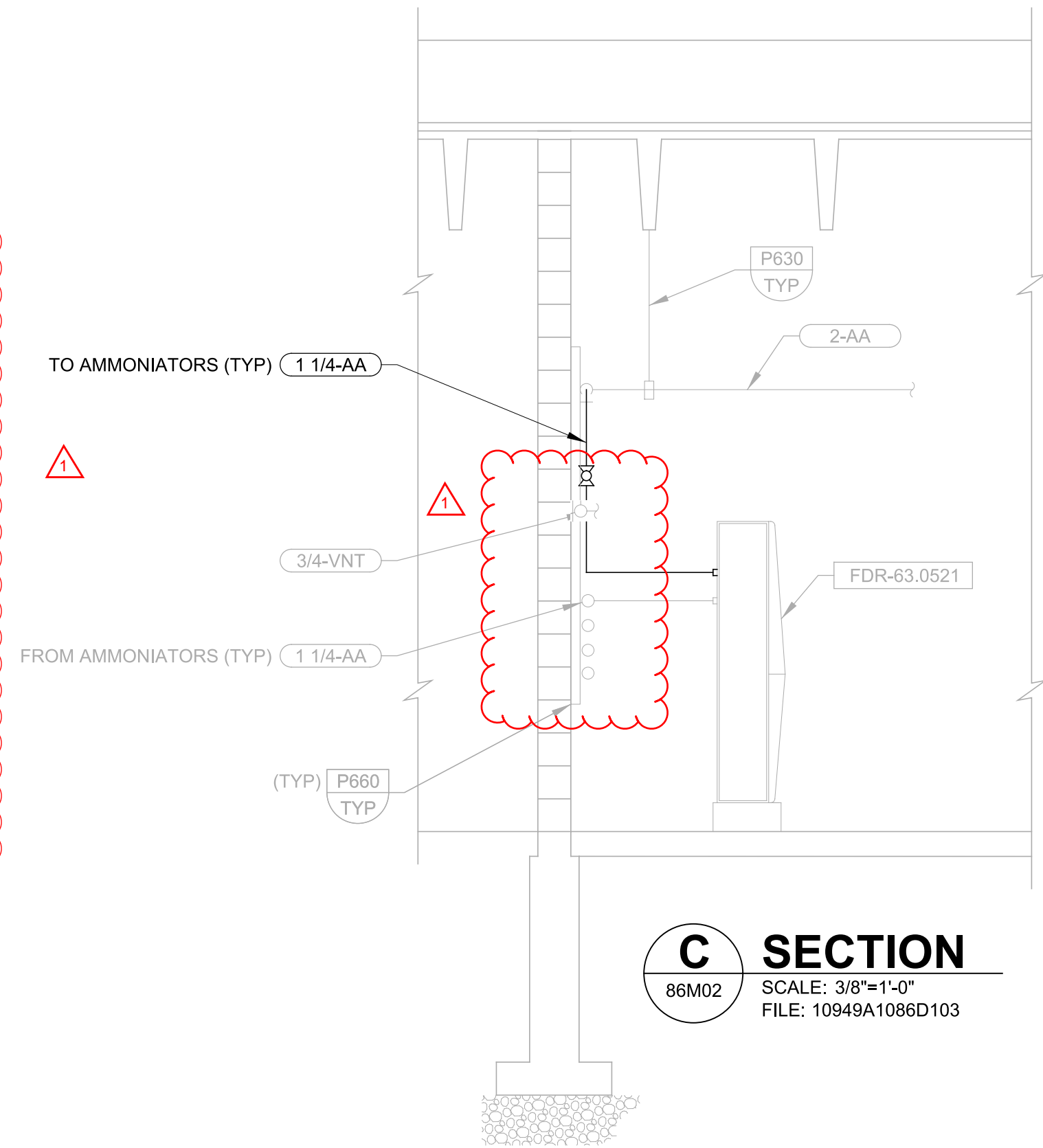
User: BSchreder

Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo Std Pen_v0905.pen PlotScale: 1:1

