

February 8, 2019
BOARD OF COUNTY COMMISSIONERS
ORANGE COUNTY, FLORIDA
Y19-725-JS / ADDENDUM # 4
ORANGE COUNTY CONVENTION CENTER
WEST BUILDING HALL "A" NATURAL GAS RETROFIT

New Bid Opening Date: February 19, 2019

This addendum is hereby incorporated into the bid documents of the project referenced above. The following items are clarifications, corrections, additions, deletions and/or revisions to and shall take precedence over the original documents. Underlining indicates additions, deletions are indicated by ~~strikethrough~~.

A. The Bid Opening Date has changed from ~~February 12, 2019~~ to February 19, 2019.

B. The following are questions/responses/clarifications:

1. Clarify if any of the proposed gas pipes will penetrate any existing fire rated wall; if yes, please provide fire rated penetration details per FBC 107.

Response: No new natural gas piping will be routed through any fire rated wall assemblies.

2. Provide proper calculations based on the appropriate table based on type of pipe, inlet psi, pressure drop and specific gravity from the Florida Building Code Fuel Gas Sixth Edition (2017).

Response: Refer to revised dwg P-001 (Addendum #3) for revised plumbing piping schedule (which indicates specific NG pipe material), pipe sizing table from equation 4-2 of the 2017 Florida Building Code - Fuel Gas 6th Edition.

3. Provide the type of pipe being used. FBCFG 403.

Response: Refer to revised dwg P-001 (Addendum #3) for revised plumbing piping schedule (which indicates specific NG pipe material).

4. Provide details for proper pipe support hangers, straps, hooks etc, for the gas piping. FBCFG 407.

Refer to revised dwg P-901 (Addendum #3) detail #4 for added pipe hanger detail.

5. Provide vent piping details for venting the new vented gas regulators to the outside or provide information to show compliance with the exception for not requiring venting to the outside. FBCFG 410.3.

Response: All new and existing NG regulators are located outside of building envelope.

6. There is a detail 2 on sheet P-901 for pipe sleeve through rated wall that indicates sealing the wall opening with wall compound. This is not allowed as a proper approved rated penetration method is required. Provide a proper approved rated penetration design. FBCB 714.3.

Response: Detail #2 on dwg. P-901 to be removed from set.

7. Specifications revisions and clarifications.

Response: Due to the existing pressure of the piping at 10 psi (exterior), all new NG piping shall be welded connections, not threaded. Refer to attached revised Specification Section 231123 (Facility Natural-Gas Piping) Parts 3.6, 3.12 and 3.13. Refer to attached revised drawing sheets P-001, P-407A, P-407D, P-412A, P-412D and P-801.

C. ATTACHMENTS:

1. Revised Plumbing Drawing Sheets: P-001, P-407A, P-407D, P-412A, P-412D, P-801 and P-901.
2. Revised Spec Section 231123, Part 3.6.D and E, Part 3.12.A, Part 3.13.A, B, C and D

D. All other term and conditions of the IFB remain the same.

E. The Proposer shall acknowledge receipt of this addendum by completing the applicable section in the solicitation or by completion of the acknowledgement information on the addendum. Either form of acknowledgement must be completed and returned not later than the date and time for receipt of the proposal.

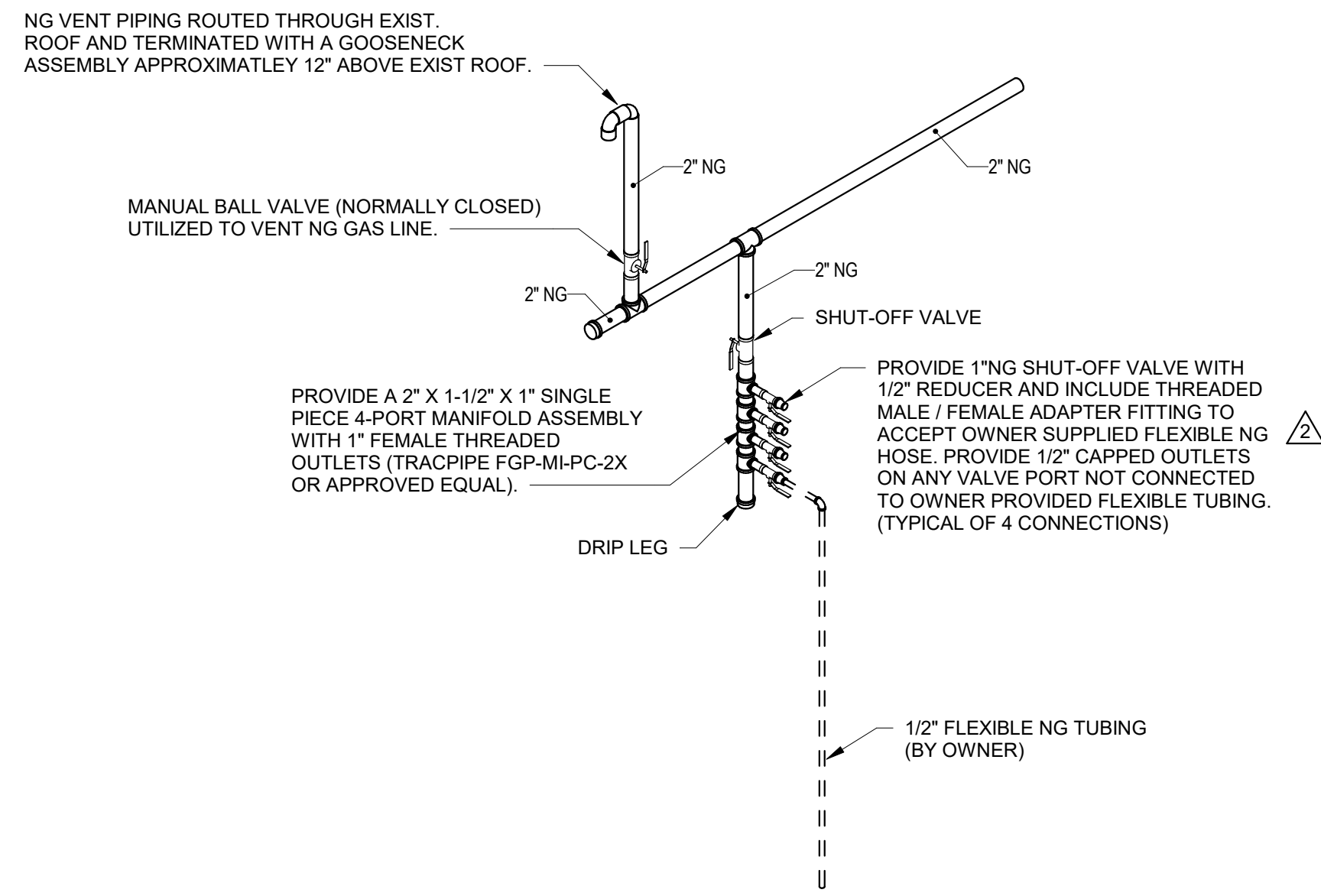
Receipt acknowledged by:

