

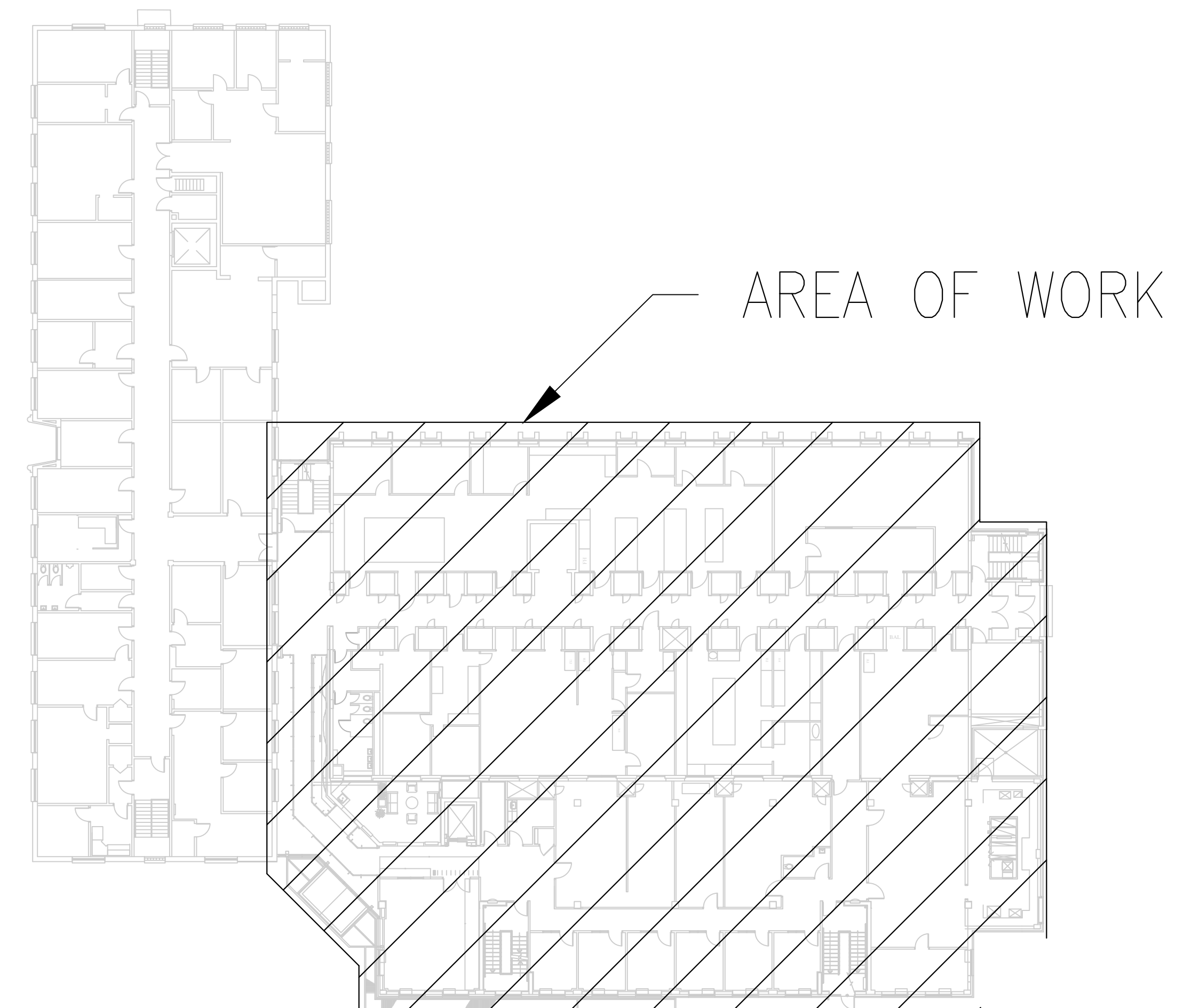
National Research
Council Canada

Conseil national
de recherches Canada

Institute for Marine
Biosciences

Institut des biosciences
marines

**NITROGEN GENERATION SYSTEM
NATIONAL RESEARCH FACILITY
OXFORD STREET, HALIFAX
CANADA