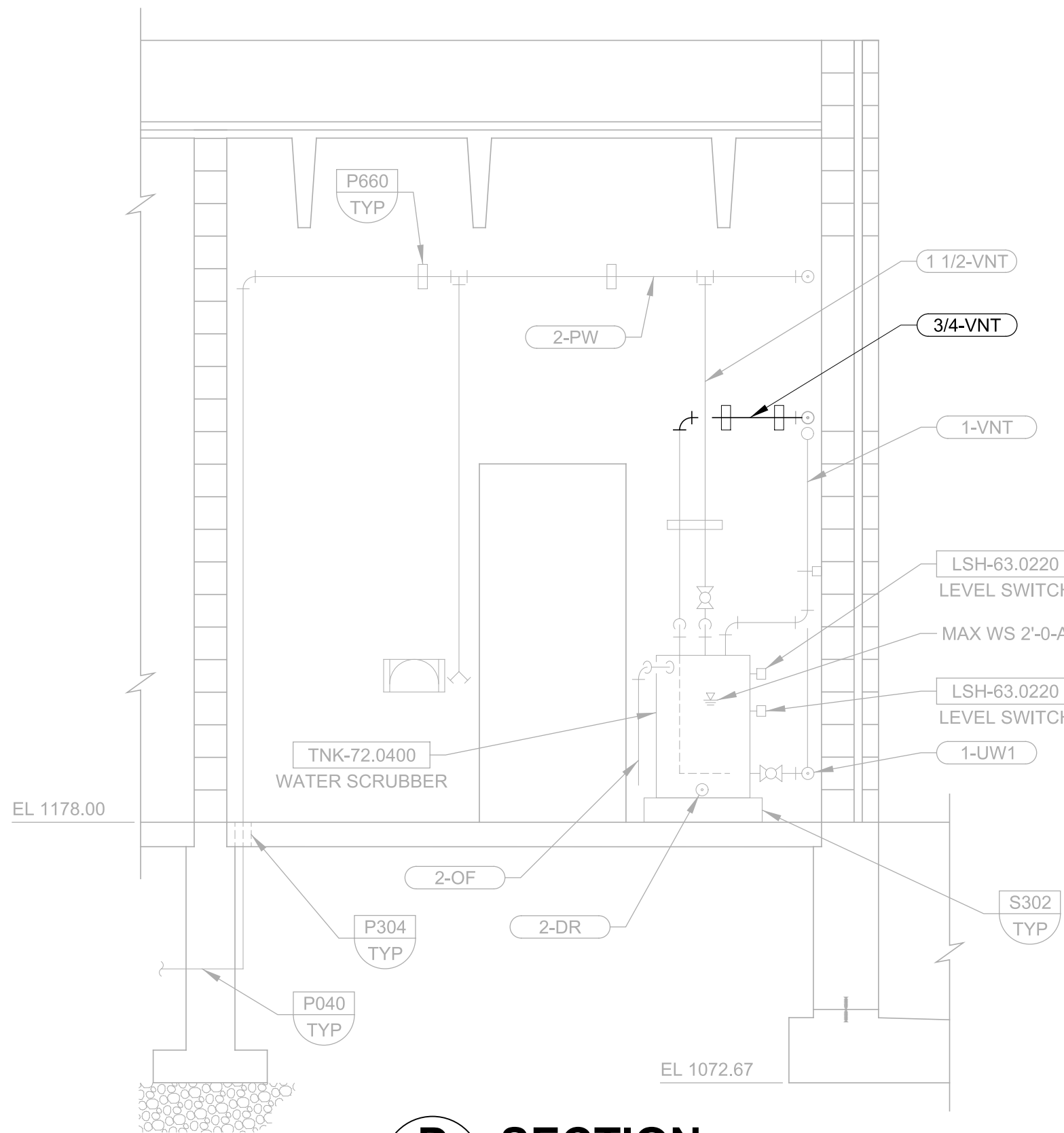
LAST SAVED BY: RTrestman



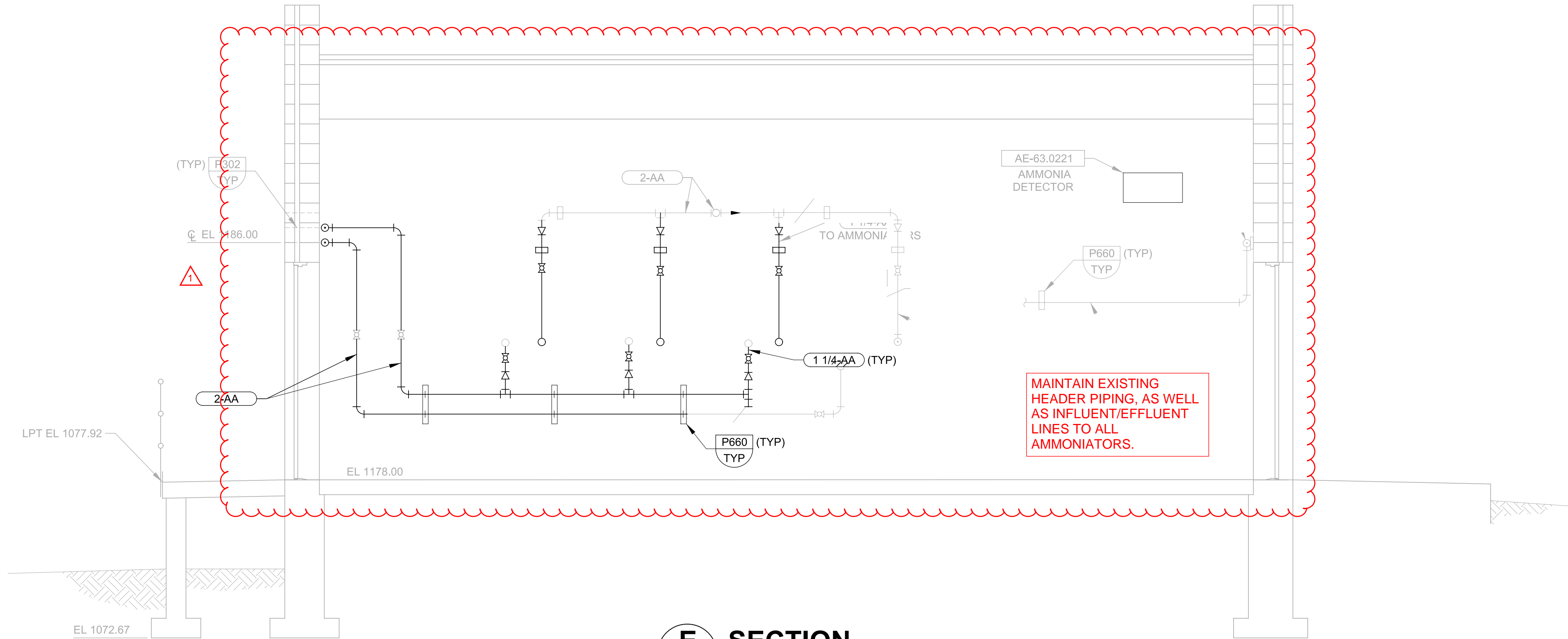
B SECTION
86M02 SCALE: 3/8"=1'-0"
FILE: 10949A1086D103



C SECTION
86M02 SCALE: 3/8"=1'-0"
FILE: 10949A1086D103



D SECTION
86M02 SCALE: 3/8"=1'-0"
FILE: 10949A1086D103



E SECTION
86M02 SCALE: 3/8"=1'-0"
FILE: 10949A1086D103

KEY NOTES:

- 1 3,000 PPD VACUUM REGULATING VALVE WITH PRESSURE CHECK AND STAND-BY PRESSURE RELIEF.

CONFORMED DOCUMENTS

DESIGNED
BD

DRAWN
RT

CHECKED

DATE
AUGUST 2018

**
ORIGINAL
SEALED BY
THOMAS O. CROWLEY
8/15/2018
OK 21073
**

carollo

CERTIFICATE OF AUTHORIZATION NO. 3907
EXPIRES JUNE 30, 2020



The City of
OKLAHOMA CITY

CITY OF OKLAHOMA CITY, OKLAHOMA
WT-0159 DRAPER WTP CLEARWELL IMPROVEMENTS

MECHANICAL

**AMMONIATOR ROOM
SECTIONS**

VERIFY SCALES

BAR IS ONE INCH ON
ORIGINAL DRAWING

0 1"

IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALES ACCORDINGLY

JOB NO.
10949A10

DRAWING NO.

86M03

SHEET NO.

289 OF 614

Attachment B – Events of 12/18/22 and 12/22/22



The City of
OKLAHOMA CITY
LAKE STANLEY DRAPER WATER TREATMENT PLANT
13700 S. Douglas Blvd.
Oklahoma City, Oklahoma 73165
Phone (405) 297-1555
Fax (405) 297-1410

MEMO

To: Sonny Masset, Draper Plant Manager
Jeff Bolden, WQ Superintendent
Tom Crowley, Corollo Engineering

From: Dennis Phillips, Draper Shift Supervisor

Date: December 18, 2022

Subject: Ammonia Vacuum Feeder Issues

At approximately 11:48 am I was notified by the operator ammonia vacuum feeder #1 was feeding erratic. The bobber was bouncing all over the place.

The current feed rate was 425 lbs per day, vacuum at the feeder was about 12 inHG, pressure from the tank was about 44 psi.

It was discovered that the ammonia line between the PRV valve on the gas feed line, through the vacuum regulator check unit, to the PVC feed line was freezing up.

There was visible frosting on the lines and it appeared to have liquid in the lines. Touching the lines you could feel what seemed like liquid ammonia bubbling in the lines at the drip leg at the Vacuum regulator and the PVC feed line immediately after.

