

Proposed 244,876 S.F. Data Center:
QTS DEN1 DC2 ESB (FIT-OUT)

1140 N GUN CLUB RD
AURORA, COLORADO 80018

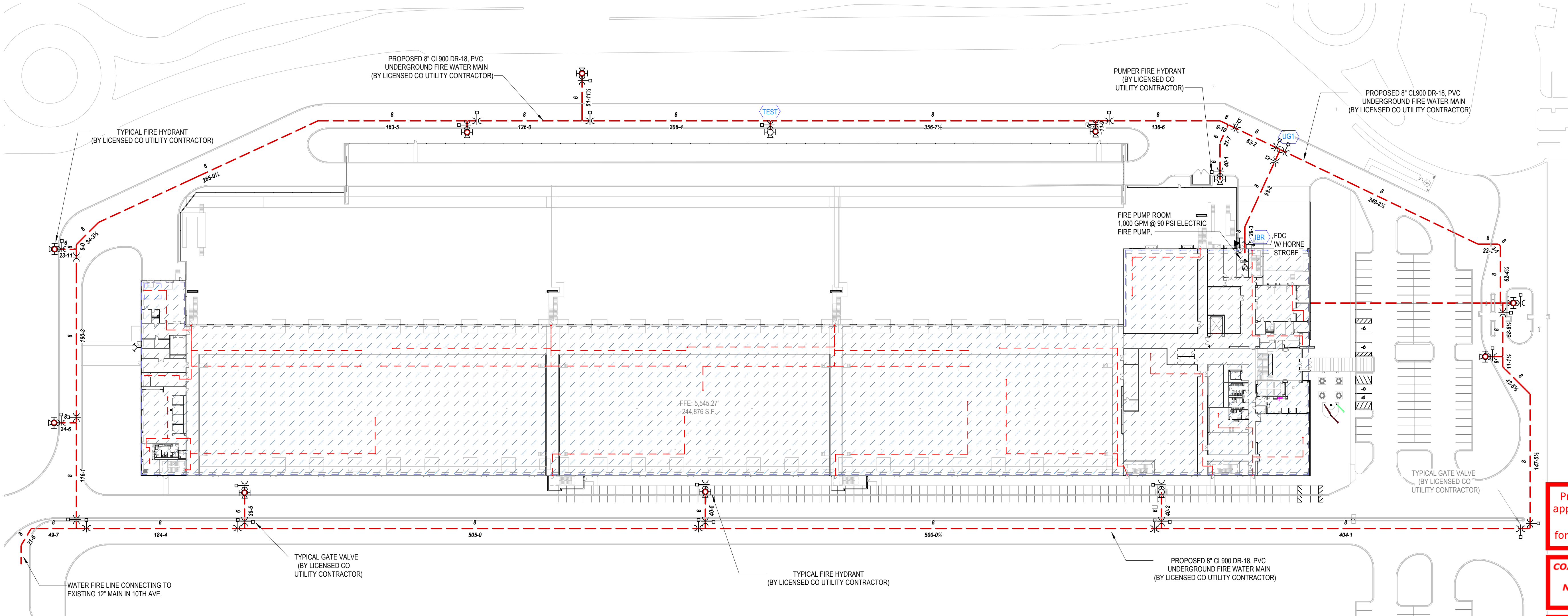
PLEASE SEE PERMIT
2026 2513934-CM04
FOR CORE & SHELL DRAWINGS
RSN 1975523

WATER FLOW TEST DATED 07/16/2025
PREPARED AND PROVIDED BY Aurora
AND WITNESSED BY Water

LOCATION:
N Gun Club Rd. & E 14th Ave

ELEVATIONS
HYDRANT ELEVATION: 5540
BUILDING ELEVATION: 5544

ACTUAL:
STATIC PRESSURE: 71 PSI
RESIDUAL PRESSURE: 59 PSI
FLOW: 4000 GPM



KEY TO UNGD. SYMBOLS

	UNGD. LEAD-IN LOCATION
	SIAMSE FIRE DEPT. CONNECTION
	STORZ FIRE DEPT. CONNECTION
	UNGD. GATE VALVE W/ ROADWAY BOX
	UNGD. GATE VALVE W/ YARD P.I.V.
	FIRE HYDRANT

New work shown has been reviewed under this permit. All other areas are shown for reference only and were not reviewed under this permit. Any changes made to previously approved plans may require a separate revision submittal.

SCOPE OF WORK:

SHAMBAUGH & SON, L.P. IS TO PROVIDE AND INSTALL:

- (3) PREACTION PIPE SYSTEM TO PROTECT UPS PODS CONNECTING TO BUILDING
- INSTALL SPRINKLER DROPS INTO T.I SPACES INSIDE DATA HALLS
- INSTALL UPRIGHTS INSIDE UPS PODS
- WATER FLOW AND SUPERVISORY SWITCHES (WIRED BY OTHERS)

WORK PROVIDED AND INSTALLED BY OTHERS:

- ALL UNDERGROUND WATER PIPING
- FIRE PUMP HOUSES CONSTRUCTION, INCLUDING ALL MECHANICAL AND ELECTRICAL WORK
- CONCRETE PUMP PADS AND GROUTING OF PUMP BASES
- ALL FIRE ALARM WORK
- WIRING OF ALL WATER FLOW AND SUPERVISORY SWITCHES INSTALLED BY SHAMBAUGH
- PAINTING OF SPRINKLER PIPE
- INSTALLATION AND REMOVAL OF TEMPORARY COVERING TO PROTECT SPRINKLERS FROM PAINTING
- FIRE EXTINGUISHERS

CODE INFORMATION:

- 2023 NATIONAL FIRE PROTECTION ASSOCIATION NATIONAL ELECTRIC CODE
- 2021 INTERNATIONAL FIRE PREVENTION CODE
- NFPA 13 - 2019 EDITION "INSTALLATION OF SPRINKLER SYSTEMS"

BUILDING DESIGN INFORMATION:

- BUILDING AREA - 244,876 S.F. EXISTING
- BUILDING USE GROUP - B (OFFICE), S-2 (ELECTRONIC DATA PROCESSING)
- CONSTRUCTION TYPE PER NFPA 13 - NON COMBUSTIBLE METAL DECK ON STEEL BEAMS, GIRDERS, & BAR JOISTS, CONCRETE SLAB UNOBSTRUCTED WITH SMOOTH CEILINGS AS DEFINED IN NFPA 13 EXISTING
- CONSTRUCTION TYPE PER IBC - IIB NONCOMBUSTIBLE UNPROTECTED EXISTING
- NUMBER OF STORIES - (2) TWO EXISTING
- BUILDING HEIGHT - 86'-0" TO TOP STEEL AT PEAK EXISTING

SPRINKLER SYSTEM PIPE AND FITTING NOTES

- ALL MATERIAL AND RELATED EQUIPMENT SHALL BE UL APPROVED AND LISTED FOR FIRE PROTECTION USE.

PIPING

- 1" THREADED BRANCH LINE PIPING SHALL BE BLACK STEEL SCH. 40 PIPE, MANUFACTURED PER ASTM A135 STANDARDS.
- 2" - 2.5" PREACTION & DRY PIPING - BLACK SCH. 40 (OR 1.0 OR GREATER) WITH GROOVED END AND WELDED OUTLETS.

VALVES

- ALL VALVES CONTROLLING WATER FLOW TO SPRINKLERS SHALL BE TAMPERED (WIRED BY OTHERS). ALL VALVES SHALL BE ACCESSIBLE AT ALL TIMES AND PERMANENTLY IDENTIFIED.

HYDRAULIC PLACARDS

- SHAMBAUGH & SON, L.P. IS TO PROVIDE HYDRAULIC PLACARDS AS PER HYDRAULIC CALCULATIONS - TO BE LOCATED ON THE FIRE SPRINKLER RISERS.

SPRINKLER HEAD WRENCH

- SHAMBAUGH & SON, L.P. IS TO PROVIDE SPRINKLER HEAD WRENCHES FOR EACH TYPE OF SPRINKLER HEADS USED THROUGHOUT THE PROJECT. SPRINKLER HEAD WRENCHES ARE ONLY TO BE USED ON THE SPRINKLER HEADS FOR WHICH THEY ARE MADE AND FOR NO OTHER USE. IF SPRINKLER HEADS ARE TO BE REMOVED BY PERSONS OTHER THAN SHAMBAUGH & SON, L.P., THE USE OF ANY OTHER TOOL (INCLUDING BUT NOT LIMITED TO CHANNEL LOCKS AND CRESCENT WRENCH) SHALL IMMEDIATELY INDEMNIFY SHAMBAUGH & SON, L.P. AGAINST ANY LOSSES DUE TO REMOVAL AND REPLACEMENT OF THE SPRINKLERS.

AUXILIARY DRAINS

- AUXILIARY DRAINS SHALL BE PROVIDED WHERE CHANGING IN ELEVATIONS PREVENTS DRAINAGE THROUGH MAIN DRAIN.

OVERHEAD PIPE TESTING

- ALL PIPE IS TO BE HYDROSTATICALLY TESTED AT 225 PSI FOR 2 HOURS.
- THE LOCAL FIRE DEPARTMENT IS TO BE NOTIFIED 48 HOURS IN ADVANCE OF THE TEST
- WHEN THE SYSTEM(S) IS (ARE) COMPLETE AND IN THE PRESENCE OF THE FIRE MARSHALL, A 2" MAIN DRAIN TEST WILL BE PROVIDED.
- ALL SPRINKLER SYSTEM WORK UNDER THE SCOPE OF WORK SHALL BE FIELD VERIFIED BY INSPECTION PERSONAL.

UNDERGROUND TESTING AND FLUSHING

- THE AUTHORITY HAVING JURISDICTION SHALL BE NOTIFIED (BY UNDERGROUND PIPING INSTALLING CONTRACTOR) PRIOR TO COVERING THE UNDERGROUND FIRE MAIN AND THRUST BLOCKS FOR A VISUAL INSPECTION AT THE AUTHORITY'S DISCRETION.
- ALL UNDERGROUND PIPE IS TO BE TESTED AND FLUSHED PER NFPA 24 STANDARDS BY THE INSTALLING CONTRACTOR BEFORE SHAMBAUGH & SON, L.P. CONNECTS ANY OVERHEAD PIPING TO IT.
- FLUSHING OPERATION SHALL BE CONTINUED FOR A SUFFICIENT TIME TO ENSURE THOROUGH CLEANING. THE MINIMUM RATE OF THE FLOW SHALL NOT BE LESS THAN REQUIRED PER NFPA 13 (2019) TABLE 6.10.2.1.3.
- TESTING OF THE NEW UNDERGROUND (BY UNDERGROUND INSTALLING CONTRACTOR) SHALL BE PER NFPA AND WITNESSED BY THE AUTHORITY HAVING JURISDICTION.
- COMPLETED CONTRACTOR'S MATERIAL TEST CERTIFICATE SHALL BE PROVIDED FOR THE BELOW GROUND & ABOVE GROUND PIPING TO THE A.H.J. PRIOR TO ACCEPTANCE TESTING.

NFPA 25

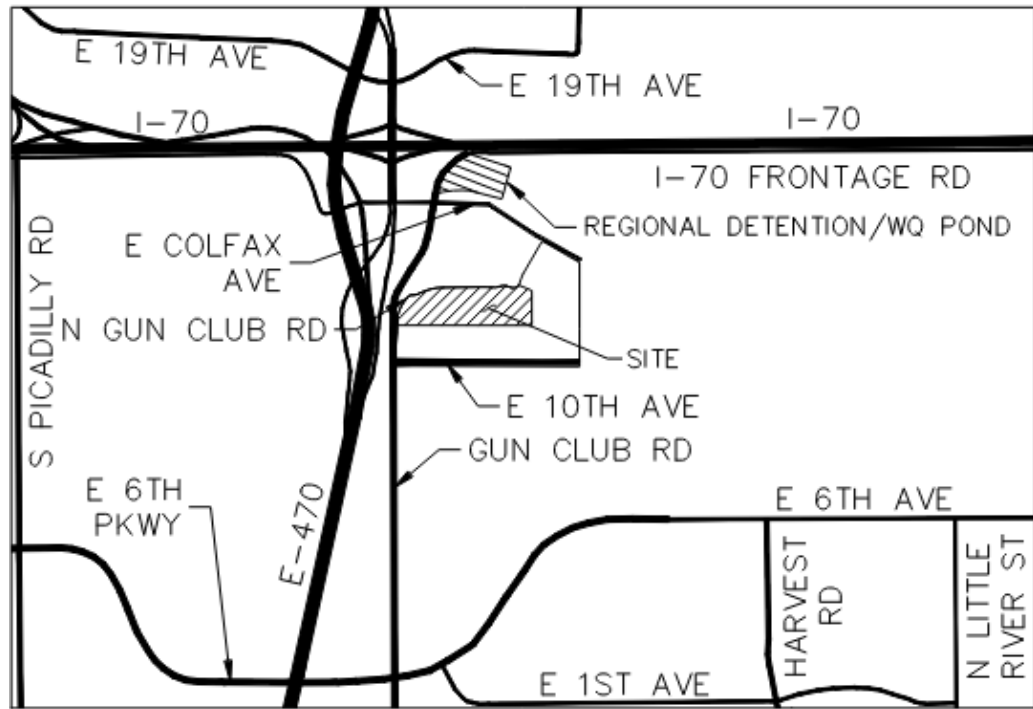
- THE OWNER WILL BE PROVIDED WITH THE APPROPRIATE MAINTENANCE INFORMATION AND A COPY OF NFPA # 25 - STANDARD FOR THE INSPECTION, TESTING, AND MAINTENANCE OF WATER-BASED FIRE PROTECTION SYSTEMS.

FITTINGS

- THREADED BRANCH LINE FITTINGS SHALL BE D.I. THREADED, CLASS 125 STANDARD, MANUFACTURED PER ANSI B16.4 U.L. LISTED FOR FIRE PROTECTION USE UP TO 175 PSI WORKING PRESSURE.
- CROSS MAIN FITTINGS SHALL BE VICTAULIC "FIRELOCK" GROOVED FITTINGS ULFM APPROVED TO 300 PSI FOR FIRE PROTECTION SERVICE WITH VICTAULIC "FIRELOCK" RIDGID COUPLINGS ULFM APPROVED TO 300 PSI FOR FIRE PROTECTION SERVICE. GASKETS SHALL BE "GRADE E (TYPE A)" EPDM RUBBER COMPOUND RATED AT -30 DEG F to +150 DEG F.
- WELDED LINE FITTINGS SHALL BE VICAULIC GROOVED INSTALLATION-READY FITTINGS ULFM APPROVED TO 300 PSI FOR FIRE PROTECTION SERVICE. GASKETS SHALL BE "GRADE E (TYPE A)" EPDM RUBBER COMPOUND RATED AT -30 DEG F to +150 DEG F.
- CROSS MAIN AND BRANCH LINE WELDED OUTLETS SHALL BE WELDED BRANCH OUTLET FITTINGS, MERIT WELD RISER TEE-LET, ULFM APPROVED TO 300 PSI FOR FIRE PROTECTION.
- FLANGED FITTING SHALL BE CAST IRON, CLASS 125 (STANDARD) MANUFACTURED PER ANSI B16.1 AND MARKED 125.

HANGERS

- HANGER RINGS TO BE ADJUSTABLE SWIVEL RING CADMIUM PLATED AS MANUFACTURED BY ERICO HANGER.
- HANGER ROD TO BE 3/8" A.T. ROD FOR PIPE DIAMETERS 4" AND SMALLER, 1/2" A.T. ROD FOR PIPE DIAMETERS 6" & 8", AND 5/8" A.T. ROD FOR PIPE DIAMETERS 10".
- ALL HANGER LOCATIONS TO BE PER NFPA 13 (2019).
- WHERE A BRANCH LINE ABOVE A CEILING SUPPLIES SPRINKLERS IN A PENDENT POSITION BELOW THE CEILING, THE HANGER ASSEMBLY SUPPORTING THE PIPE SUPPLYING THE END SPRINKLER IN A PENDENT POSITION SHALL BE OF A TYPE THAT PREVENTS UPWARD MOVEMENT OF THE PIPE.
- THIS CONTRACT DOES NOT INCLUDE SUPPLYING AND INSTALLATION OF ANY MATERIALS OR DEVICES TO IMPROVE THE STRUCTURAL STRENGTH OF THE BUILDING TO ENABLE IT TO BEAR THE WEIGHT OF THE SPRINKLER SYSTEM.



SHEET INDEX		
SHEET NO.	SHEET NAME	REV
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FP2.01	FIRE PUMP GERNAL NOTES, PIPING PLAN & DETAILS	1
FP3.01	FIRE SPRINKLER BOH RISER BANKS #1.1, #2.1, & DATA HALL BANKS #1.2, #2.2 ELEVATIONS	1
FP3.02	FIRE SPRINKLER DATA HALL RISER BANKS #1.3, #2.3, #1.4 & #2.4 ELEVATIONS	1
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FP4.01	PRE-ACT SYS#1.10, DRY SYS#1.11 & WET SYS#1.12 LEVEL 1 - FRONT OF HOUSE SEGMENT A	1
FP4.03	PRE-ACT SYS #1.08, #1.09 & WET SYS #1.12, LEVEL 1 - DATA HALL 1100	1
FP4.04	WET SYS #1.02 & PRE-ACTION SYS #1.06 & #1.07 LEVEL 1 - DATA HALL 1200	1
FP4.05	WET SYS #1.02 & PRE-ACTION SYS #1.05 LEVEL 1 - DATA HALL 1300	1
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FP4.08	LEVEL 2 - OVERALL ZONING PLAN	1
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FP4.12	WET SYS #2.01, PRE-ACT SYS# 2.05, & PRE-ACT SYS# 2.06 LEVEL 2 - DATA HALL 2200	1
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FP4.14	WET SYS #2.01 & PRE-ACT SYS #2.03 LEVEL 2 - DATA HALL 2300	1
FP4.16	PRE-ACTION SYS. PODS PIPING PLAN 1100, 1200 & 1300	1
FP5.02	LEVEL 1 - DATA HALL 1100 RCP	1
FP5.03	LEVEL 1 - DATA HALL 1200 RCP	1
FP5.04	LEVEL 1 - DATA HALL 1300 RCP	1
FP5.05	LEVEL 2 - DATA HALL 2100 RCP	1
FP5.06	LEVEL 2 - DATA HALL 2200 RCP	1
FP5.07	LEVEL 2 - DATA HALL 2300 RCP	1
TOTAL SHEETS: 25		

Provide a full size set of legible approved construction documents **PRINTED IN COLOR** for review by the Field Inspector.

COA Adopted Codes for this project:
ICC-2021 - NEC-2023
NFPA 13-2019 - NFPA 72-2019
COA Amendments 22 & 66

Field inspection consultation is available upon request; call (303) 739-7420 to schedule a consultation.

Code violations that are found during the inspection are required to be corrected. Permit issuance does not grant approval of code violations.

AHJ APPROVAL



City of Aurora Building Division
Project: **QTS DEN 1 DC2 ESB**
Address: **1140 N GUN CLUB RD**
Occupancy Group: **S-2**
Construction Type: **IIB SPK**
Permit: **2026 2513934-CM 06**



City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: **chort**
Date: **Aug 31, 2026**
2021 INTERNATIONAL CODES & 2023 NEC

Stamp or Seal

I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.

Dennis T. Scherr
Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

SYMBOLS LEGEND:

- = Hanger with rod length
- = Trapeze Hanger Location
- = Hydraulic Reference point

Abbreviations:
TOS = Top of Steel BOW = Bottom of Wood BOP = Bottom of Pipes TOW = Top or Wood BOD = Bottom of Deck

X TOS = Centerline of pipe below top of steel
XX AFF = Centerline of pipe above finished floor

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

Company: **SHAMBAUGH & SON, L.P.**
SHAMBAUGH & SON, L.P.
CONTRACTORS • ENGINEERS
6445 W. SUNSET RD., SUITE 106 P. 702-832-6545
LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

Date	08/05/26
Designed	ALEX P.
Checked	EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)

1140 N GUN CLUB RD
AURORA, COLORADO 80018

FIRE PROTECTION SYSTEMS

SITE PLAN / GENERAL NOTES

Project Number
227361

Sheet Number
FP1.00

Autodesk Docs://227361-QTS DEN2 FIT-OUT/227361 QTS DEN1 - DC2 - ESB - IFA.rvt

Ordinary Hazard Group 1 Design Criteria

Area: Electric Fire Pump Room
Sprinklers: Standard Response, 286°F, K=5.6, 130 sq. ft. maximum spacing standard spray sprinklers
C-factor used in calculations: 120 (Wet-pipe system, black steel pipe)
Density before any adjustments: .15 GPM / SQ. FT.
Remote Area before any adjustments: 1500 SQ. FT.
DENSITY USED IN CALCULATIONS: .15 GPM / SQ. FT.
REMOTE AREA USED IN CALCULATIONS: 1500 SQ. FT.
Hose Stream Allowance: 250 GPM outside hose

BUILDING FIRE ALARM SYSTEM CONNECTIONS

This information is provided for coordination purposes. Devices are provided and installed by fire protection contractor. Wiring of the devices is BY OTHERS, unless noted otherwise.
N.O. = Normally Open Control Valve N.C. = Normally Closed Valve

ELECTRIC FIRE PUMP	Control, Fire Pump Running	Supervisory
LOCATION: PUMP ROOM	May be either Supervisory or Alarm, determined by others	Alarm
	Control, Loss of Phase	Alarm
	Control, Phase Reversal	Alarm
	Fire Pump Suction control valve tamper (N.O.)	Alarm
	Fire Pump Discharge control valve tamper (N.O.)	Alarm
	Fire Pump Test Header control valve tamper (N.C.)	Alarm
	By-pass Control Valve before check tamper (N.O.)	Alarm
	By-pass Control Valve after check tamper (N.O.)	Alarm
	Jockey Pump suction control valve tamper (N.O.)	Alarm
	Jockey Pump discharge control valve tamper (N.O.)	Alarm