Authorized Signature

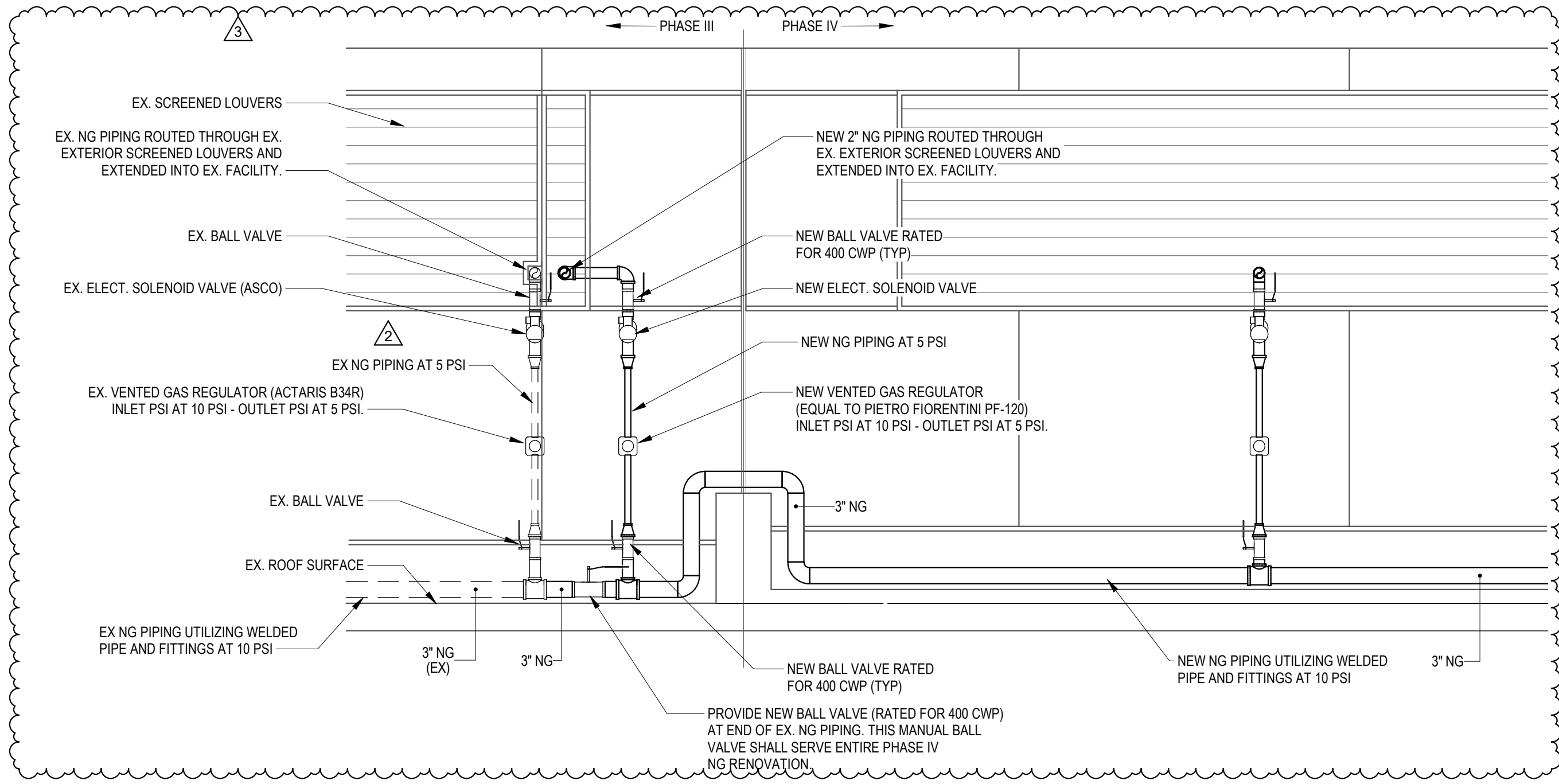
Date Signed

Title

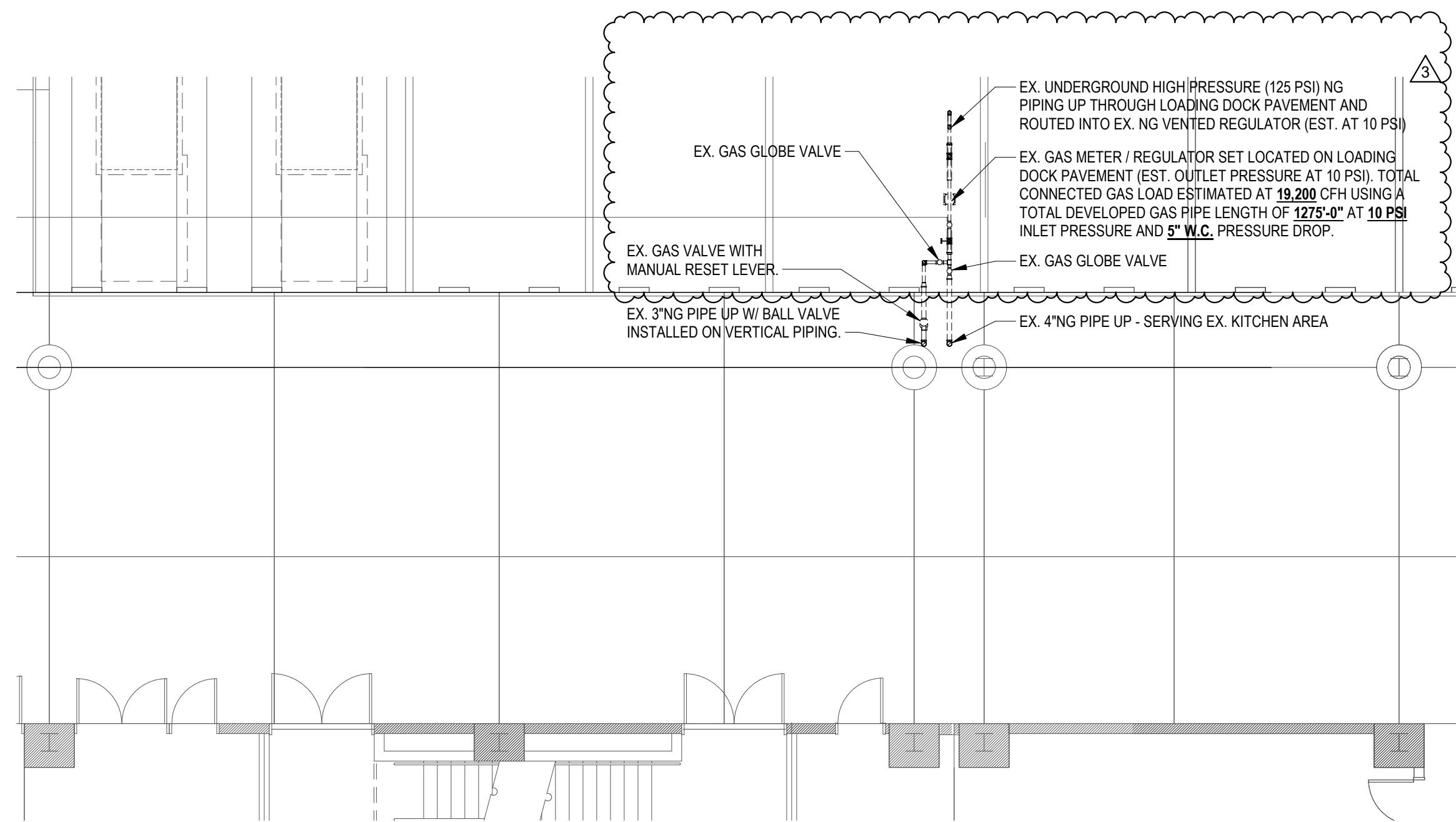
Name of Firm



2 NATURAL GAS ISOMETRIC/RISER OF TYP. CONNECTION DROP
SCALE:



3 SOUTH ELEVATION - NEW CONNECTION TIE-IN
SCALE: 1/2" = 1'-0"



4 PLUMBING OVERALL FLOOR PLAN - LEVEL 2
SCALE: 1/8" = 1'-0"

PLUMBING LEGEND

---(CW)---	DOMESTIC COLD WATER PIPING
---(HW)---	DOMESTIC HOT WATER PIPING
---(HWR)---	DOMESTIC HOT WATER RECIRCULATING PIPING
---(NG)---	NATURAL GAS PIPING
---(S)---	SANITARY PIPING
---(GR)---	GREASE PIPING
---(V)---	SANITARY VENT PIPING
---(ST)---	STORM DRAIN PIPING - PRIMARY
---(STO)---	STORM DRAIN PIPING - SECONDARY
---(M)---	WATER METER
---(H)---	HOSE BIBB OR WALL HYDRANT
---(BV)---	BALL VALVE
---(CV)---	CHECK VALVE
---(BLV)---	BALANCING VALVE
---(GV)---	GAS VALVE
---(PRV)---	PRESSURE REDUCING (GAS) VALVE
---(PRV)---	PRESSURE REDUCING VALVE
---(SV)---	SOLENOID VALVE
---(BFP)---	BACKFLOW PREVENTOR (REDUCED PRESSURE)
---(FD)---	FLOOR DRAIN
---(FS)---	FLOOR SINK
---(RD)---	ROOF DRAIN

PLUMBING ABBREVIATIONS

AVV	AIR ADMITTANCE VALVE
AFF	ABOVE FINISH FLOOR
AW	ACID WASTE
AV	ACID VENT
CA	COMPRESSED AIR
CD	CONDENSATE DRAIN
CFH	CUBIC FEET PER HOUR
CO	CLEANOUT
CONT	CONTINUATION
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DIS	DEIONIZED WATER SUPPLY
DIR	DEIONIZED WATER RETURN
DN	DOWN
DS	DOWNSPOUT
DWG	DRAWING
EXIST	EXISTING
ESH	EMERGENCY SHOWER/EYE WASH
EW	ELECTRIC WATER HEATER
EWC	ELECTRIC WATER COOLER
°F	DEGREE FAHRENHEIT
FF	FLOOR CLEANOUT
FD	FLOOR DRAIN
FS	FLOOR SINK
G	GAS
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	KITCHEN WASTE (GREASE)
HB	HOSE BIBB
HD	HUD DRAIN
HWR	DOMESTIC HOT WATER RECIRCULATING
IE	INVERT ELEVATION
IW	INDIRECT WASTE
KW	KILOWATT
LS	POUNDS
LCW	LABORATORY COLD WATER
LHW	LABORATORY HOT WATER
LHW	LABORATORY HOT WATER CIRCULATING
MH	MANHOLE
NC	NORMALLY CLOSED
NC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OD	OUTSIDE DIAMETER
PEMB	PRE-ENGINEERING METAL BUILDING
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE PIPE
RD	ROOF DRAIN
RFBP	REDUCED PRESSURE BACKFLOW PREVENTOR
SAN	SANITARY
ST	STORM DRAIN
SF	SQUARE FEET
SH	SHEET
STO	OVERFLOW STORM DRAIN
V	VENT
VAC	VACUUM
VTR	VENT THRU ROOF
WCO	WALL CLEANOUT
WM	WASHING MACHINE SUPPLY AND DRAIN BOX
WTR	WATER

GENERAL NOTES

- REFERENCE THE SPECIFICATIONS FOR MATERIAL AND EQUIPMENT INSTALLATION STANDARDS.
- THE PLUMBING INSTALLATION SHALL COMPLY WITH ALL STATE AND LOCAL CODES.
- PLANS ARE NOT COMPLETELY TO SCALE. PIPE ROUTING SHOWN IS SCHEMATIC AND IS NOT INTENDED TO INDICATE EXACT ROUTING. CONTRACTOR SHALL PROVIDE ANY ADDITIONAL OFFSETS AND FITTINGS REQUIRED FOR PROPER INSTALLATION AND TO MAINTAIN CLEARANCES. VERIFY STRUCTURAL, MECHANICAL, AND ELECTRICAL INSTALLATIONS AND OTHER POTENTIAL OBSTRUCTIONS AND ROUTE PIPING TO AVOID INTERFERENCES.
- PROVIDE ALL OFFSETS AND FITTINGS AND MAKE CONNECTION TO THE SITE UTILITIES.
- CONCEAL PIPING ABOVE CEILINGS, WITHIN WALLS OR CHASES EXCEPT IN MECHANICAL ROOMS OR AS SPECIFICALLY NOTED.
- PROVIDE ACCESS PANELS FOR ALL VALVES CONCEALED IN WALLS OR ABOVE NON-ACCESSIBLE CEILINGS.
- SLEEVE AND/OR FIRESTOP ALL PENETRATIONS THROUGH RATED WALLS, CEILINGS, AND FLOORS WITH UL LISTED ASSEMBLIES. FIRESTOP ASSEMBLIES SHALL BE EQUAL TO OR EXCEED THE RATING OF THE WALL, CEILING OR FLOOR. SEE ARCHITECTURAL DRAWINGS FOR FINISH FINISHES.
- FLASH AND COUNTER-FLASH ROOF PENETRATIONS.
- WHEN BEAM SLEEVE PENETRATIONS ARE NECESSARY, COORDINATE PENETRATIONS WITH ALL TRADES, AND THE STRUCTURAL ENGINEER. WRITTEN PERMISSION SHALL BE OBTAINED FROM THE STRUCTURAL ENGINEER BEFORE ANY PENETRATIONS ARE MADE.
- PROVIDE FOUNDATION PAD PENETRATION SLEEVES. ALLOW 1" MINIMUM CLEARANCE BETWEEN SLEEVE INSIDE SURFACE AND PIPE EXTERIOR.
- SEE ARCHITECTURAL DRAWINGS FOR FIXTURE LOCATIONS AND MOUNTING HEIGHTS.
- PROVIDE AUTOMATIC TRAP PRIMERS FOR FLOOR DRAIN TRAP SEALS.
- PROVIDE AN AIR GAP, WHEN REQUIRED BY CODE, SERVING INDIVIDUAL FIXTURE, DEVICES, APPLIANCES AND APPARATUS.
- MOUNT HOSE BIBBS 24" ABOVE FINISHED GRADE. PROVIDE EACH HOSE BIBBS WITH ISOLATION VALVE.
- PROVIDE CLEANOUTS IN ACCORDANCE WITH ALL STATE AND LOCAL CODES. INSTALL CLEANOUT WITH COVER FLUSH TO FINISH SURFACE.
- COORDINATE EXACT FLOOR DRAIN LOCATIONS WITH ARCHITECTURAL DRAWINGS. SET FLOOR DRAINS BELOW FINISHED FLOOR TO ALLOW FOR FLOOR SLOPING TO THE DRAIN.
- COORDINATE PIPING WITH ALL ELECTRICAL EQUIPMENT (PANELS, TRANSFORMERS, ETC.) PRIOR TO ANY INSTALLATION. DO NOT ROUTE ANY PIPING OVER ANY ELECTRICAL PANELS UNDER ANY CIRCUMSTANCES. ANY PIPING RUN OVER PANELS SHALL BE RE-ROUTED AT NO ADDITIONAL COST.
- ALL WALL MOUNTED LAVATORIES SHALL BE ATTACHED TO FLOOR MOUNTED CARRIER DESIGNED TO WITHSTAND A VERTICAL LOAD OF 250 POUNDS OF THE FRONT OF THE FIXTURE.
- PROVIDE SANITARY WASTE, VENT, DOMESTIC WATER, ETC. ROUGH-IN AND MAKE FINAL CONNECTIONS (TO INCLUDE PROVIDING ALL NECESSARY RATED STOPS, VALVES, TRAPS, ETC. AND MAKE READY FOR USE) TO ALL EQUIPMENT, WHETHER FURNISHED BY THIS CONTRACTOR OR FURNISHED BY OTHERS.
- INSTALL ISOLATION (SHUT-OFF) VALVES AT ALL MAIN RISERS AND MAIN BRANCH TAKEOFFS, TO PERMIT ISOLATION OF PIPING SECTIONS OR ENTIRE SYSTEM.
- PROVIDE RIGID SUPPORT SWAY BRACING AT ALL CHANGES IN DIRECTION GREATER THAN 45 DEGREES ON PIPING 4" AND LARGER.
- PROVIDE FIRE WATCH AND INTERIM FIRE PROTECTION MEASURES WHERE REQUIRED BY THE AUTHORITY HAVING JURISDICTION, INSURANCE CARRIER OR OWNER DURING TIMES OF ANY ACTIVE WELDING EVENTS.