We turned off the gas supply line and the feeder continued to feed for some time. We did this several times to try and remove the liquid ammonia from the lines. After about an hour or so we finally were able to get the feeder to start feeding again as it should but there was still some frosting of the PVC line. The black iron line and ammonia vacuum regulator check unit was completely de-iced.

At approximately 3:40 pm the same issue came up again exact same scenario. We tried for a few minutes to feed out the liquid.

We made the decision to revert back to the pressure feed system to prevent issues from happening during the night.

We shut the supply valves and fed out as much as possible. Turned on the number one pressure feeder.

We then noticed liquid ammonia coming from the PVC nipple between the vacuum regulator check unit and the first ball valve. We left the room opened the doors.

I notified Sonny Massey.

The Ammonia tank heater was warm to the touch, The line pressure seemed normal, The heater in the feed room was functioning correctly,

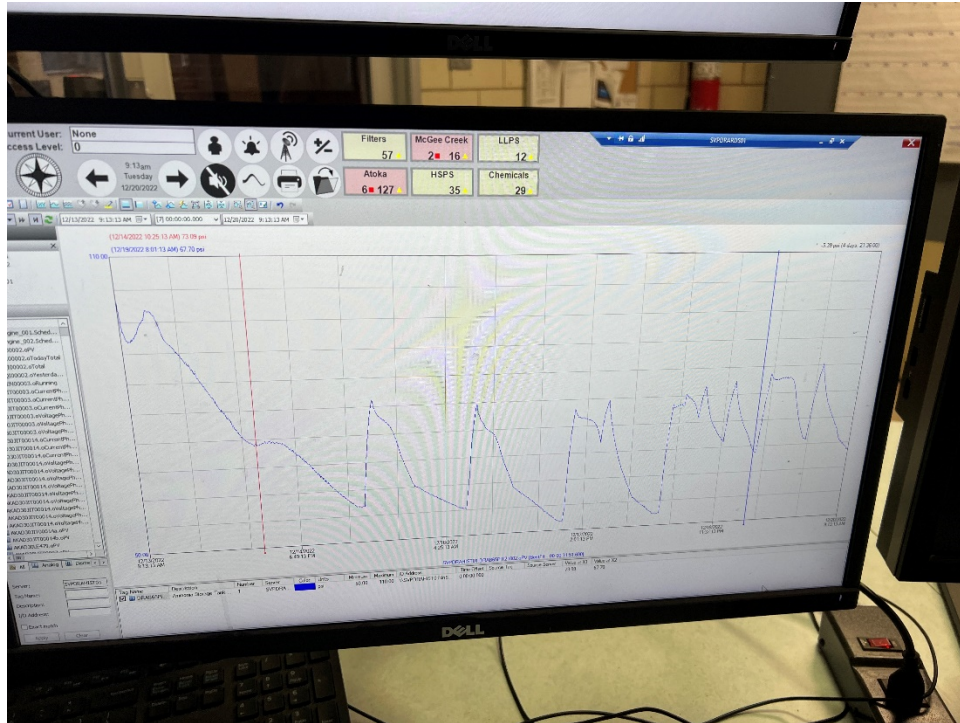
There was no frost on the feed line prior to the PRV valve. The feed line was warmer prior to PRV valve on the gas supply line than after the PRV.

SUPPLEMENTAL INFORMATION COLLECTED:

ENGINEER's RESPONSE: Based upon a walkthrough with the draper staff and discussions on the operations of the ammonia tank:

- 1) Vacuum Ammoniators ran from 12/12/22 – 12/18/22
 - a. Vacuum at ammoniator 12-15 in HG
 - b. Vacuum at eductor: 22-25 in HG.
- 2) The tank (TANK-01) vapor outlet pressures are cycling from 70 psig to 100 psig over the past 5 days. When the event occurred (10:00 am – 3:00 pm on 12/18/22) pressure in the tank vapor headspace was between 85 and 100 psig.





- 3) There did not appear to be any issues with the vaporizer turning on/off to maintain tank 1 cycle pressures during the 6 days.
- 4) During the Event (see attached Memo)
 - a. The current feed rate was 425 lbs per day, vacuum at the feeder was about 12 inHG.
 - b. Inlet pressure to vacuum regulator was 44 psig (DOWNSTREAM OF PRV)
 - c. Liquid ammonia/pipes freezing was observed downstream of the Ammonia PRV (installed on this project) but upstream of the PRV was warm to the touch (i.e. the side coming from the vapor side of the tank).
 - d. It appears that liquid ammonia appears DOWNSTREAM of the installed ammonia PRV (installed on the project) as evidenced by the freezing of these pipes from downstream of the PRV.
 - e. Liquid ammonia in the vacuum regulating check valve is the likely cause of the “bobbing” feeder.
- 5) When the ammonia was placed back to the direct feed ammoniator and the EXISTING PRV, there seemed to be no issues with the system.

Given this, we have asked Archer Western to discuss this with Denora to determine:

- 1) Is the PRV installed in the correct manner (vertical vs horizontal)? There seems to be some question as to whether the Horizontal installation is recommended rather than the vertical installation but the literature is not clear.



- 2) Is the PRV the correct application for this installation? Recall that the original specified PRV's were automatic rather than manual and these were replaced and sized by Denora as a replacement to the originally specified valves.