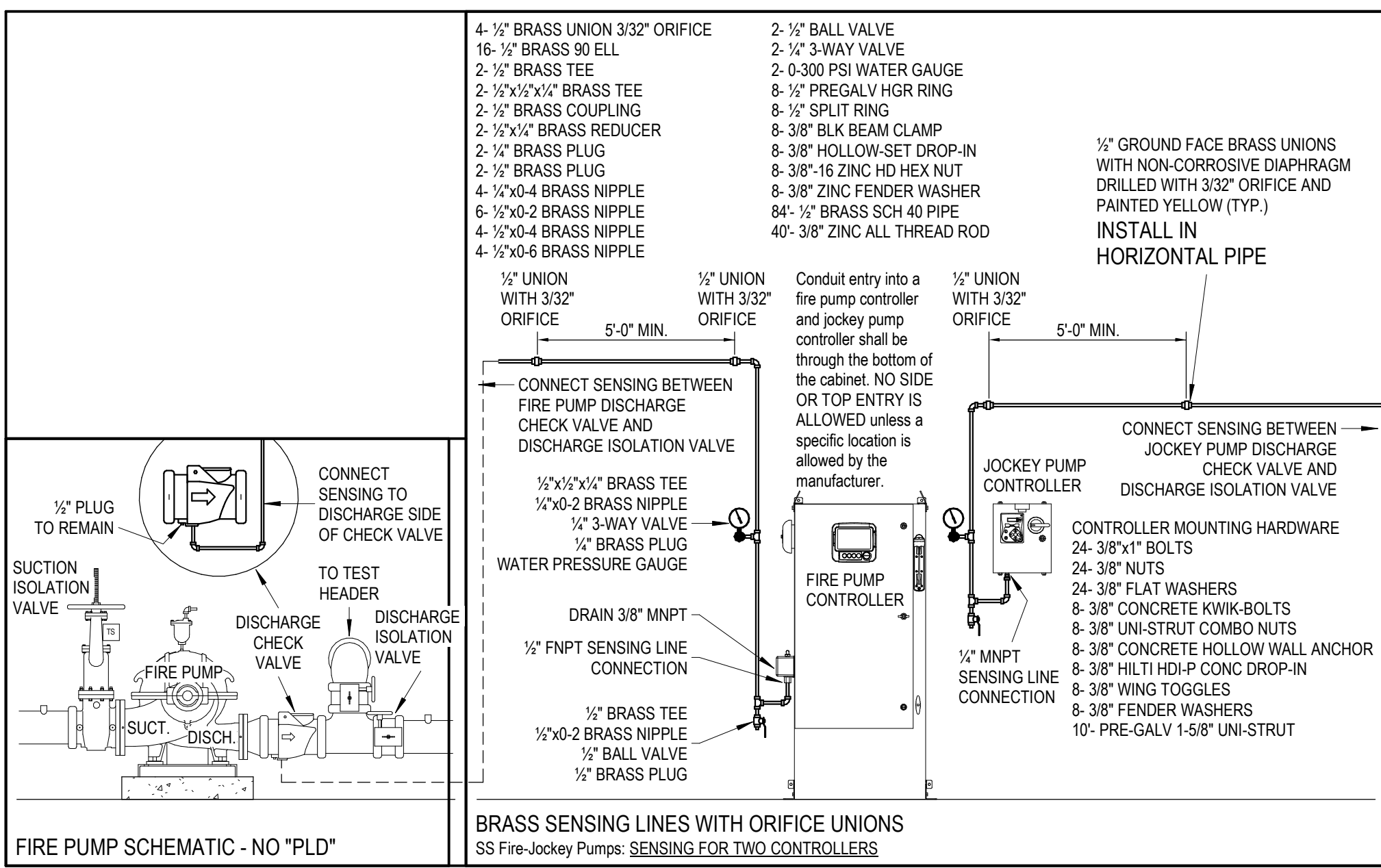
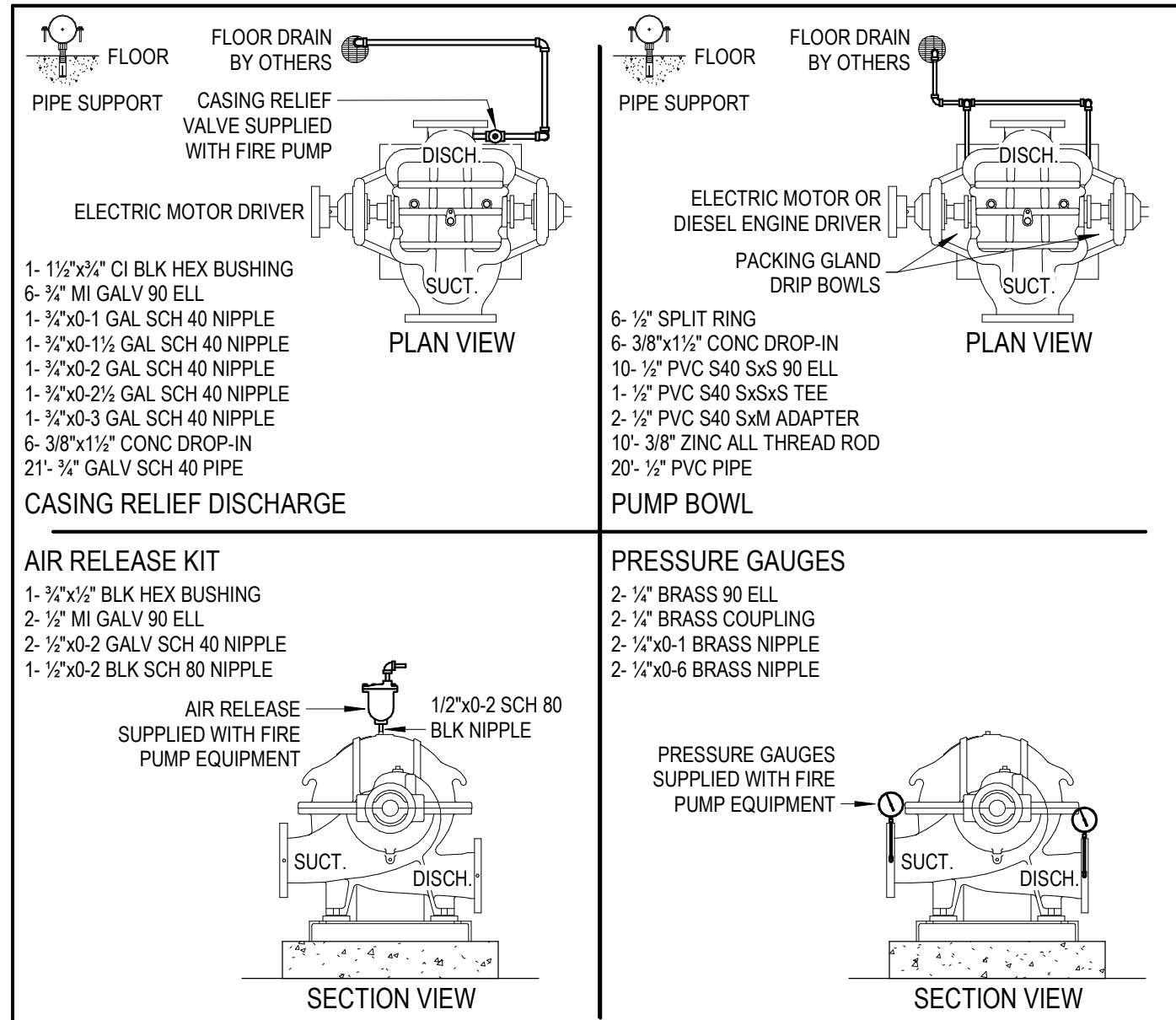
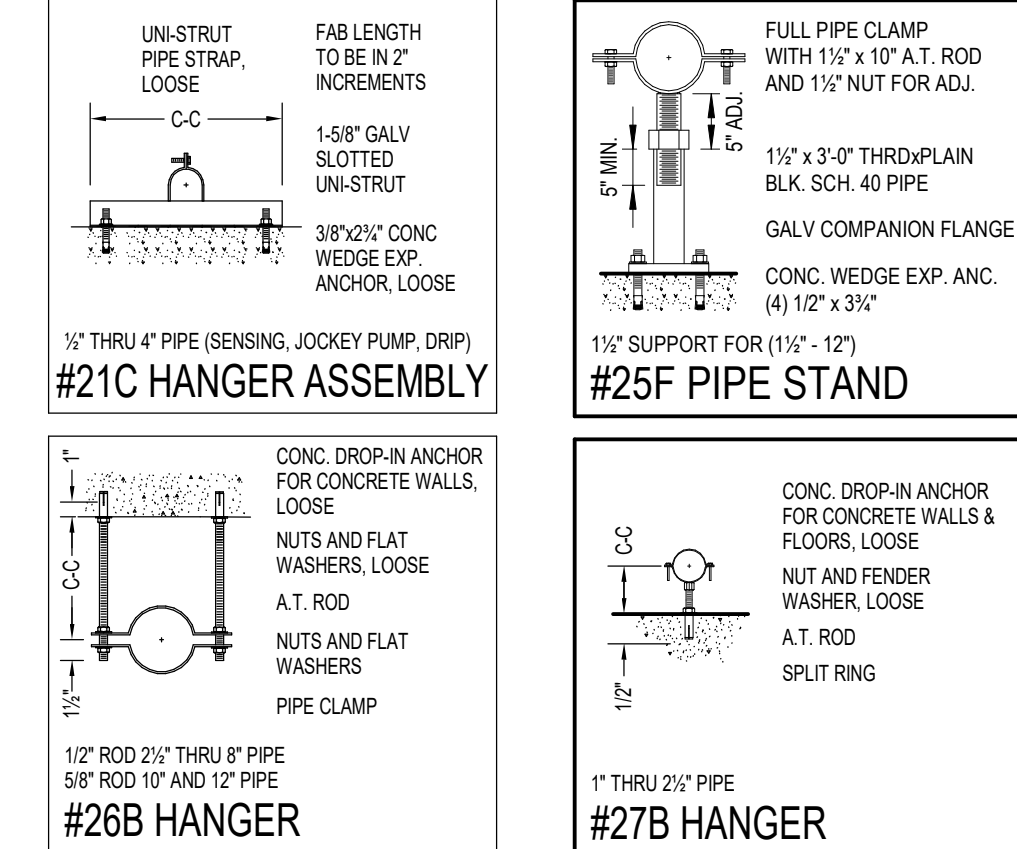
POWER SUPPLY REQUIREMENTS FOR FIRE PROTECTION EQUIPMENT

This information is for coordination purposes. Equipment is provided by fire protection contractor. Exterior audible alarm is mounted and wired BY OTHERS. Other equipment is mounted by the fire protection contractor, wiring of the equipment is BY OTHERS, unless noted otherwise.

ELECTRIC FIRE PUMP	Electric Fire Pump Controller and Motor
LOCATION: PUMP ROOM	Dedicated Power: see "P1" and "P2" in electric fire pump data.
	Note: Power supply direct from transformer, no disconnected, route exterior and/or underground
	Electric Jockey Pump
	Dedicated circuit: see "P2" and "J2" in electric fire pump data.

Fire Pump Material Notes

Schedule 10 piping with grooves and/or welded flanges	
Schedule 40 piping with threads	
Piping	BLACK steel ASTM A53, A135, A795
Threaded Fittings	BLACK ductile iron class 300
Grooved Fittings	Factory Painted Orange, Victaulic "Firelock" and "Standard"
Grooved Couplings	Factory Painted Orange, 1-1/4" thru 4" Victaulic Style #0059N (rigid), 6" and 8" Style #0059H (rigid), 10" and 12" Style #77 (flexible), #07 (rigid)
Gaskets	Gaskets are Grade "T" EPDM rubber compound
Welded Outlets	BLACK steel, THREADED and/or GROOVED
Flange Fittings	Ductile iron class 125, rated to 250 PSI, ASTM A536, ASME B16.1
Flange Gaskets	Cast iron class 125, rated to 200 PSI, ASTM A126, ASME B16.1
	Full-face class 125 red rubber, 1/8" thick



ELECTRIC FIRE PUMP DATA

ELECTRIC MOTOR DRIVEN FIRE PUMP

FIRE PUMP RATING:	1000 GPM @ 90 PSI
MANUFACTURER:	AURORA
MODEL:	HORIZONTAL SPLITCASE 5-481-15
SUCTION FLANGE:	6" CLASS 125
DISCHARGE FLANGE:	5" CLASS 125
RPM:	1770
ELECTRIC MOTOR:	404TS
FRAME:	1800
RPM:	108 HP
HORSEPOWER:	3-60-480 VOLT
POWER SUPPLY:	

ELECTRIC FIRE PUMP CONTROLLER

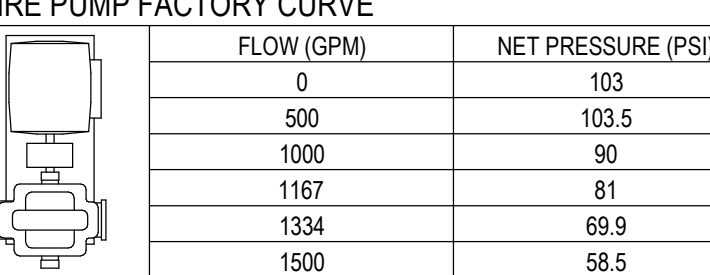
TYPE:	SOFT START W/ A.T.S.
MANUFACTURER:	TORNATECH
MODEL:	GPS-CPU
ENCLOSURE RATING:	NEMA 2
POWER SUPPLY:	3-60-480 VOLT

ELECTRIC JOCKEY PUMP

JOCKEY PUMP RATING:	12.5 GPM @ 100 PSI
MANUFACTURER:	AURORA
MODEL:	PJM-3
SUCTION:	1-1/2" F.NPT
DISCHARGE:	1-1/2" F.NPT
HORSEPOWER:	1.5 HP
POWER SUPPLY:	3-60-480 VOLT

ELECTRIC JOCKEY PUMP CONTROLLER

MANUFACTURER:	TORNATECH
MODEL:	JPLT
ENCLOSURE RATING:	NEMA 2
POWER SUPPLY:	3-60-480 VOLT



Electric Fire Pump Notes

All work and materials shall conform with NFPA 13 and 20.

Fire pump rooms shall be free from storage, equipment, and penetrations not essential to the operation of the fire pump and related components. Equipment related to domestic water distribution shall be permitted to be located within the same room as the fire pump equipment.

Temperature within the fire pump room shall be maintained above 40°F by others.

Artificial light shall be provided in the fire pump room by others. Emergency lighting shall be provided by fixed or portable battery operated lights, including flashlights. Emergency lights shall NOT be connected to an engine-starting battery.

Ventilation of the fire pump room shall be by others.

Floor shall be pitched for adequate drainage of escaping water away from critical equipment such as the pump, driver, controller, etc. The fire pump room shall be provided with a floor drain that will discharge to a frost-free location.

All electrical work to supply power to the fire controller/pump and jockey controller/pump shall be by others.

Conductors feeding fire pump(s) shall be dedicated and protected to resist possible damage by fire, structural failure, or operational accident.

Conduit entry into a fire pump controller and jockey pump controller shall be through the bottom of the cabinet. NO SIDE OR TOP ENTRY IS ALLOWED unless a specific location is allowed by the manufacturer.

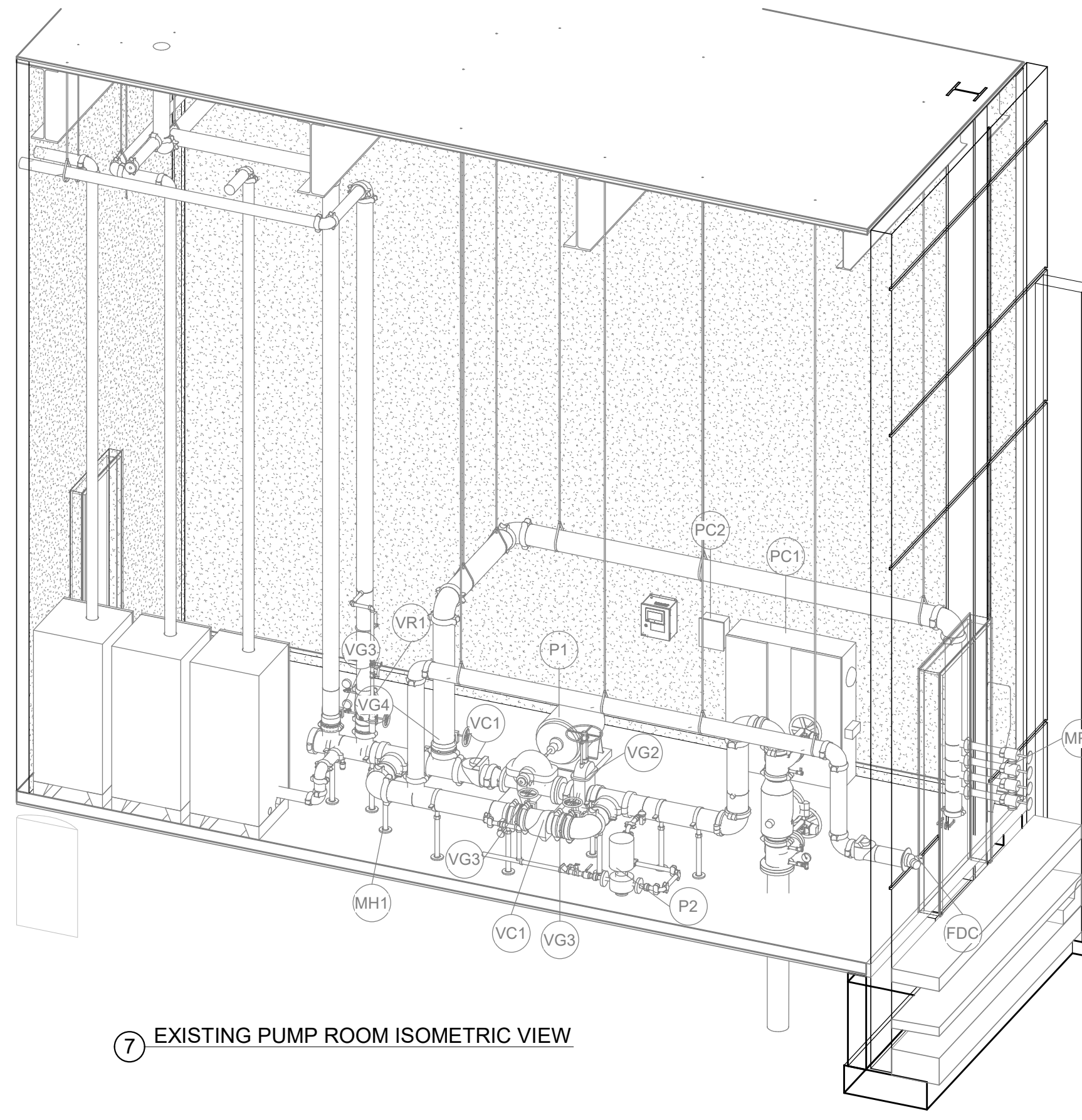
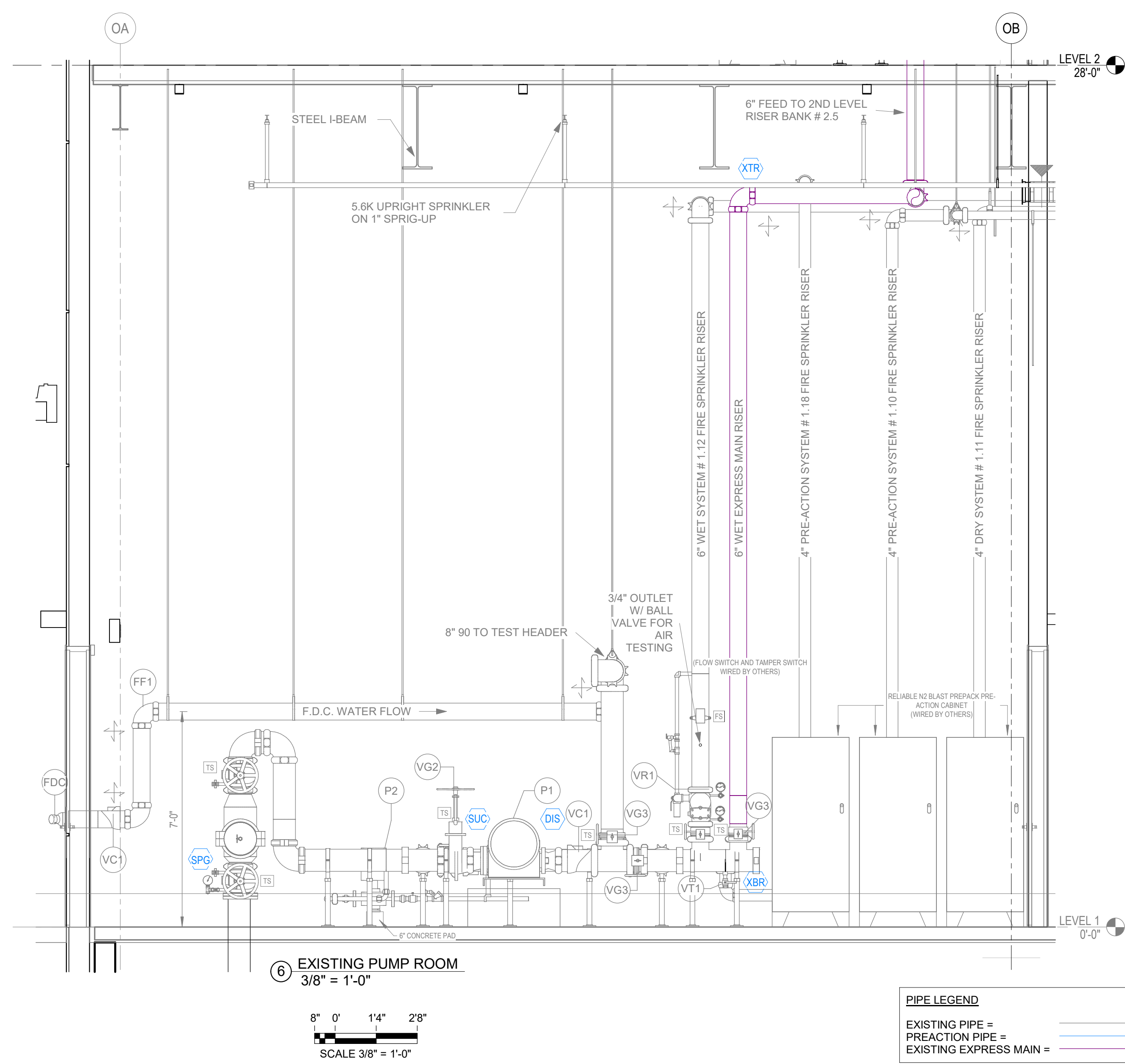
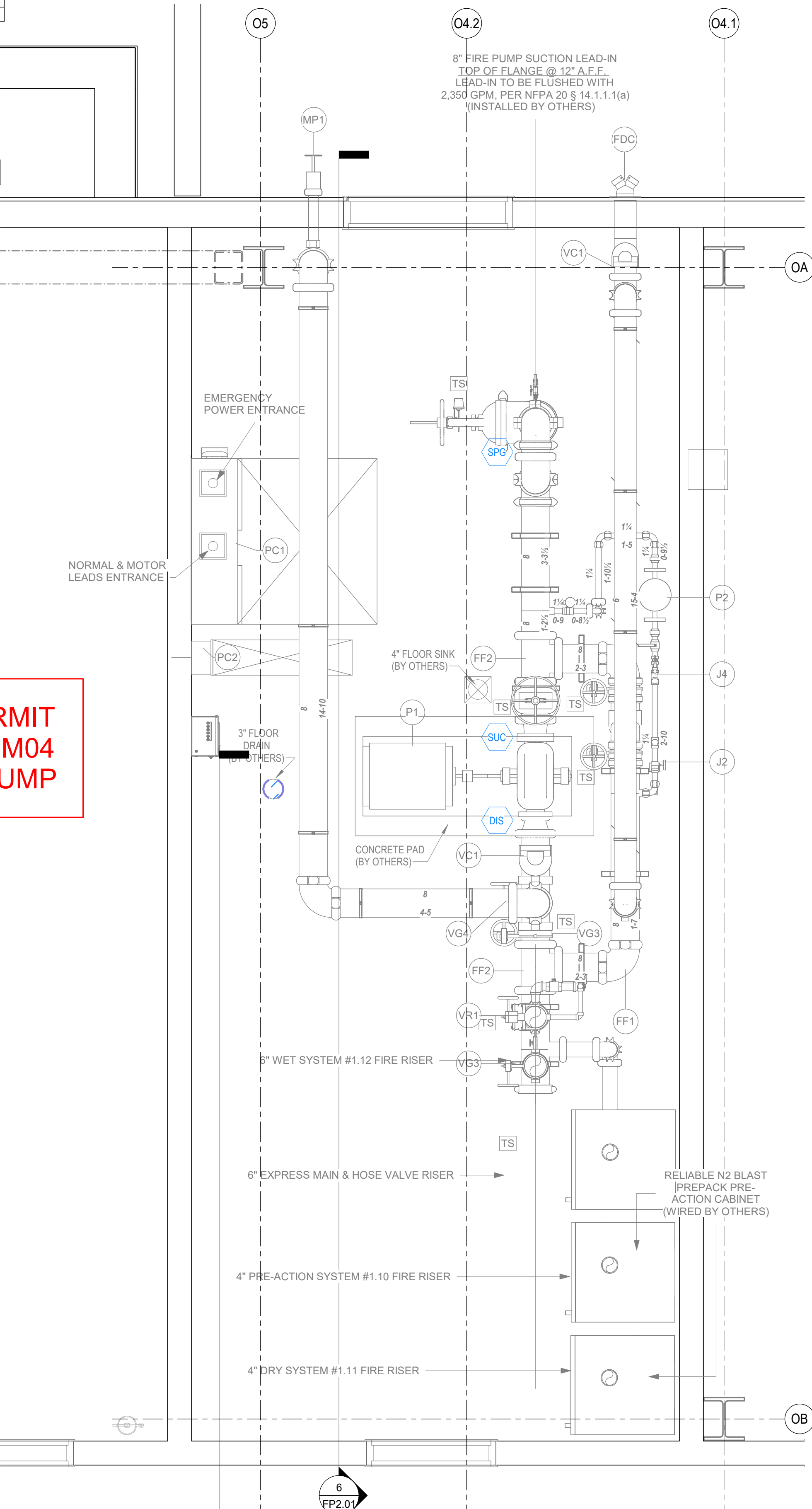
The supply conductors shall directly connect the power source to a listed fire pump controller, no disconnects ahead of the fire pump controller per NFPA 70.

Concrete pad below fire pump and grouting of the fire pump base is to be by others.

FIRE PUMP COMPONENTS

NO.	DESCRIPTION
FDC	FIRE DEPARTMENT CONNECTIONS
FF1	VICTAULIC FIRELOCK #001 90 ELL
FF2	VICTAULIC FIRELOCK #002 TEE
J2	VICTAULIC #728 THREADED BALL VALVE W/ TAMPER SWITCH
J4	THREADED BRASS CHECK VALVE
MH1	#25F PIPE STAND
MP1	TEST HEADER (SEE DETAIL ON THIS SHEET)
VC1	VICTAULIC #717 FIRELOCK SWING CHECK VALVE
VG2	VICTAULIC #711H G&G OS&Y GATE VALVE W/ TAMPER SWITCH
VG3	VICTAULIC #705 BUTTERFLY VALVE W/ TAMPER SWITCH
VG4	VICTAULIC #707C (N.C.) BUTTERFLY VALVE W/ TAMPER SWITCH
VR1	VIKING E-1F-1 EASY RISER SWING CHECK VALVE W/ TRIM, DRAIN VALVE, (2) 0-400psi PRESSURE GAUGES
VT1	BALL VALVE (NORMALLY CLOSED)

PLEASE SEE PERMIT
2026 2513934-CM04
EXISTING FIRE PUMP
RSN 1975523



EXISTING PUMP ROOM PLAN VIEW

1/2\"/>

SCALE 1/2\"/>

NORTH

6\"/>

SCALE 1/2\"/>

1\"/>

SCALE 1/2\"/>

1\"/>

SCALE 1/2\"/>

1\"/>

SCALE 1/2\"/>

1\"/>

SCALE 1/2\"/>

PIPE LEGEND
EXISTING PIPE =
PREACTION PIPE =
EXISTING EXPRESS MAIN =

Stamp or Seal

I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.