NOVA SCOTIA**



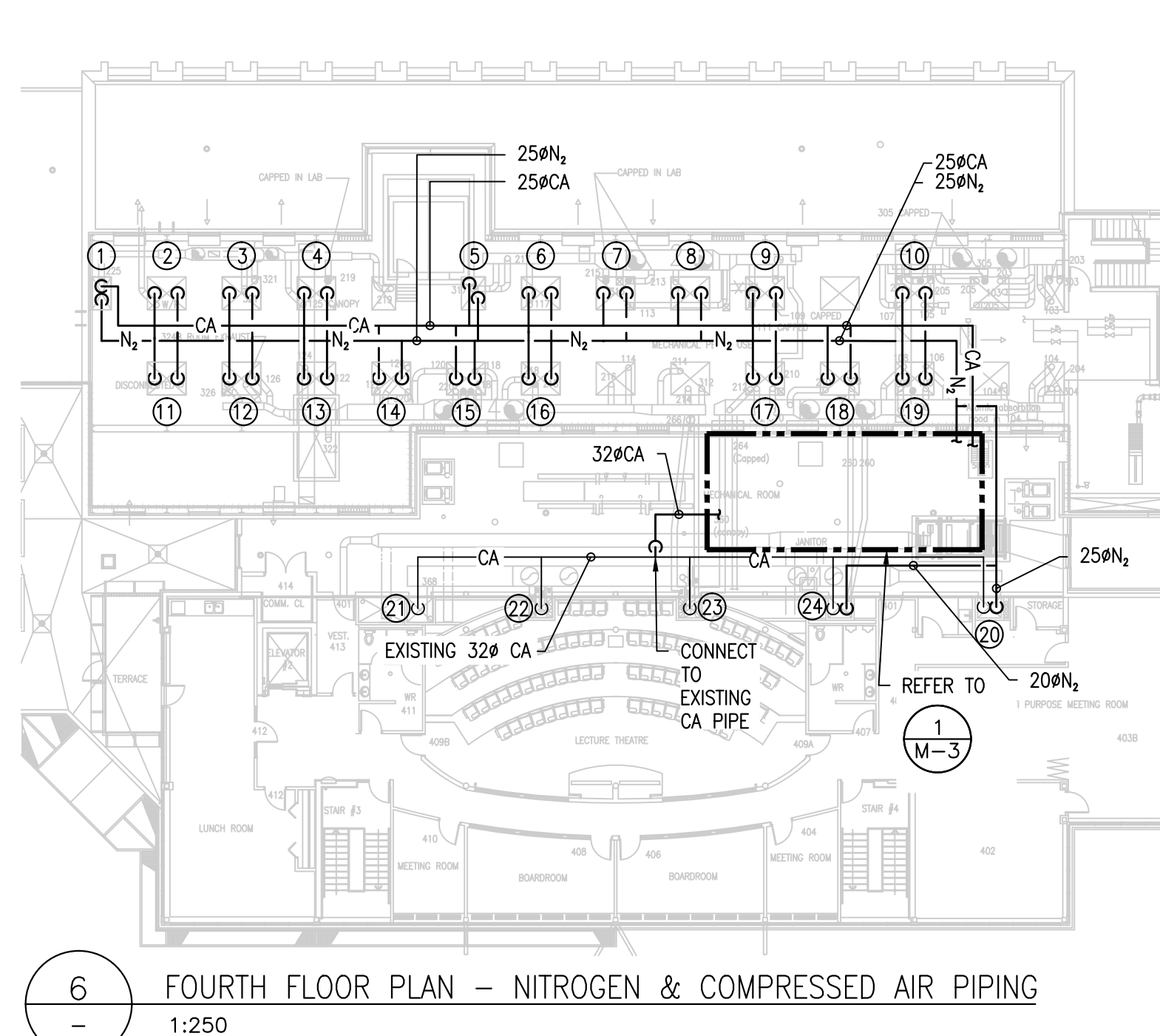
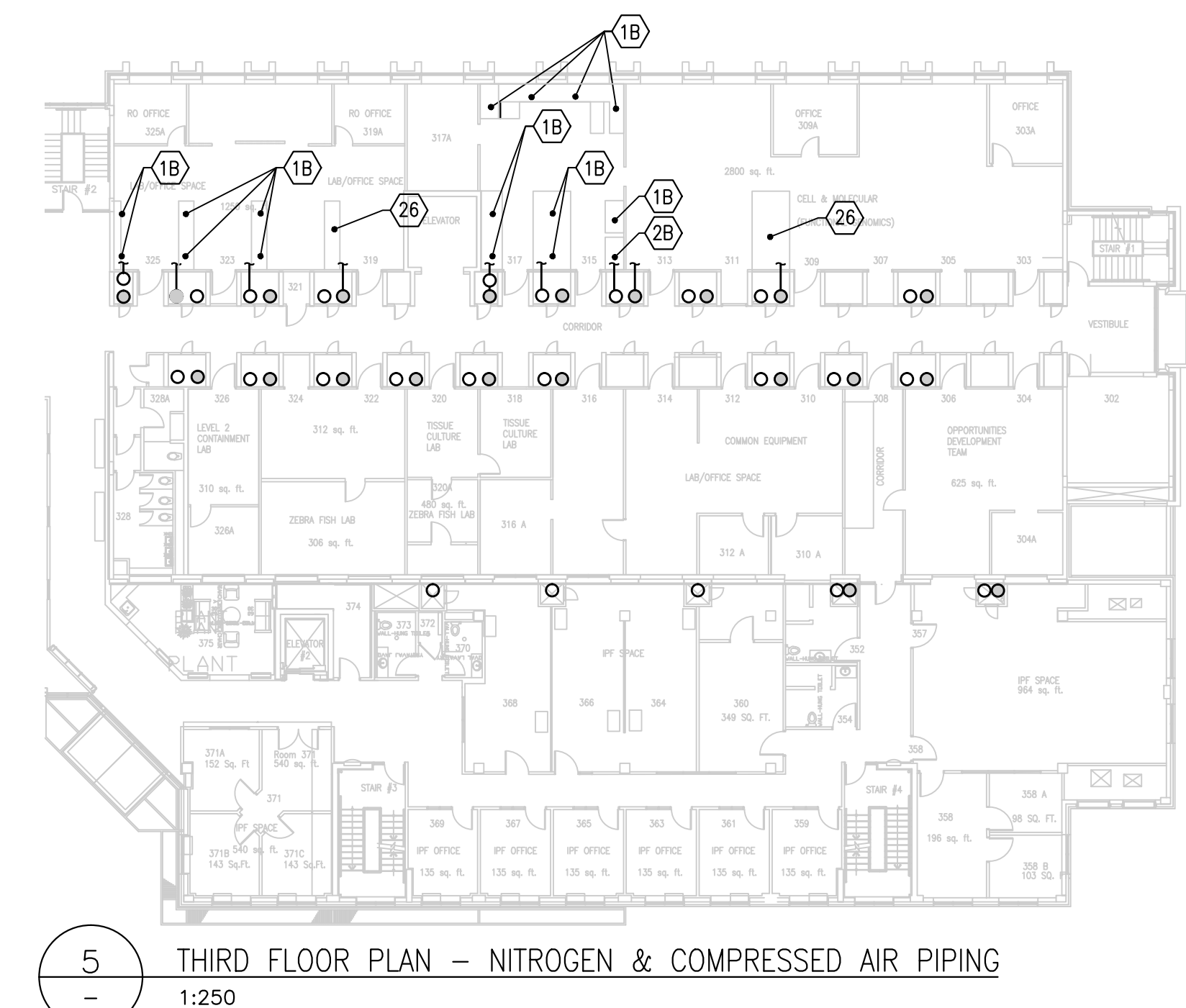
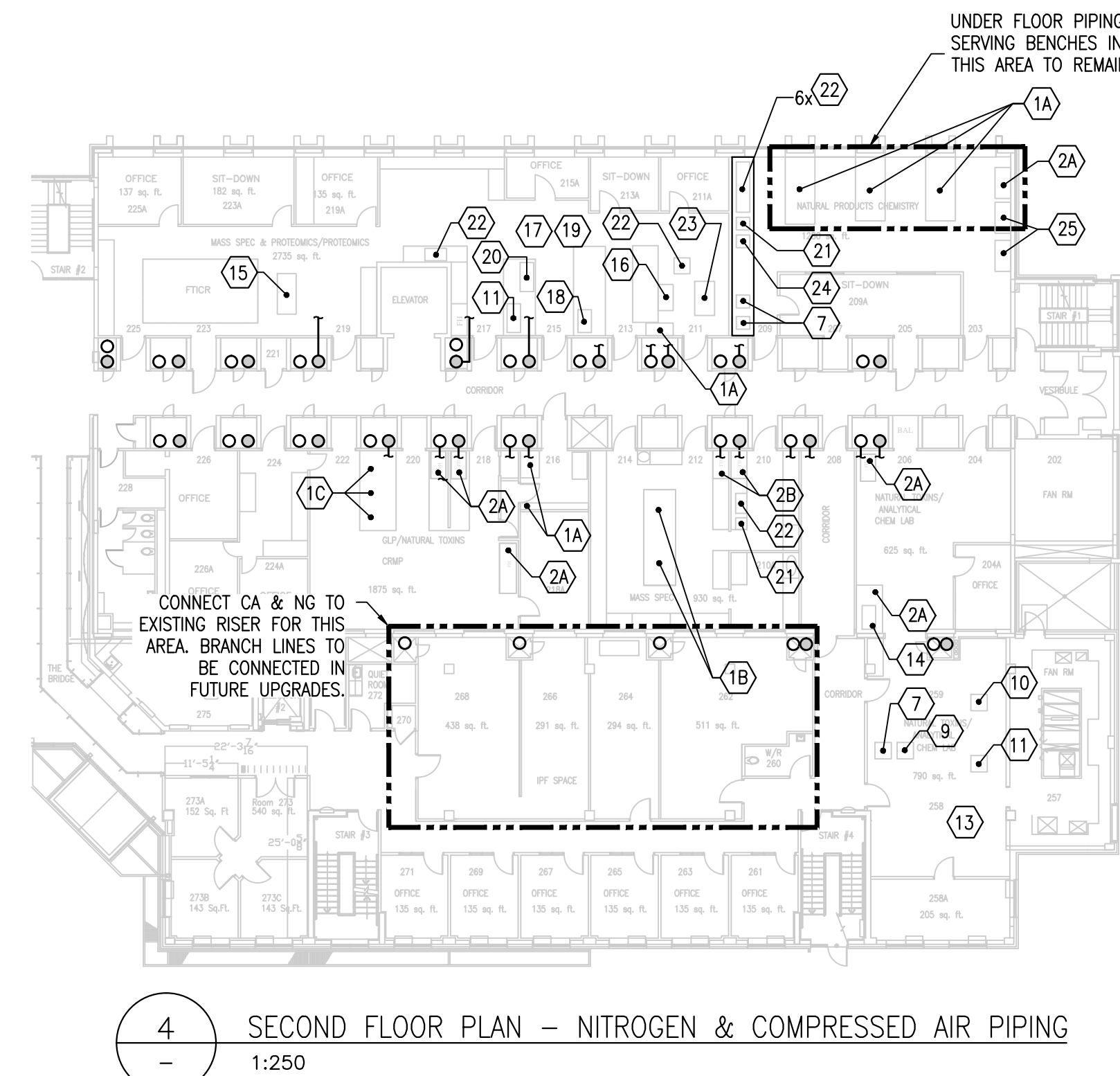
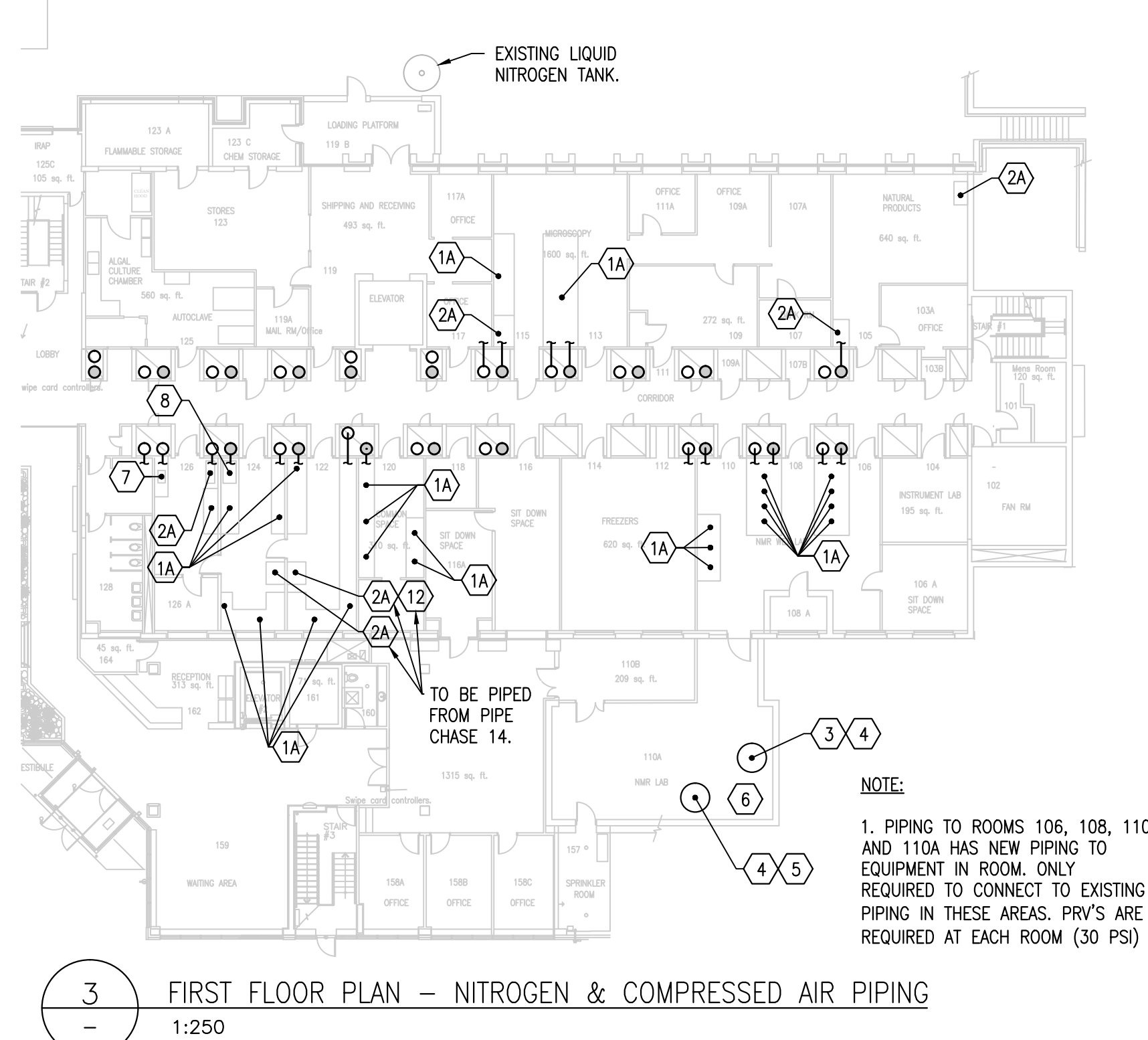
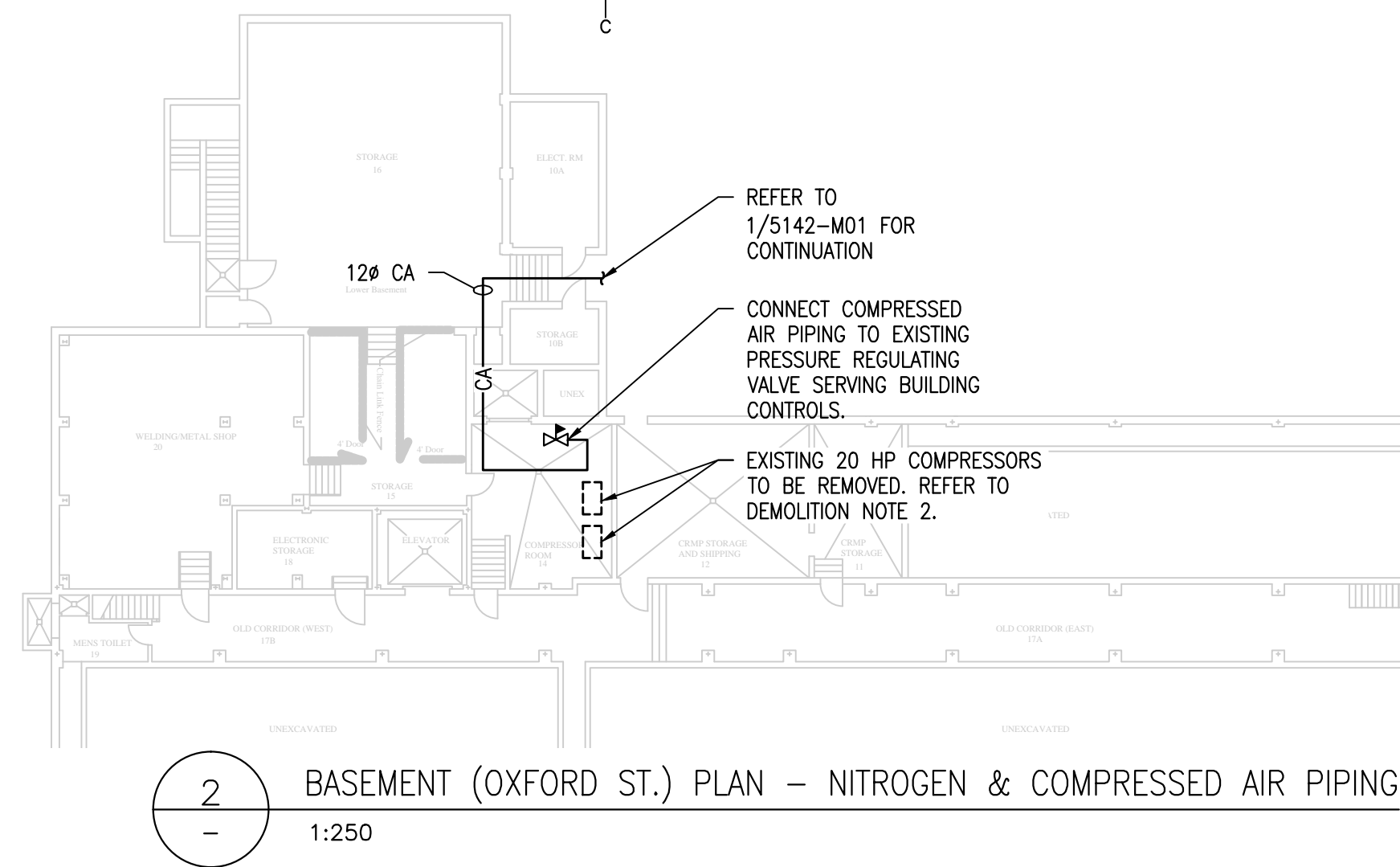
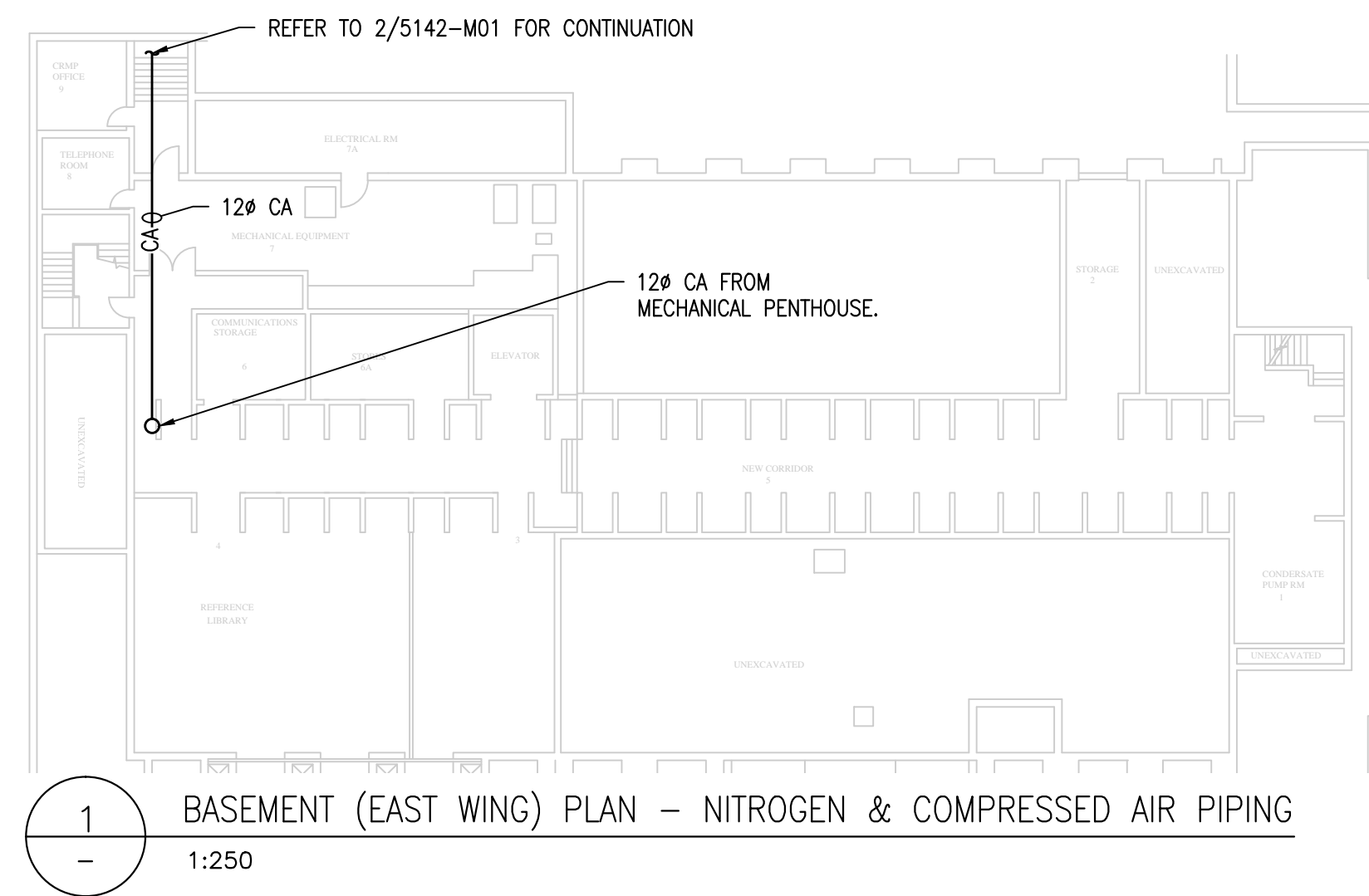
DRAWING LIST