CODE COMPLIANCE

- THESE DRAWINGS ARE PREPARED TO COMPLY WITH CURRENT FLORIDA BUILDING CODE, THE CURRENT FLORIDA FIRE PREVENTION CODE, AND OTHER SUCH CODES AS MAY BE REFERENCED.

TABLE CREATED FROM 2017 FLORIDA FUEL CODE 402 (EQUATION 4-2)

NATURAL GAS PIPING SCH. 40 METALLIC (BLACK STEEL)	GAS: NATURAL
Q=2237 D ^{3.025}	INLET PRESSURE: 10 PSI
(P ₁ - P ₂) / Y ^{0.854}	PRESSURE DROP: 0.25" W.C.
C x L	SPECIFIC GRAVITY: 0.60
USING LONGEST LENGTH METHOD WITH 1275' OF TO MOST REMOTE OUTLET	
SIZE	CFH
1/2"	514
3/4"	913
1"	1720
1-1/4"	3531
1-1/2"	5291
2"	10190
2-1/2"	16241
3"	28711
3-1/2"	43165
4"	58561
5"	105944
6"	171548
8"	352466
10"	640173
12"	1013474

PLUMBING PIPING SCHEDULE

TYPE/LOCATION	DOMESTIC COLD WATER	DOMESTIC HOT WATER	DRAIN, WASTE & VENT	NATURAL GAS
ABOVE GROUND	CPVC	CPVC	PVC	BLACK STEEL
BELOW GROUND	CPVC	CPVC	PVC	BLACK STEEL
EXPOSED (PUBLIC)	TYPE L COPPER	TYPE L COPPER	TYPE L COPPER	BLACK STEEL

NOTES:
EXISTING NATURAL GAS PIPE AND FITTINGS (AT 5 AND 10 PSI) LOCATED ALONG EXTERIOR ROOF AND WALL SHALL UTILIZE SCH. 40 BLACK STEEL PIPE WITH WELDED FITTINGS. EXISTING NATURAL GAS PIPE AND FITTINGS (LESS THAN 5 PSI) LOCATED ALONG EXTERIOR ROOF AND ALONG INTERIOR PORTIONS OF EX. FACILITY SHALL UTILIZE SCH. 40 BLACK STEEL PIPE WITH WELDED FITTINGS. NEW NATURAL GAS PIPE AND FITTINGS (AT 2 PSI) LOCATED WITHIN THE INTERIOR PORTIONS OF EX. FACILITY SHALL UTILIZE SCH. 40 BLACK STEEL PIPE WITH THREADED FITTINGS.

PLUMBING SHEET LIST

NUMBER	NAME
P-001	PLUMBING LEGEND
P-400	LEVEL 4 OVERALL PLAN - PLUMBING
P-407A	PARTIAL LEVEL 4 PLAN - AREA 7A - PLUMBING
P-407D	PARTIAL LEVEL 4 PLAN - AREA 7D - PLUMBING
P-408A	PARTIAL LEVEL 4 PLAN - AREA 8A - PLUMBING
P-408B	PARTIAL LEVEL 4 PLAN - AREA 8B - PLUMBING
P-408C	PARTIAL LEVEL 4 PLAN - AREA 8C - PLUMBING
P-408D	PARTIAL LEVEL 4 PLAN - AREA 8D - PLUMBING
P-411A	PARTIAL LEVEL 4 PLAN - AREA 11A - PLUMBING
P-411B	PARTIAL LEVEL 4 PLAN - AREA 11B - PLUMBING
P-411C	PARTIAL LEVEL 4 PLAN - AREA 11C - PLUMBING
P-411D	PARTIAL LEVEL 4 PLAN - AREA 11D - PLUMBING
P-412A	PARTIAL LEVEL 4 PLAN - AREA 12A - PLUMBING
P-412D	PARTIAL LEVEL 4 PLAN - AREA 12D - PLUMBING
P-801	PLUMBING - NATURAL GAS ISOMETRIC
P-801	PLUMBING DETAILS



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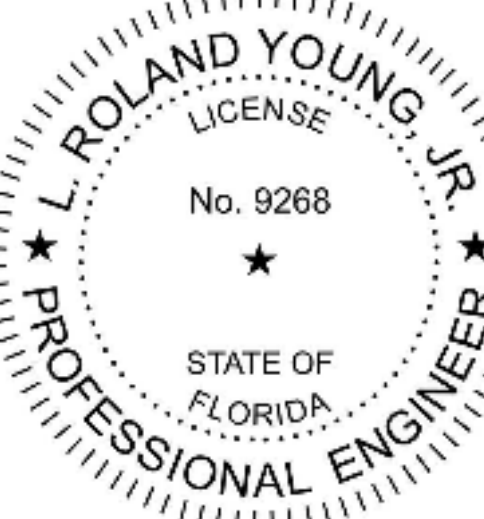
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COA #27158
Project No: 03.18007
Engineer of Record:
L. Roland Young, Jr.
P.E. #9268 FL.



Orange County Convention Center

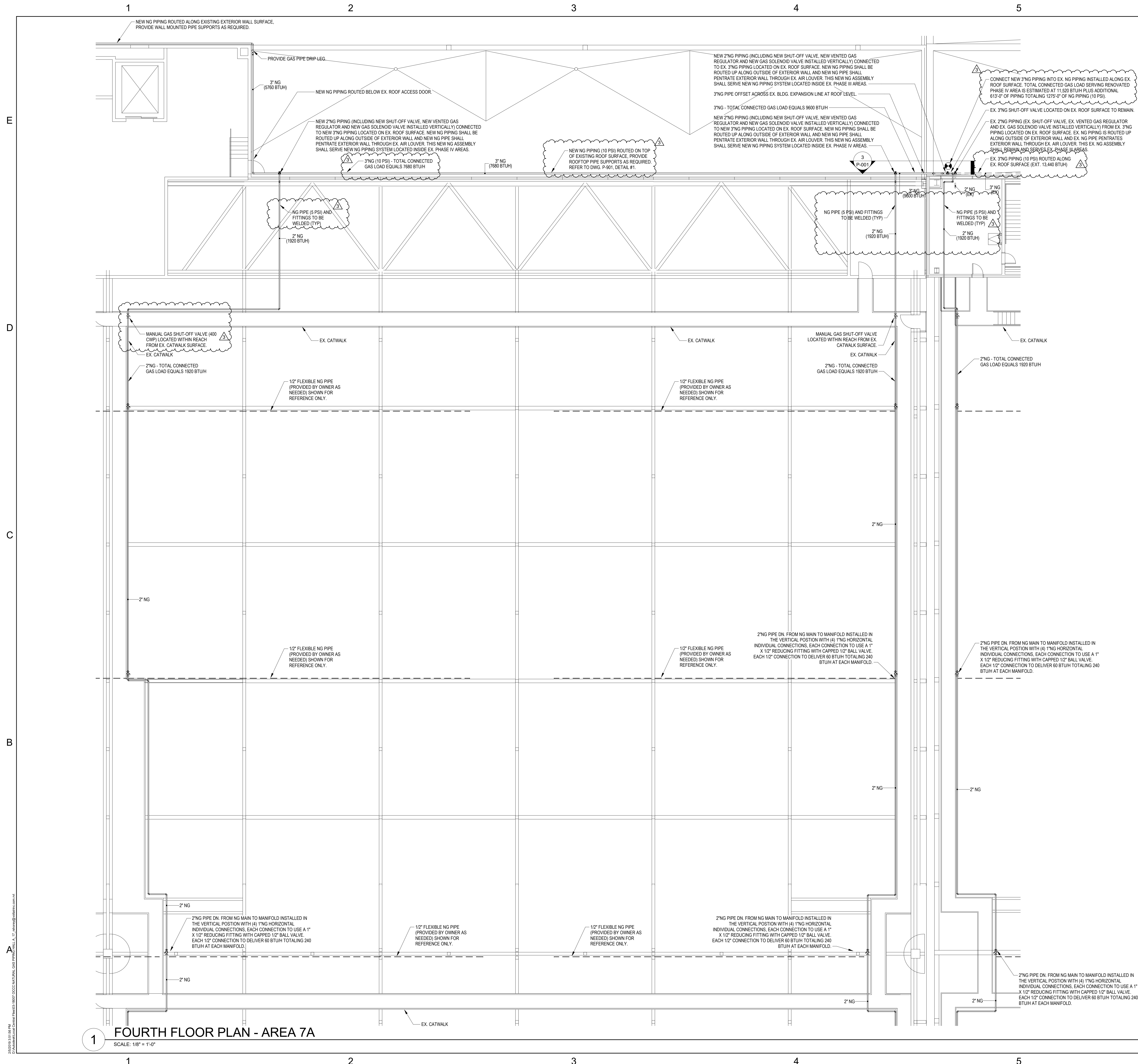
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OCCC - WEST BUILDING, HALL "A" NATURAL GAS RETROFIT