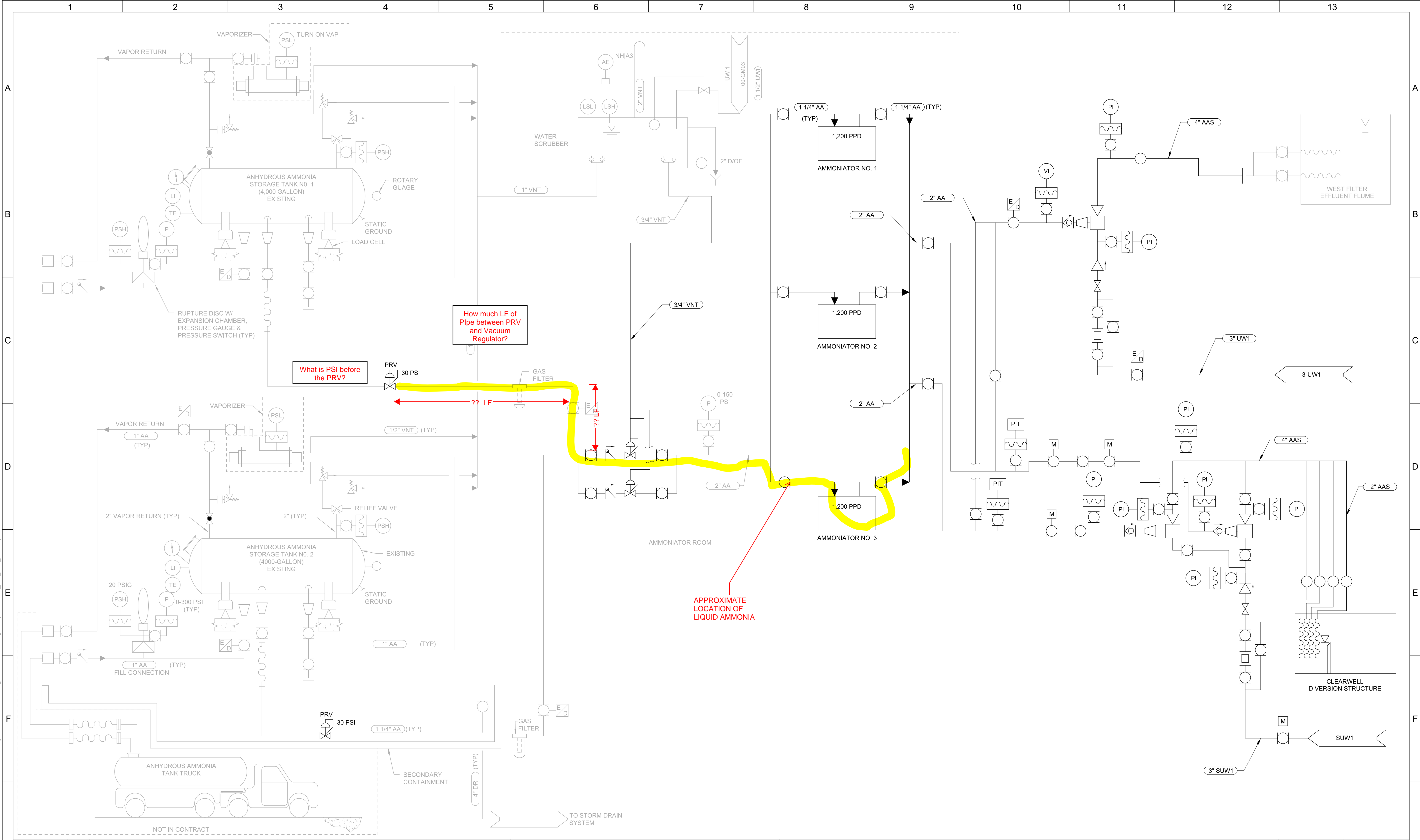
- 3) Is the PRV the correct size for the application? The piping feeding and leaving the PRV is much larger (1.5") than the PRV $\frac{3}{4}$ ". The existing PRV is 1.5".

Plot Date: 14-NOV-2018 9:51:31 AM

User: BSchroeder

Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo Std Pen_v0905.pen PlotScale: 1:1

LAST SAVED BY: BSchroeder

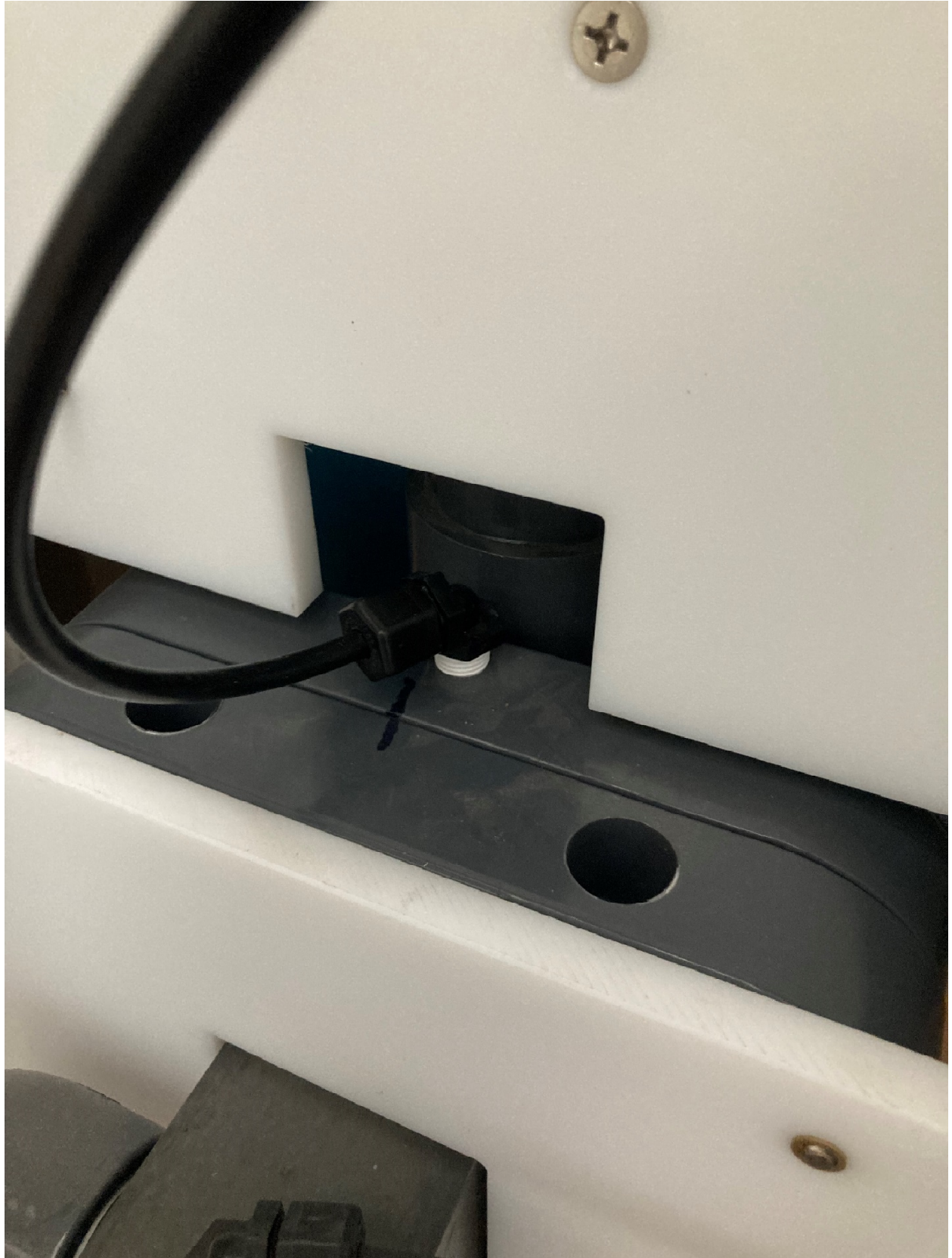


CONFORMED DOCUMENTS				DESIGNED MB	** ORIGINAL SEALED BY THOMAS O. CROWLEY 8/15/2018 OK 21073 **	 The City of OKLAHOMA CITY		CITY OF OKLAHOMA CITY, OKLAHOMA		VERIFY SCALES	JOB NO. 10949A10
				DRAWN BWS				WT-0159 DRAPER WTP CLEARWELL IMPROVEMENTS		BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO.
				CHECKED				GENERAL		0 1"	00G09
1	09-20-2018	MB	ADDENDUM NO. 1	DATE AUGUST 2018	CERTIFICATE OF AUTHORIZATION NO. 3907 EXPIRES JUNE 30, 2020		AMMONIA PROCESS FLOW DIAGRAM		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY		SHEET NO. 9 OF 614
1	DATE	BY	DESCRIPTION								