5142-M01 -NITROGEN & COMPRESSED AIR PIPING PLAN

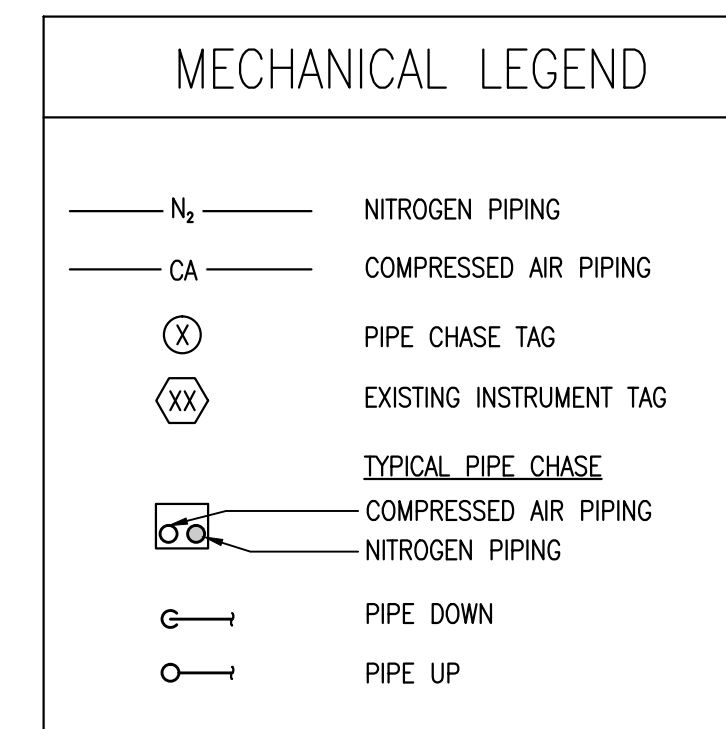
5142-M02 -NITROGEN & COMPRESSED AIR PIPING - PIPE
CHASE SCHEMATICS

5142-M03 -NITROGEN GENERATION SYSTEM DETAILS

Canada



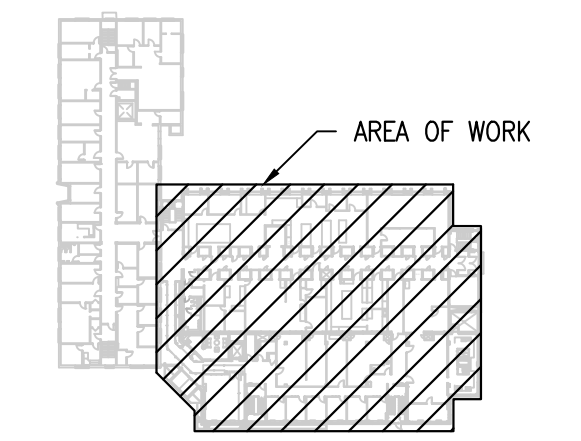
TAG	EXISTING INSTRUMENT	# OF CA CONNECTIONS	# OF N ₂ CONNECTIONS
1A	BENCH TAP	1	1
1B	BENCH TAP	1	
1C	BENCH TAP		1
2A	HOOD	1	1
2B	HOOD	1	
3	BRUKER AVANCE III 700 MHz		1
4	ANTI-VIBRATION LEGS	1	
5	BRUKER AVANCE III 500 MHz		1
6	HR-MAS		1
7	AGILENT 1200 SERIES ELSD	1	
8	NICOLET 6700 FT-IR		1
9	AB SCIEX QTRAP 5500	1	2
10	AB SCIEX API4000	1	2
11	AB SCIEX API4000 Q TRAP	1	2
12	REACTIVAP		1
13	ORGANOMOTION		1
14	CALIPER TURBOVAP VP		1
15	WATERS QTOF PREMIER		1
16	QTOF NANOACQUITY		1
17	WATERS QUATRO		1
18	EXACTIVE		1
19	ALLTECH 3300 ELSD		1
20	AB MDS SCIEX 2000 Q TRAP		2
21	HPLC CORONA	1	1
22	AGILENT 1100 LC-MS		1
23	IONICS 3Q 320		1
24	AGILENT 6110 LC-MS (MSD)		1
25	PRESSURIZE COLUMN		1
26	RAINDROP QPCR		1



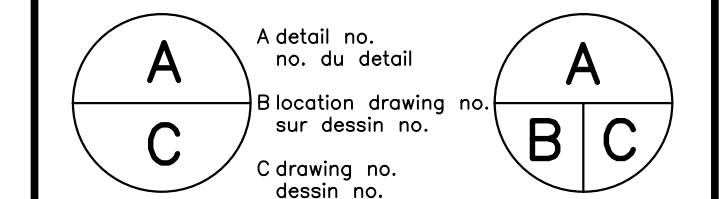
- DEMOLITION NOTES
- ALL EXISTING PIPING TO EQUIPMENT TO BE REMOVED BACK TO EXISTING LIQUID NITROGEN TANK (LOCATION OF TANK ON DETAIL 3.)
 - EXISTING COMPRESSORS AND ASSOCIATED BUFFER TANK TO BE REMOVED, C/W ALL PIPING IN ORIGINAL SECTION OF BUILDING. EXISTING CA PIPING SHOWN ON DETAIL 6, AND ASSOCIATED PIPING IN PIPE CHASES (FIVE (5) PIPE CHASES TOTAL) TO REMAIN FOR CONNECTION TO NEW EQUIPMENT.
 - ELECTRICAL FOR EXISTING COMPRESSORS TO BE REMOVED, INCLUDING DISCONNECTS WIRING AND CONDUITS; ALL THE WAY BACK TO PANEL SOURCE.