Dennis T. Scherr

Dennis T. Scherr

NICET Level IV

Water-Based Systems Layout

Cert. # 113016 Exp. 3/1/2029

SYMBOLS LEGEND:

= Hanger with rod length

= Trapezoid Hanger Location

= Hydraulic Reference point

Abbreviations: TOS = Top of Steel, BOS = Bottom of Steel, BOP = Bottom of Piping, BOD = Bottom of Deck, TOW = Top of Wall

X TOS = Centerline of pipe below top of steel

XX X AFF = Centerline of pipe above finished floor

No.	Date	By	Description
-----	------	----	-------------

1 08/05/26 ALEX P. ISSUED FOR APPROVAL

Company

S&S

SHAMBAUGH & SON, L.P.

CONTRACTORS - ENGINEERS

6445 W. SUNSET RD., SUITE 106

P. 702-832-6445

LAS VEGAS, NV 89118

www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

Date

08/05/26

Designed

ALEX P.

Checked

EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)

1140 N GUN CLUB RD

AURORA, COLORADO 80018

FIRE PROTECTION SYSTEMS

FIRE PUMP GERNAL NOTES, PIPING PLAN & DETAILS

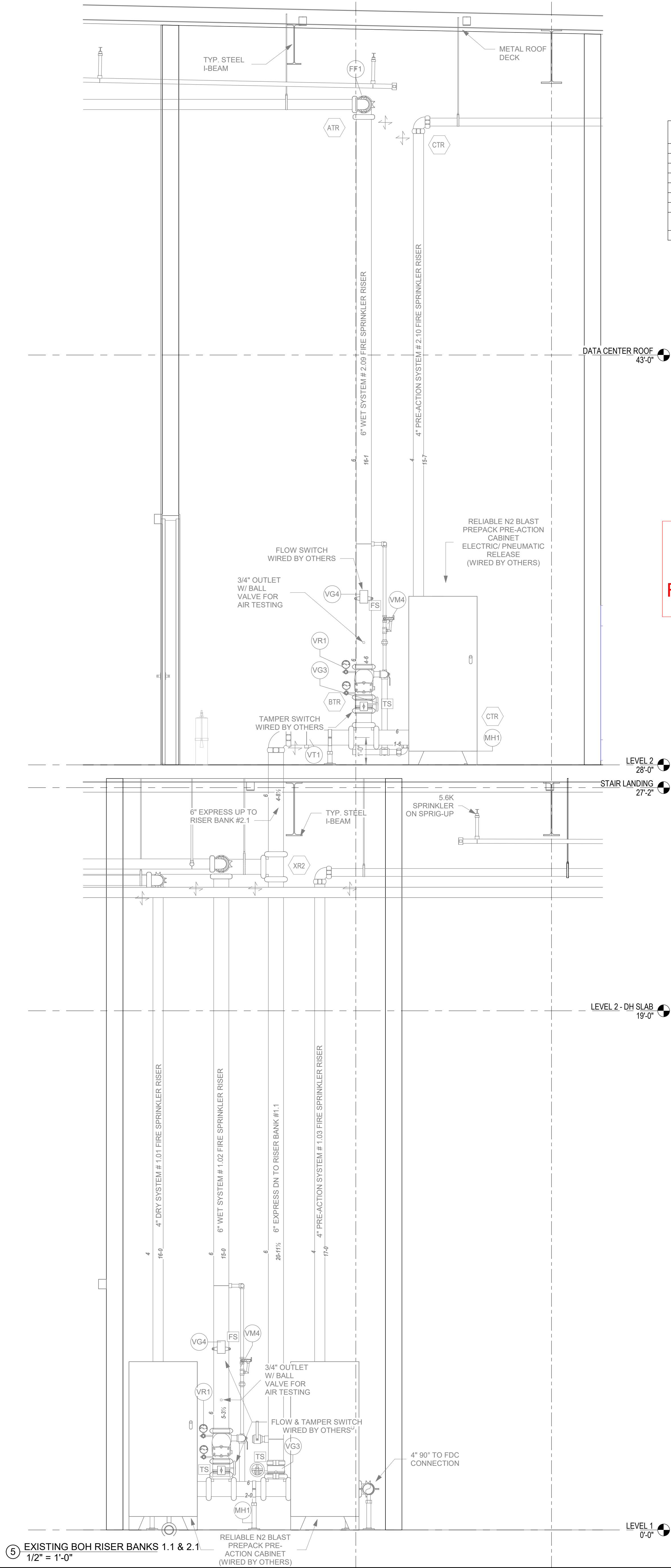
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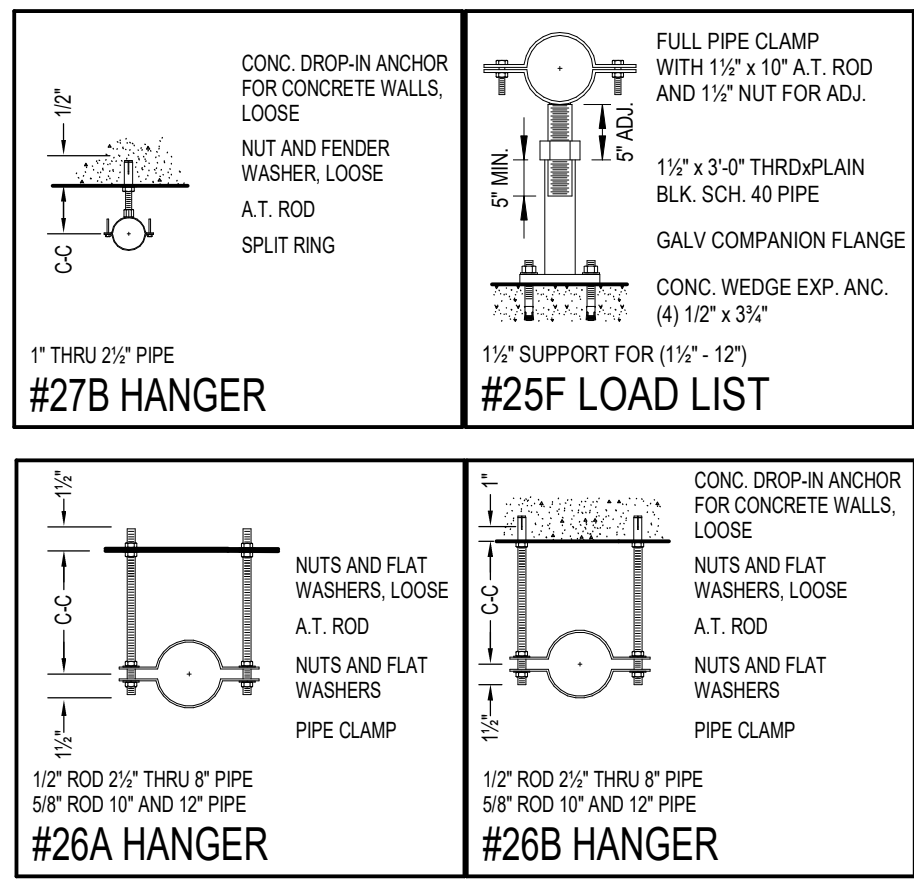
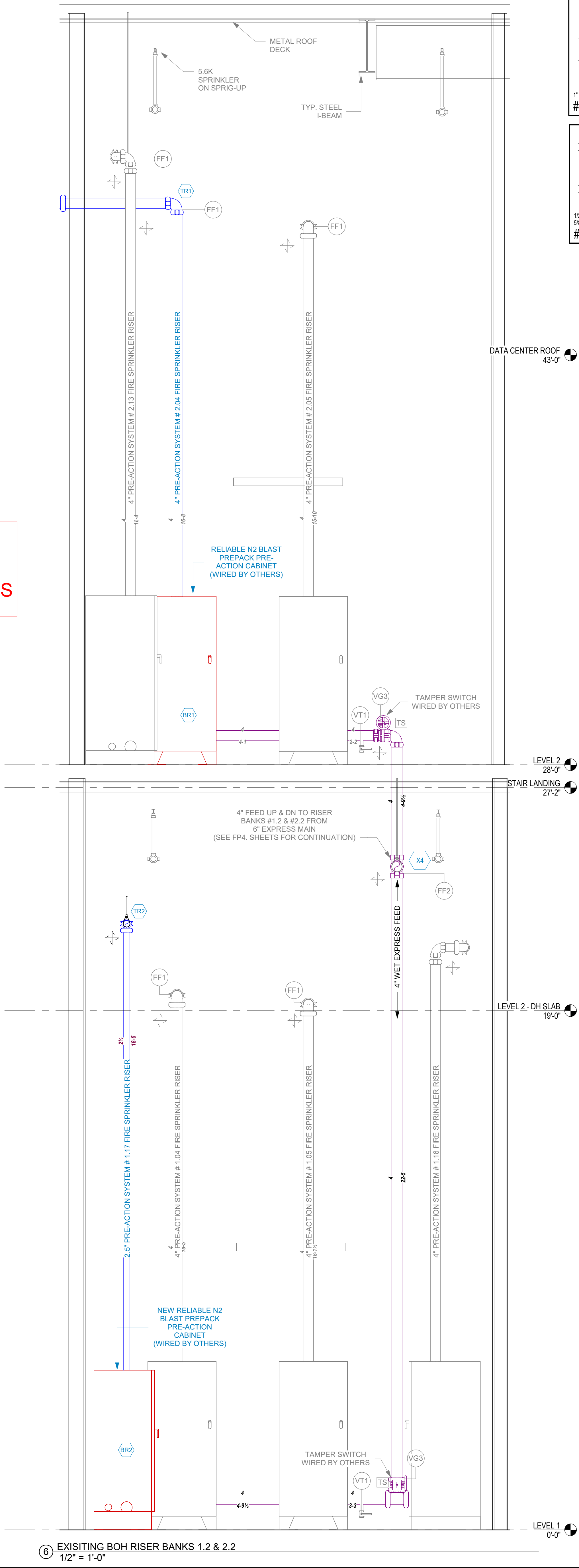
FP2.01

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FIRE SPRINKLER LEGEND	
NO.	DESCRIPTION
FF1	VICTAULIC FIRELOCK #001 90 ELL
FF2	VICTAULIC FIRELOCK #002 TEE
MH1	#25F PIPE STAND
VG3	VICTAULIC #705 BUTTERFLY VALVE W/ TAMPER SWITCH
VG4	VICTAULIC #707 (N.C.) BUTTERFLY VALVE W/ TAMPER SWITCH
VM4	AGF #3011A INSPECTOR'S TEST VALVE W/ PSI RELIEF
VR1	VIKING E-1F-1 EASY RISER SWING CHECK VALVE W/ TRIM, DRAIN VALVE, (2) 0-400psi PRESSURE GAUGES
VT1	BALL VALVE (NORMALLY CLOSED)

PLEASE SEE PERMIT
2026 2513934-CM04
FOR CORE & SHELL DRAWINGS
RSN 1975523



FIRE PROTECTION SYMBOLS	
SYMBOL	DESCRIPTION
↑	UP OR DOWN IN PIPING w/ TEE
↗	UP OR DOWN IN PIPING w/ ELBOW
—	PIPE HANGER LOCATIONS
—	TRAPEZE HANGER LOCATIONS
—	GROOVED COUPLING LOCATION
⊗	FIRE SPRINKLER SYSTEM RISER
—	NEW PIPING
---	EXISTING PIPING
↔	2 WAY SWAY BRACE
↔	4 WAY SWAY BRACE
—	BRANCHLINE RESTRAINT
---	SMOKE PARTITION
---	FULL-HEIGHT MASONRY WALL
---	FULL-HEIGHT GYP BOARD WALL
---	1-HOUR FIRE-RATED WALL
---	2-HOUR FIRE-RATED WALL
---	3-HOUR FIRE-RATED WALL
—	FIRE DEPARTMENT CONNECTION (FDC)
⊕	ELECTRIC BELL

PIPE LEGEND	
---	EXISTING PIPE
---	NEW PREACTION PIPE
---	EXISTING EXPRESS MAIN

Stamp or Seal
I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.
Dennis T. Scherr
Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

SYMBOLS LEGEND:			
—	= Hanger with rod length		
—	= Trapeze Hanger Location		
⊗	= Hydraulic Reference point		
Abbreviations:			
TOS = Top of Steel	BOV = Bottom of Wood		
BOV = Bottom of Steel	BOC = Bottom of Concrete		
BOV = Bottom of Purlin	BOV = Bottom of Deck		
TOW = Top of Wood			
X TOS	= Centerline of pipe below top of steel		
XX'X' AFF	= Centerline of pipe above finished floor		

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

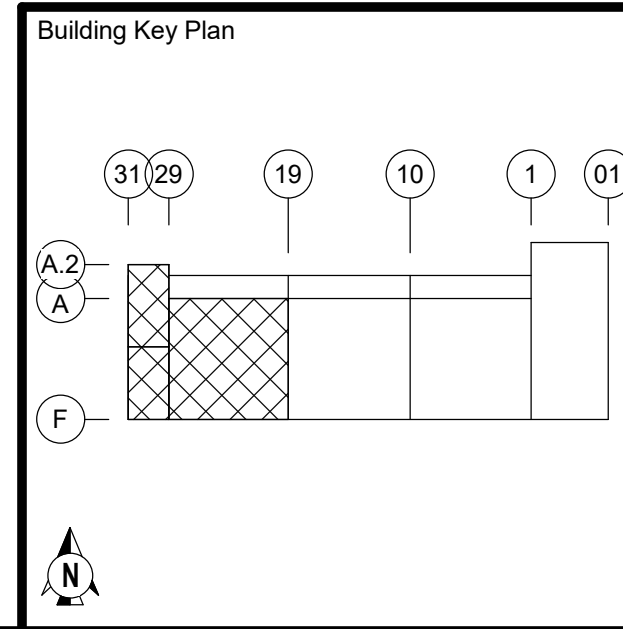
Company
S&S
SHAMBAUGH & SON, L.P.
CONTRACTORS • ENGINEERS
6445 W. SUNSET RD., SUITE 106 P. 702-832-4545
LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

Date	08/05/26
Designed	ALEX P.
Checked	EV/DS

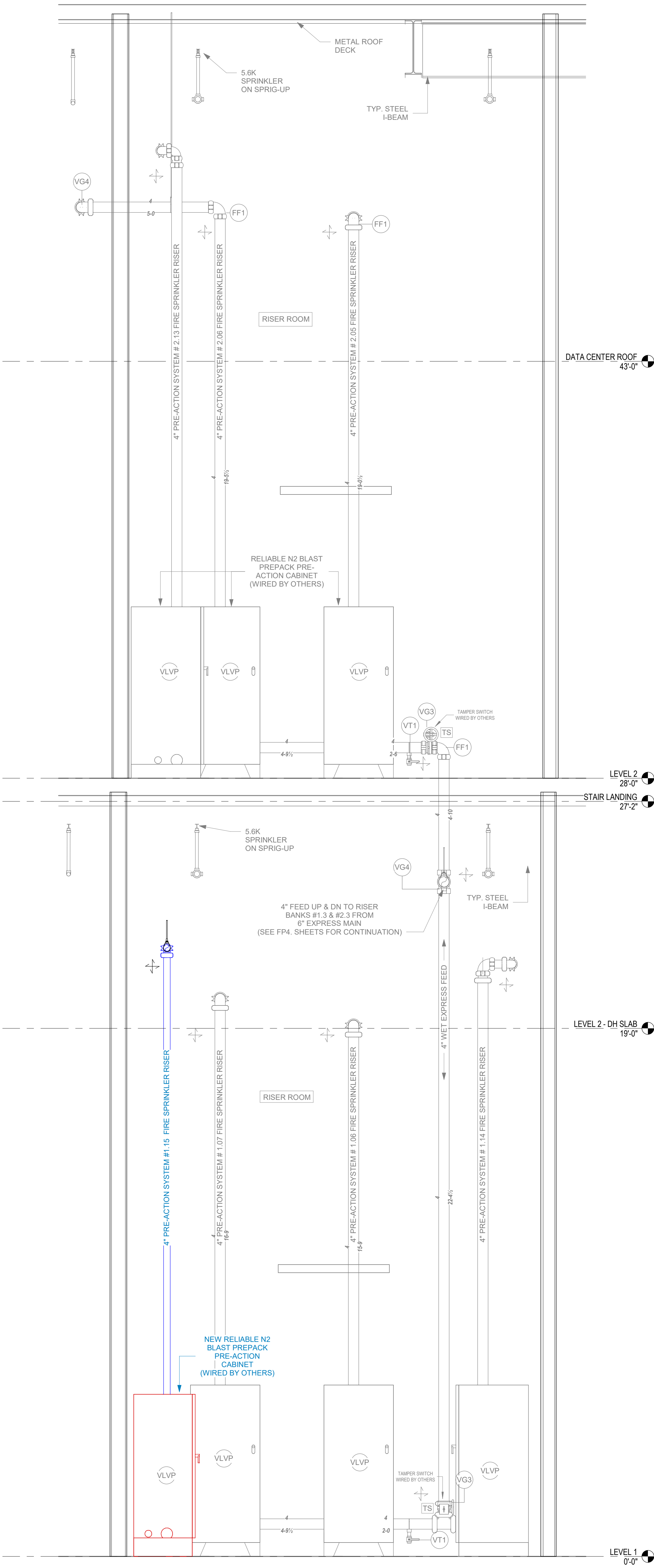
City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted:
Date: Aug 31, 2026
2021 INTERNATIONAL CODES & 2023 NEC

QTS DEN1 - DC2 ESB (FIT-OUT)
1140 N GUN CLUB RD
AURORA, COLORADO 80018



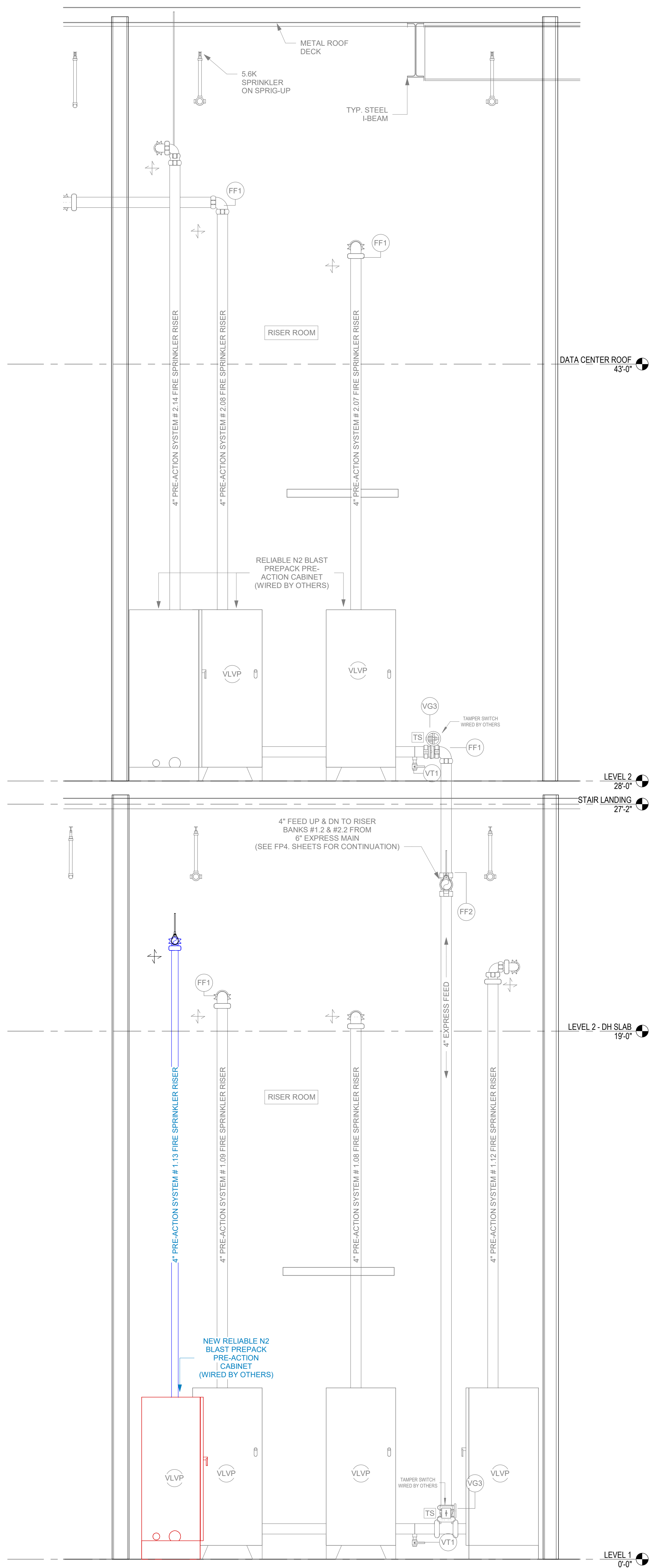
FIRE SPRINKLER BOH RISER BANKS #1.1, #2.1, & DATA HALL BANKS #1.2, #2.2 ELEVATIONS

Project Number	227361
Sheet Number	FP3.01

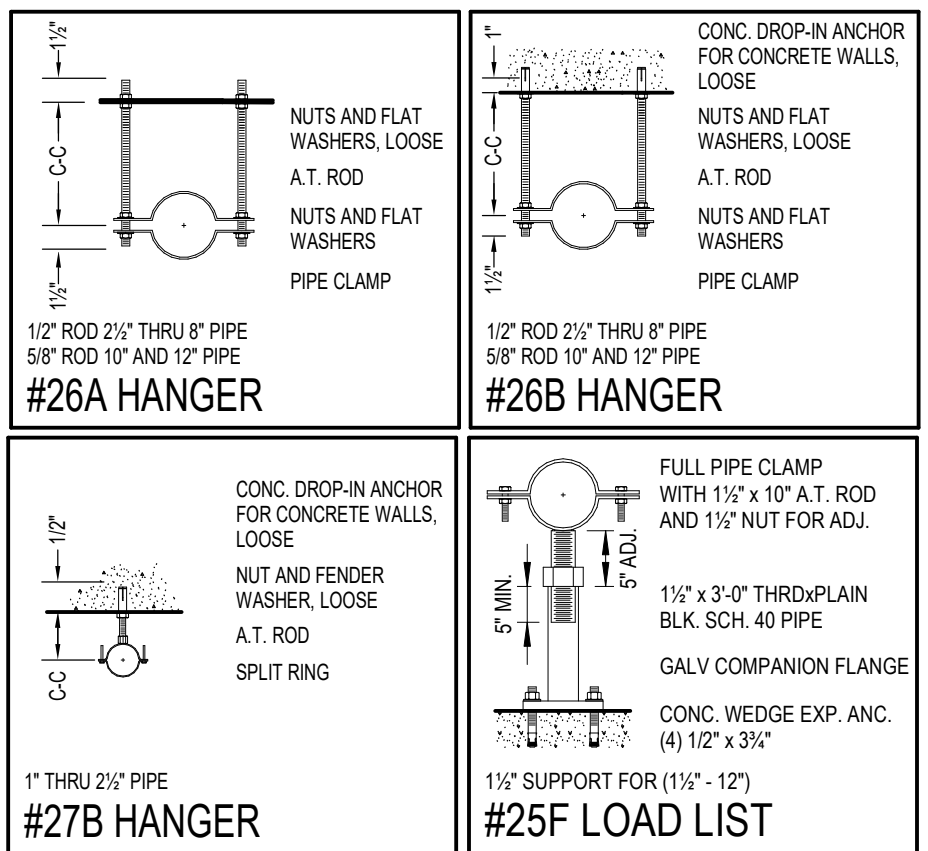


FIRE SPRINKLER LEGEND	
NO.	DESCRIPTION
FF1	VICTAULIC FIRELOCK #001 90 ELL
FF2	VICTAULIC FIRELOCK #002 TEE
VG3	VICTAULIC #705 BUTTERFLY VALVE W/ TAMPER SWITCH
VG4	VICTAULIC #707C (N.C.) BUTTERFLY VALVE W/ TAMPER SWITCH
VLVP	VALVES - DRY/PRE-ACTION
VT1	BALL VALVE (NORMALLY CLOSED)

PLEASE SEE PERMIT
2026 2513934-CM04
FOR CORE & SHELL DRAWINGS
RSN 1975523



FIRE PROTECTION SYMBOLS	
SYMBOL	DESCRIPTION
	UP OR DOWN IN PIPING w/ TEE
	UP OR DOWN IN PIPING w/ ELBOW
	PIPE HANGER LOCATIONS
	TRAPEZE HANGER LOCATIONS
	GROOVED COUPLING LOCATION
	FIRE SPRINKLER SYSTEM RISER
	NEW PIPING
	EXISTING PIPING
	2 WAY SWAY BRACE
	4 WAY SWAY BRACE
	BRANCHLINE RESTRAINT
	SMOKE PARTITION
	FULL-HEIGHT MASONRY WALL
	FULL-HEIGHT GYP BOARD WALL
	1-HOUR FIRE-RATED WALL
	2-HOUR FIRE-RATED WALL
	3-HOUR FIRE-RATED WALL
	FIRE DEPARTMENT CONNECTION (FDC)
	ELECTRIC BELL



PIPE LEGEND	
	EXISTING PIPE
	PREACTION PIPE
	EXISTING EXPRESS MAIN

Stamp or Seal

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Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

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BOD = Bottom of Deck

No.	Date	By	Description
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Company
S&S SHAMBAUGH & SON, L.P.
CONTRACTORS • ENGINEERS
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LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

Date: 08/05/26
Designed: ALEX P.
Checked: EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)
1140 N GUN CLUB RD
AURORA, COLORADO 80018

FIRE PROTECTION SYSTEMS
FIRE SPRINKLER DATA HALL RISER BANKS #1.3, #2.3, #1.4 & #2.4 ELEVATIONS

Project Number: 227361
Sheet Number: FP3.02

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FULL PIPE CLAMP
WITH 1½" x 10" A.T. ROD
AND 1½" NUT FOR ADJ.