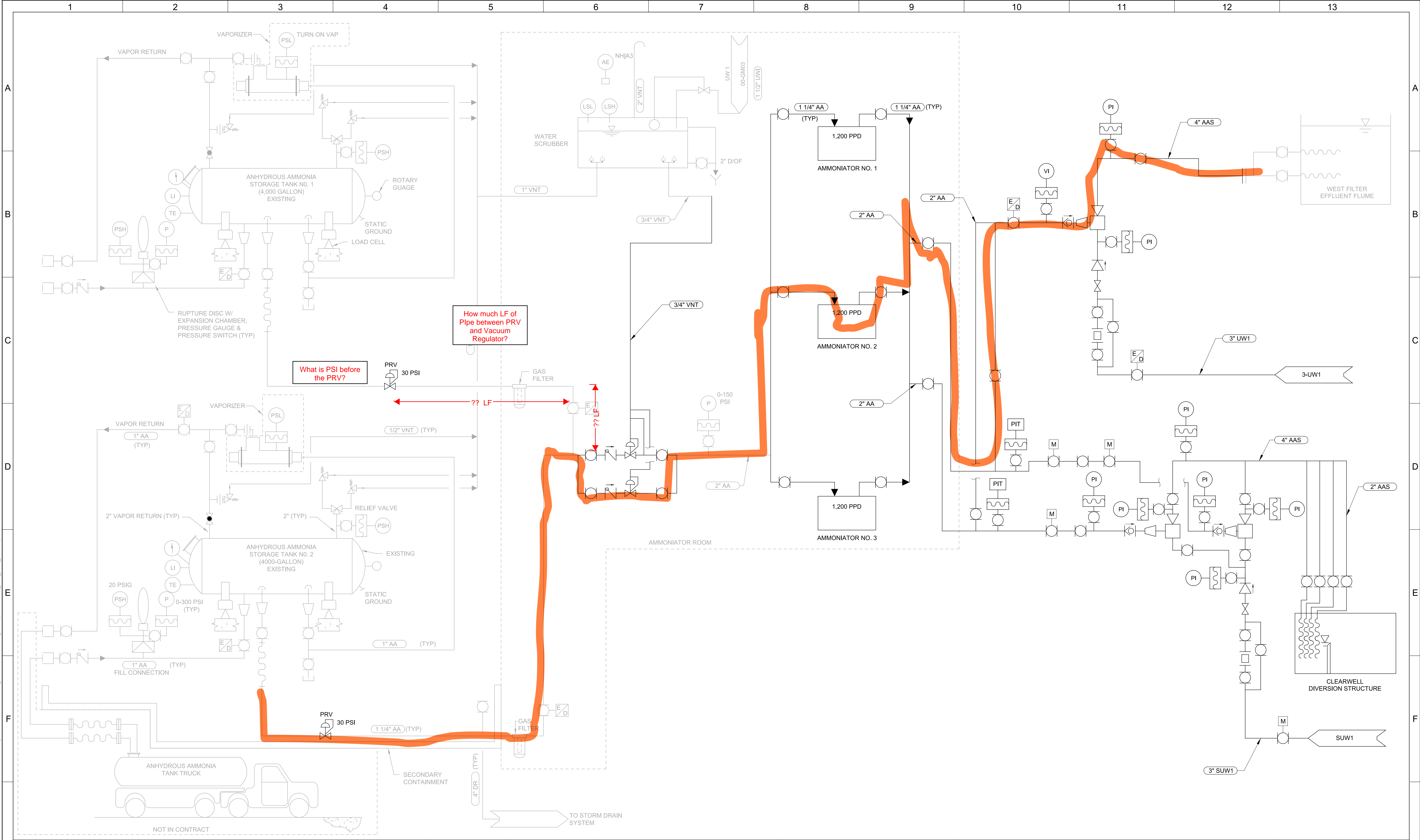
Update on 12/22/22 – On 12/19/22 Carollo and the City (see attachment) routed ammonia through the existing (larger) PRV and the vacuum ammoniators/vacuum regulating valves not impacted by the ammonia incident. The pressure seemed to be just fine with no issues of liquid ammonia being formed downstream of the PRV. However several leaks in the vacuum system developed including at the regulating valve and ammonia feeder (see photos below):







Plot Date: 14-NOV-2018 9:51:31 AM
User: BSchroeder
Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo Std Pen_v0905.pen PlotScale: 1:1
LAST SAVED BY: BSchroeder



G				CONFORMED DOCUMENTS			DESIGNED MB	** ORIGINAL SEALED BY THOMAS O. CROWLEY 8/15/2018 OK 21073 **																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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NON-COMPLIANCE NOTICE (NCN)

Owner:	City of Oklahoma City / Oklahoma City Water Utilities Trust	Date Issued:	9/13/2021
Contractor:	Archer Western Construction	Carollo Project No.:	10949A.30
Project Name:	WT-0159 Draper Water Treatment Plant, Various Improvements to Strengthen the Redundancy and Resiliency for Water Treatment and Storage		
Subject/Item:	Clearwell No. 4 and No. 5 Cracking	Notice No.:	005
		Spec/Dwg. Reference:	93S001/03300

Pursuant to the Articles of the General Conditions of the Contract, you are hereby notified of the following non-compliance violation of the Contract			
Item:	Concrete Installation/Cracking	Spec. Section:	03300
Drawing No.:	93S001-93S003	Other:	Submittal 13207E-002A (DN Tanks)
Violation Detected By:	<input type="checkbox"/> Test <input checked="" type="checkbox"/> Inspection	Non-Compliance Detected By:	<input checked="" type="checkbox"/> Defective <input type="checkbox"/> Rejected
Non-Compliance Description			
<p>1. In accordance with Item 13, Paragraph D.1 of the Standard Provisions, we are notifying you of work we believe to be defective due to noncompliance with the Contract Documents.</p> <p>2. In accordance with Item 37 of the Special Provisions, please provide a corrective action plan to conform this work with the requirements of the contract documents. .</p> <p>3. The attached photos show some concerning cracking at the at the tank cover eave identified by our inspector at Clearwell #5.</p> <p>4. The cracking at clearwell #5 is more extensive but some similar cracking has been observed at clearwell #4.</p>			
Corrective Action Required			
<p>1. In accordance with Specification 03300 (3.13), contractor is required to remove and replace or repair all non-conforming and defective work.</p> <p>2. Contractor shall conduct the following:</p> <ul style="list-style-type: none">a. Provide documentation and measurement of cracking width, depth, length, and location to Manufacturer DN tanks.b. If necessary, DN tanks shall conduct a site visit at no cost to owner to inspect tank cracking.c. DN Tanks should conduct a meeting and supply any analysis necessary to determine 1) if there is a problem, 2) the cause of the problem, 3) the potential solutions, and 4) a timetable for those solutions.			