- MECHANICAL NOTES
- PROVIDE NEW COMPRESSED AIR AND NITROGEN PIPING TO ALL EXISTING EQUIPMENT AS SHOWN ON DRAWINGS AND AS PER SPECIFICATIONS. FINAL PIPE CONNECTION SIZES AS PER MANUFACTURER'S
 - REFER TO DRAWING 5142-M02 FOR PIPE CHASE SCHEMATICS, INCLUDING RISER PIPE SIZES.
 - NITROGEN LINES AND COMPRESSED AIR LINES IN CHASES (20, 21, 22, 23) AND (24) TO BE COMPLETE WITH TAKE OFFS AT EACH FLOOR INCLUDING ISOLATION VALVE.
 - EQUIPMENT INSTALLATION TO BE REGISTERED WITH BOILERS AND PRESSURE EQUIPMENT (BPE) FOR PERMIT AND INSPECTION OF WORK.

KEYPLAN



1	ISSUED FOR TENDER	FEB 12 2016
0	ISSUED FOR TENDER	JAN 12 2016
revisions		date



project project

**NRC - NITROGEN GENERATION SYSTEM
1411 OXFORD ST.
HALIFAX, N.S.**

drawing dessin

NITROGEN & COMPRESSED AIR PIPING PLAN

designed M.N.	concu
date OCT 21/2015	
drawn T.H.	dessine
date OCT 21/2015	
approved T.D.	approuve
date OCT 21/2015	
Tender	Soumission
PWC Project Manager	Administrateur de projets TPC
project number	no. du projet

drawing no. no. du dessin

5142-M01

TAG	EXISTING INSTRUMENT	# OF CA CONNECTIONS	# OF N ² CONNECTIONS
1A	BENCH TAP	1	1
1B	BENCH TAP	1	
1C	BENCH TAP		1
2A	HOOD	1	1
2B	HOOD	1	
3	BRUKER AVANCE III 700 MHz		1
4	ANTI-VIBRATION LEGS	1	
5	BRUKER AVANCE III 500 MHz		1
6	HR-MAS		1
7	AGILENT 1200 SERIES ELSD	1	
8	NICOLET 6700 FT-IR		1
9	AB SCIEX QTRAP 5500	1	2
10	AB SCIEX API4000	1	2
11	AB SCIEX API4000 Q TRAP	1	2
12	REACTIVAP		1
13	ORGANMOTION		1
14	CALIPER TURBOVAP VP		1
15	WATERS QTOF PREMIER		1
16	QTOF NANOACQUITY		1
17	WATERS QUATRO		1
18	EXACTIVE		1
19	ALLTECH 3300 ELSD		1
20	AB MDS SCIEX 2000 Q TRAP		2
21	HPLC CORONA	1	1
22	AGILENT 1100 LC-MS		1
23	IONICS 3Q 320		1
24	AGILENT 6110 LC-MS (MSD)		1
25	PRESSURIZE COLUMN		1
26	RAINDROP QPCR		1
27	FUTURE EQUIPMENT	1	1



1	ISSUED FOR TENDER	FEB 12 2016
0	ISSUED FOR TENDER	JAN 12 2016
revisions		date

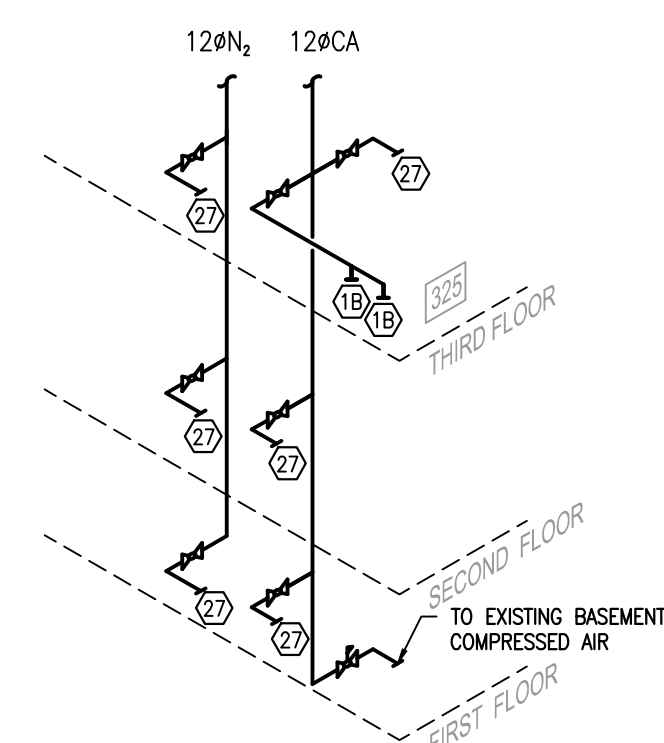
A	A detail no. / no. du detail	A
C	B location drawing no. / sur dessin no.	B
	C drawing no. / dessin no.	C

project NRC - NITROGEN GENERATION SYSTEM 1411 OXFORD ST. HALIFAX, N.S.

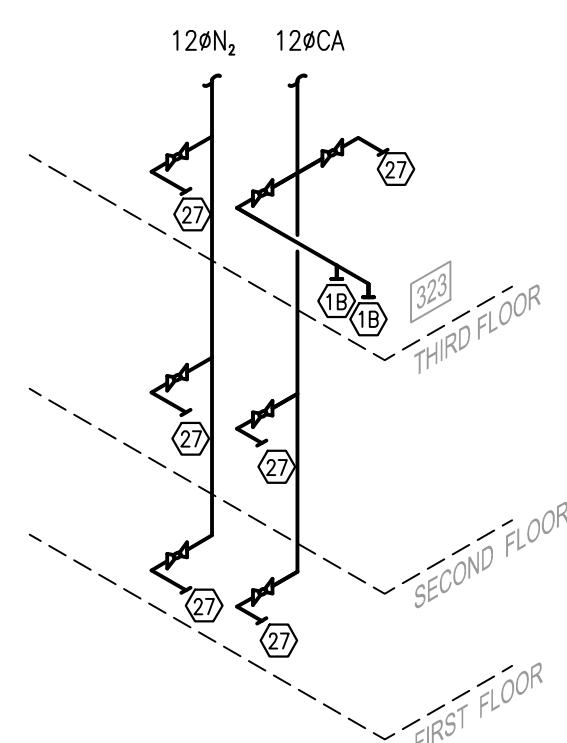
NITROGEN & COMPRESSED AIR PIPING - PIPE CHASE SCHEMATICS

designed M.N.	concu
date OCT 21/2015	
drawn T.H.	dessine
date OCT 21/2015	
approved T.D.	approuve
date OCT 21/2015	
Tender NADINE MERKLEY	Soumission
PWC Project Manager	Administrateur de projets TPC
project number	no. du projet