9800 International Dr.
Orlando, FL. 32819

MARK	DATE	DESCRIPTION
△	2/04/19	Addendum #3
△	1/23/19	Addendum #2

ISSUE: 11/30/18
PROJECT NO: 17G0189
DESIGN BY: RJS
DRAWN BY: RJS
REVIEWED BY:

SHEET TITLE
PLUMBING LEGEND



PRESSURE GENERAL NOTES

- NATURAL GAS PIPING SHOWN INSIDE THE EXISTING BUILDINGS ENVELOPE AND ABOVE CONVENTION FLOOR AREA SHALL BE INSTALLED ABOVE EXISTING CATWALK PATHS. GAS PIPING SHALL BE OFFSET TOWARDS THE RAIL SIDE OF CATWALK PATH TO ALLOW READY ACCESS TO NEW GAS PIPING DROPS TO MANIFOLD AND VALVE ASSEMBLIES AND TO KEEP CATWALK PATH CLEAR.
- NATURAL GAS MANIFOLD SHALL BE INSTALLED IN THE VERTICAL POSITION AND VALVE ASSEMBLIES SHALL BE INSTALLED IN A HORIZONTAL POSITION.
- HORIZONTAL NATURAL GAS VALVE ASSEMBLIES SHALL BE INSTALLED 5'-0" OFF OF EXISTING CATWALK SURFACE (SO THE MIDDLE OF VALVE ASSEMBLY IS 5'-0" ABOVE CATWALK SURFACE).

KEYPLAN

			6	5	
12C	12B	7C	7B	4C	
12D	12A	7D	7A	4D	
11C	11B	8C	8B	3C	
11D	11A	8D	8A	3D	
10C	10B	9C	9B	2C	
10D	10A	9D	9A	2D	



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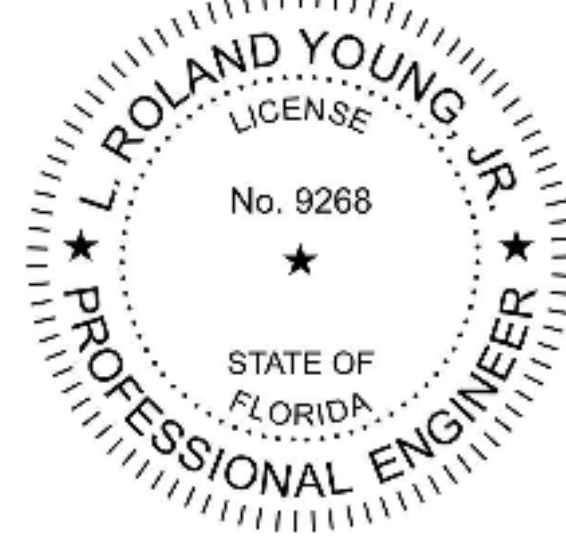
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SHEET TITLE
 PARTIAL LEVEL 4
 PLAN - AREA 7A -
 PLUMBING

100% CD'S
 P-407A

FOURTH FLOOR PLAN - AREA 7A
 SCALE: 1/8" = 1'-0"

1

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3

4

5

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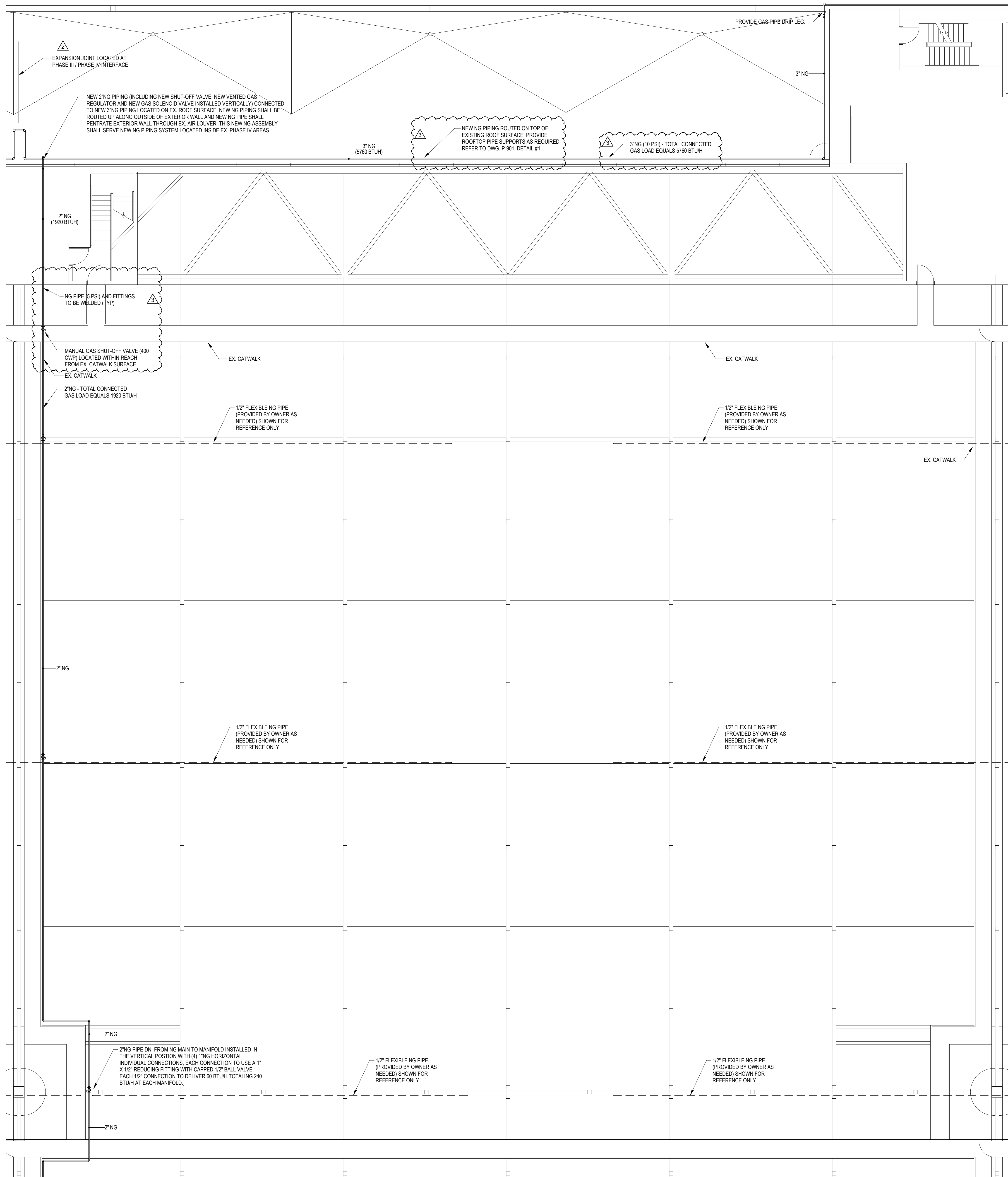
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D

C

B

A



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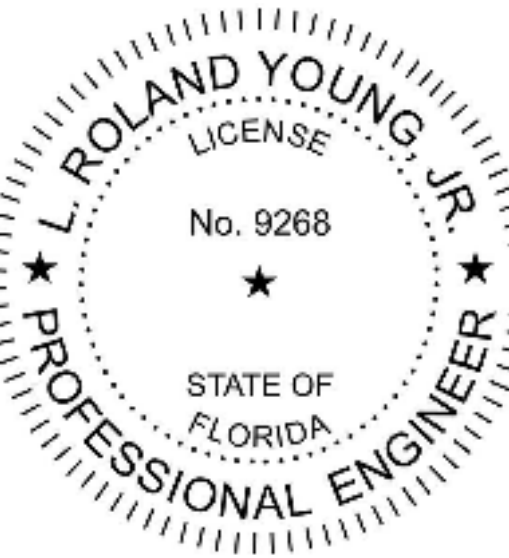
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SHEET TITLE
PARTIAL LEVEL 4
PLAN - AREA 7D -
PLUMBING

100% CD'S
P-407D

FOURTH FLOOR PLAN - AREA 7D

SCALE: 1/8" = 1'-0"

1

2

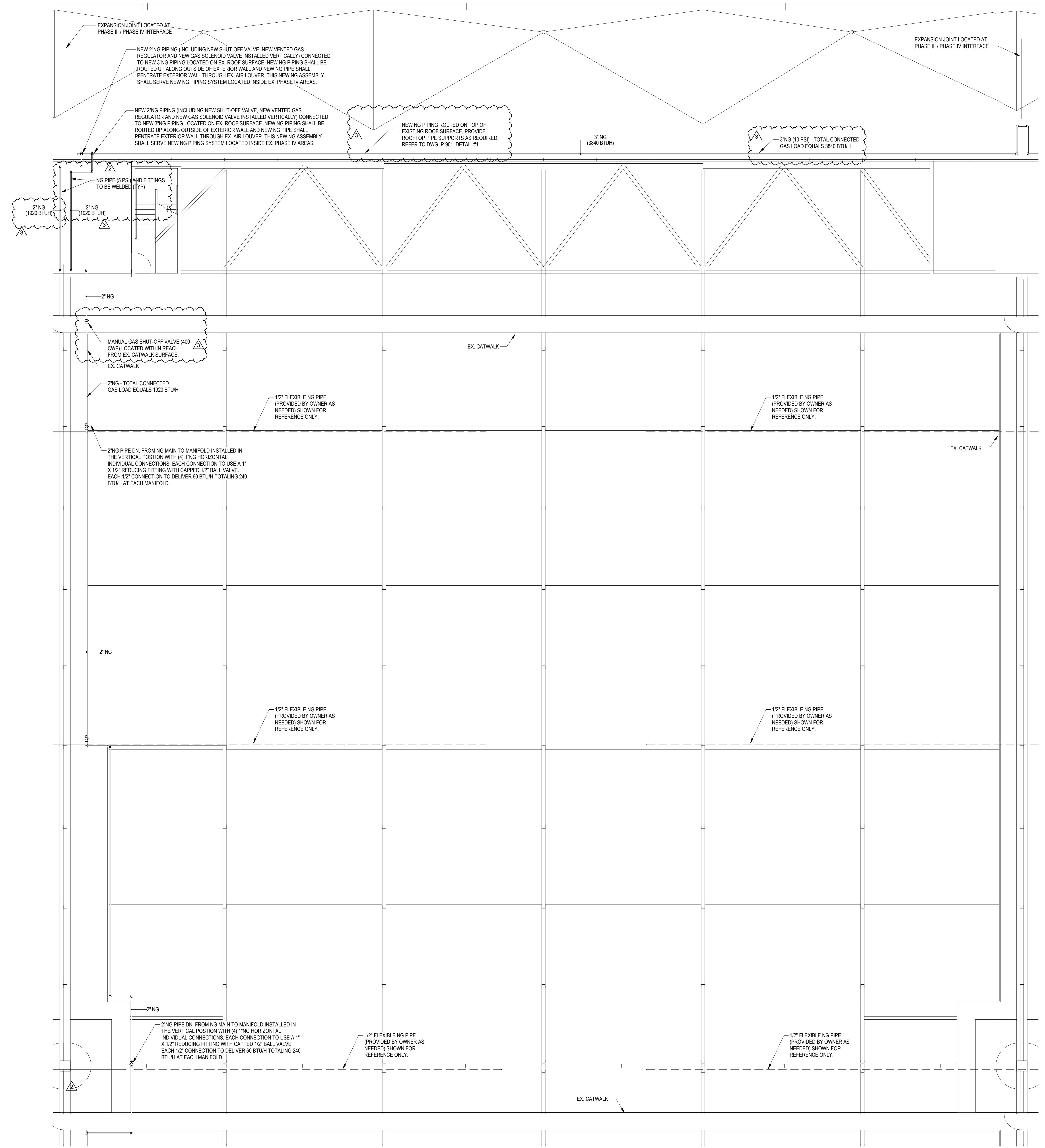
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1 FOURTH FLOOR PLAN - AREA 12A
SCALE: 1/8" = 1'-0"