1½" x 3'-0" THRDxPLAIN
BLK. SCH. 40 PIPE

GALV COMPANION FLANGE

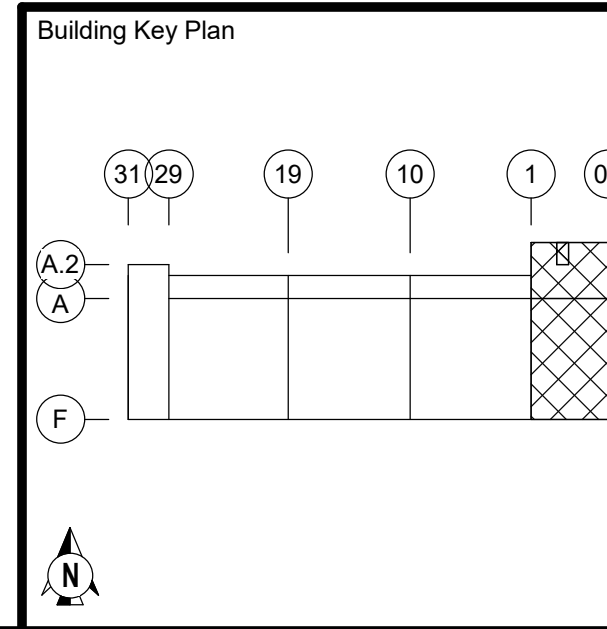
CONC. WEDGE EXP. ANC.
(4) 12" x 36"

1½" SUPPORT FOR (1½" - 12")

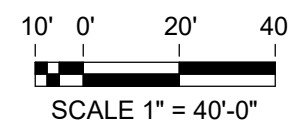
#25F PIPE STAND

PIPE LEGEND

EXISTING PIPE	
NEW PREACTION PIPE	
EXISTING EXPRESS MAIN	

FP3.03

① EXISTING LEVEL 1 ZONING PLAN
1" = 40'-0"

[illegible]**FIRE PROTECTION - FIRE ALARM**

QTS DEN1 - DC2 ESB
(FIT-OUT)

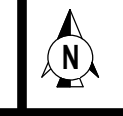
FIRE PROTECTION SYSTEMS

LEVEL 1 - OVERALL
ZONING PLAN

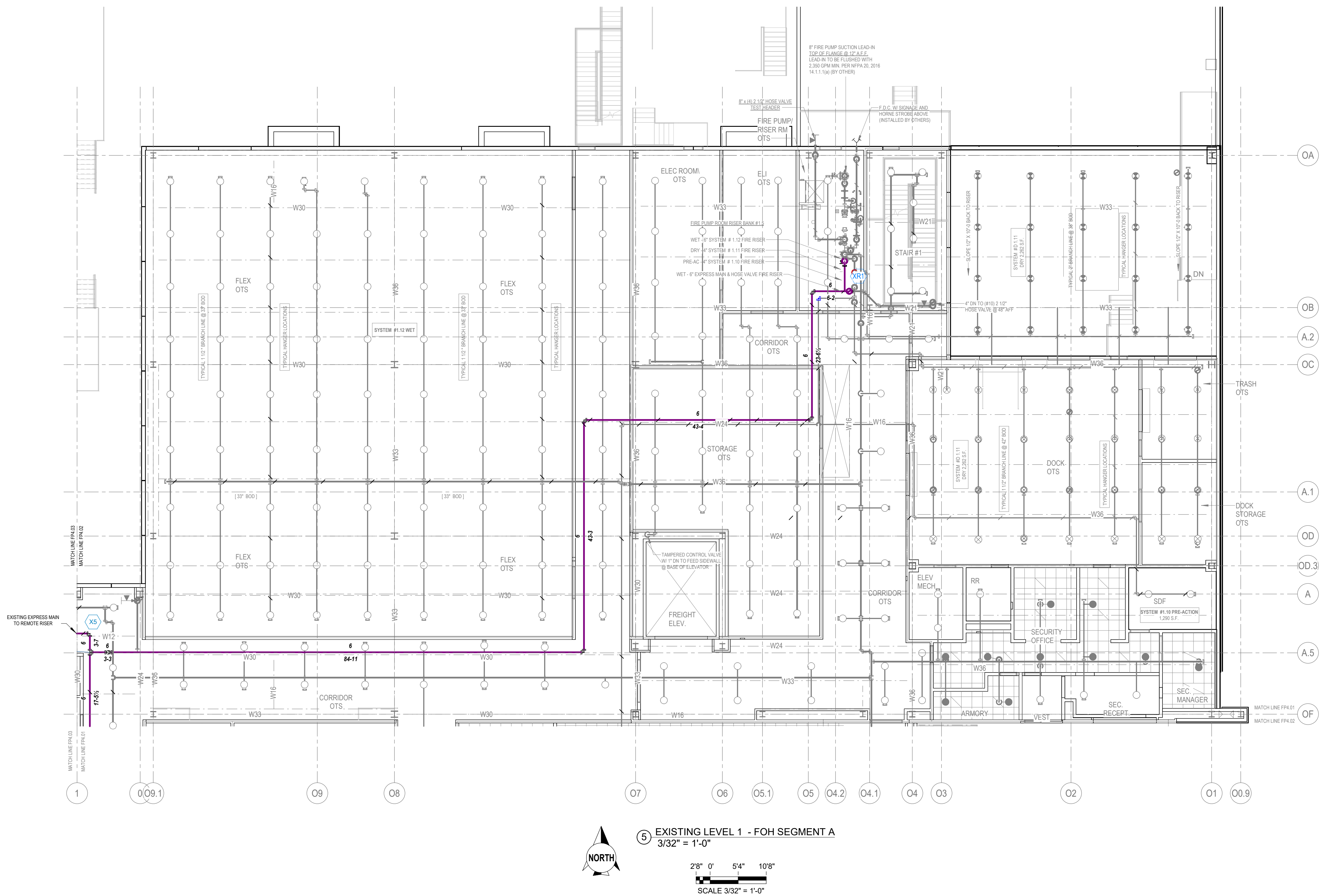
	Project Number

	227361
Sheet Number	

FP4.00



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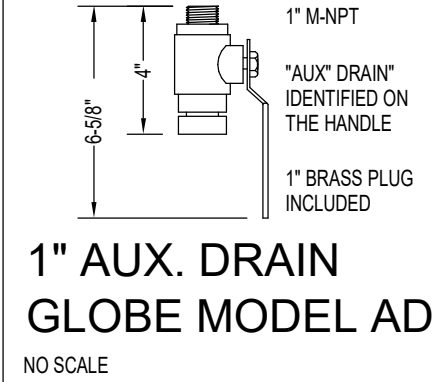


5 EXISTING LEVEL 1 - FOH SEGMENT A
3/32" = 1'-0"

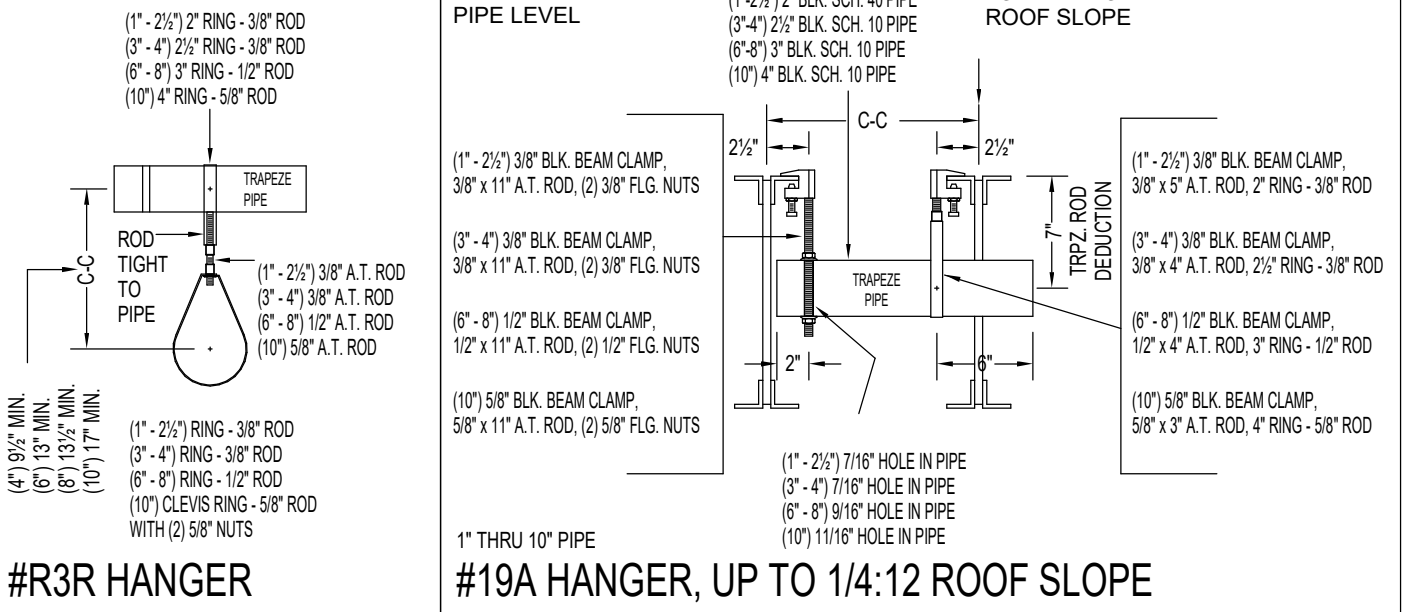
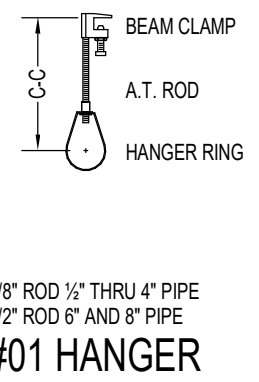


28' 0" 54' 108'
SCALE 3/32" = 1'-0"

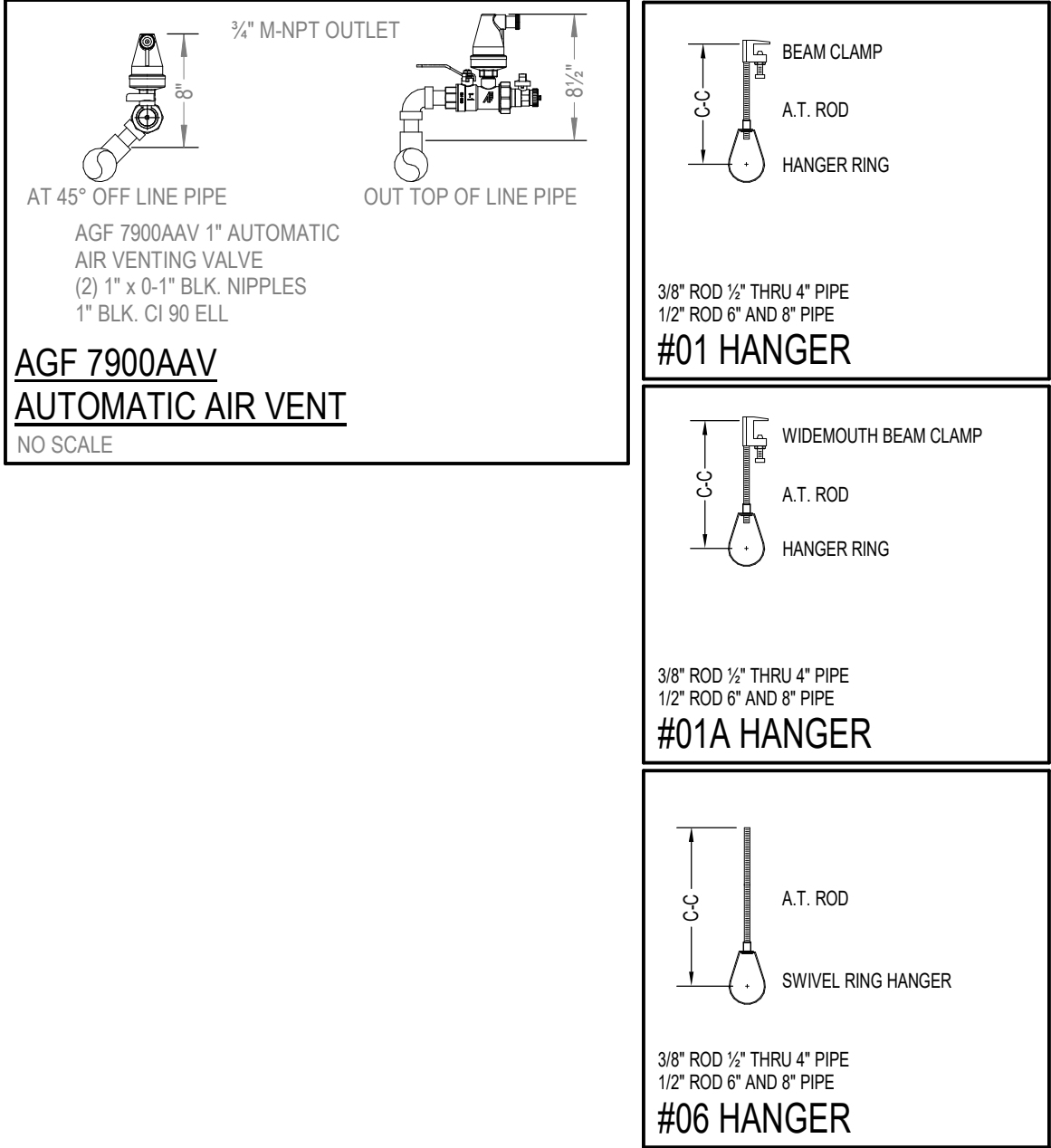
PIPE LEGEND		
EXISTING PIPE =		
PREACTION PIPE =		
EXISTING EXPRESS MAIN =		



- NOTES:
1. ALL PIPING IN PREACTION DRY SYSTEMS SHALL BE SLOPED PER NFPA
 2. ALL PENDENTS SHALL BE CONNECTED VIA FLEX DROPS UNLESS NOTED OTHERWISE
 3. OBSTRUCTED CONSTRUCTION DEFLECTOR DISTANCE APPLIED PER NFPA 13 (2019) TO 2.6.1.2
 4. HANGERS ARE TOP BEAM CLAMPS WHERE BEAMS PRESENT AND HILTI HUS-EZ CONCRETE ANCHORS WHERE BEAMS ARE NOT PRESENT
 5. LEVEL 1 WET AND PREACTION PIPE SIZING BASED ON LEVEL 2 CALCULATIONS



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 3. REFER TO DETAILS ON THIS SHEET FOR TYPICAL HANGER ATTACHMENTS.
 4. REFER TO SHEETS FP1.0 & FP1.1 FOR ADDITIONAL SPECIFIC FIRE SPRINKLER NOTES & DETAILS.
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Stamp or Seal
I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.
Dennis T. Scherr
Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

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BOW = Bottom of Wood
BOD = Bottom of Concrete
BOD = Bottom of Deck
TOM = Top of Wood

X TOS = Centerline of pipe below top of steel
XX'X" AFF = Centerline of pipe above finished floor

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

Company
S&S
SHAMBAUGH & SON, L.P.
CONTRACTORS - ENGINEERS
6445 W. SUNSET RD., SUITE 106 P. 702-832-4545
LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

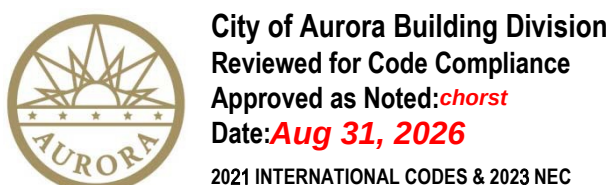
Date
08/05/26

Designed
ALEX P.

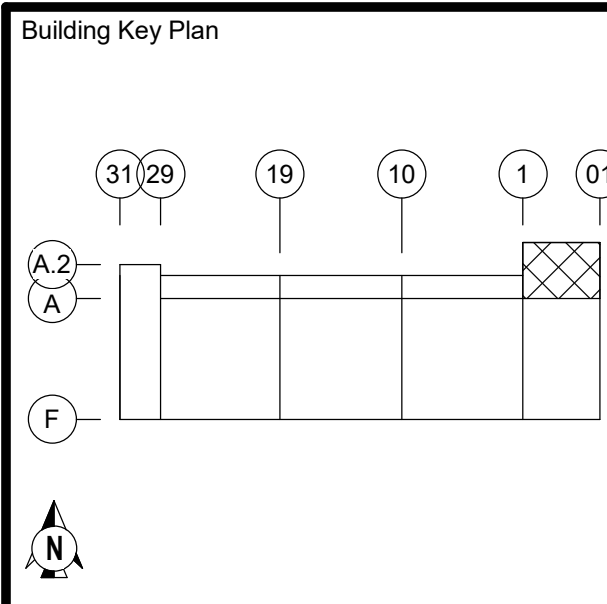
Checked
EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)

1140 N GUN CLUB RD
AURORA, COLORADO 80018



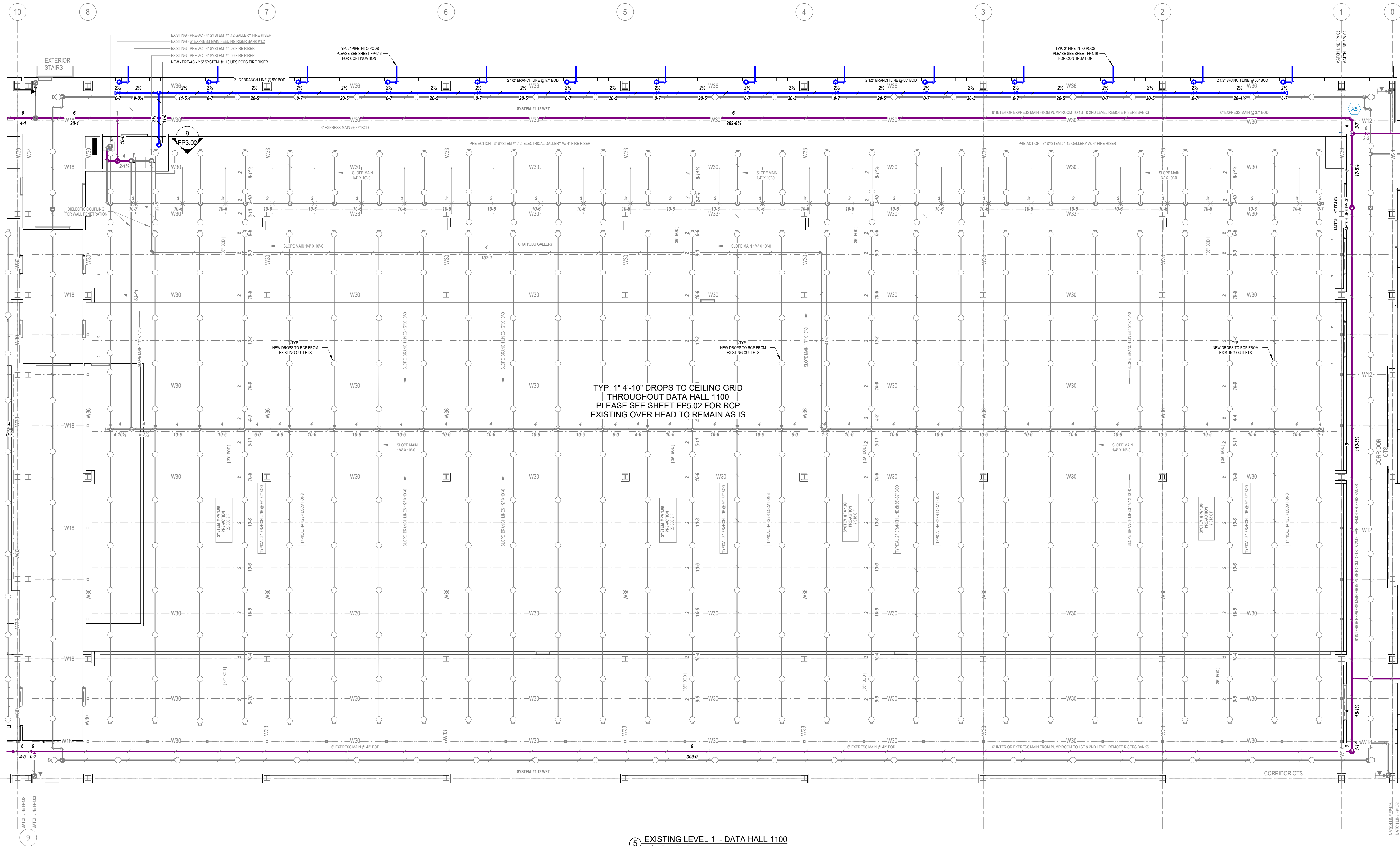
City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted:
Date: Aug 31, 2026
2021 INTERNATIONAL CODES & 2023 NEC



FIRE PROTECTION SYSTEMS
**PRE-ACT SYS#1.10,
DRY SYS#1.11 & WET
SYS#1.12 LEVEL 1 -
FRONT OF HOUSE
SEGMENT A**

Project Number
227361

Sheet Number
FP4.01



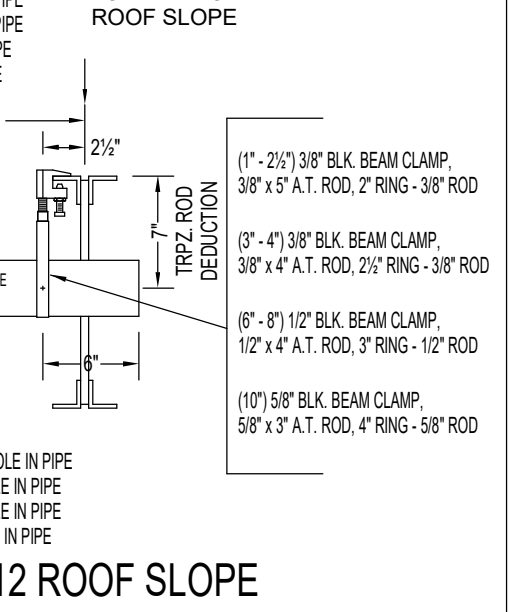
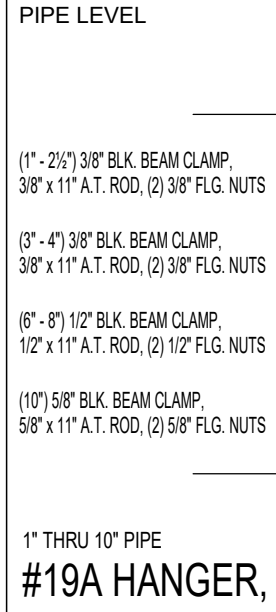
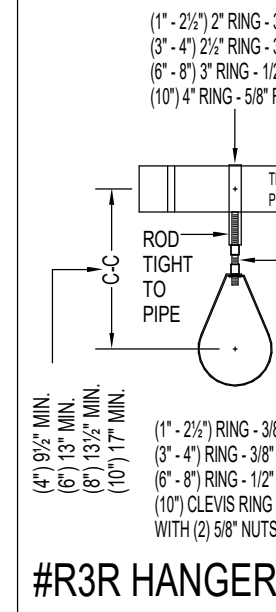
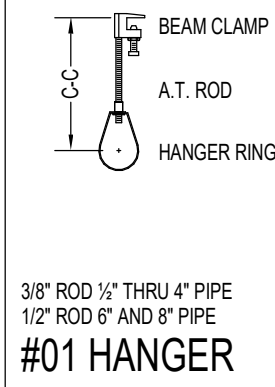
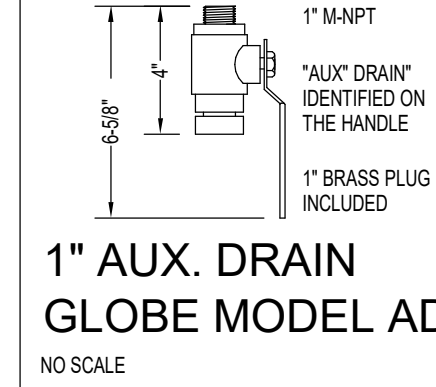
5 EXISTING LEVEL 1 - DATA HALL 1100
3/32" = 1'-0"



28' 0" 54" 108"
SCALE 3/32" = 1'-0"