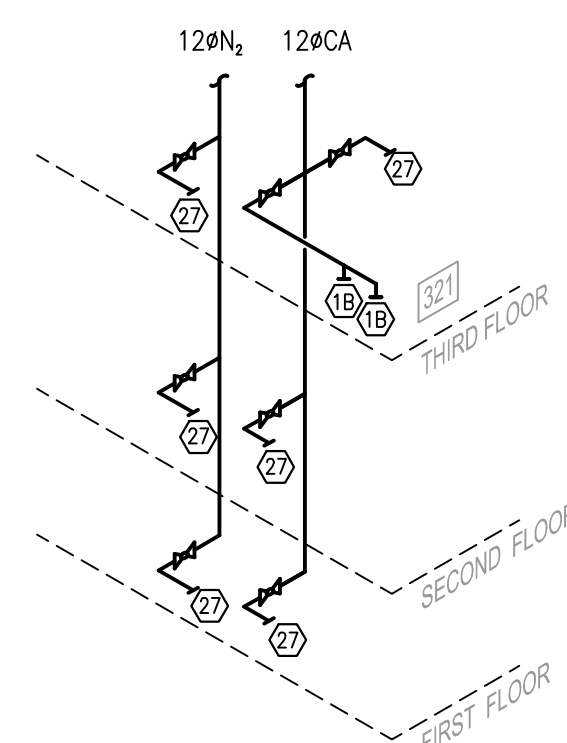
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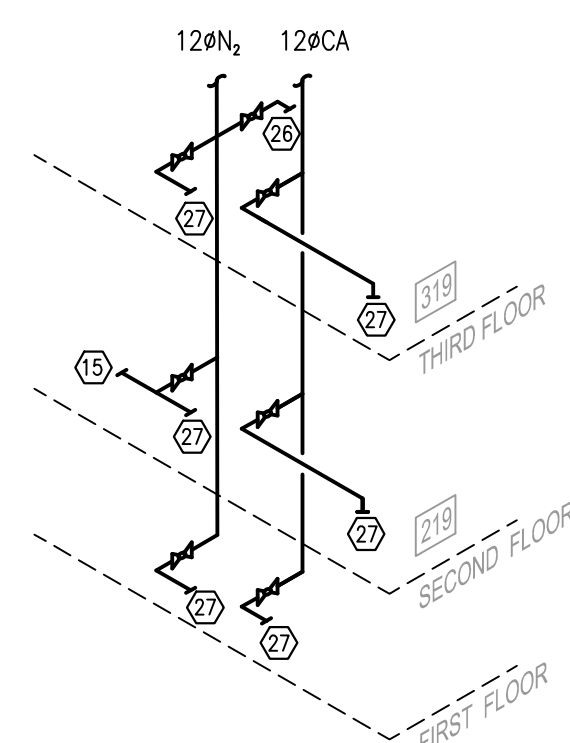
1 PIPE CHASE 1
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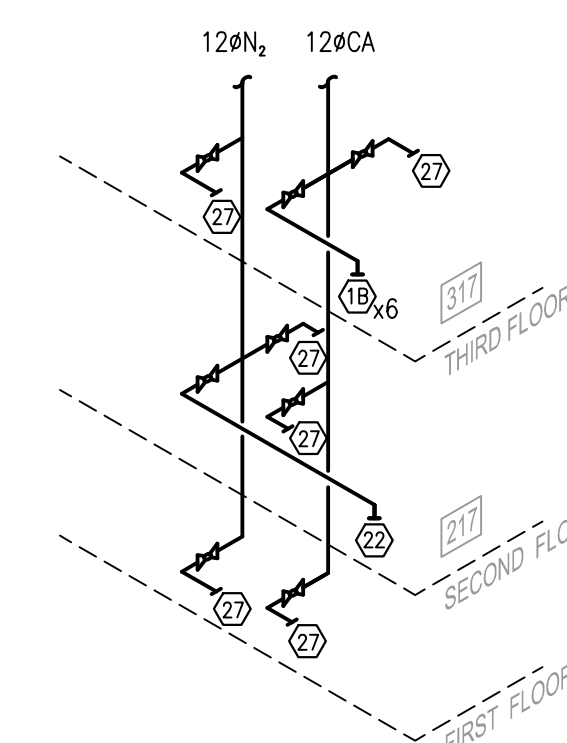
2 PIPE CHASE 2
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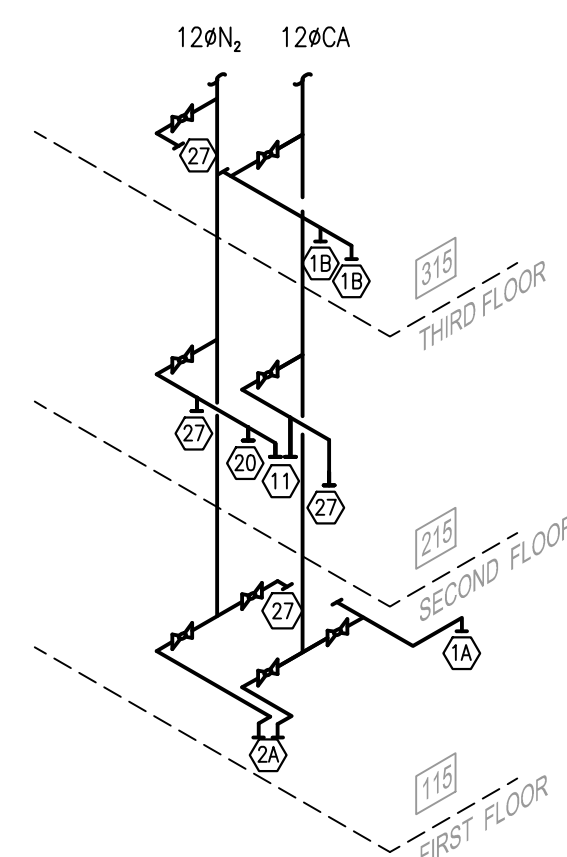
3 PIPE CHASE 3
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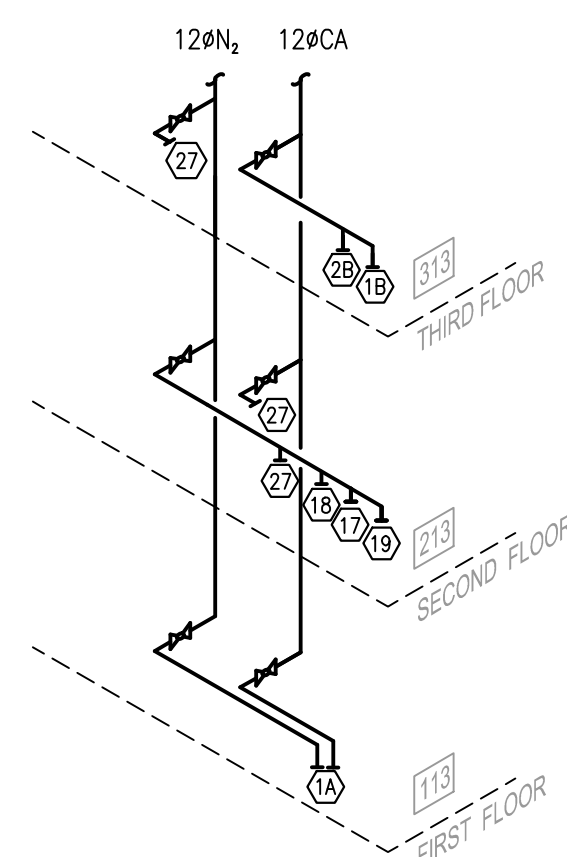
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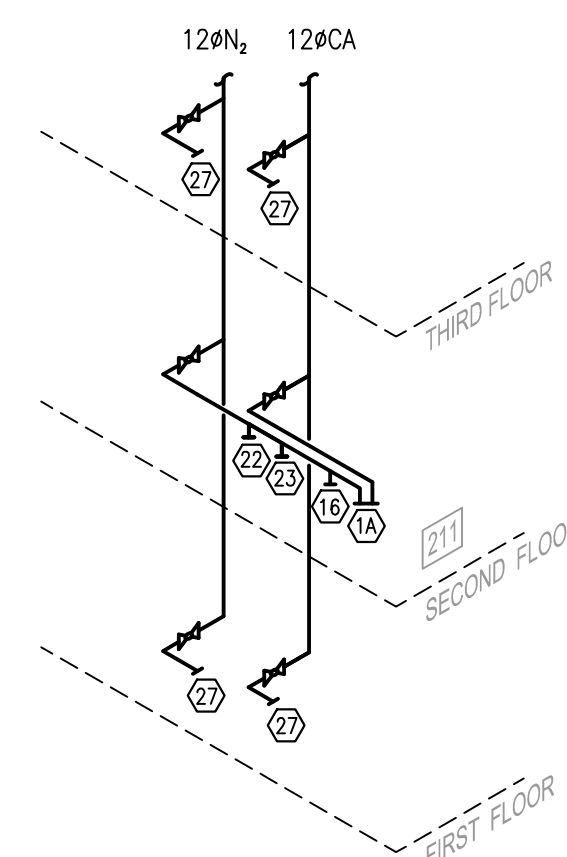
5 PIPE CHASE 5
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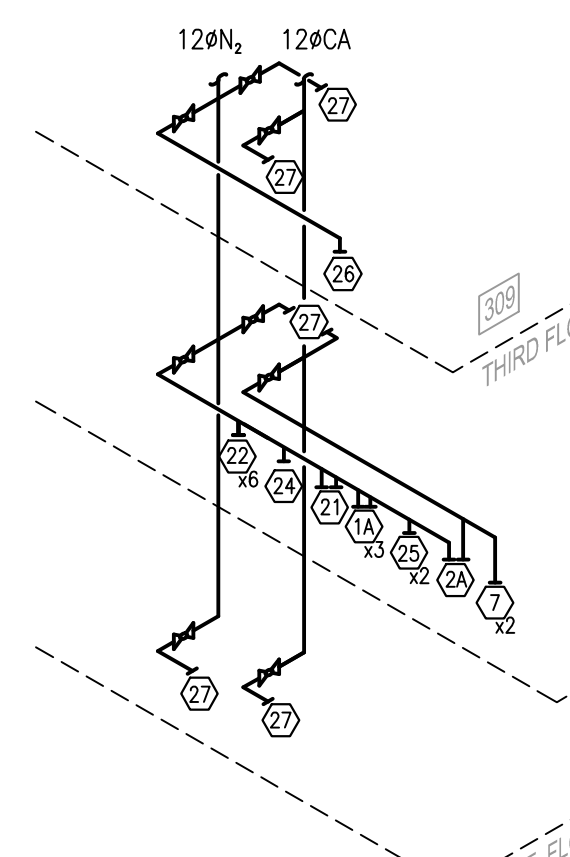
6 PIPE CHASE 6
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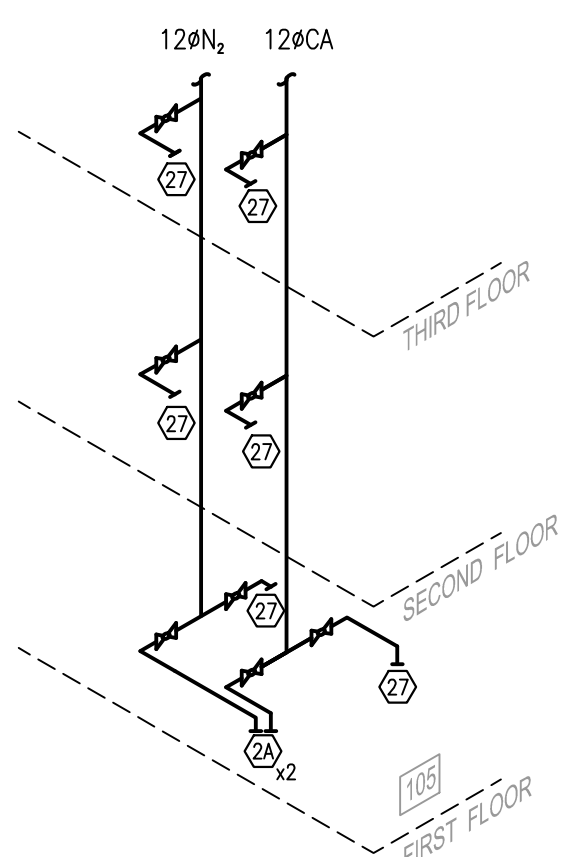
7 PIPE CHASE 7
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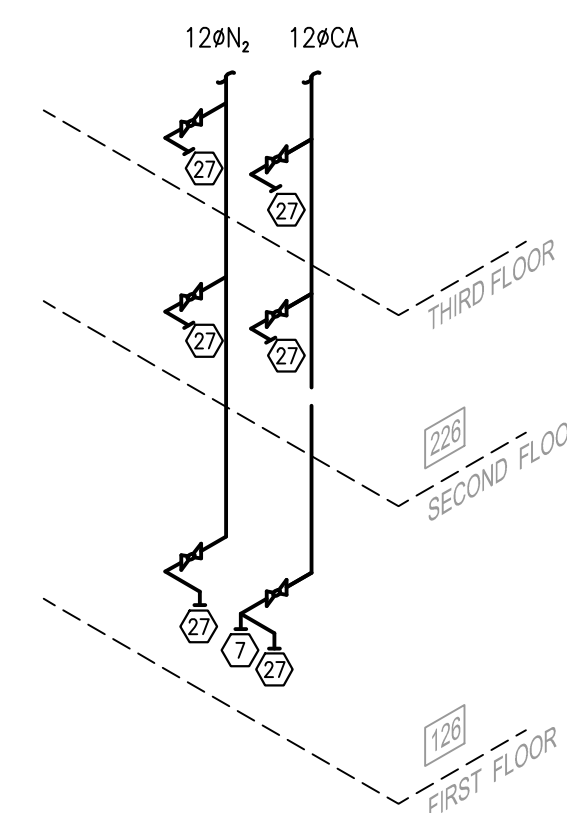
8 PIPE CHASE 8
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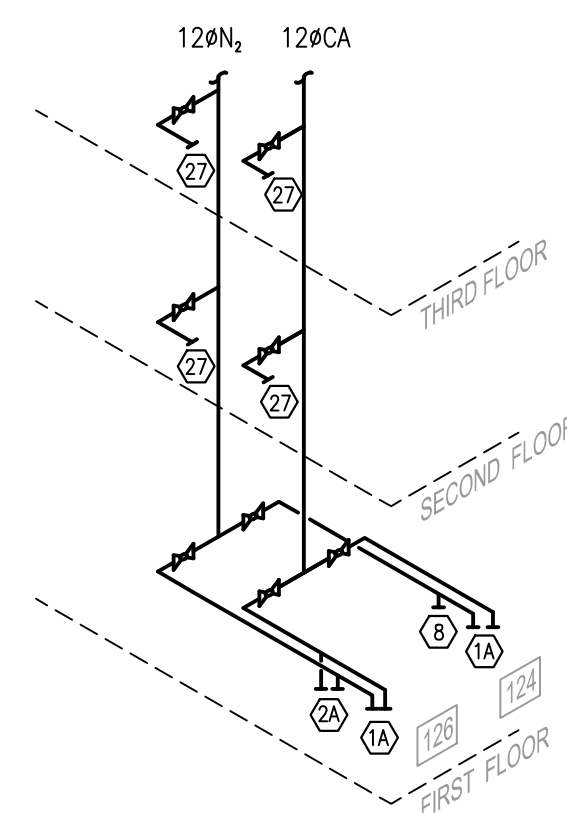
9 PIPE CHASE 9
N.T.S.