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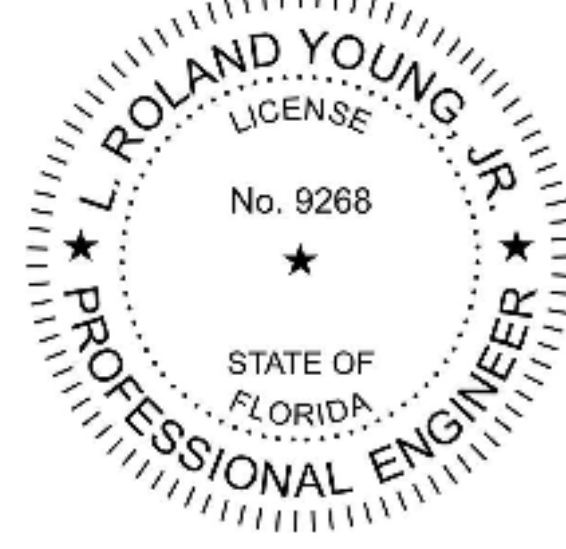
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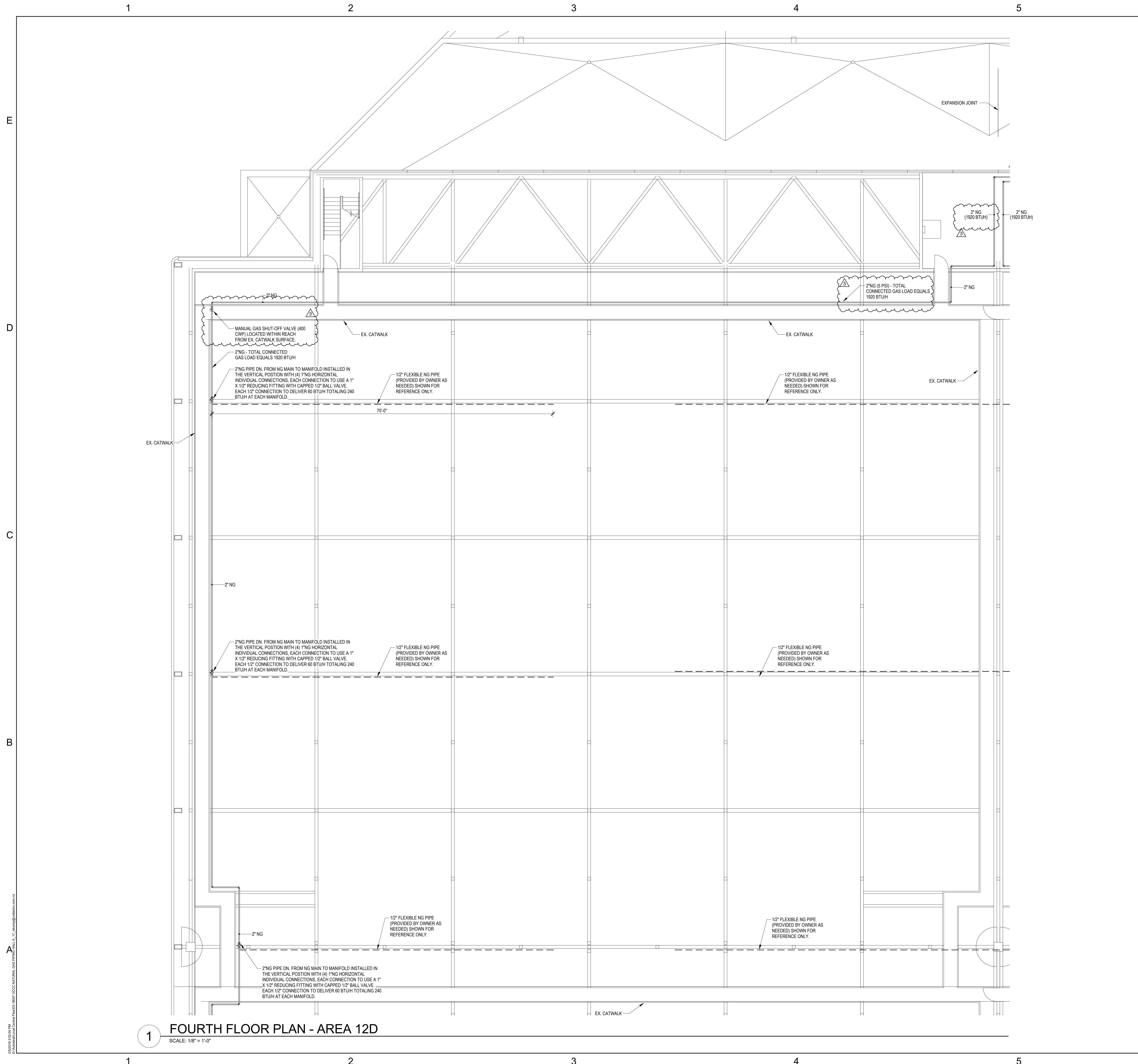
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SHEET TITLE
PARTIAL LEVEL 4
PLAN - AREA 12A -
PLUMBING

100% CD'S
P-412A



1 FOURTH FLOOR PLAN - AREA 12D
SCALE: 1/8" = 1'-0"

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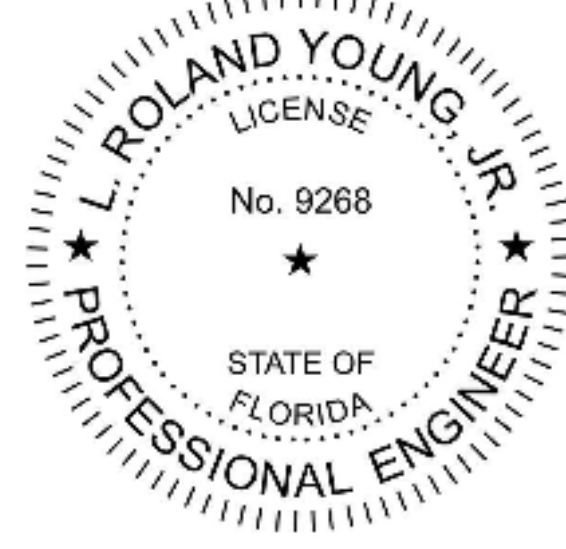
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12D	12A	7D	7A	4D
11C	11B	8C	8B	3C
11D	11A	8D	8A	3D
10C	10B	9C	9B	2C
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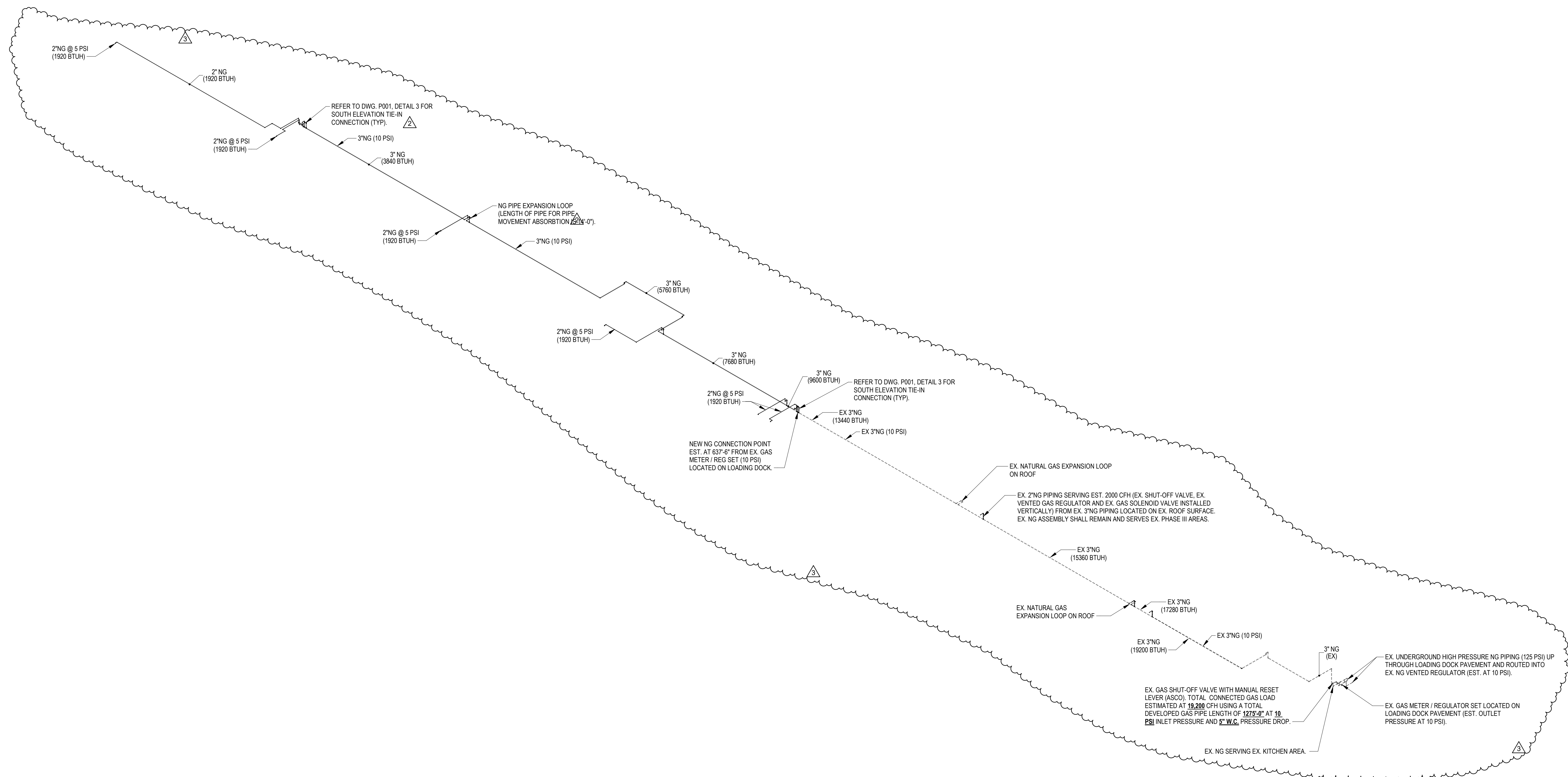
9800 International Dr.
Orlando, FL. 32819