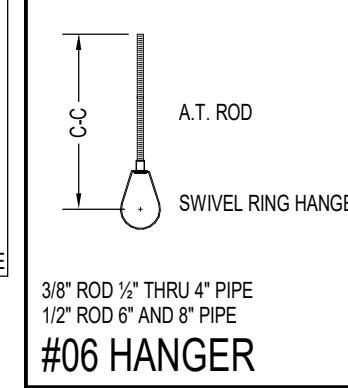
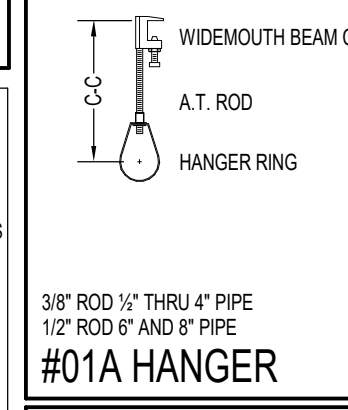
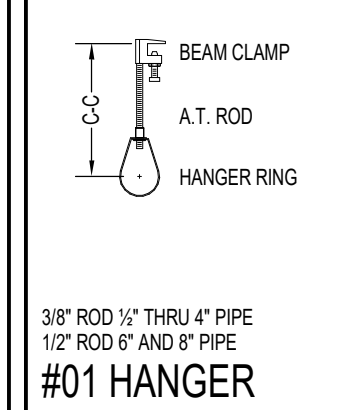
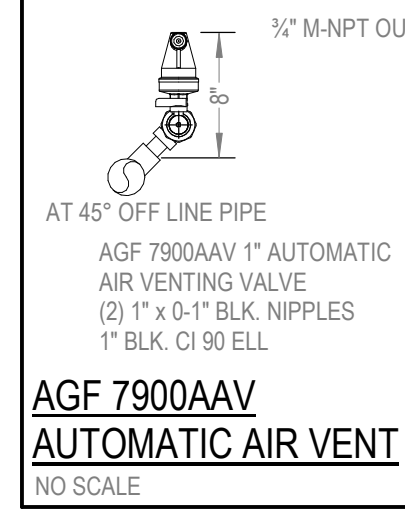
PLEASE SEE PERMIT
2026 2513934-CM04
FOR CORE & SHELL DRAWINGS
RSN 1975523

PIPE LEGEND
EXISTING PIPE =
PREACTION PIPE =
EXISTING EXPRESS MAIN =



- NOTES:
1. ALL PIPING IN PREACTION DRY SYSTEMS SHALL BE SLOPED PER NFPA.
 2. ALL PENDENTS SHALL BE CONNECTED VIA FLEX DROPS UNLESS NOTED OTHERWISE.
 3. OBSTRUCTED CONSTRUCTION DEFLECTOR DISTANCE APPLIED PER NFPA 13 (2019) 10.2.4.1.2.
 4. HANGERS ARE TOP BEAM CLAMPS WHERE BEAMS PRESENT AND HILT-HUS-EZ CONCRETE ANCHORS WHERE BEAMS ARE NOT PRESENT.
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Stamp or Seal
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Dennis T. Scherr
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NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

SYMBOLS LEGEND:
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Abbreviations:
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BOP = Bottom of Purlin BOD = Bottom of Deck
TOM = Top of Mound

X TOS = Centerline of pipe below top of steel
XX' AFF = Centerline of pipe above finished floor

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

Company
S&S
SHAMBAUGH & SON, L.P.
CONTRACTORS - ENGINEERS
6445 W. SUNSET RD., SUITE 106 P. 702-832-6646
LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

Date
08/05/26
Designed
ALEX P.
Checked
EV/DS

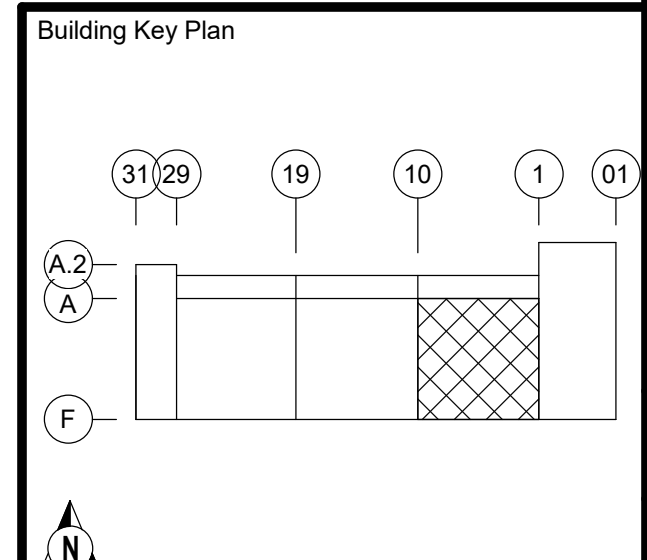
QTS DEN1 - DC2 ESB (FIT-OUT)
1140 N GUN CLUB RD
AURORA, COLORADO 80018

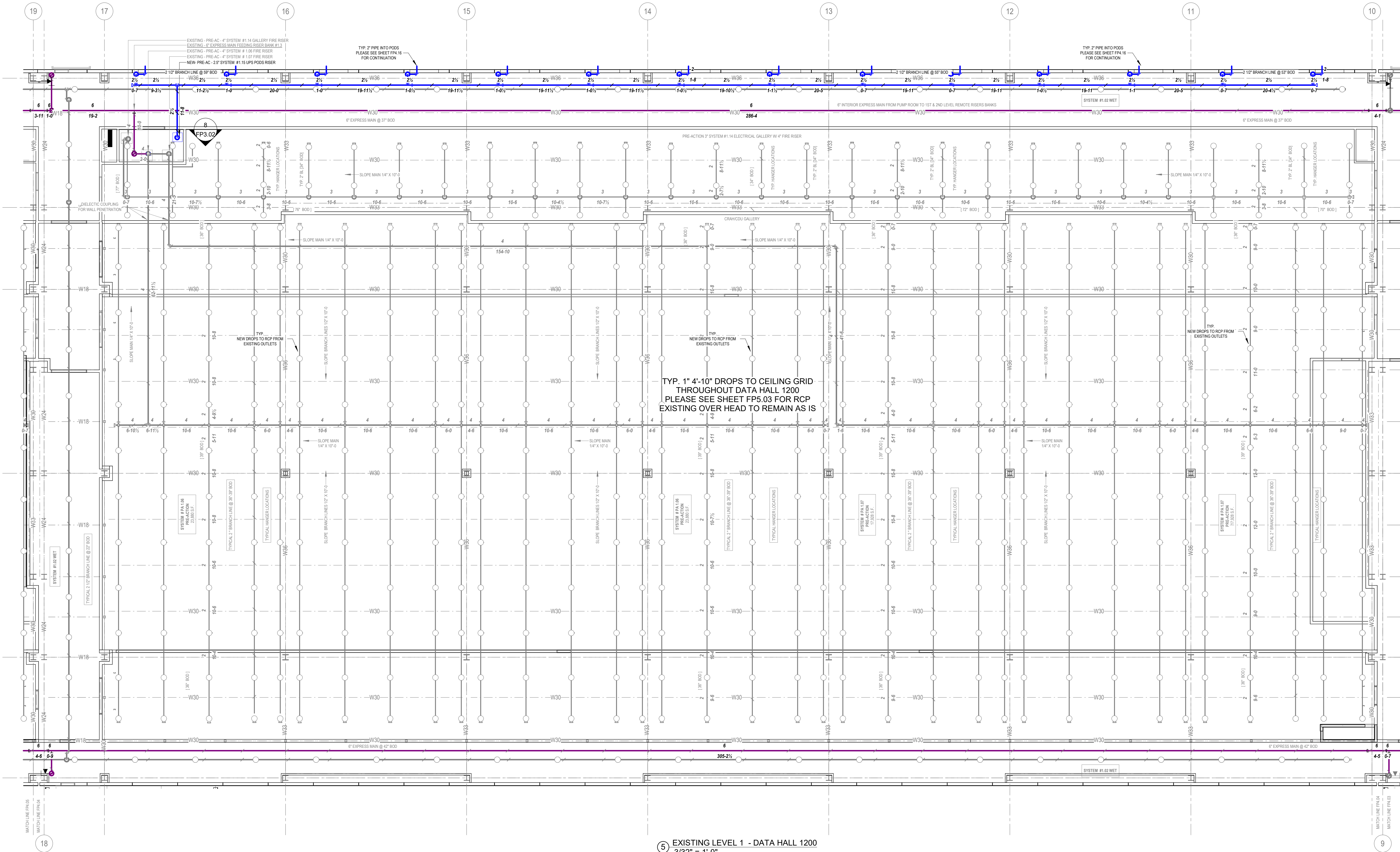
FIRE PROTECTION SYSTEMS
PRE-ACT SYS #1.08, #1.09 & WET SYS #1.12, LEVEL 1 - DATA HALL 1100

Project Number
227361

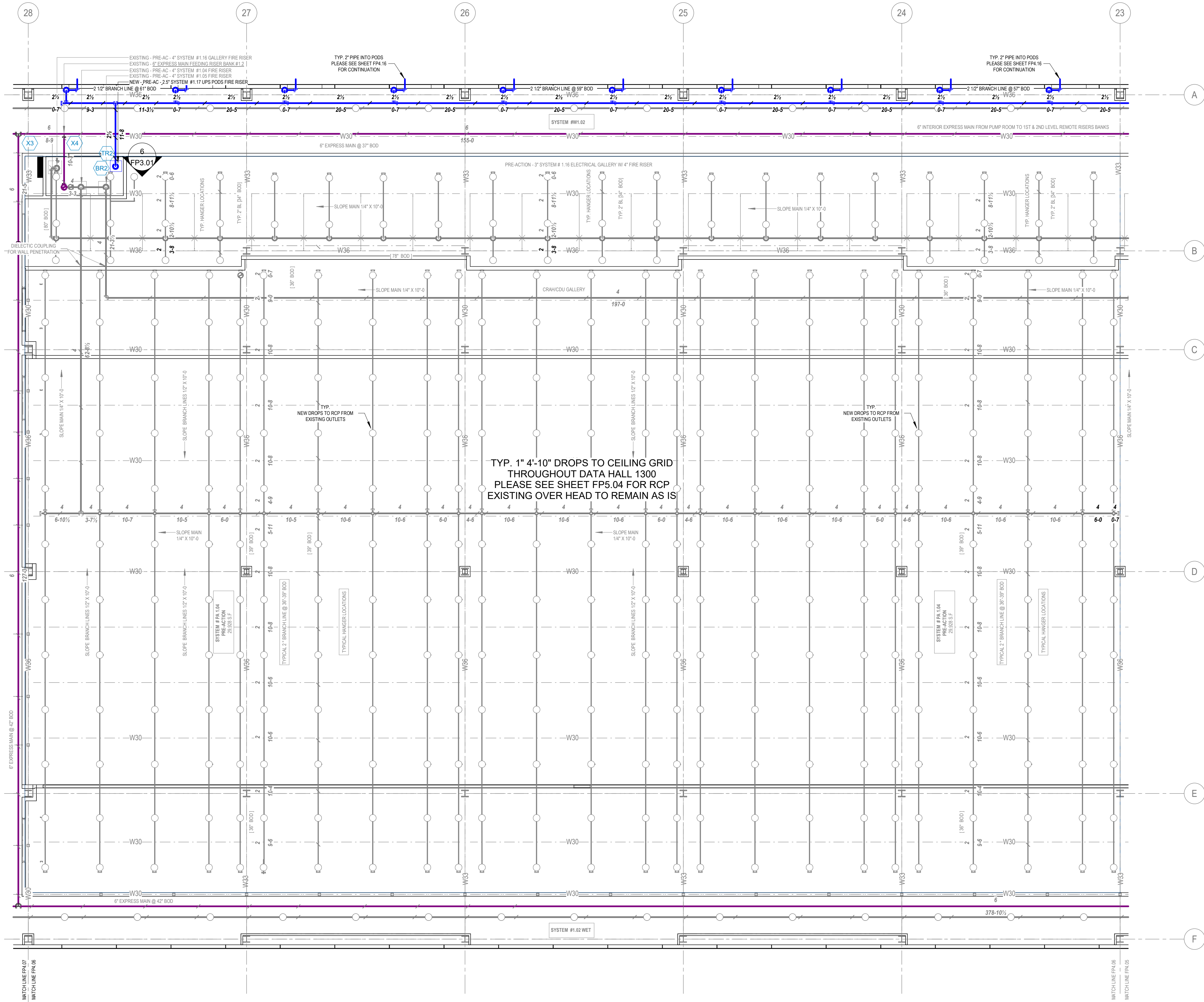
Sheet Number
FP4.03

City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: **cherr**
Date: **Aug 31, 2026**
2021 INTERNATIONAL CODES & 2023 NEC

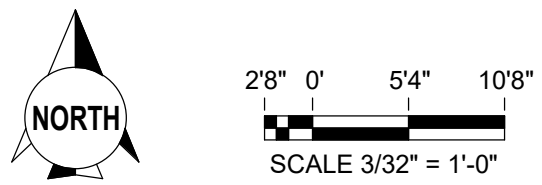




Autodesk Docs://227361-QTS DEN2 FIT-OUT/227361 QTS DEN1 - DC2 - ESB - IFA.rv

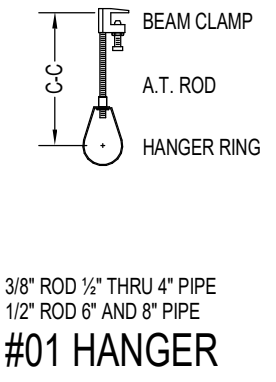
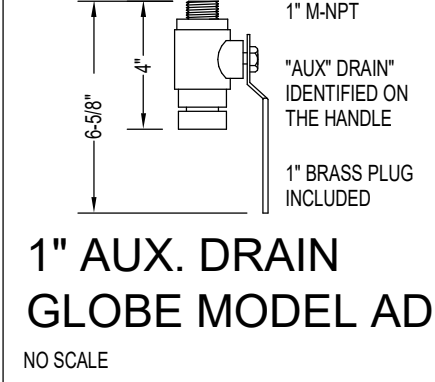


① EXISTING LEVEL 1 - DATA HALL 1300.2
3/32" = 1'-0"

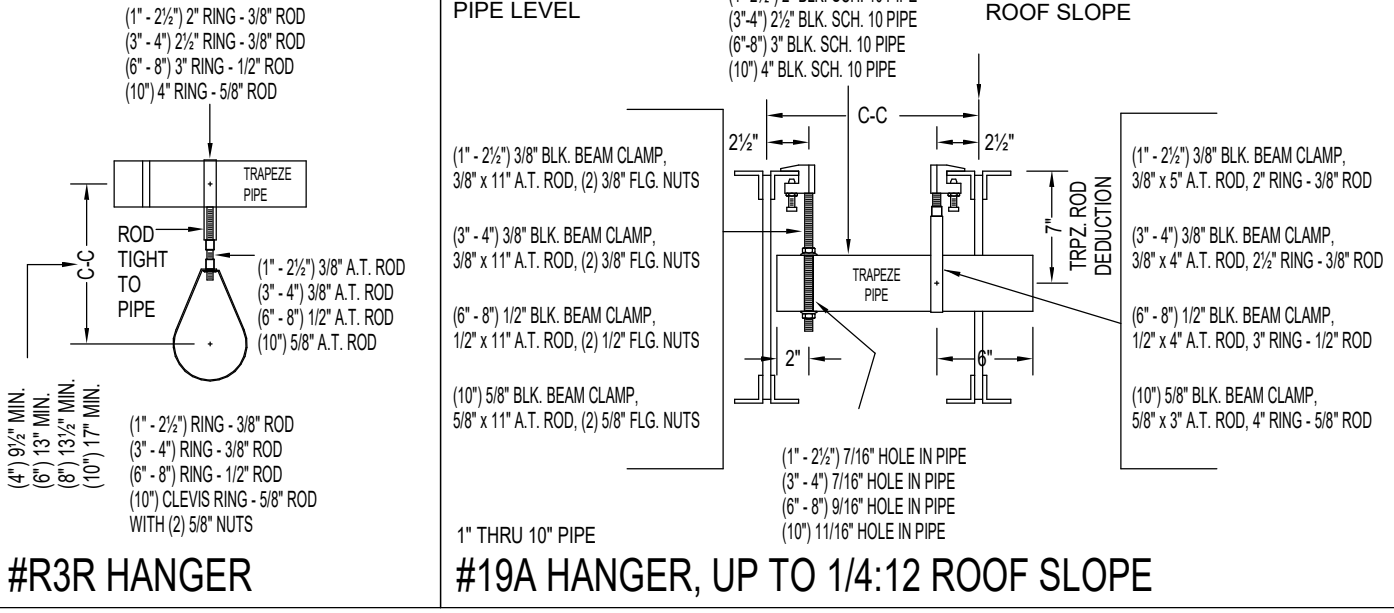


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FOR CORE & SHELL DRAWINGS
RSN 1975523

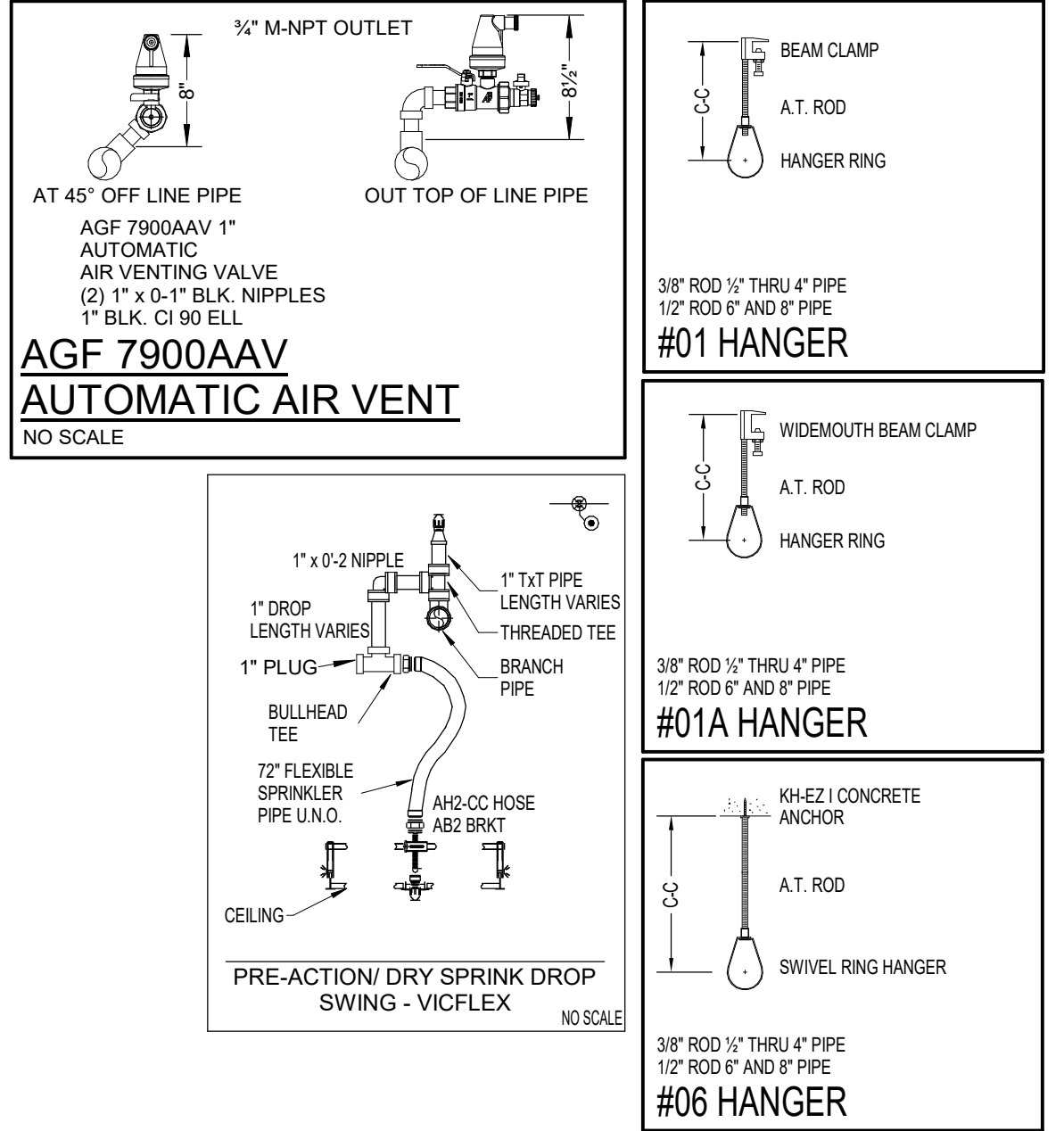
PIPE LEGEND
EXISTING PIPE =
PREACTION PIPE =
EXISTING EXPRESS MAIN =



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No.	Date	By	Description
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Company

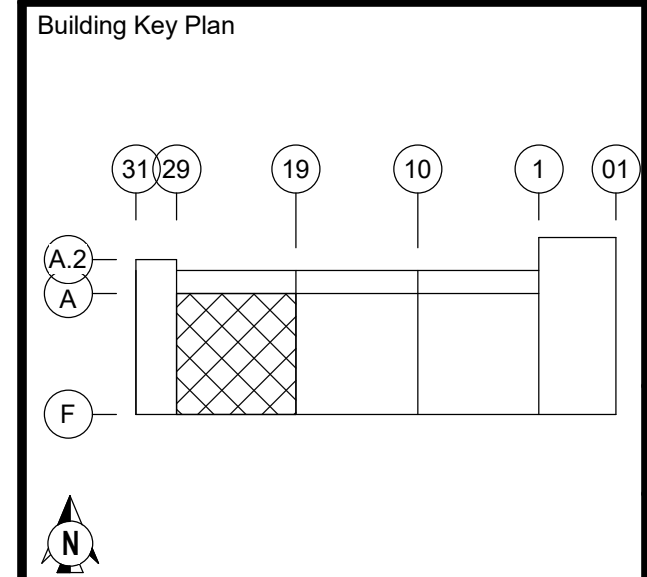
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SHAMBAUGH & SON, L.P.
CONTRACTORS • ENGINEERS
6445 W. SUNSET RD., SUITE 106 P. 702-832-6545
LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

Date: 08/05/26
Designed: ALEX P.
Checked: EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)
1140 N GUN CLUB RD
AURORA, COLORADO 80018

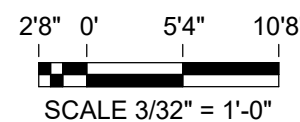
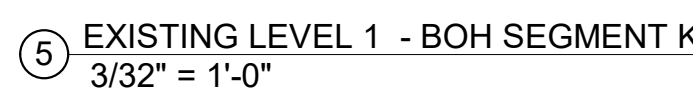
City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *chort*
Date: **Aug 31, 2026**
2021 INTERNATIONAL CODES & 2023 NEC



FIRE PROTECTION SYSTEMS
WET SYS #1.02 & PRE-ACTION SYS # 1.04
LEVEL 1 - DATA HALL 1300

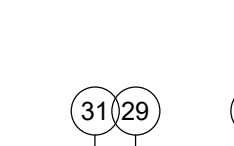
Project Number
227361

Sheet Number
FP4.06



Autodesk Docs://227361-QTS DEN2 FIT-OUT/227361 QTS DEN1 - DC2 - ESB - IFA.rvt

Building Key Plan



31 29 19 10 1

A-2 A

F

N

FIRE PROTECTION SYSTEMS

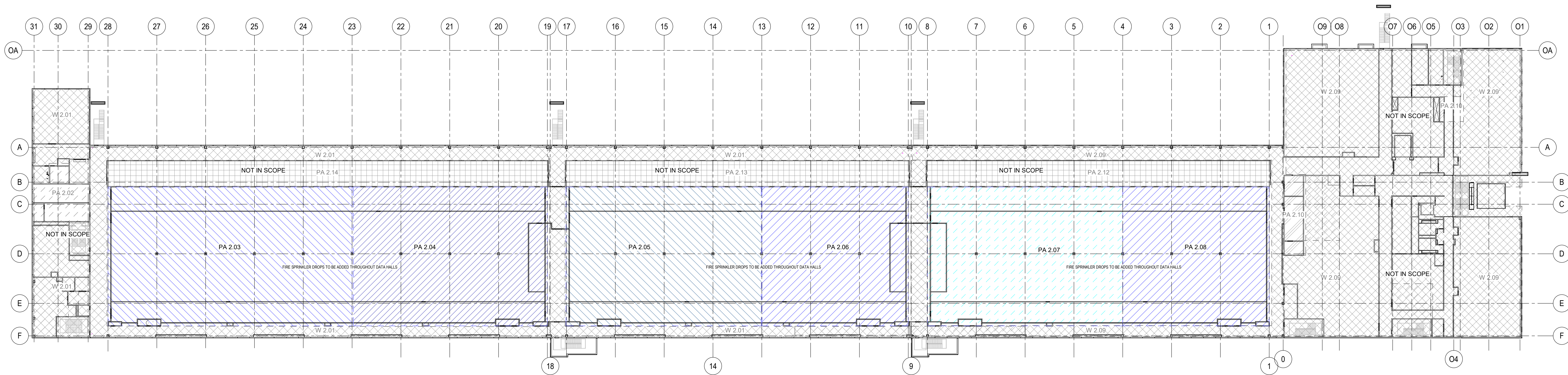
DRY SYS #1.01, WE
SYS # 1.02 & PRE-AC
1.03 LEVEL 1 - BACK
OF HOUSE

Sheet Number
ED4.07

FP4.07

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

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FOR CORE & SHELL DRAWINGS
RSN 1975523



1 LEVEL 2 ZONING PLAN
1" = 40'-0"



10' 0' 20' 40'
SCALE 1" = 40'-0"

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Company
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SHAMBAUGH & SON, L.P.
CONTRACTORS • ENGINEERS
6445 W. SUNSET RD., SUITE 106 P. 702-432-4545
LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

Date	08/05/26
Designed	ALEX P.
Checked	EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)

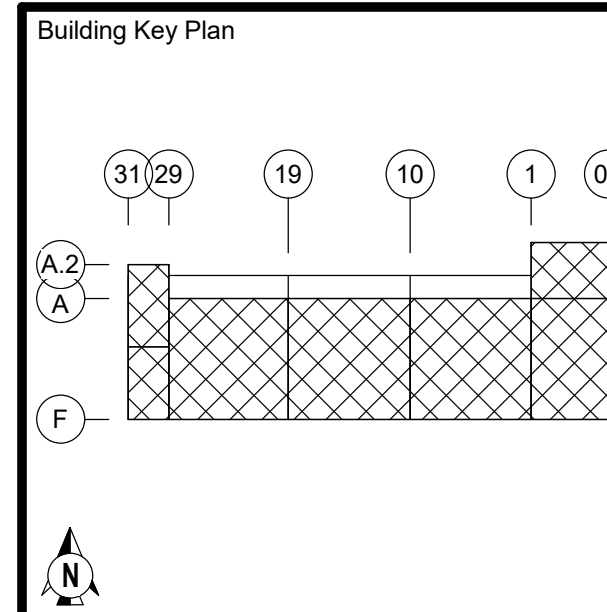
1140 N GUN CLUB RD
AURORA, COLORADO 80018

FIRE PROTECTION SYSTEMS

LEVEL 2 - OVERALL ZONING PLAN

Project Number
227361

Sheet Number
FP4.08



PLEASE SEE PERMIT
2026 2513934-CM04
FOR CORE & SHELL DRAWINGS
RSN 1975523

PIPE LEGEND
EXISTING PIPE =
PREACTION PIPE =
EXISTING EXPRESS MAIN =

1" M-NPT
1" AUX. DRAIN
GLOBE MODEL AD
NO SCALE

BEAM CLAMP
A.T. ROD
HANGER RING
3/8" ROD 1/2" THRU 4" PIPE
1/2" ROD 6" AND 8" PIPE
#01 HANGER

#R3R HANGER
1" THRU 12" PIPE
#19A HANGER, UP TO 1/4:12 ROOF SLOPE

GENERAL PIPING NOTES:
1. OVERHEAD PIPE SHALL BE ROLL-GROOVED, AS APPLICABLE, UNLESS NOTED OTHERWISE.
2. ALL MAINS, RISERS, BRANCH LINES AND DROPS SHALL BE SCH. 40.
3. REFER TO DETAILS ON THIS SHEET FOR TYPICAL HANGER ATTACHMENTS.
4. REFER TO SHEETS FP1.0 & FP1.1 FOR ADDITIONAL SPECIFIC FIRE SPRINKLER NOTES & DETAILS.
5. TYPICAL HANGERS ARE #01 TOP BEAM CLAMPS, WHERE JOISTS/BEAMS ARE NOT ACCESSIBLE, #19A TRAPEZE HANGERS SHALL BE USED.