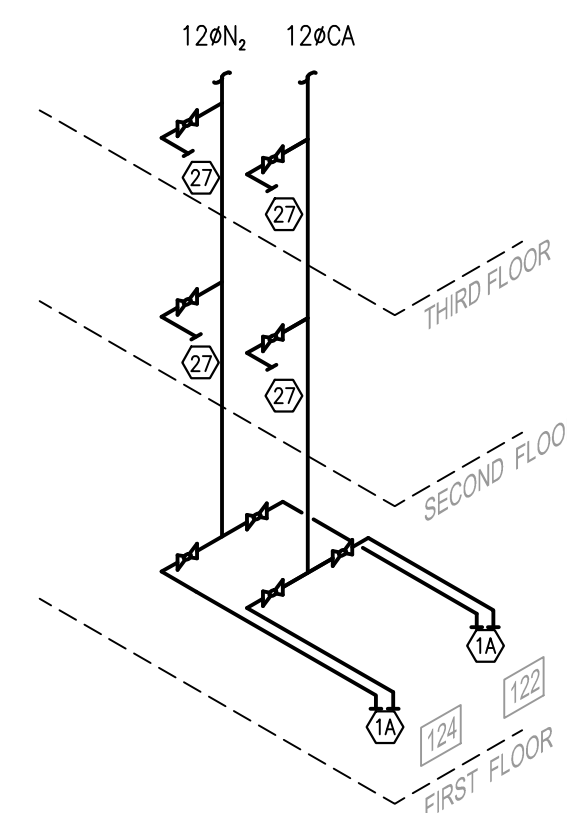
10 PIPE CHASE 10
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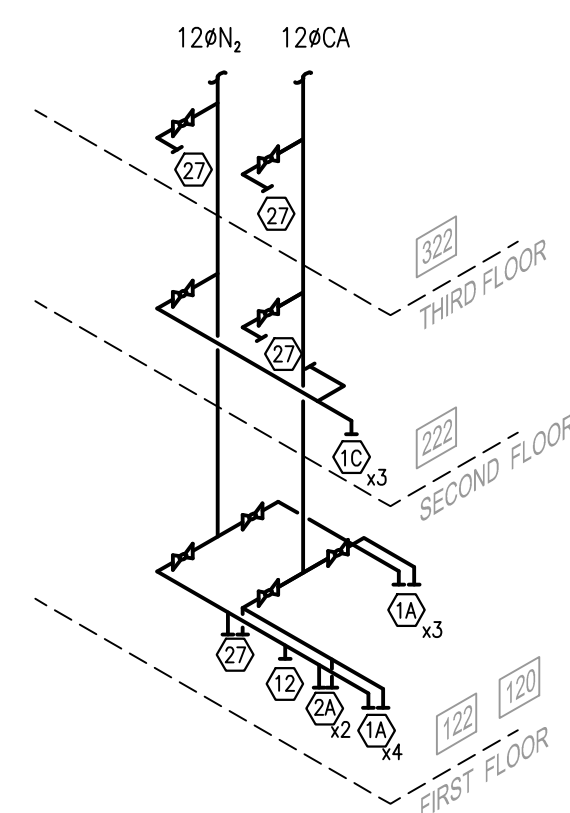
11 PIPE CHASE 11
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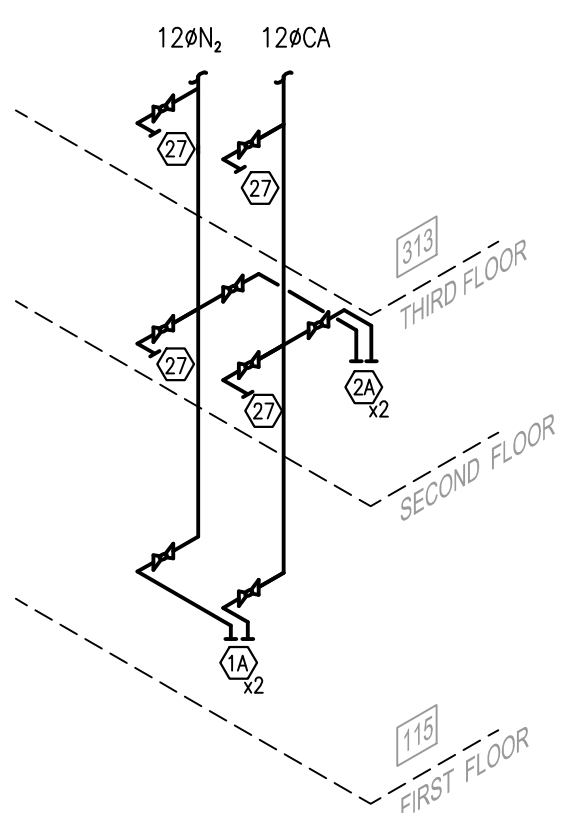
12 PIPE CHASE 12
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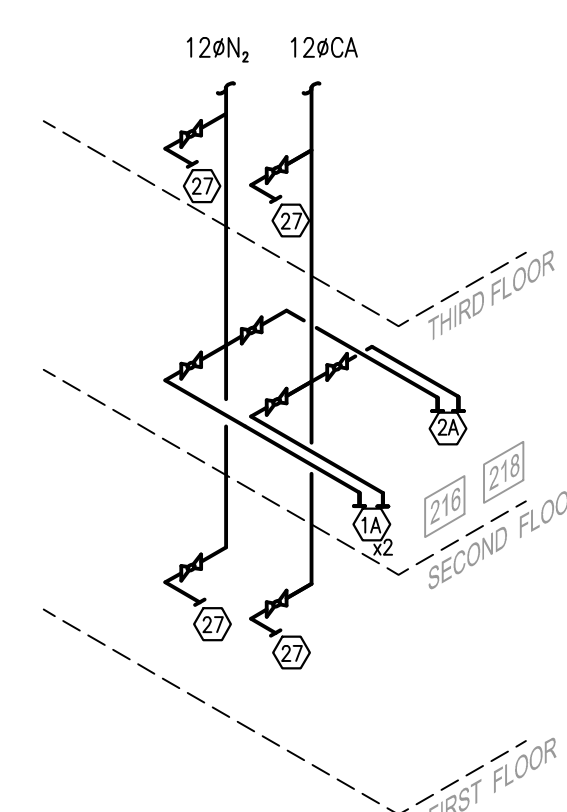
13 PIPE CHASE 13
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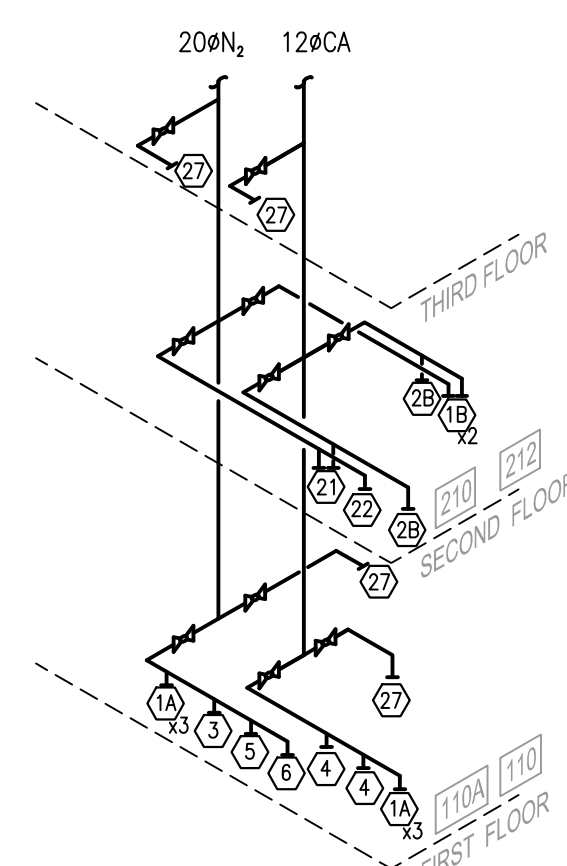
14 PIPE CHASE 14
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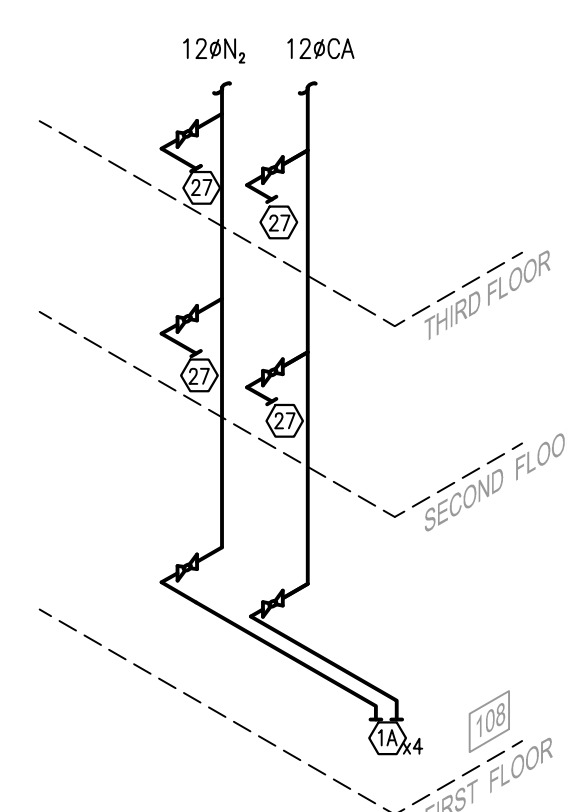
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N.T.S.