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▲	MARK	DATE	DESCRIPTION	

ISSUE: 11/30/18
PROJECT NO: 17G0189
DESIGN BY: RJS
DRAWN BY: RJS
REVIEWED BY:

SHEET TITLE
PARTIAL LEVEL 4
PLAN - AREA 12D -
PLUMBING

100% CD'S
P-412D



1 NATURAL GAS ISOMETRIC
SCALE:



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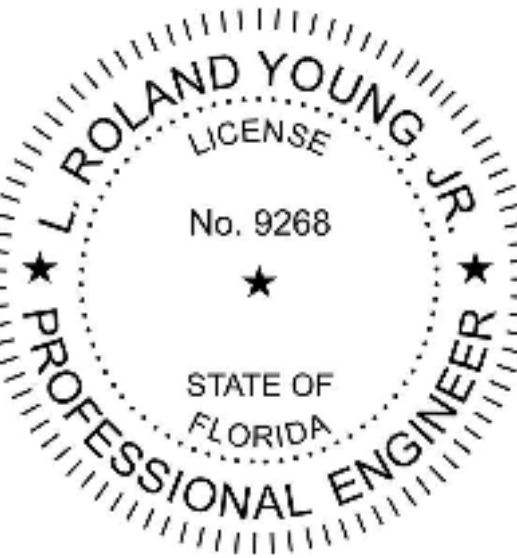
Hanson Professional Services Inc.

EB0007061
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IB0001058

CONSULTANTS



220 West 7th Avenue, Suite 210
Tampa, Florida 33602
Tel: 888.891.9713
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COA #27158
Project No: 03.18007
Engineer of Record:
L. Roland Young, Jr.
P.E. #9268 FL



**Orange
County
Convention
Center**

SEAL

**OCCC - WEST
BUILDING, HALL "A"
NATURAL GAS
RETROFIT**

9800 International Dr.
Orlando, FL. 32819

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▲	2/04/19	Addendum #3
▲	1/23/19	Addendum #2
MARK	DATE	DESCRIPTION

ISSUE: 11/30/18
PROJECT NO: 17G0189
DESIGN BY: RJS
DRAWN BY: RJS
REVIEWED BY:

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SHEET TITLE
**PLUMBING -
NATURAL GAS
ISOMETRIC**

100% CD'S

P-801

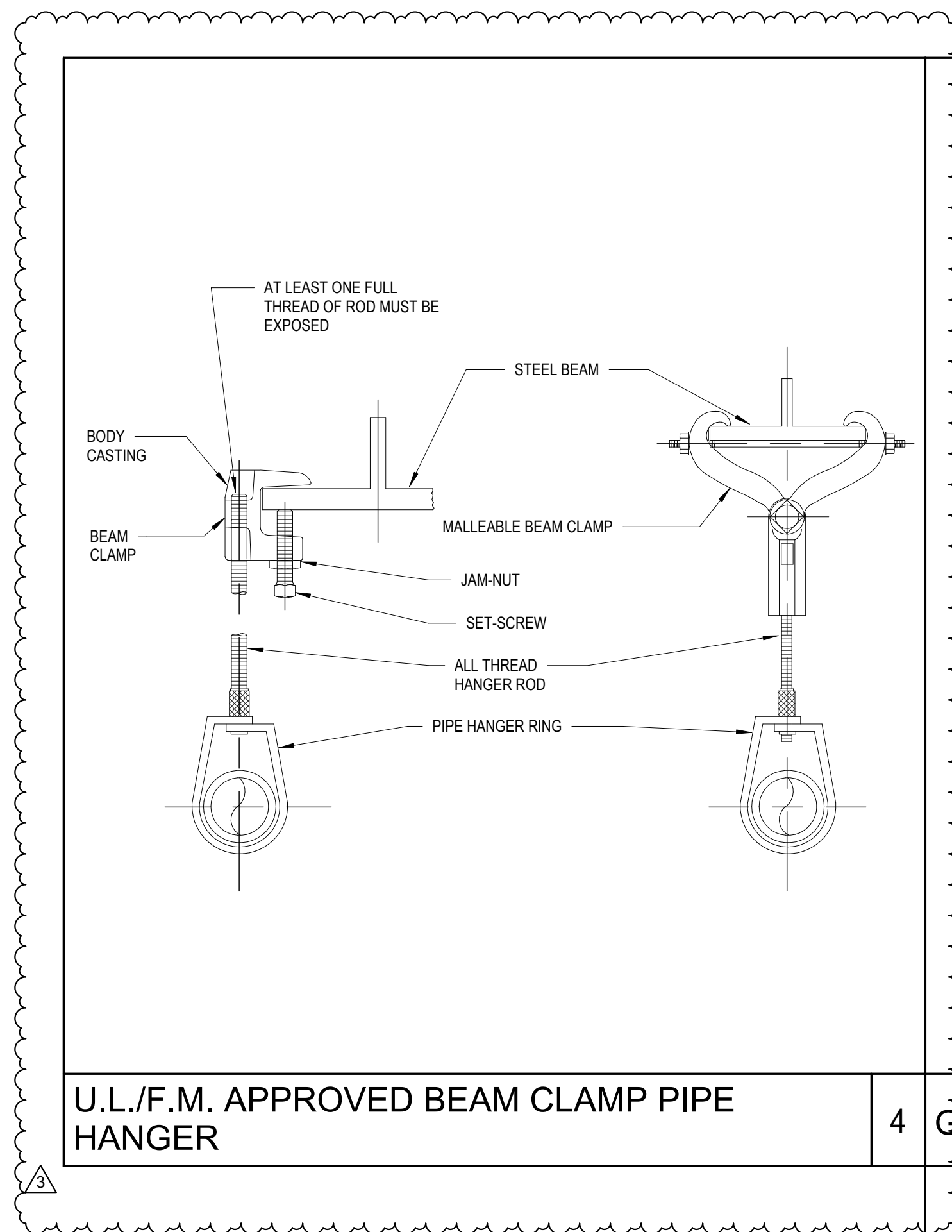
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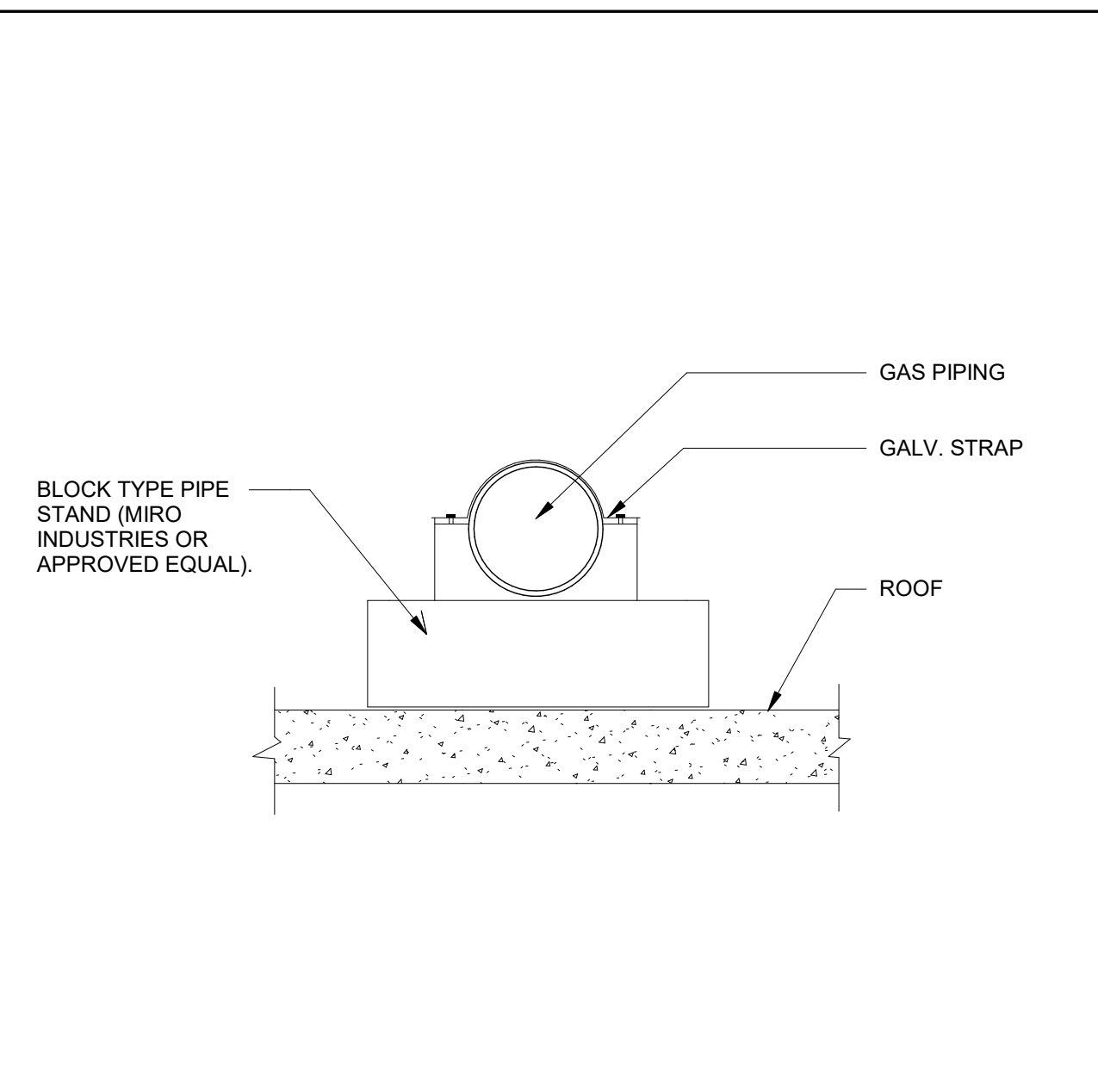
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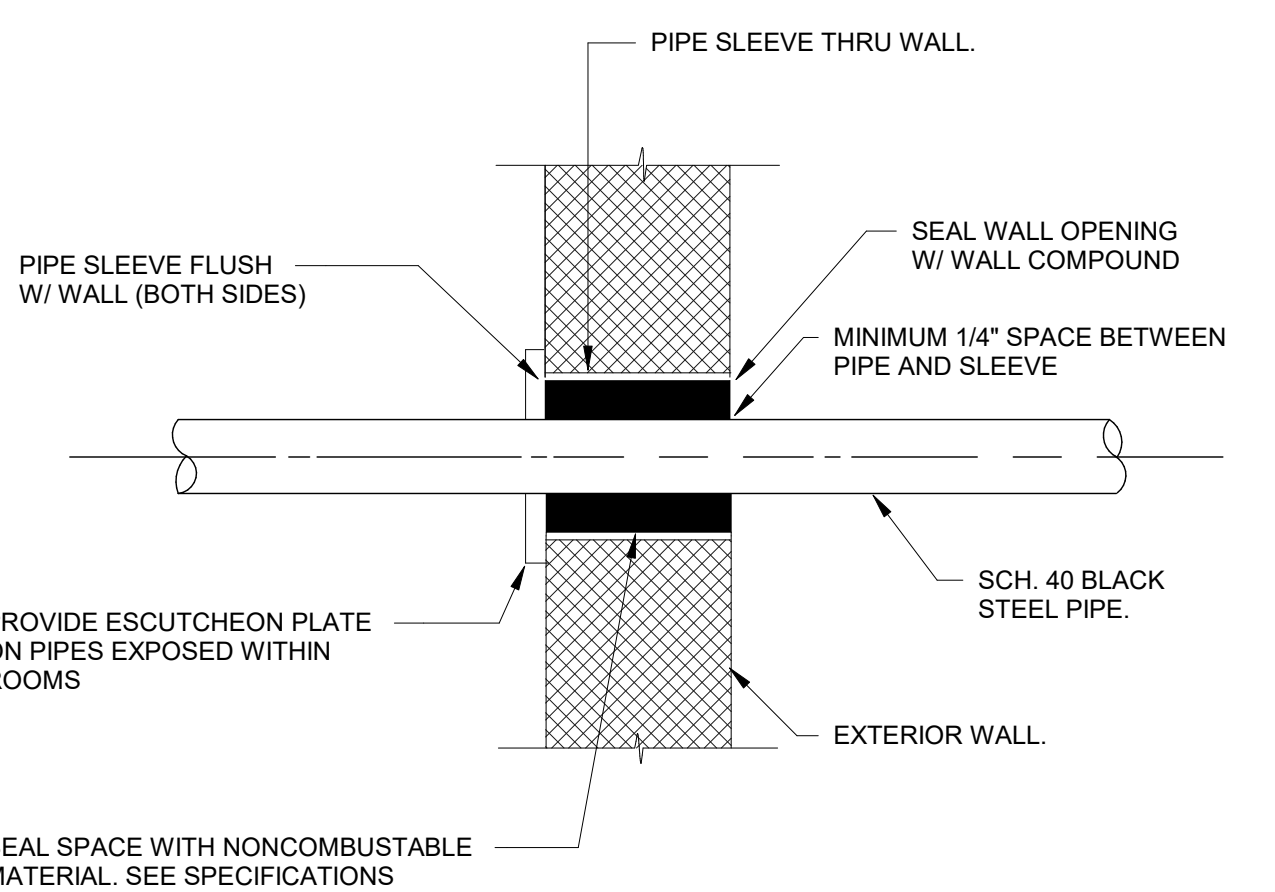
U.L./F.M. APPROVED BEAM CLAMP PIPE HANGER