3/4" M-NPT OUTLET
AT 45° OFF LINE PIPE
AGF 7900AAV 1" AUTOMATIC AIR VENTING VALVE
(2) 1" x 0.1" BLK. NIPPLES
1" BLK. C.I. 90 ELL
NO SCALE

BEAM CLAMP
A.T. ROD
HANGER RING
3/8" ROD 1/2" THRU 4" PIPE
1/2" ROD 6" AND 8" PIPE
#01 HANGER

WIDEMOUTH BEAM CLAMP
A.T. ROD
HANGER RING
3/8" ROD 1/2" THRU 4" PIPE
1/2" ROD 6" AND 8" PIPE
#01A HANGER

SWIVEL RING HANGER
A.T. ROD
HANGER RING
3/8" ROD 1/2" THRU 4" PIPE
1/2" ROD 6" AND 8" PIPE
#06 HANGER

EXISTING LEVEL 2 - DATA HALL 2100
3/32" = 1'-0"

NORTH
28' 0" 54' 108'
SCALE 3/32" = 1'-0"

Stamp or Seal
I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.
Dennis T. Scherr
Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 9/1/2029

SYMBOLS LEGEND:
= Hanger with rod length
= Trapeze Hanger Location
= Hydraulic Reference point
Abbreviations:
TOS = Top of Steel
BOS = Bottom of Steel
BOP = Bottom of Purlin
TOM = Top of Mallet
BOD = Bottom of Deck
= Centerline of pipe below top of steel
= Centerline of pipe above finished floor

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

Company
S&S
SHAMBAUGH & SON, L.P.
CONTRACTORS • ENGINEERS
6445 W. SUNSET RD., SUITE 106 P. 702-832-5545
LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

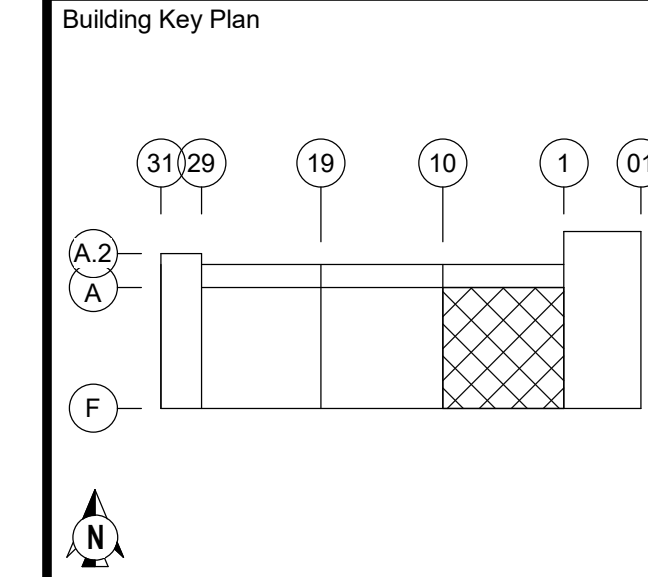
Date
08/05/26
Designed
ALEX P.
Checked
EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)
1140 N GUN CLUB RD.
AURORA, COLORADO 80018

**PRE-ACT SYS# 2.07,
PRE-ACT SYS# 2.08 &
WET SYS #2.09
LEVEL 2 - DATA HALL
2100**

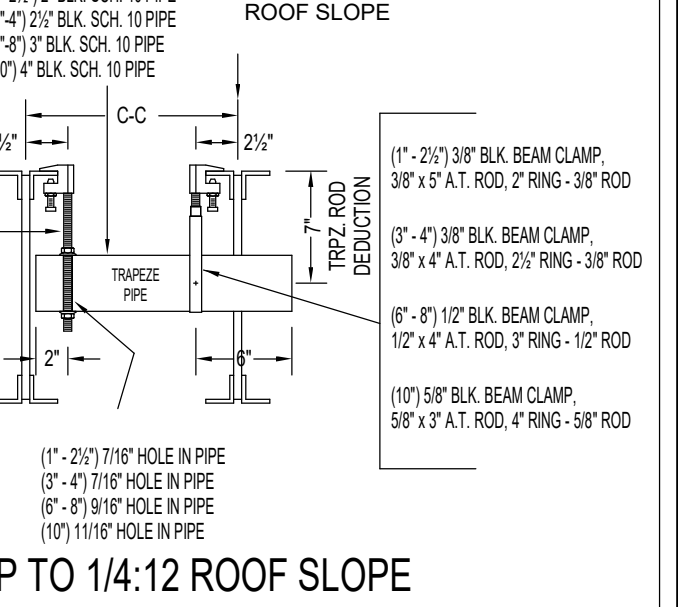
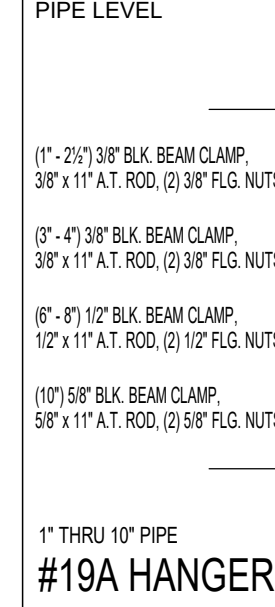
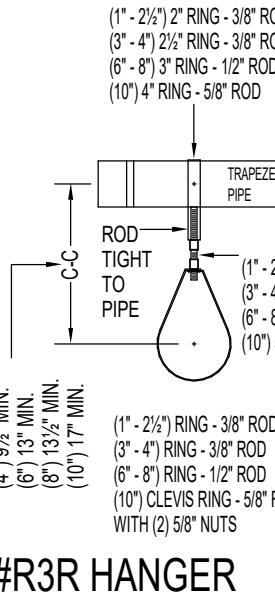
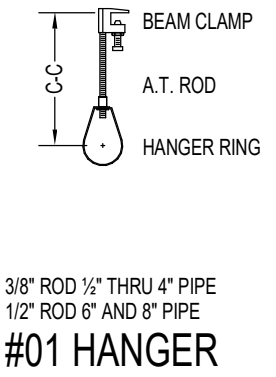
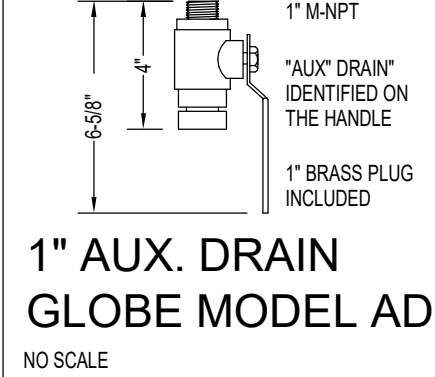
Project Number
227361
Sheet Number

FP4.11

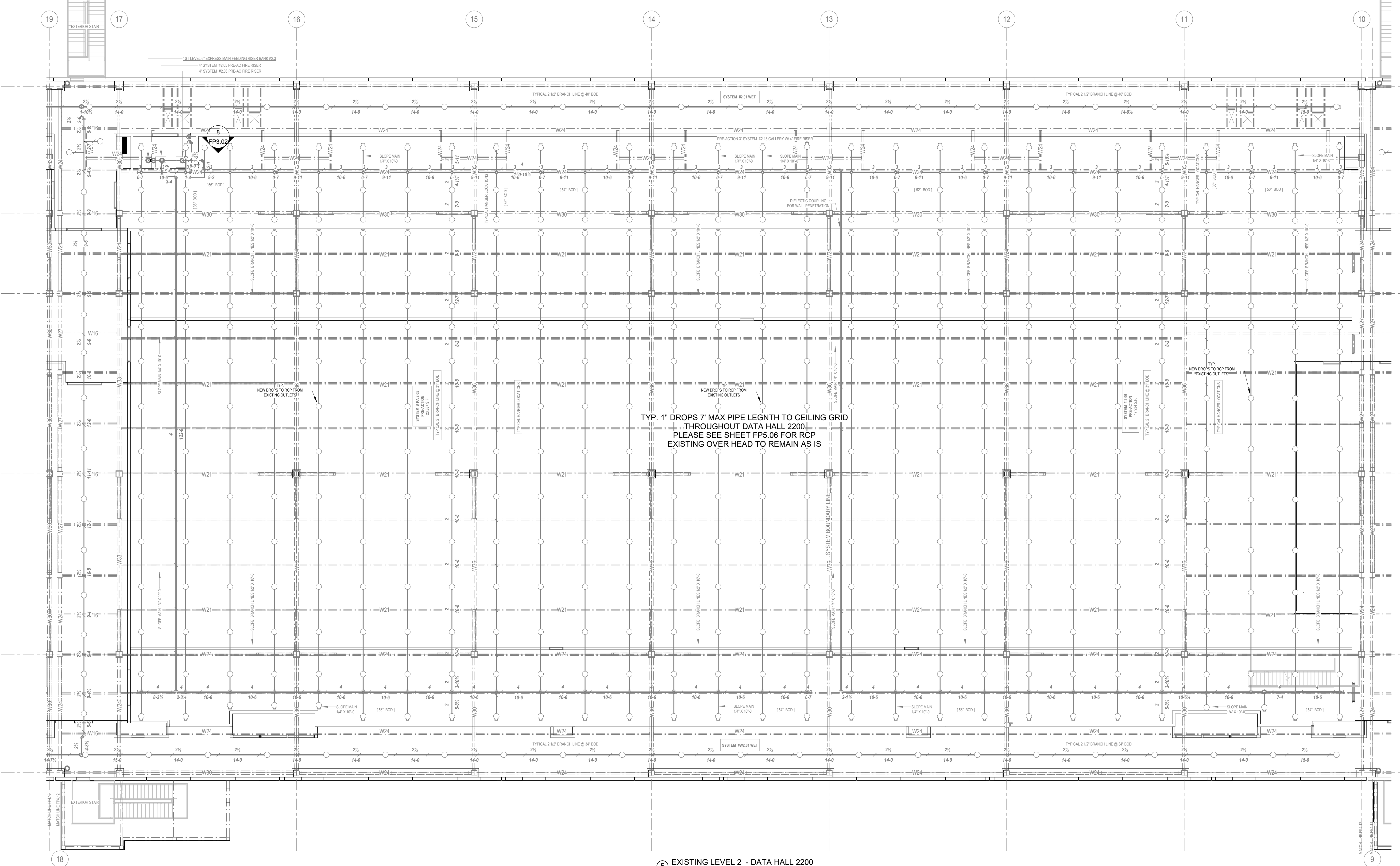
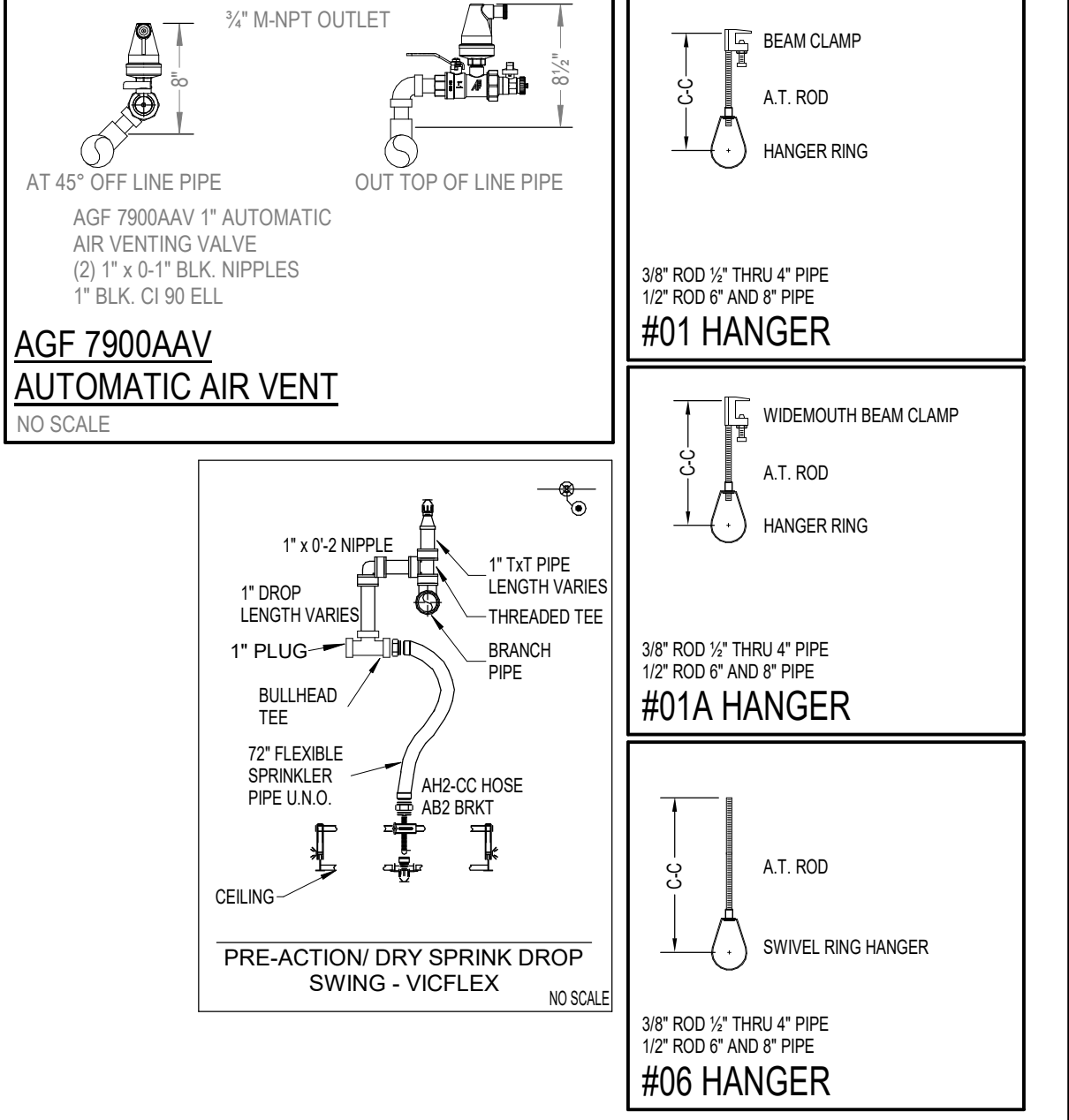


PLEASE SEE PERMIT
2026 2513934-CM04
FOR CORE & SHELL DRAWINGS
RSN 1975523

PIPE LEGEND
EXISTING PIPE =
PREACTION PIPE =
EXISTING EXPRESS MAIN =



GENERAL PIPING NOTES:
1. OVERHEAD PIPE SHALL BE ROLL-GROOVED, AS APPLICABLE, UNLESS NOTED OTHERWISE.
2. ALL MAINS, RISERS, BRANCHLINES AND DROPS SHALL BE SCH. 40.
3. REFER TO DETAILS ON THIS SHEET FOR TYPICAL HANGER ATTACHMENTS.
4. REFER TO SHEETS FP1.0 & FP1.1 FOR ADDITIONAL SPECIFIC FIRE SPRINKLER NOTES & DETAILS.
5. TYPICAL HANGERS ARE ROY TOP BEAM CLAMPS. WHERE JOISTS/BEAMS ARE NOT ACCESSIBLE, #19A TRAPEZE HANGERS SHALL BE USED.



EXISTING LEVEL 2 - DATA HALL 2200
3/32\" = 1'-0"



Stamp or Seal
I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.
Dennis T. Scherr
Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029
SYMBOLS LEGEND:
= Hanger with rod length
= Trapeze Hanger Location
= Hydraulic Reference point
Abbreviations:
TOS = Top of Steel BOW = Bottom of Wood
BOS = Bottom of Steel BOC = Bottom of Concrete
BOP = Bottom of Purlin BOD = Bottom of Deck
TOM = Top of Mover

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

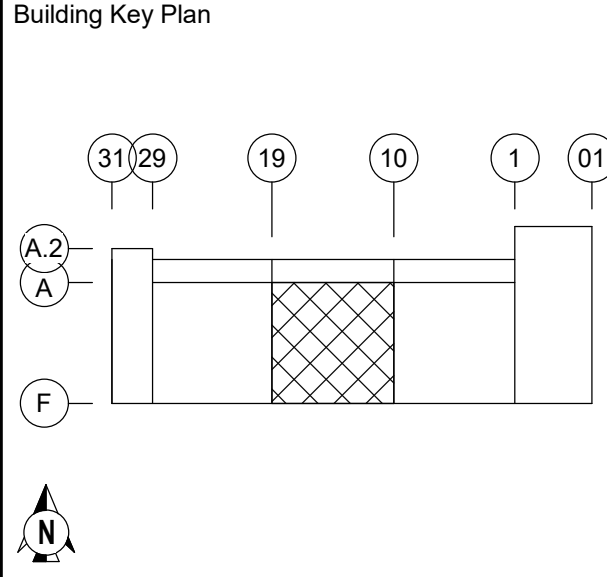
Company
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SHAMBAUGH & SON, L.P.
CONTRACTORS - ENGINEERS
6445 W. SUNSET RD., SUITE 106 P. 702-832-6545
LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM
Date 08/05/26
Designed ALEX P.
Checked EV/DS

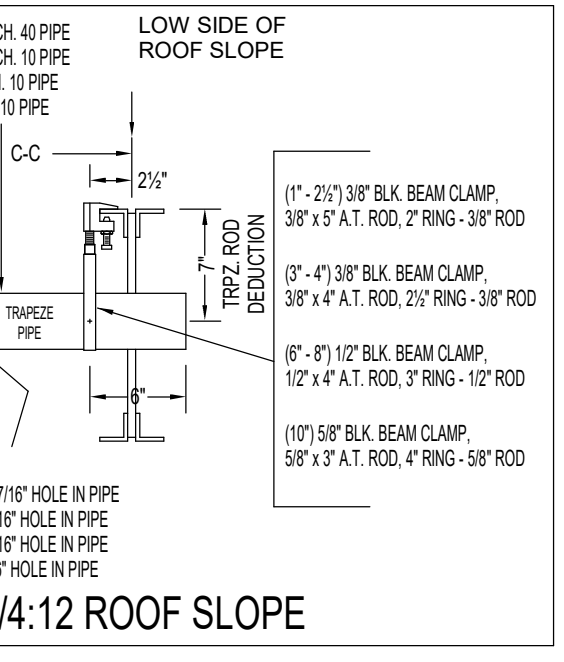
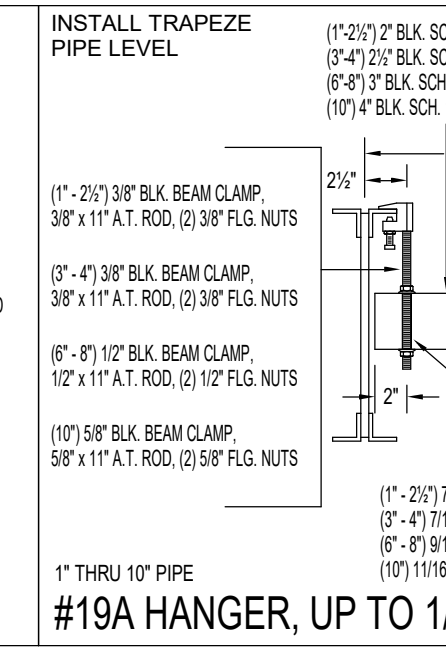
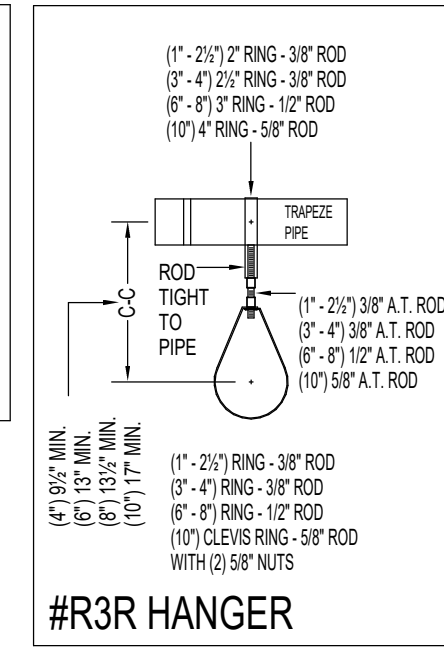
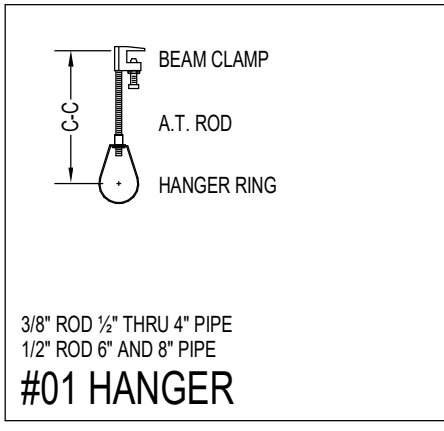
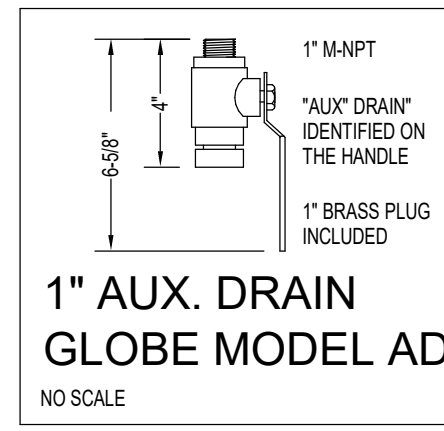
QTS DEN1 - DC2 ESB (FIT-OUT)
1140 N GUN CLUB RD
AURORA, COLORADO 80018

FIRE PROTECTION SYSTEMS
WET SYS #2.01, PRE-ACT SYS# 2.05, & PRE-ACT SYS# 2.06
LEVEL 2 - DATA HALL 2200

Project Number
227361
Sheet Number
FP4.12



PLEASE SEE PERMIT
2026 2513934-CM04
FOR CORE & SHELL DRAWINGS
RSN 1975523



- NOTES:
1. ALL PIPING IN PREACTION/DRY SYSTEMS SHALL BE SLOPED PER NFPA.
 2. ALL PENDENTS SHALL BE CONNECTED VIA FLEX DROPS UNLESS NOTED OTHERWISE.
 3. OBSTRUCTED CONSTRUCTION DEFLECTOR DISTANCE APPLIED PER NFPA 13 (2019) 10.2.5.1.2.
 4. HANGERS ARE TOP BEAM CLAMPS WHERE BEAMS PRESENT AND HILTI HUS-EZ CONCRETE ANCHORS WHERE BEAMS ARE NOT PRESENT.
 5. LEVEL 1 WET AND PREACTION PIPE SIZING BASED ON LEVEL 2 CALCULATIONS.