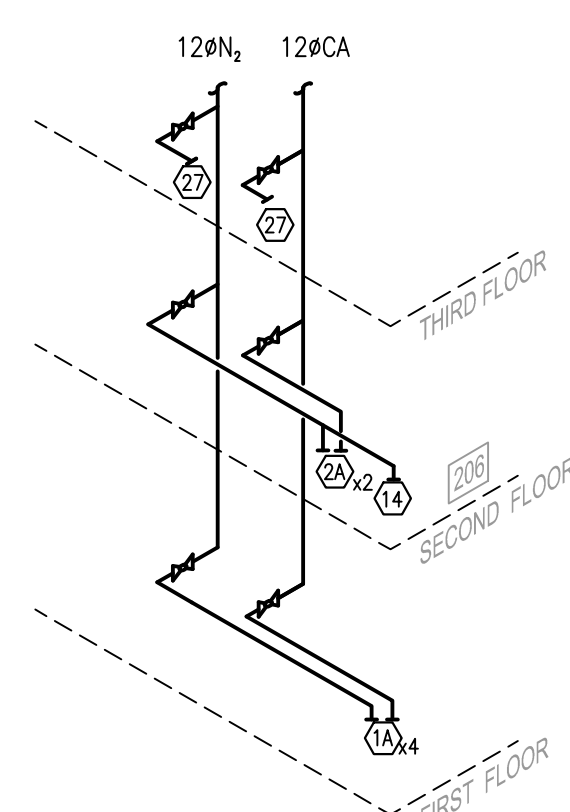
16 PIPE CHASE 16
N.T.S.



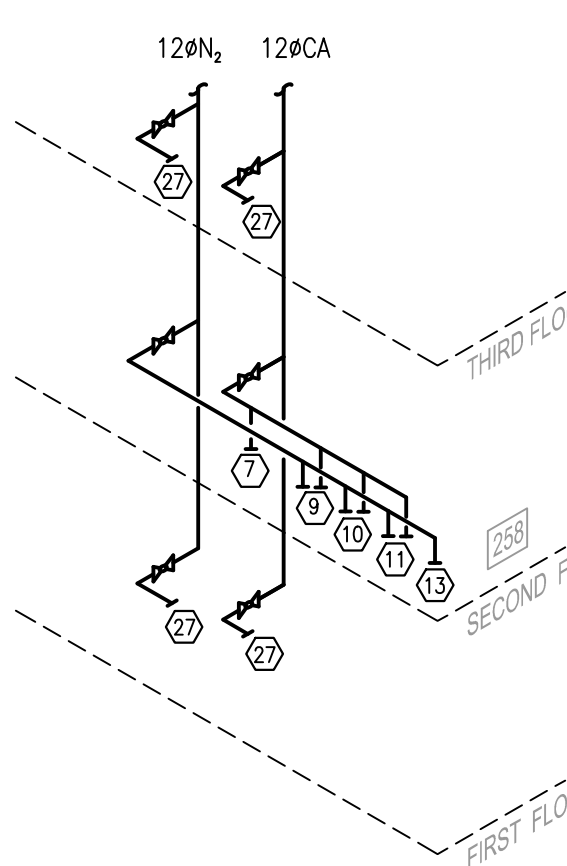
17 PIPE CHASE 17
N.T.S.



18 PIPE CHASE 18
N.T.S.



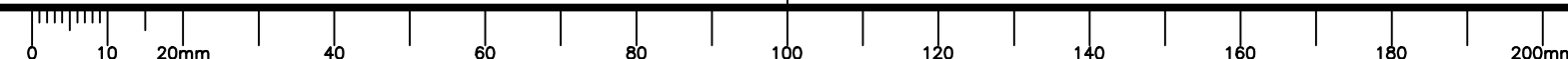
19 PIPE CHASE 19
N.T.S.



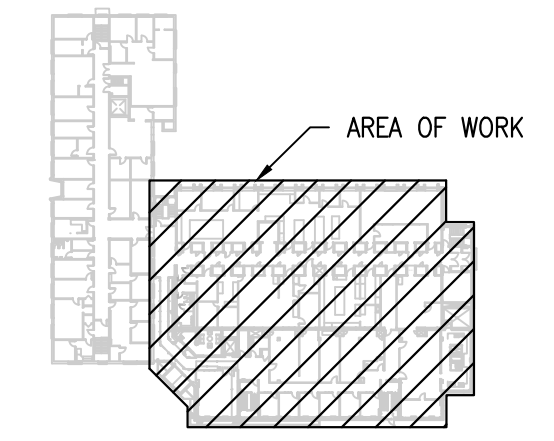
20 PIPE CHASE 20
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Plot Scale:

PWGSC A1

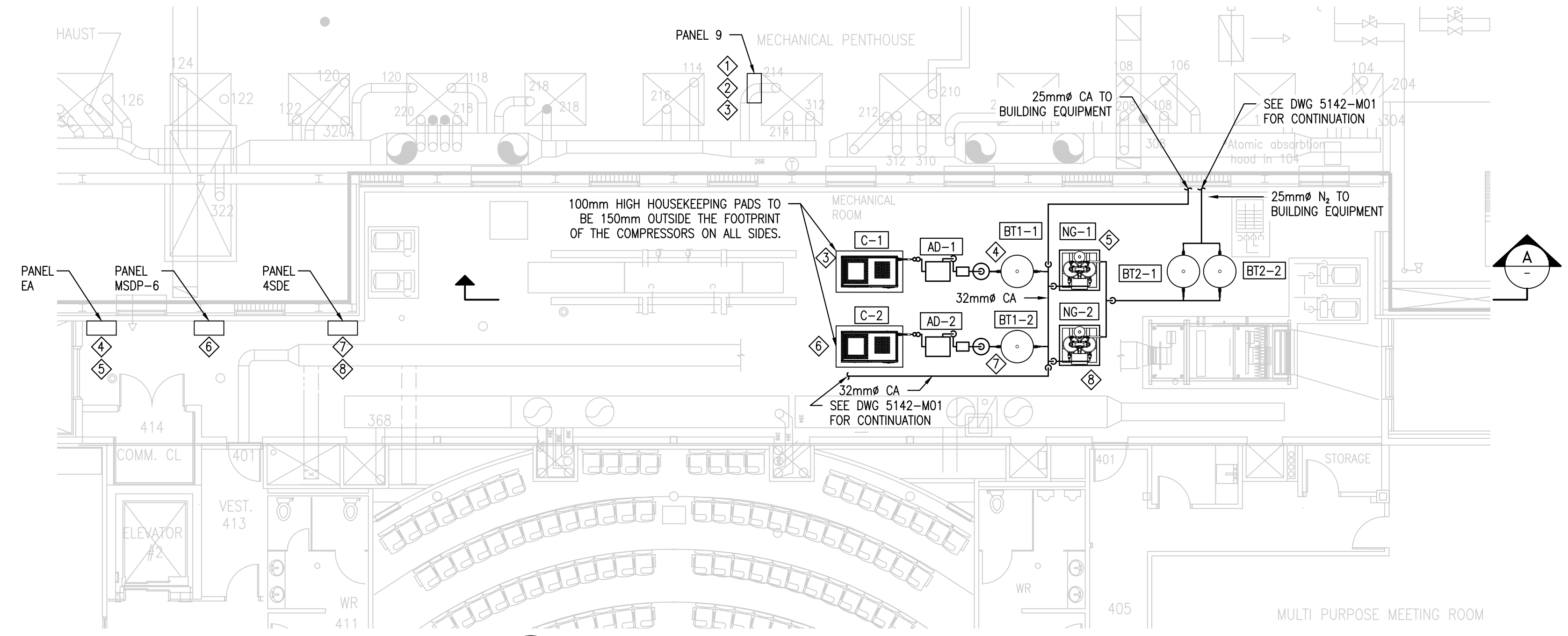


KEYPLAN



ELECTRICAL KEY NOTES

- 1 REMOVE TWO EXISTING 30A,3P,600V BREAKERS AND TURN OVER TO OWNER.
- 2 PROVIDE 70A,3P,600V BREAKER. INSTALL BREAKER IN PANEL 9. MAKE USE OF SPACE PROVIDED BY REMOVAL OF 30A BREAKERS.
- 3 FEED COMPRESSOR C-1 FROM NEW 70A BREAKER IN PANEL 9. RUN 3c #6 AWG + #8 AWG BOND IN 27mm EMT CONDUIT.
- 4 FEED AIR DRYER AD-1 FROM EXISTING 15A,1P, BREAKER IN PANEL EA. USE CIRCUIT 5. RUN 2c #12 AWG + #14 AWG BOND IN 21mm EMT CONDUIT.
- 5 FEED NITROGEN GENERATOR NG-1 FROM EXISTING 15A,1P, BREAKER IN PANEL EA. USE CIRCUIT 6. RUN 2c #12 AWG + #14 AWG BOND IN 21mm EMT CONDUIT.
- 6 PROVIDE NEW 70A,3P,600V BREAKER IN PANEL MSDP-6. FEED COMPRESSOR C-2 FROM NEW 70A BREAKER WITH 3c #6 AWG + #8 AWG BOND IN 27mm EMT CONDUIT.
- 7 FEED NEW AIRDRYER AD-2 FROM EXISTING 15A,1P, BREAKER IN PANEL 4SDE. USE CIRCUIT 26. RUN 2c #12 AWG + #14 AWG BOND IN 21mm EMT CONDUIT.
- 8 FEED NEW NITROGEN GENERATOR NG-2 FROM EXISTING 15A,1P, BREAKER IN PANEL 4SDE. USE CIRCUIT 28. RUN 2c #12 AWG + #14 AWG BOND IN 21mm EMT CONDUIT.