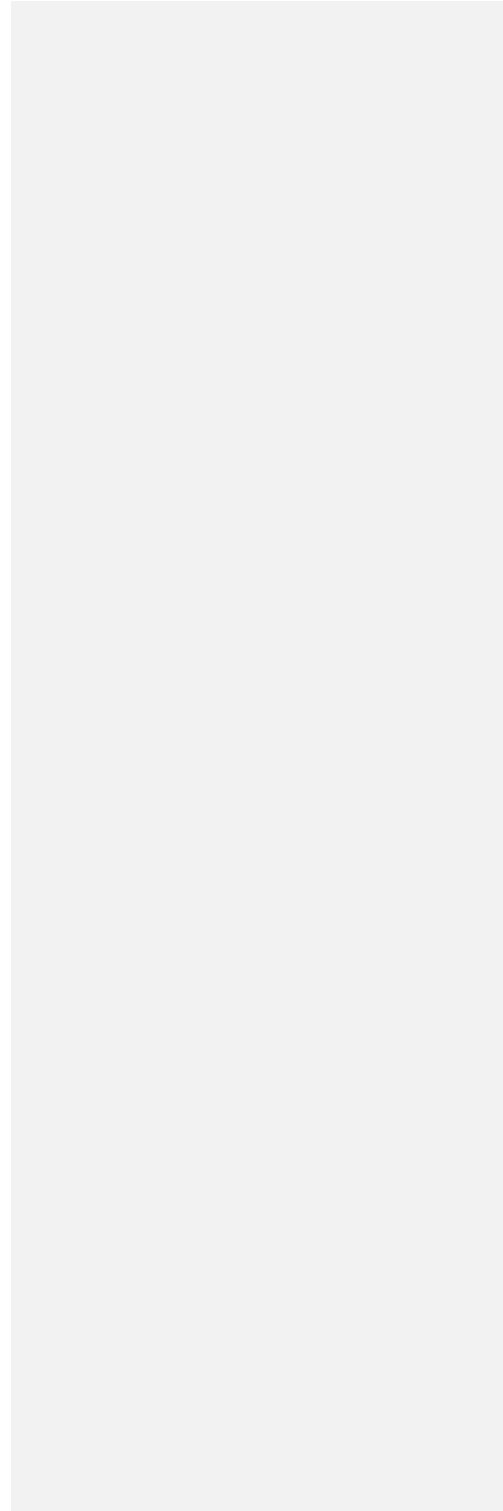
Commented [GS1]: If possible, I would try to refer to a GC or Div 1 spec that generically addresses remediation of poor workmanship.

Then, say that the repairs should include the following, and that we would expect them to be in general compliance with the provisions of 03300-3.13

Commented [TC2R1]: Done, see above

Acknowledgement by Contractor			
Defective work shall be corrected. Rejected work shall be removed and replaced with work that is not defective. All costs made necessary thereby shall be borne by the Contractor. Payment will not be made for defective or rejected work until amended. Contractor shall notify inspector when defective or rejected work is amended.			
Prepared By:	Thomas Crowley, PE	Date:	09/13/2022
Received By:		Date:	XX/XX/XXXX

ATTACHMENT A- Photographs of DN Tank #5 Cracking:













NON-COMPLIANCE NOTICE (NCN)

Owner:	City of Oklahoma City / Oklahoma City Water Utilities Trust	Date Issued:	9/21/2021
Contractor:	Archer Western Construction	Carollo Project No.:	10949A.30
Project Name:	WT-0159 Draper Water Treatment Plant, Various Improvements to Strengthen the Redundancy and Resiliency for Water Treatment and Storage	Notice No.:	006
Subject/Item:	Pavement Settlement at Utility Crossings	Spec/Dwg. Reference:	002318 - Trenching

Pursuant to the Articles of the General Conditions of the Contract, you are hereby notified of the following non-compliance violation of the Contract			
Item:	Utility Crossings at Roadway	Spec. Section:	02318, Trenching
Drawing No.:	199TP01, Detail P002	Other:	Quality Assurance Quality Control
Violation Detected By:	<input type="checkbox"/> Test <input checked="" type="checkbox"/> Inspection	Non-Compliance Detected By:	<input checked="" type="checkbox"/> Defective <input type="checkbox"/> Rejected
Non-Compliance Description			
<ol style="list-style-type: none">1. The attached photos depict settlement of the utilities beneath the existing roadways in numerous locations along the plant roadways.2. The attached specifications indicate the specific lifts and compaction requirements for the pipe trenching beneath roadways.3. The inspection daily reports seem to indicate the inspectors concerns regarding conformance to the lift thickness and degree of compaction.			
Corrective Action Required			
<ol style="list-style-type: none">4. Identify and mark all locations with site inspector of settlement with orange identifying paint.5. Provide QA/QC documentation for each location indicating that detail P002 and specification section 02318 was in complete conformance.6. Propose solution to repair areas of settlement to engineer for review.			
Acknowledgement by Contractor			
Defective work shall be corrected. Rejected work shall be removed and replaced with work that is not defective. All costs made necessary thereby shall be borne by the Contractor. Payment will not be made for defective or rejected work until amended. Contractor shall notify inspector when defective or rejected work is amended.			

Prepared By:	Thomas Crowley, PE	Date:	09/21/2022
Received By:		Date:	XX/XX/XXXX

ATTACHMENT A- Photos depicting settlement of roadway at utility crossing.















NON-COMPLIANCE NOTICE (NCN)

Owner:	City of Oklahoma City / Oklahoma City Water Utilities Trust	Date Issued:	1227/2022
Contractor:	Archer Western Construction	Carollo Project No.:	10949A.30
Project Name:	WT-0159 Draper Water Treatment Plant, Various Improvements to Strengthen the Redundancy and Resiliency for Water Treatment and Storage	Notice No.:	009
Subject/Item:	Excessive Submittal Reviews Submittal 17050-5	Spec/Dwg. Reference:	11261/P&ID's

Pursuant to the Articles of the General Conditions of the Contract, you are hereby notified of the following non-compliance violation of the Contract			
Item:	Vacuum Ammonia System	Spec. Section:	17050,
Drawing No.:	All Relevant N drawings	Other:	O&M Manuals defined by spec sections
Violation Detected By:	<input type="checkbox"/> Test <input checked="" type="checkbox"/> Inspection	Non-Compliance Detected By:	<input checked="" type="checkbox"/> Defective <input type="checkbox"/> Rejected
Non-Compliance Description			
<p>1. In accordance with Specification Section 01330, engineer has conducted excessive submittal reviews for the control panel O&M manuals due to excessive errors, incompleteness of submittals, lack of detail required by Section 17050.</p> <p>2. In accordance with the special provisions, the engineer will be charging for these excessive submittal reviews.</p>			
Corrective Action Required			
<p>1. Respond fully to submittal comments and resubmit with a complete submittal responding to ALL of the engineers comments.</p>			
Acknowledgement by Contractor			
<p>Defective work shall be corrected. Rejected work shall be removed and replaced with work that is not defective. All costs made necessary thereby shall be borne by the Contractor. Payment will not be made for defective or rejected work until amended. Contractor shall notify inspector when defective or rejected work is amended.</p>			
Prepared By:	Thomas Crowley, PE	Date:	06/27/2023
Received By:		Date:	XX/XX/XXXX