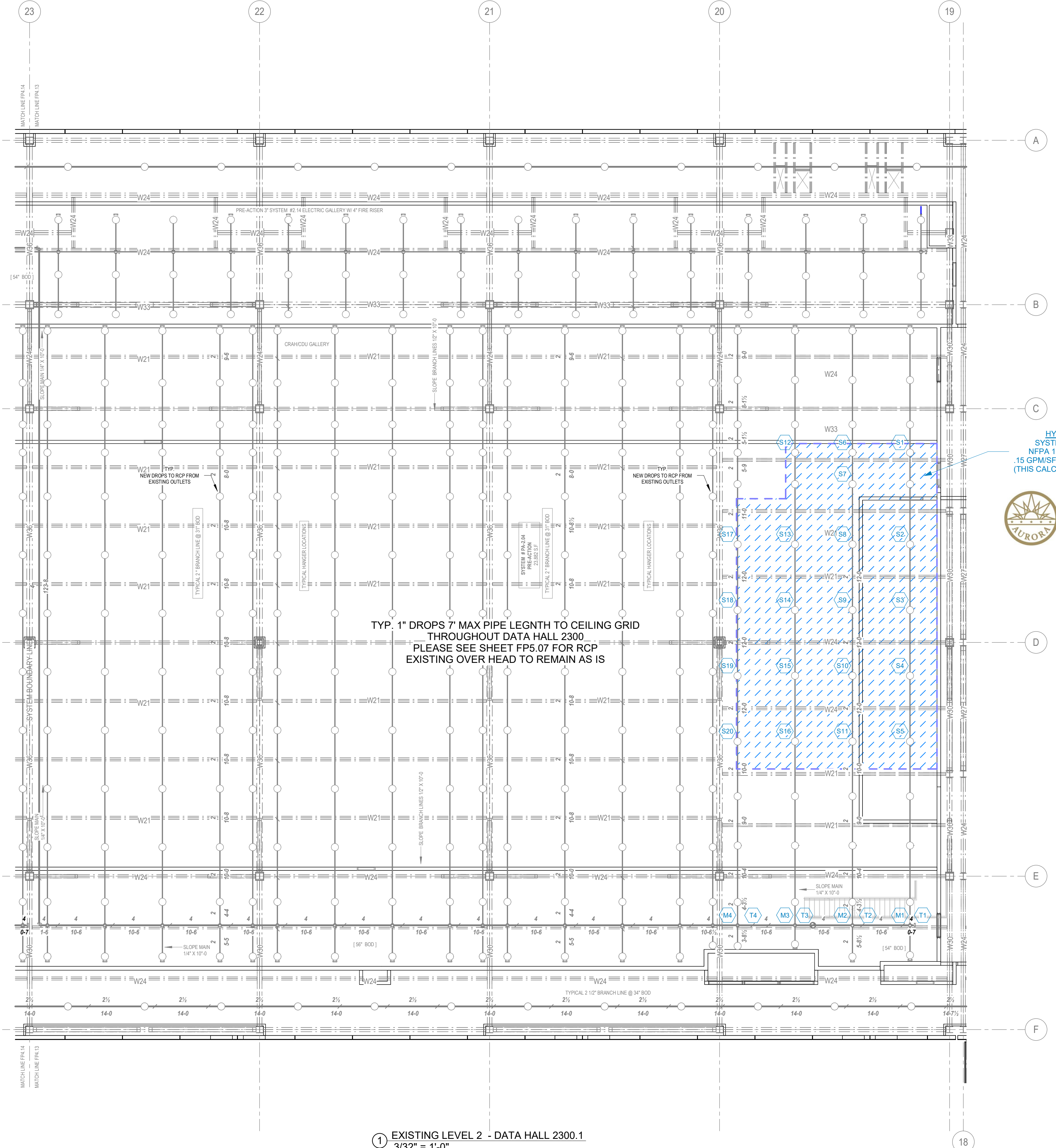
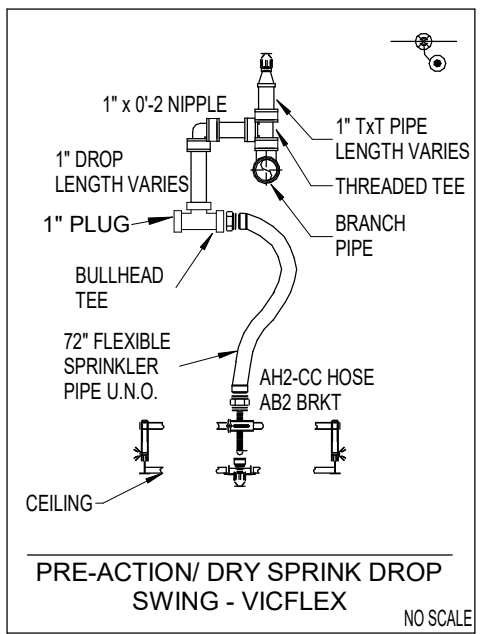
- GENERAL PIPING NOTES:
1. OVERHEAD PIPE SHALL BE ROLL-GROOVED, AS APPLICABLE, UNLESS NOTED OTHERWISE.
 2. ALL MAINS, RISERS, BRANCHLINES AND DROPS SHALL BE SCH. 40.
 3. REFER TO DETAILS ON THIS SHEET FOR TYPICAL HANGER ATTACHMENTS.
 4. REFER TO SHEETS FP1.0 & FP1.1 FOR ADDITIONAL SPECIFIC FIRE SPRINKLER NOTES & DETAILS.
 5. TYPICAL HANGERS ARE #01 TOP BEAM CLAMPS. WHERE JOISTS/BEAMS ARE NOT ACCESSIBLE, #19A TRAPEZE HANGERS SHALL BE USED.

PIPE LEGEND

EXISTING PIPE =

PREACTION PIPE =

EXISTING EXPRESS MAIN =



HYD. REMOTE AREA #1 -
SYSTEM PA2-04 - DATA HALL 2300
NFPA 13 - ORDINARY HAZ. GRP-1
15 GPM/SF OVER 2,063 SF (1,890 SF MIN.)
(THIS CALC IS FOR RCP PLEASE SEE FP5.07)

City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *chort*
Date: **Aug 31, 2026**
2021 INTERNATIONAL CODES & 2023 NEC

TYP. 1" DROPS 7' MAX PIPE LGENTH TO CEILING GRID
THROUGHOUT DATA HALL 2300
PLEASE SEE SHEET FP5.07 FOR RCP
EXISTING OVER HEAD TO REMAIN AS IS

1 EXISTING LEVEL 2 - DATA HALL 2300.1
3/32" = 1'-0"



Stamp or Seal

I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.

Dennis T. Scherr

Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

- SYMBOLS LEGEND:
- = Hanger with rod length
 - = Trapeze Hanger Location
 - = Hydraulic Reference point
- Abbreviations:
- | | |
|------------------------|--------------------------|
| TOS = Top of Steel | BOF = Bottom of Wood |
| BOS = Bottom of Steel | BDC = Bottom of Concrete |
| BOP = Bottom of Purlin | BOD = Bottom of Deck |
| TOM = Top of Mow | |
- = Centerline of pipe below top of steel
 = Centerline of pipe above finished floor

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

Company

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LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

Date 08/05/26
Designed ALEX P.
Checked EV/DS

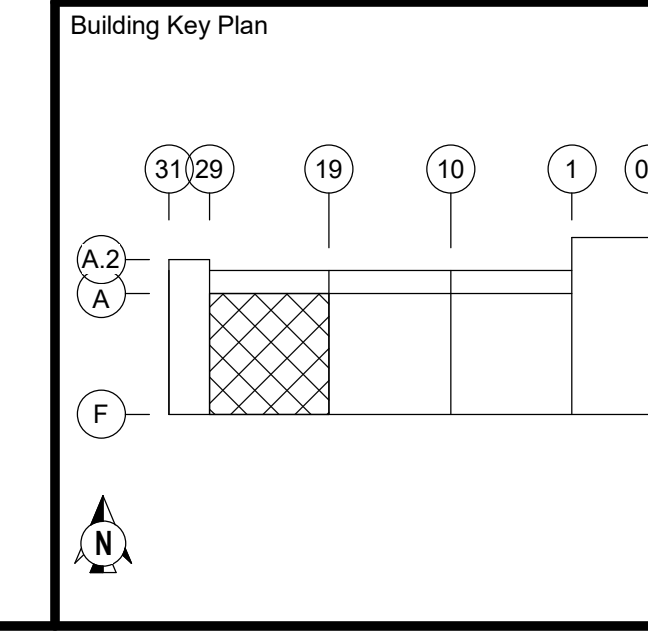
QTS DEN1 - DC2 ESB (FIT-OUT)

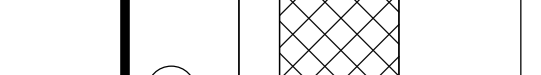
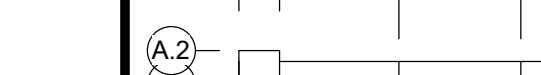
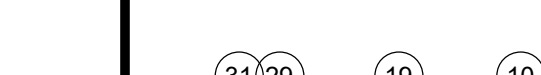
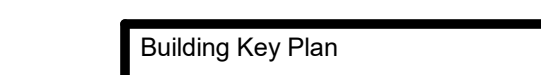
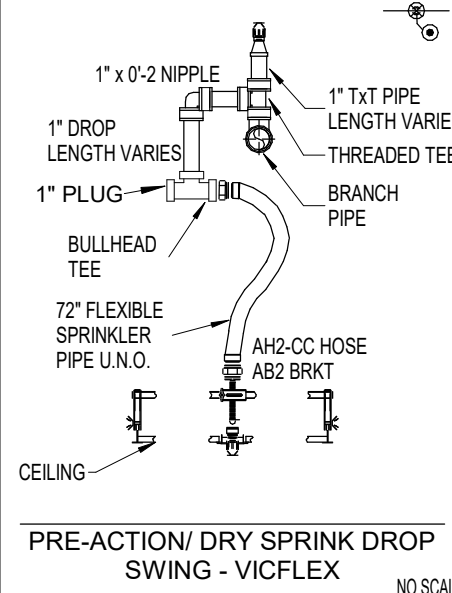
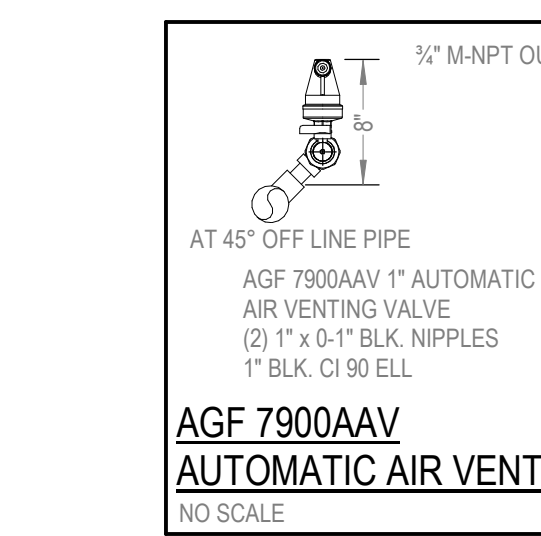
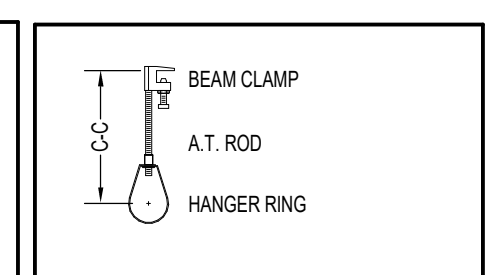
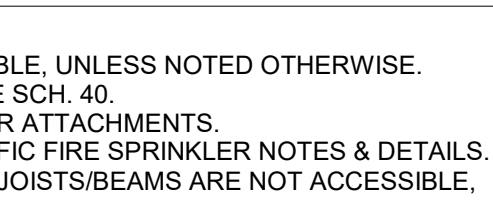
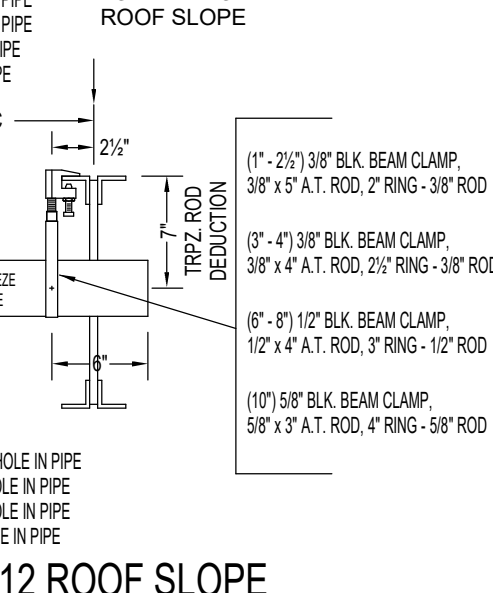
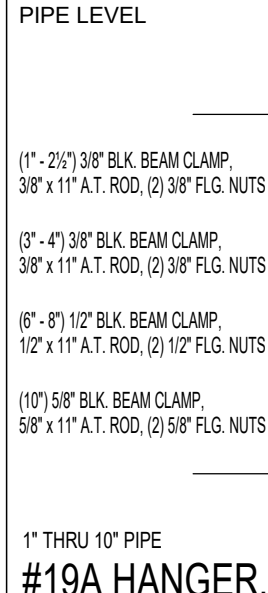
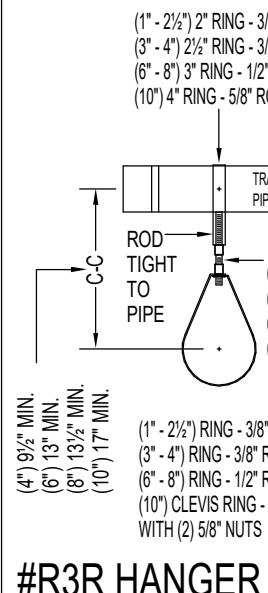
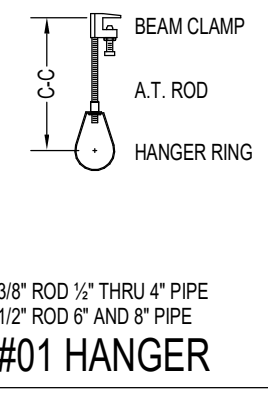
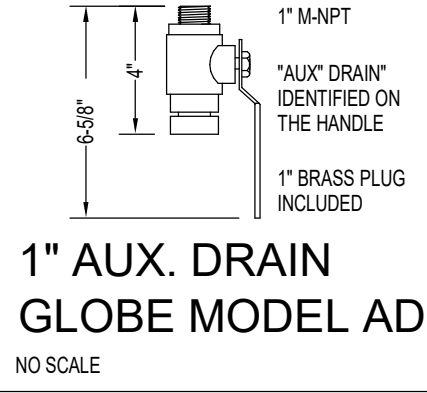
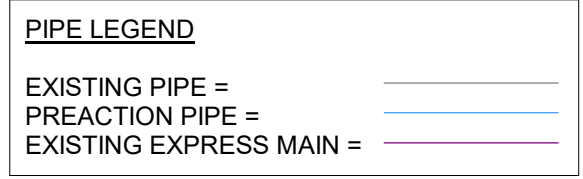
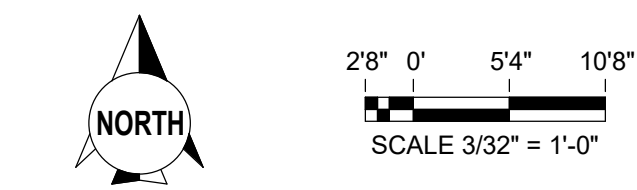
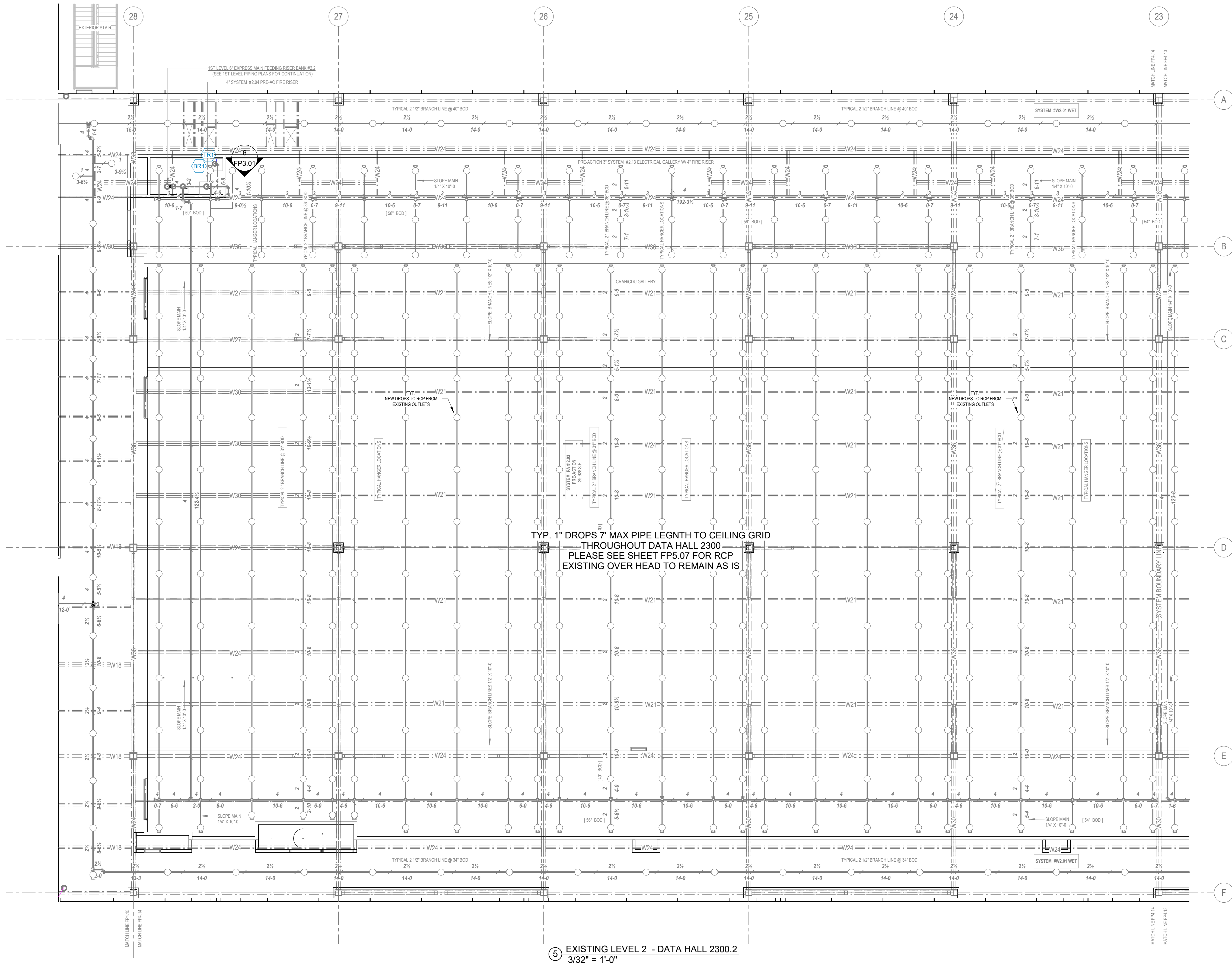
1140 N GUN CLUB RD
AURORA, COLORADO 80018

FIRE PROTECTION SYSTEMS
WET SYS #2.01 & PRE-ACT SYS #2.04
LEVEL 2 - DATA HALL 2300

Project Number
227361

Sheet Number
FP4.13





Stamp or Seal
I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.
Dennis T. Scherr
Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

SYMBOLS LEGEND:

—	= Hanger with rod length
—	= Trapeze Hanger Location
○	= Hydraulic Reference point

Abbreviations:
TOS = Top of Steel BOD = Bottom of Steel BOP = Bottom of Purlin BOD = Bottom of Deck TOM = Top of Mover

X TOS	= Centerline of pipe below top of steel
XX-X AFF	= Centerline of pipe above finished floor

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

Company

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LAS VEGAS, NV 89118 www.shambaugh.com

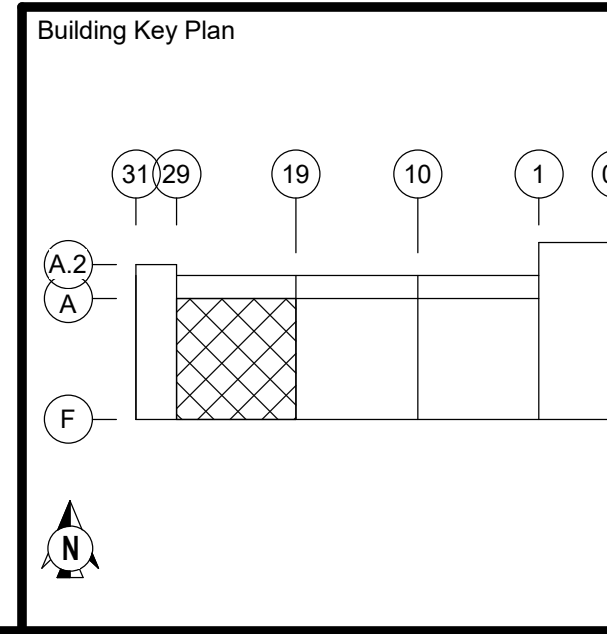
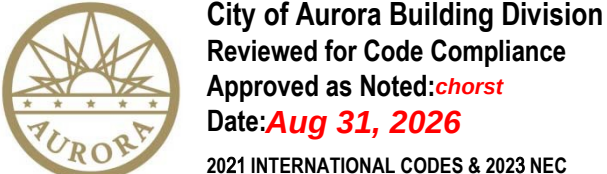
FIRE PROTECTION - FIRE ALARM

Date	08/05/26
Designed	ALEX P.
Checked	EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)
1140 N GUN CLUB RD
AURORA, COLORADO 80018