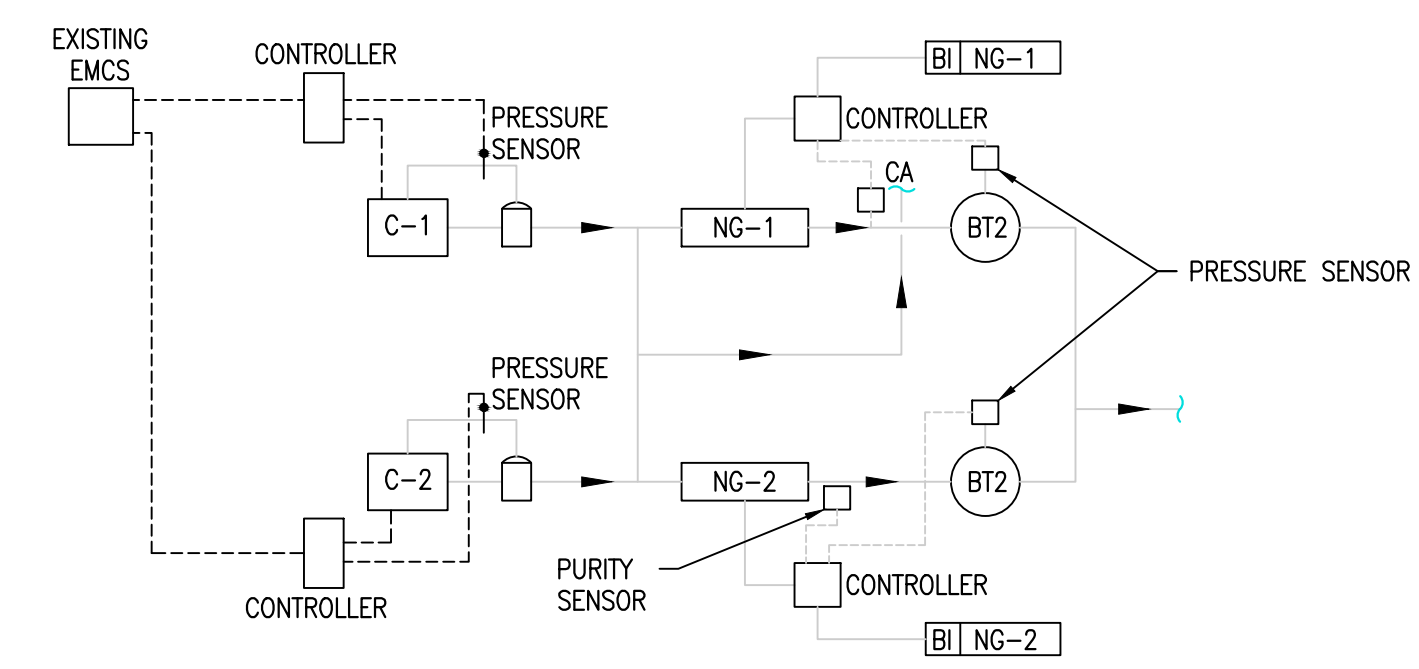
1 PROPOSED NITROGEN GENERATION SYSTEM LOCATION
 1:100

NOTE:

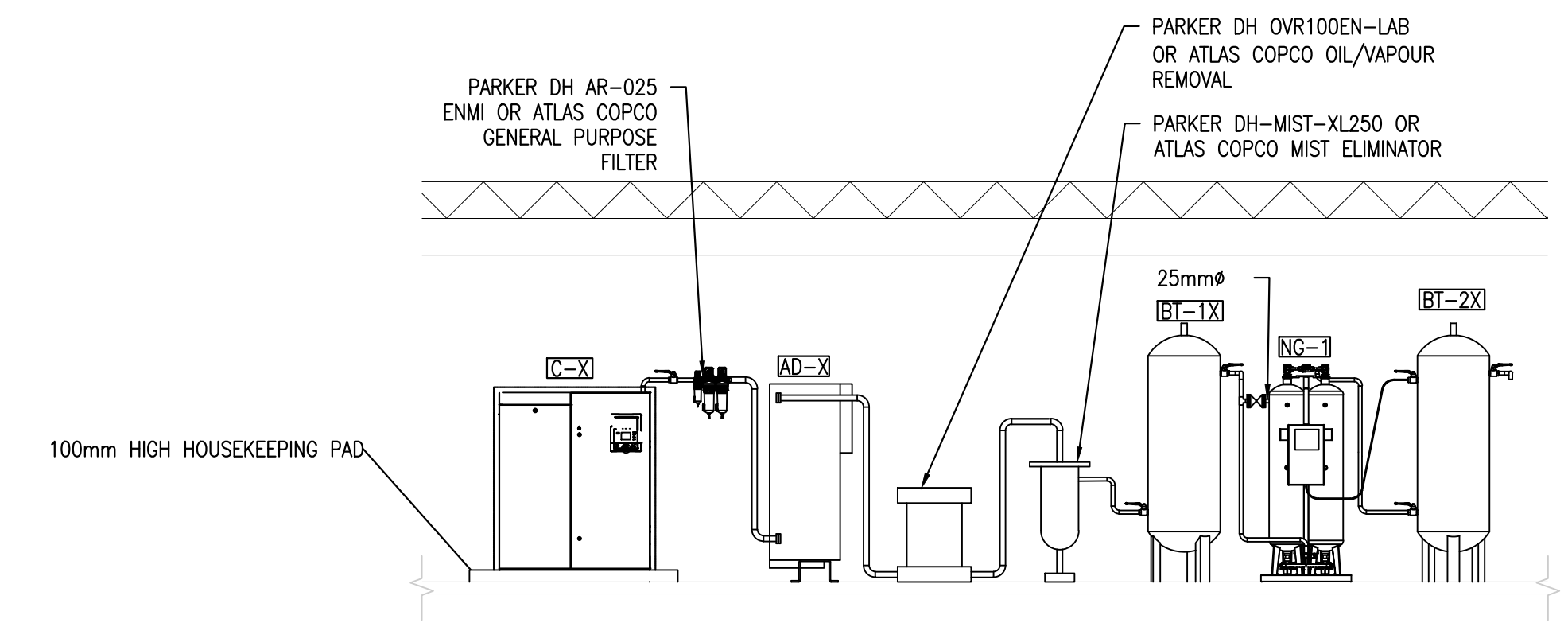
1. CONTROLS TO BE INTERFACED WITH EXISTING SIEMENS ENERGY MANAGEMENT SYSTEM

SEQUENCE OF OPERATION:

- (i) COMPRESSORS AND NITROGEN GENERATORS TO MAINTAIN A SYSTEM PRESSURE OF 100psi.
- (ii) ON PRESSURE DROP BELOW 95psi THE COMPRESSORS SHALL START. ON A PRESSURE ABOVE 105 psi THE COMPRESSORS SHALL STOP.
- (iii) COMPRESSORS AND NITROGEN GENERATORS TO OPERATE AS LEAD/LAG UNLESS SYSTEM NEEDS ADDITIONAL CAPACITY TO SATISFY DEMAND.
- (iv) NITROGEN GENERATOR AUTOMATIC OPERATION. STAND BY MODE WHEN PRESSURE IN STORAGE VESSEL IS SATISFIED WHEN THE LOWER NITROGEN PRESSURE LIMIT IS REACHED THE GENERATOR WILL RESTART.



2 PROPOSED NITROGEN GENERATION SYSTEM CONTROLS
 N.T.S.



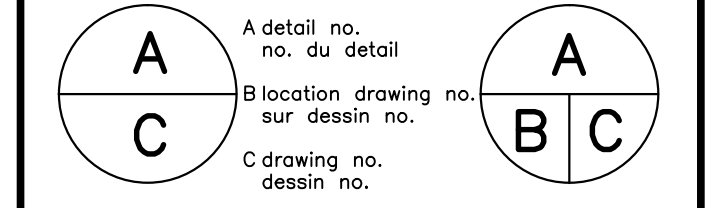
A NITROGEN GENERATION SYSTEM ELEVATION
 1:50

NITROGEN GENERATOR SCHEDULE											
TAG	MANUFACTURER	DESCRIPTION	FLOW (l/min.)	OUTLET PRESSURE (kPa)	NITROGEN PURITY (%)	NITROGEN DEWPOINT (°C)	GENERATOR TYPE	NOISE (dBA)	ELECTRICAL DATA		NOTES
									V/ø/Hz	AMPS	
NG-1	PARKER MAXIGAS 120LAB-B, ATLAS COPCO NCP73 OR APPROVED ALTERNATE	INDUSTRIAL PSA NITROGEN GAS GENERATOR	750	690	99.9	-48	DUAL BED PSA WITH CMS	<80	120/1/60	<1	C/W 1515L BUFFER TANK 'BT1-1'
NG-2	PARKER MAXIGAS 120LAB-B, ATLAS COPCO NCP73 OR APPROVED ALTERNATE	INDUSTRIAL PSA NITROGEN GAS GENERATOR	750	690	99.9	-48	DUAL BED PSA WITH CMS	<80	120/1/60	<1	C/W 1515L BUFFER TANK 'BT1-2'

COMPRESSOR SCHEDULE								
TAG	MANUFACTURER	DESCRIPTION	NORMAL HP	FLOW (L/S)	NOISE (dBA)	ELECTRICAL DATA		NOTES
						V/ø/Hz	HP	
C-1	SULLAIR 3010PVB, ATLAS COPCO GA30VSD+ OR APPROVED ALTERNATE.	LUBRICATED ROTARY SCREW VFD COMPRESSOR	40	77	69	575/3/60	40	C/W 1515L BUFFER TANK 'BT2-1'
C-2	SULLAIR 3010PVB, ATLAS COPCO GA30VSD+ OR APPROVED ALTERNATE.	LUBRICATED ROTARY SCREW VFD COMPRESSOR	40	77	69	575/3/60	40	C/W 1515L BUFFER TANK 'BT2-2'

COMPRESSED AIR DRYER SCHEDULE								
TAG	MANUFACTURER	DESCRIPTION	OUTLET AIR			INLET AIR		
			FLOW (L/S)	PDP	PRESSURE (kPa)	FLOW (L/S)	PDP	PRESSURE (kPa)
AD-1	PARKER MXA102C/N2-LDP-LAB, ATLAS COPCO CD100+ OR APPROVED ALTERNATE.	DESSICANT AIR DRYER	43	-70°C	793	66	-70°C	931
AD-2	PARKER MXA102C/N2-LDP-LAB, ATLAS COPCO CD100+ OR APPROVED ALTERNATE.	DESSICANT AIR DRYER	43	-70°C	793	66	-70°C	931

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Tender NADINE MERKLEY	Soumission
PWC Project Manager	Administrateur de projets TPC
project number	no. du projet
drawing no.	no. du dessin

5142-M03