PROJECT NAME: WT-0159 Draper WTP Redundancy
& Resiliency Improvements

SUBMITTAL NO.: POM-17050-003B



SUBMITTAL REVIEW

DATE: 6/28/2023 **JOB NO.:** 10949A.30 **SPECIFICATION SECTION:** 17050

CLIENT: City of Oklahoma City / Oklahoma City Water Utilities Trust

ATTENTION: Eric Mariconda - Archer Western

SUBMITTAL NAME: INSTRUMENTATION PRELIMINARY O&M RESUBMITTAL

REVIEWED BY: Kris Hansen

SUBMITTAL REVIEW

Review is for general compliance with contract documents. No responsibility is assumed by Carollo for correctness of quantities, dimensions, and details. No deviation or variation is approved unless specifically accepted in these review comments. Refer to specification section 01330 for additional requirements. The Contractor shall assume full responsibility for coordination with all other trades and deviations from contract requirements.

	Approved	No Exceptions Taken
	Approved	Make Corrections Noted
	Approved	Confirm Corrections Noted (Resubmit)
X	Not Approved	Correct and Resubmit (Resubmit)
	Not Approved	Rejected (Resubmit)
		Receipt Acknowledged (Filed for Record)

Comments:

1. Final O&M shall have As Built P&IDs, Specific Control Strategies, Panel Drawings, updated I/O List and Loop Drawings after construction has been completed and all RFIs and DCMs have been implemented into the documents.
HECo: Loop Drawings (pending), VCP/LCP Panel Drawings, I/O List, As-Built P&ID's, Specific Controls Strategies As-builts have been updated to most current version available.
ENGINEER'S RESPONSE – Acknowledged. See below.
2. Loop drawings shall include equipment details, callouts for conduits and J-Boxes, and wire label information as required by Section 16075, paragraph 1.04.B.
HECo: Pending
ENGINEER'S RESPONSE – Acknowledged. There does not appear to be any change in the loop drawings from the previous version and it should be noted that this is a key item that cannot be reviewed in its current state.
3. ISA data sheets should be completed based upon the products ordered with all fields filled out, including manufacturer. The ISA data sheets that have been provided here are copied directly from the design specifications before the contractor purchased, or even submitted the specific instrument models that have been used in the project. In addition to the requirement that ISA data sheets need to be completed per actual instruments procured, some sheets were missing. These omissions have been noted per specific instrument tab sections below.
HECo: ISA sheets have been updated.
ENGINEER'S RESPONSE – Acknowledged.
4. Product cut sheets shall be marked up according to the specifications to clearly identify which options have been selected as well as including a model number breakdown sheet that identifies

the model codes that defines all of the selected options. This was only included for the differential pressure/level transmitter tab. For example, for the magnetic flow meters, there should be a sheet that clearly identifies which options are selected under model number 7ME6580-3MJ14-2JB2-Z+C14+Y17.

HECo: Manufactures Standard O&M's have been reviewed and marked to indicate specific product as best as possible. Some information is applicable to multiple devices from the same manufacturer. This data has been left unchanged.

ENGINEER'S RESPONSE – Acknowledged. Markups for multiple devices on the same sheet are acceptable in the manner presented. Note that accuracy still needs to be addressed. As an example, for point level switches on page 229 of 3489, the first two portions of the differing model numbers are addressed correctly, but the third portion (0HA & 1HC0) does not show both versions.

5. Under the Level Switch tab, the cover sheet is missing LSL-27.0537.01D and LSL-27.0537.02D. Additionally, ISA data sheets and signed test sheets have not been provided for the ECO-Float switches.

HECo: Formal testing of float switches does not occur. The function within the associated control panel either functions or does not according to the position of the float. This would have been identified during start up of the LCP/VCP provided by Haynes Eq.

ENGINEER'S RESPONSE – Acknowledged.

6. Under the Ultrasonic Level Transmitter tab, the cover sheet is missing LE/LIT-27.0100, LE/LIT-29.0090, and LE/LIT-29.0091. Additionally, ISA data sheets are missing for LE/LIT-27.0204, LE/LIT-27.0205, LE/LIT-29.0090, and LE/LIT-29.0091, as well as signed test sheets for LE/LIT-29.0090, and LE/LIT-29.0091.

HECo: Only devices started at the time of O&M submission was included. Test sheets and ISA sheets for missing Tags have been added.

ENGINEER'S RESPONSE – Acknowledged. All test sheets will be required for final O&M manual.

7. Under the Flow Switch tab, signed test sheets are missing for tags FSL-27.0601, FSL-27.0603, and FSL-27.0604. Additionally, a ninth flow switch has been added under DCM #51 (FSL-24.0066) which has identical specifications as FSL-24.0065. This flow switch is completely missing in all aspects from Section 4.

HECo: Only devices started at the time of O&M submission was included. Missing test sheets have been added.

ENGINEER'S RESPONSE – Acknowledged. All test sheets will be required for final O&M manual.

8. Under the Electromagnetic Flow Meter tab, the potable water header flow meter (FE/FIT-29.0322 on 110N04 added in DCM #27) is missing from the cover sheet. The signed test sheets for FE/FIT-29.0322 and FE/FIT-24.0060.21 are missing. Additionally, there is a typo that lists FE/FIT-24.0060.21 incorrectly on the cover sheet. FE/FIT-29.0034A is missing from the ISA data sheets. HECo: Only devices started at the time of O&M submission was included. Missing test sheets and ISA sheets have been added. Typo has been corrected.

ENGINEER'S RESPONSE – Acknowledged. All test sheets will be required for final O&M manual.

9. Under the Pressure Gauges tab, the cover sheet includes tags PI-27.0521, PI-27.0522, PI-27.0523, PI-27.0525.01, and 27.0525.02, which were all removed under DCM #12. The cover sheet is also missing PI-24.0066.01 and PI-24.0066.02, added under DCM #51, which have identical specifications as PI-24.0065.01 and PI-24.0065.02. These pressure indicators are also missing from the ISA data sheets. Per DCM #28, PI-63.0522 and PI-63.0523 should both be listed under the vacuum range pressure indicators on the cover sheet. All signed data sheets are missing.

HECo: Pressure gauge testing is not required, and no test sheets provided. ISA Sheets added. Gauge tags deleted per DCM12 crossed out and marked as such. Gauge tags miss labeled (DCM28) have been corrected.

ENGINEER'S RESPONSE – Acknowledged.