- NOTES:
1. BLOCK PIPE STANDS TO BE SPACED NO MORE THAN 10'-0" ON CENTER OR CLOSER IF REQUIRED BY LOAD OR ROOF STRUCTURE.
 2. PROVIDE 12 GA. GALVANIZED STRAP. ATTACH TO PILLOW BLOCK PIPE STAND W/ CADMIUM PLATED SCREWS (SIZE AS REQUIRED)

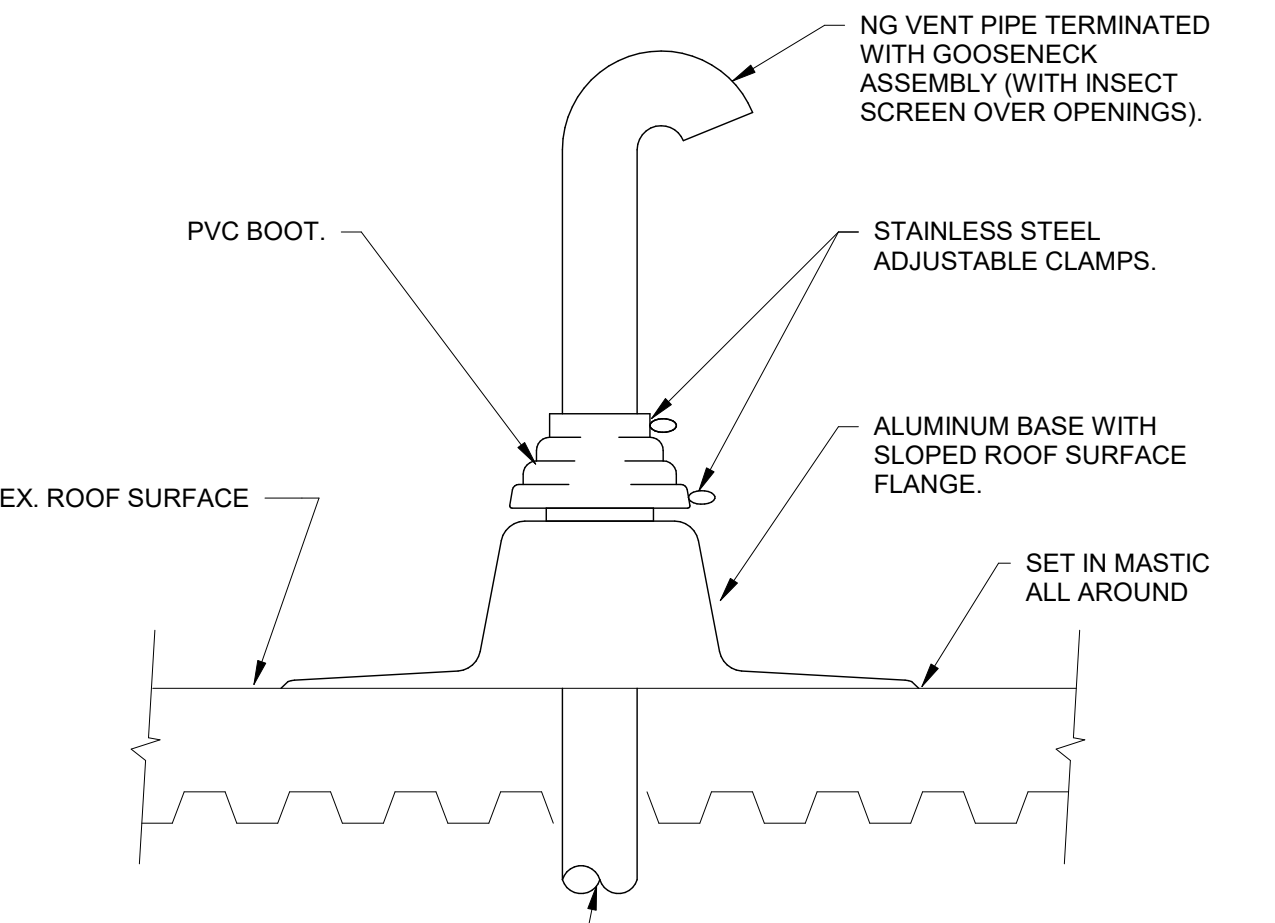
GAS PIPE SUPPORT

4 1



PIPE SLEEVE THROUGH RATED WALL

2



NOTE:
PIPE SEAL ASSEMBLY SHALL UTILIZE ONE PIECE SPUN ALUMINUM BASE WITH FULL FIVE INCH SLOPED ROOF SURFACE FLANGE WITH GRADUATED STEP PVC BOOT AND ADJUSTABLE STAINLESS STEEL CLAMPS EQUAL TO THE PATE COMPANY OR APPROVED EQUAL.

PIPING ROOF PENETRATION DETAIL

3



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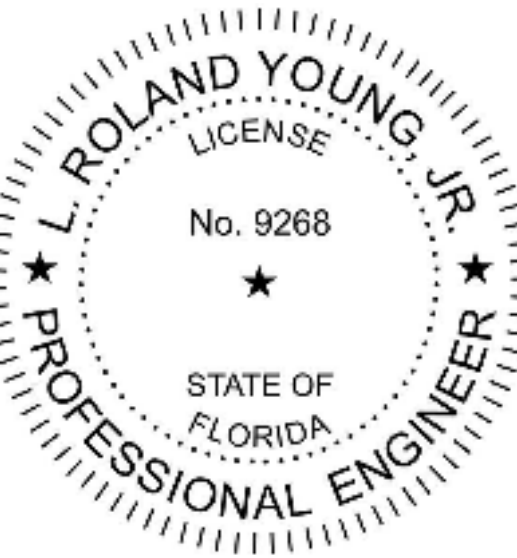
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Orange County Convention Center

SEAL
OCCC - WEST BUILDING, HALL "A" NATURAL GAS RETROFIT

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SECTION 231123 - FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipes, tubes, and fittings.
 - 2. Piping specialties.
 - 3. Piping and tubing joining materials.
 - 4. Valves.
 - 5. Pressure regulators.
 - 6. Mechanical sleeve seals.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

1.4 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings:
 - 1. Piping and Valves: 100 psig minimum unless otherwise indicated.
 - 2. Service Regulators: 100 psig minimum unless otherwise indicated.
- B. Natural-Gas System Pressure down stream of service meter: 10 psi.

1.5 SUBMITTALS

- A. Product Data: For each type of the following:

1. Piping and specialties.
2. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
3. Pressure regulators. Indicate pressure ratings and capacities.
4. Dielectric fittings.
5. Escutcheons.

B. Welding certificates

C. Operation and Maintenance Data: For piping specialties.

1.6 QUALITY ASSURANCE

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.

1.8 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.
- B. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:
 1. Notify Architect and Owner in advance of proposed interruption of natural-gas service.
 2. Do not proceed with interruption of natural-gas service without Architect's and Owner's written permission.

1.9 COORDINATION

- A. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
 - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
 - 2. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
 - 3. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
 - a. Material Group: 1.1.
 - b. End Connections: Threaded.
 - c. Lapped Face: Not permitted underground.
 - d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
 - e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground.

2.2 PIPING SPECIALTIES

- A. Appliance Flexible Connectors:
 - 1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
 - 2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
 - 3. Corrugated stainless-steel tubing with polymer coating.
 - 4. Operating-Pressure Rating: Refer to Appliance manufacturer.
 - 5. End Fittings: Zinc-coated steel.
 - 6. Threaded Ends: Comply with ASME B1.20.1.
 - 7. Maximum Length: 72 inches
- B. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.3 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for natural gas.
- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 MANUAL GAS SHUTOFF VALVES

- A. See "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.
- B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.
 - 1. CWP Rating: 400 psig.
 - 2. Threaded Ends: Comply with ASME B1.20.1.
 - 3. Tamperproof Feature: Locking feature for valves indicated in "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 - 4. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 - 5. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.
- C. General Requirements for Metallic Valves, NPS 2-1/2 and Larger: Comply with ASME B16.38.
 - 1. CWP Rating: 400 psig.
 - 2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
 - 3. Tamperproof Feature: Locking feature for valves indicated in "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 - 4. Service Mark: Initials "WOG" shall be permanently marked on valve body.
- D. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.; Apollo Div.
 - b. Perfection Corporation; a subsidiary of American Meter Company.
 - c. NIBCO Inc.
 - 2. Body: Bronze, complying with ASTM B 584.
 - 3. Ball: Chrome-plated bronze.
 - 4. Stem: Bronze; blowout proof.
 - 5. Seats: Reinforced TFE; blowout proof.
 - 6. Packing: Threaded-body packnut design with adjustable-stem packing.
 - 7. Ends: Threaded, "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 - 8. CWP Rating: 600 psig.
 - 9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 - 10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- E. Bronze Plug Valves: MSS SP-78.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Lee Brass Company.
 - b. McDonald, A. Y. Mfg. Co.
2. Body: Bronze, complying with ASTM B 584.
 3. Plug: Bronze.
 4. Ends: Threaded, "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 5. Operator: Square head or lug type with tamperproof feature where indicated.
 6. Pressure Class: 400 psig.
 7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

2.5 MOTORIZED GAS VALVES

A. Automatic Gas Valves: Comply with ANSI Z21.21.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ASCO Power Technologies, LP; Division of Emerson.
 - b. Honeywell International Inc.
 - c. Johnson Controls.
2. Body: Brass or aluminum.
3. Seats and Disc: Nitrile rubber.
4. Springs and Valve Trim: Stainless steel.
5. Normally closed.
6. Visual position indicator.
7. Electrical operator for actuation by appliance automatic shutoff device.
8. Manual reset.

B. Electrically Operated Valves: Comply with UL 429.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ASCO Power Technologies, LP; Division of Emerson.
 - b. Magnatrol Valve Corporation.
 - c. Watts Regulator Co.; Division of Watts Water Technologies, Inc.
2. Pilot operated.
3. Body: Brass or aluminum.
4. Seats and Disc: Nitrile rubber.
5. Springs and Valve Trim: Stainless steel.
6. 120-V ac, 60 Hz, Class B, continuous-duty molded coil, and replaceable.
7. NEMA ICS 6, Type 4, coil enclosure.

8. Normally closed.
9. Visual position indicator.

2.6 PRESSURE REGULATORS

A. General Requirements:

1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 and smaller.

B. Line Pressure Regulators: Comply with ANSI Z21.80.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Meter Company.
 - b. Pietro Fiorentini
 - c. Maxitrol Company.
2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
6. Orifice: Aluminum; interchangeable.
7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
10. Overpressure Protection Device: Factory mounted on pressure regulator.
11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
12. Pressure rating as required per system design see drawings

C. Appliance Pressure Regulators: Comply with ANSI Z21.18.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Eaton Corporation; Controls Div.
 - b. Harper Wyman Co.

- c. Maxitrol Company.
 2. Body and Diaphragm Case: Die-cast aluminum.
 3. Springs: Zinc-plated steel; interchangeable.
 4. Diaphragm Plate: Zinc-plated steel.
 5. Seat Disc: Nitrile rubber.
 6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
 7. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
 8. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
 9. Pressure rating as required per system design see drawings

2.7 DIELECTRIC FITTINGS

A. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. Hart Industries International, Inc.
 - d. McDonald, A. Y. Mfg. Co.
 - e. Watts Regulator Co.; Division of Watts Water Technologies, Inc.
 - f. Wilkins; Zurn Plumbing Products Group.
2. Minimum Operating-Pressure Rating: 150 psig.
3. Combination fitting of copper alloy and ferrous materials.
4. Insulating materials suitable for natural gas.
5. Combination fitting of copper alloy and ferrous materials with threaded, brazed-joint, plain, or welded end connections that match piping system materials.

B. Dielectric-Flange Kits:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
2. Minimum Operating-Pressure Rating: 150 psig.
3. Companion-flange assembly for field assembly.
4. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or PE bolt sleeves, phenolic washers, and steel backing washers.
5. Insulating materials suitable for natural gas.

6. Combination fitting of copper alloy and ferrous materials with threaded, brazed-joint, plain, or welded end connections that match piping system materials.

2.8 SLEEVES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

2.9 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico Inc.
 - c. Metraflex Company (The).
 - d. Pipeline Seal and Insulator, Inc.
 2. Sealing Elements: interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe and sleeve.
 3. Pressure Plates: Stainless steel.
 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one nut and bolt for each sealing element.

2.10 ESCUTCHEONS

- A. General Requirements for Escutcheons: Manufactured wall and ceiling escutcheons and floor plates, with ID to fit around pipe or tube, and OD that completely covers opening.
- B. One-Piece, Deep-Pattern Escutcheons: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Escutcheons: With set screw.
 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Escutcheons: With concealed hinge and set screw.
 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Escutcheons: With set screw and chrome-plated finish.

- F. Split-Plate, Stamped-Steel Escutcheons: With concealed hinge, set screw or spring clips, and chrome-plated finish.
- G. One-Piece, Floor-Plate Escutcheons: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Escutcheons: Cast brass with concealed hinge and set screw.

2.11 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

2.12 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Close equipment shutoff valves before turning off natural gas to premises or piping section.
- B. Inspect natural-gas piping according to NFPA 54 or Local Code requirements to determine that natural-gas utilization devices are turned off in piping section affected.
- C. Comply with NFPA 54 or the Local Code requirements for prevention of accidental ignition.

3.3 OUTDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 or the Local Code requirements for installation and purging of natural-gas piping.
- B. Steel Piping with Protective Coating:
 - 1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
 - 2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.
 - 3. Replace pipe having damaged PE coating with new pipe.
- C. Install fittings for changes in direction and branch connections.
- D. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
- E. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 INDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 or the Local Code requirements for installation and purging of natural-gas piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Locate valves within arm's reach of catwalk platforms for easy access. Install all pipe valves above horizontal plane or in vertical rise.
- G. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.

- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install escutcheons at penetrations of interior walls, ceilings, and floors.
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Piping at Wall, Ceiling and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
- K. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
- L. Verify final equipment locations for roughing-in.
- M. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
- N. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets and all equipment connections. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
 - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.
- O. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.
- P. Conceal pipe installations in pipe spaces, utility spaces, and above ceilings.
- Q. Concealed Location Installations: Except as specified below, install concealed natural-gas piping in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.
 - 1. Above Accessible Ceilings: Natural-gas piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.
 - 2. Prohibited Locations:
 - a. Do not install natural-gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
 - b. Do not install natural-gas piping in solid walls or partitions.

- R. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- S. Connect branch piping from top or side of horizontal piping.
- T. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.
- U. Do not use natural-gas piping as grounding electrode.
- V. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.

3.5 VALVE INSTALLATION

- A. Install manual gas shutoff valve for each gas appliance.
- B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

3.6 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints (**Above Ground Only**) :
 - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
 - 2. Cut threads full and clean using sharp dies.
 - 3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
 - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
 - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints:

- 1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
- 2. Bevel plain ends of steel pipe.
- 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

3.7 HANGER AND SUPPORT INSTALLATION

- A. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
- B. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
 - 1. NPS 1 and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 - 2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 3. NPS 1-1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 4. NPS 2-1/2 to NPS 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.

3.8 CONNECTIONS

- A. Connect to utility's gas main according to utility's procedures and requirements.
- B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.
- C. Install piping adjacent to appliances to allow service and maintenance of appliances.
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.9 LABELING AND IDENTIFYING

- A. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for piping and valve identification.

3.10 PAINTING

- A. Comply with requirements in Division 09 painting Sections for painting interior and exterior natural-gas piping.
- B. Paint metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.
 - 1. Alkyd System: MPI EXT 5.1D.
 - a. Prime Coat: Alkyd anticorrosive metal primer.
 - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
 - c. Topcoat: Exterior alkyd enamel (semigloss).
 - d. Color: Safety Yellow.

- C. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.11 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Test, inspect, and purge natural gas according to NFPA 54 or Local Code requirements and authorities having jurisdiction.
- C. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.12 OUTDOOR PIPING SCHEDULE

- A. Aboveground natural-gas piping (greater than 5 psi) shall be one of the following:
 - 1. Steel pipe with wrought-steel fittings and welded joints, 2" and smaller diameter.
 - 2. Steel pipe with wrought-steel fittings and welded joints, 2 1/2" and larger diameter.

3.13 INDOOR PIPING SCHEDULE:

- A. Aboveground piping 2" and smaller shall be the following:
 - 1. Steel pipe with wrought-steel fittings and welded joints.
- B. Aboveground piping 2 1/2" and larger shall be the following:
 - 1. Steel pipe with wrought-steel fittings and welded joints.
- C. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.
- D. Containment Conduit Vent Piping: Steel pipe with malleable-iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.

3.14 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

- A. Valves for pipe sizes NPS 2 and smaller shall be listed for use with natural gas and shall be one of the following:
 - 1. Two-piece, full-port, bronze ball valves with bronze trim.

- B. Valves for pipe sizes NPS 2-1/2 and larger shall be listed for use with natural gas and shall be one of the following:
1. Two-piece, full-port, bronze ball valves with bronze trim.
 2. Bronze plug valve.

END OF SECTION 231123