10. Under the pH analyzer tab, the cover sheet includes tag AE/AIT-27.0525.01, which was removed under DCM #12.
HECo: Tag has been corrected.
ENGINEER'S RESPONSE – Acknowledged.
11. Under the Gas Monitors tab, the cover sheet includes AE-79.0325, which were all removed under DCM #12. The cover sheet also has ammonia gas sensor and transmitters for AE/AIT-79.0305 crossed out, but there were actually two separate ammonia sensors that used this tag and are still required. The sensor shown on sheet 92N07 shall retain the AE/AIT-79.0305 tag, while the sensor on sheet 110N03 has been updated to tag AE/AIT-79.0307, per DCM #27. These tags should also be corrected in the ISA data sheets and have signed data sheets added.
HECo: Tag Deleted per DCM12. Tags mis marked have been corrected, however AE/AIT-79.0305 (79.0307) in AHSPS was deleted from the project but provided as spare. ISA Sheet will not be provided for spare equipment.
ENGINEER'S RESPONSE – Acknowledged. There will be additional gas monitor transmitters added as a result of upcoming DCM 66. These will need to be included in the O&M. Additionally, there will be changes made to the panel drawings of the related panels to these gas monitor transmitters.
12. Under the Residual Chlorine Analyzers tab, The cover sheet is missing AE/AIT-24.0066.01 and AE/AIT-24.0066.02, added under DCM #51, which have identical specifications as PI-24.0065.04 and PI-24.0065.05.
HECo: Tags above have been added to sheet per DCM51.
ENGINEER'S RESPONSE – Acknowledged.
13. Under the Turbidimeter tab, The ISA data sheet for AE/AIT-24.1820 is missing.
HECo: ISA sheet has been added.
ENGINEER'S RESPONSE – Acknowledged.
14. Under the Room Temperature Transmitter tab, the cover sheet includes tag TE/TIT-79.0324, which was removed under DCM #12.
HECo: Tag has been corrected.
ENGINEER'S RESPONSE – Acknowledged.
15. General comment: If this is a submittal to show the proposed structure of the I&C O&M manual, this is mostly a good representation of how the finished product should be. There are still several key components that are not up to specifications, notably the Loop Drawings. There are also a number of design details still in flux that will affect the end O&M product. While the details from the previous review were checked as well as a few spot checks throughout the submittal to verify intent, the submittal is still short of being ready for a proper review. A number of typos and errant markings are still present, some test and commissioning documentation is still missing, and most of all several outstanding RFIs and DCs need to be resolved before all of the information is available for a true final and complete O&M manual.

ATTACHMENT B

Amendment No. 6 Summary of NCN Costs (Deductive Change Order Proposal)

WT-0159 Redundancy and Resiliency of Water Treatment and Storage Draper WTP

Updated; 07-25-23

	Project Director	Project Manager	Project Engineer	Staff Professional	Electrical & I&C Engineers	Structural Engineer	EIT	CAD	Inspector	Admin	Total Hours	PCEC \$	Total Labor
Rate	\$ 274.00	\$ 265.00	\$ 231.00	\$ 196.00	\$ 231.00	\$ 245.00	\$ 155.00	\$ 117.00	\$ 105.45	\$ 110.00		\$	13
NCN-002 Hobas Pipe													
Inspection of Hobas Pipe Following Event	4		4						8			16 \$	208 \$ 3,071.60
Determination of Repair Method for Pipe	2		24									26 \$	338 \$ 6,430.00
Inspection of Hobas Pipe Repairs	4		8						40			52 \$	676 \$ 7,838.00
Meeting with Director	2											2 \$	26 \$ 574.00
Review of Steel Pipe Submittal	4		32			8				2		46 \$	598 \$ 11,266.00
Inspection of Steel Pipe Installation	2		4						16			22 \$	286 \$ 3,445.20
Closeout of NCN 002	1		2									3 \$	39 \$ 775.00
Subtotal NCN-002 HOBAS PIPE	19	-	74	-	-	8	-	-	64	2	167 \$	2,171 \$	33,400
NCN-004 Ammonia Feeder													
Initial Inspection	4								4			8 \$	104 \$ 1,621.80
Prepare NCN-004	0.5	2	16		2				4	2		26.5 \$	345 \$ 5,811.30
Review Resubmittal	4		16		4	1			1	1		27 \$	351 \$ 6,527.45
On-site Meeting with Denora	4		4						4			12 \$	156 \$ 2,597.80
Review Resubmittal #2	2		10		1				1	1		15 \$	195 \$ 3,499.45
Review O&M Manual	2		16		1	1				1		21 \$	273 \$ 5,103.00
Inspection/Testing/Commissioning of New Feeders	16		24						32			72 \$	936 \$ 14,238.40
NCN-004 Closeout			6									6 \$	78 \$ 1,464.00
Subtotal NCN 004 Ammonia Feeders	32.5	2	92	0	8	2	0	0	46	5	187.5 \$	2,438 \$	40,863
NCN-005 Clearwell #4 and Clearwell #5 Cracking													
Inspect DN Tanks for Deficiencies	2								2			4 \$	52 \$ 810.90
Prepare NCN-005	0.5	1	12			4			1	2		20.5 \$	267 \$ 4,745.95
Review Initial DN Tank Response	0.5	4				4			1			9.5 \$	124 \$ 2,405.95
Site Visit with DN tanks to Inspect Coating	4					4			4			12 \$	156 \$ 2,653.80
Review Final DN Tank Response	0.5	4				4			1			9.5 \$	124 \$ 2,405.95
NCN-005 Closeout			4									4 \$	52 \$ 976.00
Subtotal NCN-005 Clearwell #4 and #5 Cracking	7.5	9	16	0	0	16	0	0	9	2	59.5 \$	774 \$	13,999
NCN-006 Pavement Settlement													
Subtotal NCN-006 Pavement Cracking													\$ -
NCN-007 Emergency Loop Pumps													
Third Submittal Review	2		16		4	2			1	2		0 \$	- \$ -
Prepare NCN-007	1		4									27 \$	351 \$ 6,334.45
Fourth Submittal Review	1		8		2	1			1	1		5 \$	65 \$ 1,263.00
Review NCN-006 Response	4		16									14 \$	182 \$ 3,226.45
Meeting with Haynes to Discuss	2											20 \$	260 \$ 5,052.00
Review Testing Protocol	2		8									2 \$	26 \$ 574.00
Test/Commission Pumps To confirm conformance	2		16						16			10 \$	130 \$ 2,526.00
NCN-007 closeout			12									34 \$	442 \$ 6,373.20
Subtotal NCN-007 Emergency Loops Pumps	14	0	80	0	6	3	0	0	18	3	124 \$	1,456 \$	25,349
NCN-009 Excessive Submittals - Control Panels													
Third Submittal Review	2				24							26 \$	338 \$ 6,430.00
Fourth Submittal Review	2				8							10 \$	130 \$ 2,526.00
Subtotal NCN-009 Excessive Submittals -Control Panels	4	0	0	0	32	0	0	0	0	0	36 \$	468 \$	8,956
TOTAL ALL NCN's	77	11	262	-	46	29	-	-	137	12	574 \$	7,306 \$	122,567