FIRE PROTECTION SYSTEMS
WET SYS #2.01 & PRE-ACT SYS #2.03
LEVEL 2 - DATA HALL 2300

Project Number	227361
Sheet Number	FP4.14



PLEASE SEE PERMIT
2026 2513934-CM04
FOR CORE & SHELL DRAWINGS
RSN 1975523

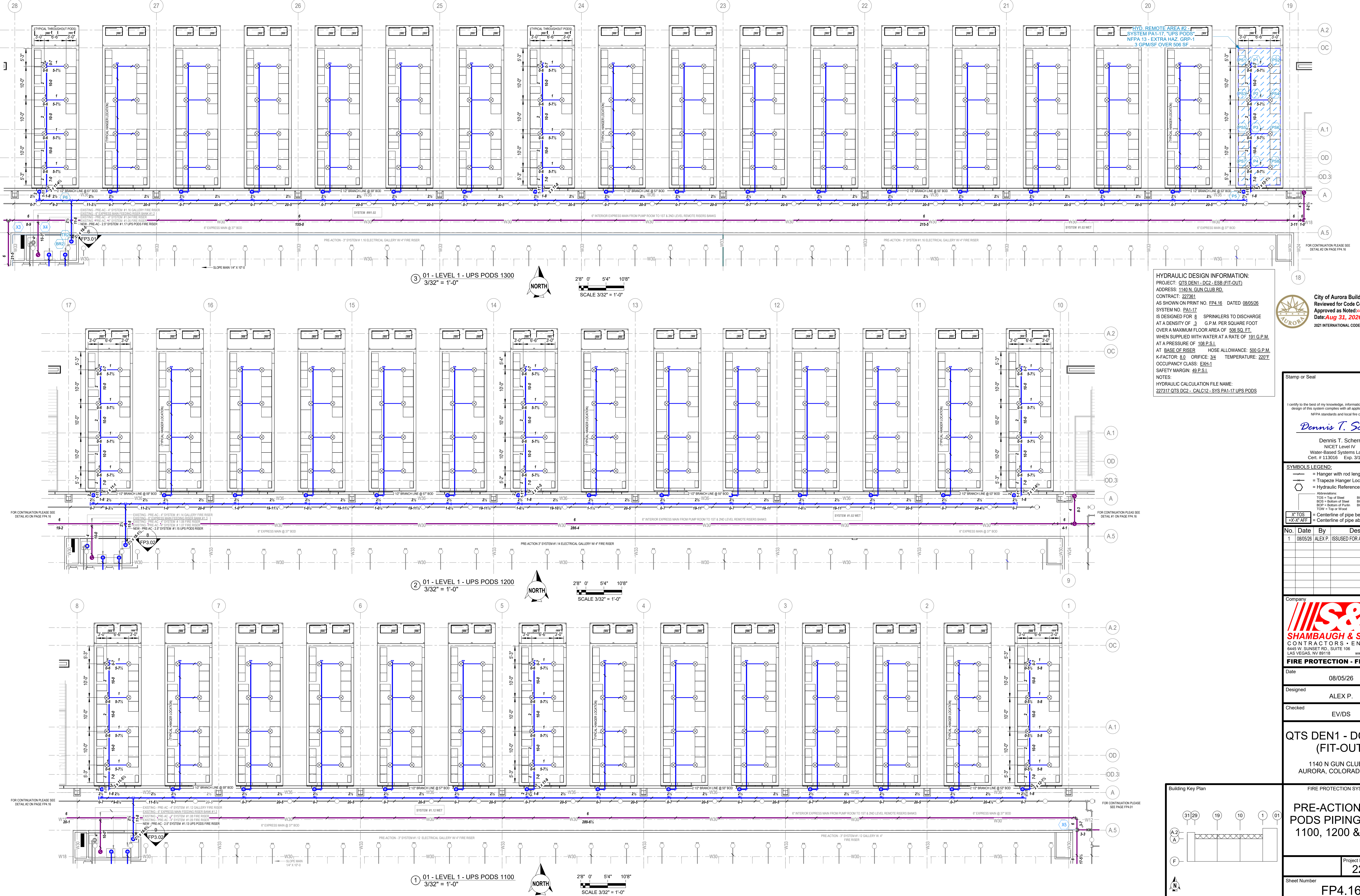
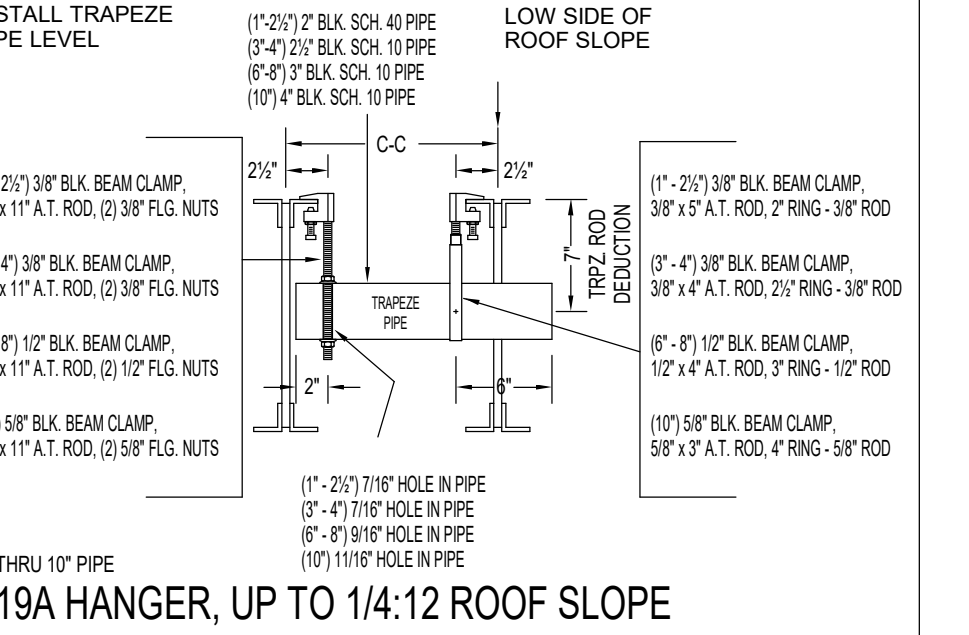
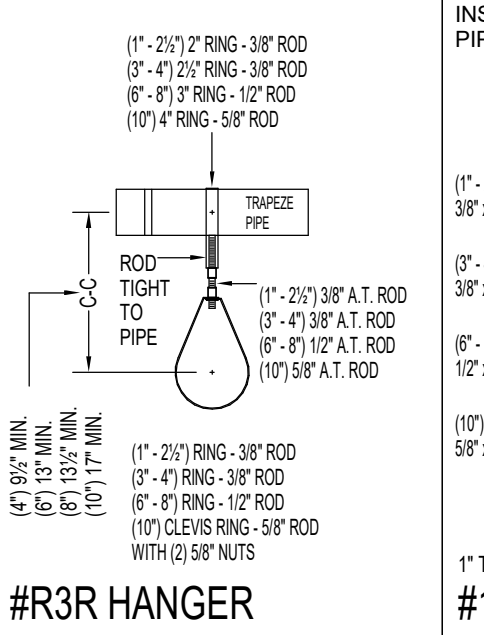
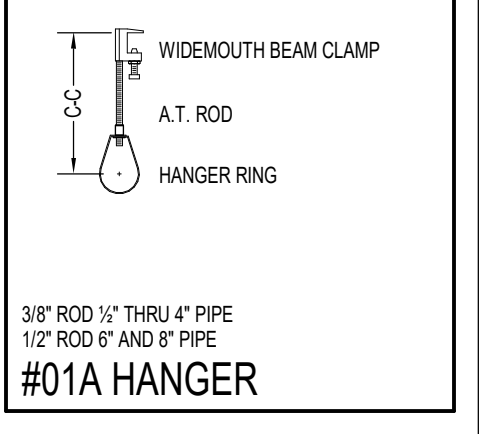
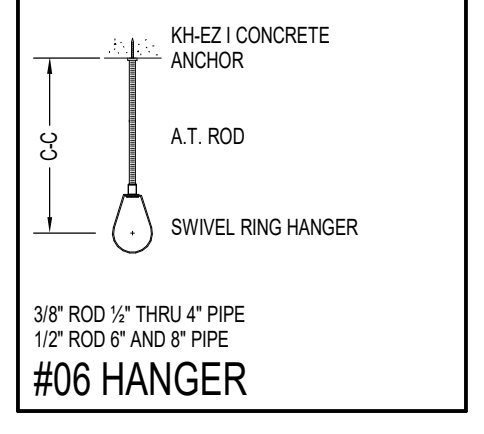
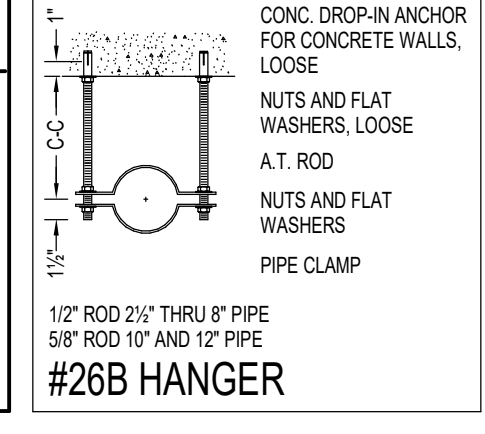
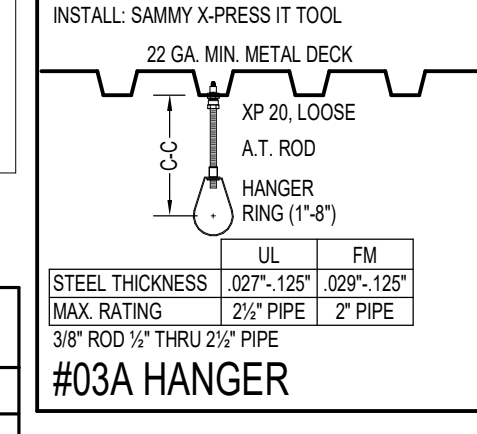
- GENERAL PIPING NOTES:
- OVERHEAD PIPE SHALL BE ROLL-GROOVED, AS APPLICABLE, UNLESS NOTED OTHERWISE.
 - MAINS SHALL BE SCH. 10, 2 1/2" BRANCHLINES SHALL BE EDDY FLOW, 1" DROPS SHALL BE SCH. 40.
 - REFER TO DETAILS ON THIS SHEET FOR TYPICAL HANGER ATTACHMENTS.
 - REFER TO SHEETS FPM 0 & FPM 1 FOR ADDITIONAL SPECIFIC FIRE SPRINKLER NOTES & DETAILS.
 - TYPICAL HANGERS ARE #01 TOP BEAM CLAMPS, WHERE JOISTS/BEAMS ARE NOT ACCESSIBLE, #19A TRAPEZE HANGERS SHALL BE USED.

PIPE LEGEND

- EXISTING PIPE =
PREACTION PIPE =
EXISTING EXPRESS MAIN =

UPS PODS SPRINKLER LEGEND

QTY	THRD	K-FACT	TEMP.	FINISH	RESP.	MANUF.	MODEL	SIN	DESCRIPTION	WRENCH
368	3/4"	8.0	199 °F	Brass	Standard	Viking	XT1	VK2001	Extra Hazard - Upright	
Total No. of Sprinklers: 368										



HYDRAULIC DESIGN INFORMATION:

PROJECT: QTS DEN1 - DC2 - ESB (FIT-OUT)

ADDRESS: 1140 N GUN CLUB RD.

CONTRACT: 227361

AS SHOWN ON PRINT NO. FP4.16 DATED 08/05/26

SYSTEM NO. PA1-17

IS DESIGNED FOR 8 SPRINKLERS TO DISCHARGE AT A DENSITY OF 3 G.P.M. PER SQUARE FOOT OVER A MAXIMUM FLOOR AREA OF 588 SQ. FT. WHEN SUPPLIED WITH WATER AT A RATE OF 191 G.P.M. AT A PRESSURE OF 108 P.S.I.

AT BASE OF RISER HOSE ALLOWANCE: 500 G.P.M.

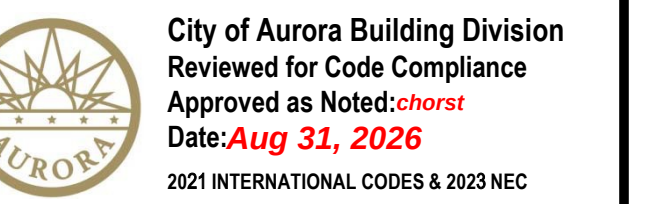
K-FACTOR: 8.0 ORIFICE: 3/4" TEMPERATURE: 220°F

OCCUPANCY CLASS: EXH-1

SAFETY MARGIN: 48 P.S.I.

NOTES:

HYDRAULIC CALCULATION FILE NAME: 227317 QTS DC2 - CALC12 - SYS PA1-17 UPS PODS



City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *chors*
Date: **Aug 31, 2026**
2021 INTERNATIONAL CODES & 2023 NEC

Stamp or Seal

I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.

Dennis T. Scherr

Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

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- = Hanger with rod length
 - = Trapeze Hanger Location
 - = Hydraulic Reference point
- Abbreviations:
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 - BOS = Bottom of Steel
 - BOF = Bottom of Floor
 - BOC = Bottom of Concrete
 - BOB = Bottom of Deck
 - TOB = Top of Wood
- X TOS = Centerline of pipe below top of steel
- XX-X AFF = Centerline of pipe above finished floor

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

Company

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SHAMBAUGH & SON, L.P.
CONTRACTORS • ENGINEERS
6445 W. SUNSET RD., SUITE 106 P. 702-832-4545
LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM

Date: 08/05/26

Designed: ALEX P.

Checked: EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)

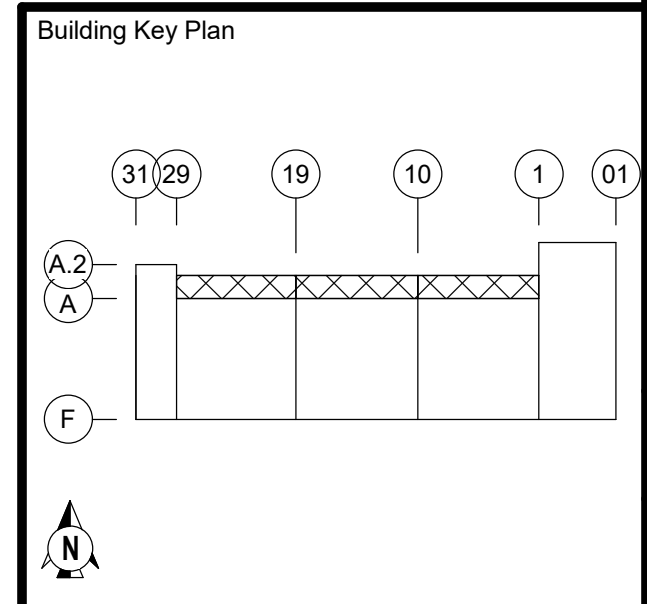
1140 N GUN CLUB RD
AURORA, COLORADO 80018

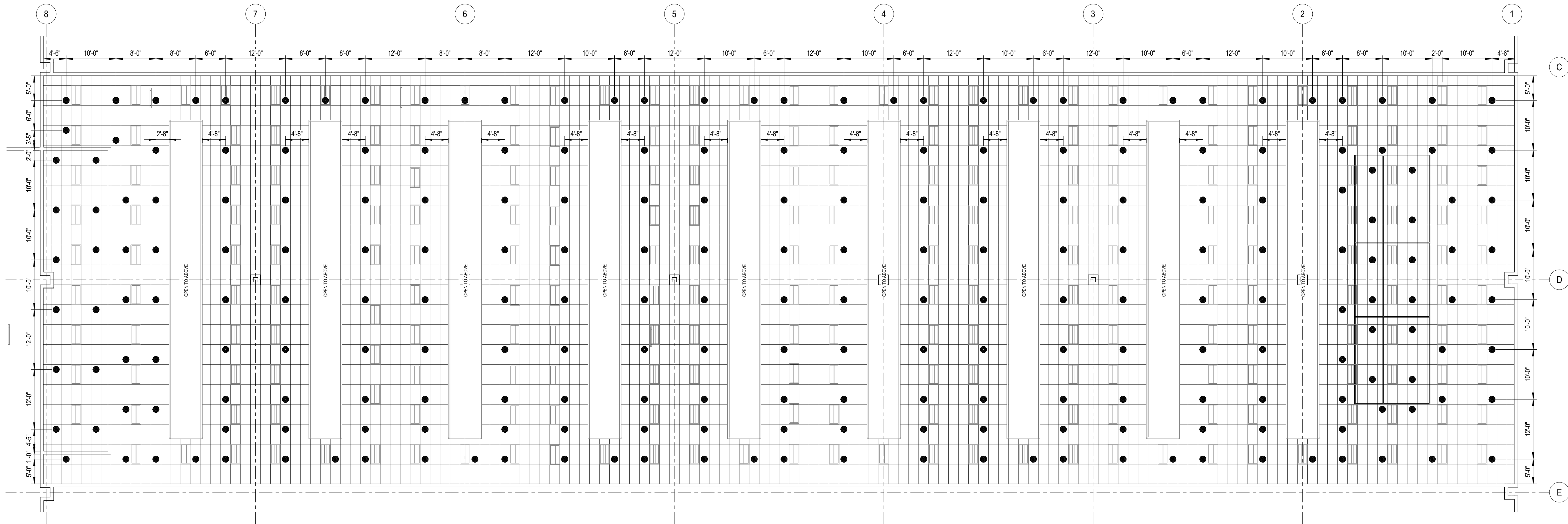
FIRE PROTECTION SYSTEMS

PRE-ACTION SYS.
PODS PIPING PLAN
1100, 1200 & 1300

Project Number: 227361

Sheet Number: FP4.16



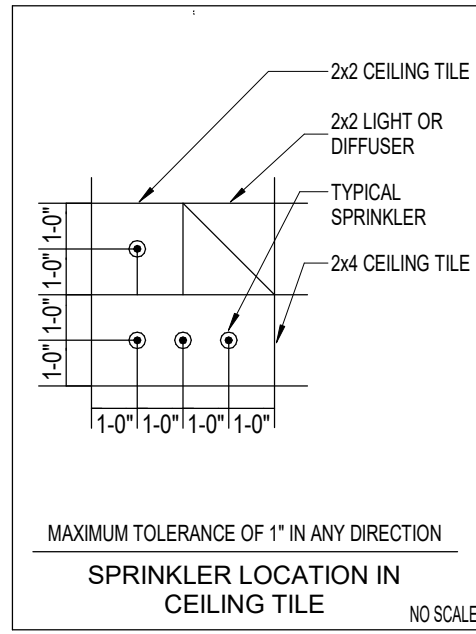
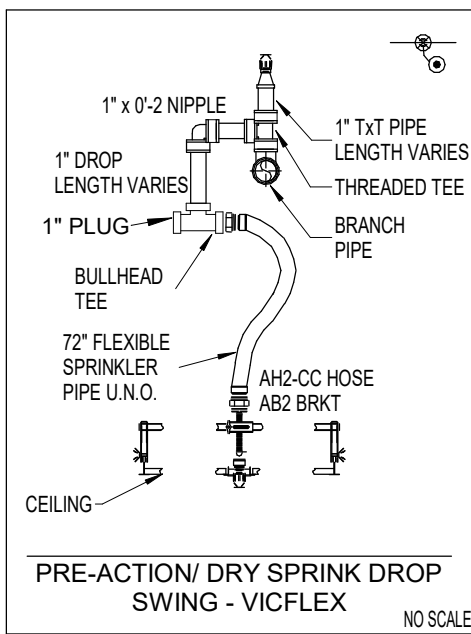
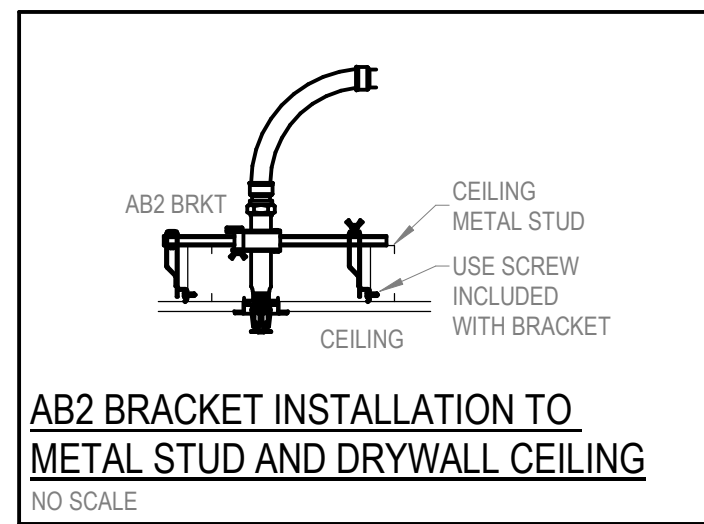


1 LEVEL 1 - DATA HALL RCP 1100
3/32" = 1'-0"



26' 0' 5' 10'
SCALE 1" = 10'-0"

SPRINKLER SCHEDULE DATA HALL RCP 1100										
QTY	THRD	K-FACT.	TEMP.	FINISH	RESP.	MANUF.	MODEL	SIN	DESCRIPTION	WRENCH
234	1/2"	5.6	200 °F	Brass	Quick	Viking	22961	VK4621	CONCEALED PENDENT	23143
Total No. of Sprinklers: 234										



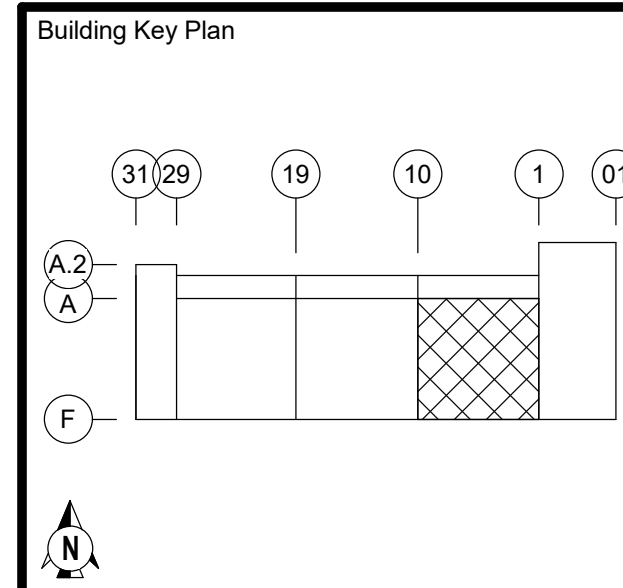
Stamp or Seal			
I certify to the best of my knowledge, information and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.			
<i>Dennis T. Scherr</i>			
Dennis T. Scherr NICET Level IV Water-Based Systems Layout Cert. # 113016 Exp. 3/1/2029			
SYMBOLS LEGEND:			
— = Hanger with rod length — = Trapeze Hanger Location ○ = Hydraulic Reference point			
Abbreviations: TOS = Top of Steel BOS = Bottom of Steel BOP = Bottom of Purlin TOW = Top of Wood			
BOW = Bottom of Wood BOC = Bottom of Concrete BOD = Bottom of Deck = Centerline of pipe above finished floor			
X TOS = Centerline of pipe below top of steel XX' AFF = Centerline of pipe above finished floor			
No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

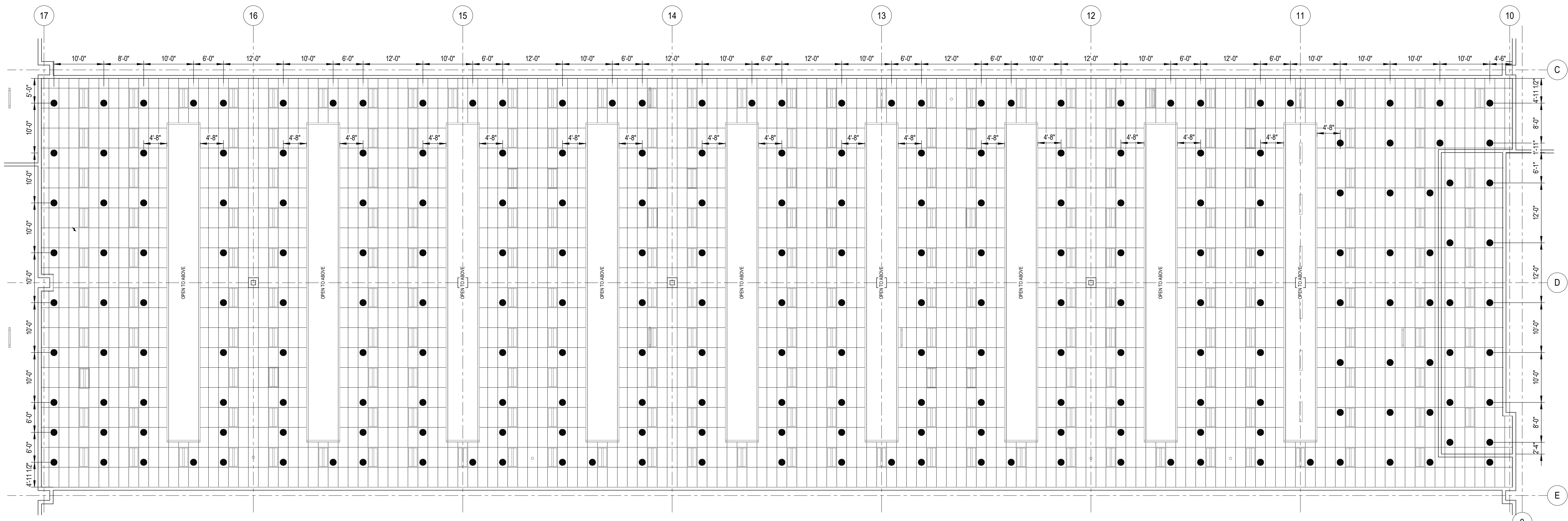
Company	
S&S SHAMBAUGH & SON, L.P. CONTRACTORS • ENGINEERS 6445 W. SUNSET RD., SUITE 106 P. 702-832-4545 LAS VEGAS, NV 89118 www.shambaugh.com	

FIRE PROTECTION - FIRE ALARM	
Date	08/04/26
Designed	ALEX P.
Checked	EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)	
1140 N GUN CLUB RD AURORA, COLORADO 80018	

FIRE PROTECTION SYSTEMS	
LEVEL 1 - DATA HALL 1100 RCP	
Project Number	227361
Sheet Number	FP.02



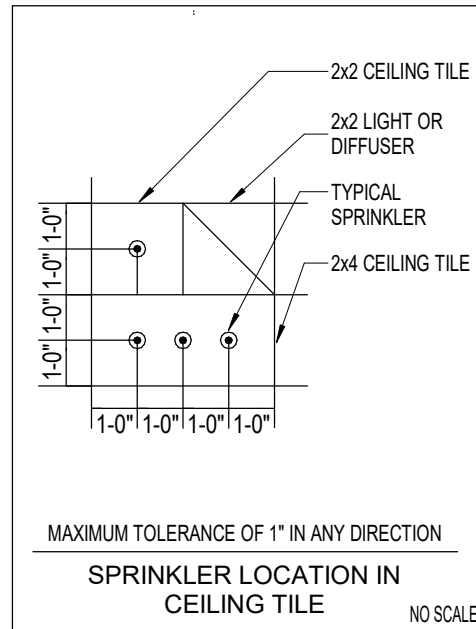
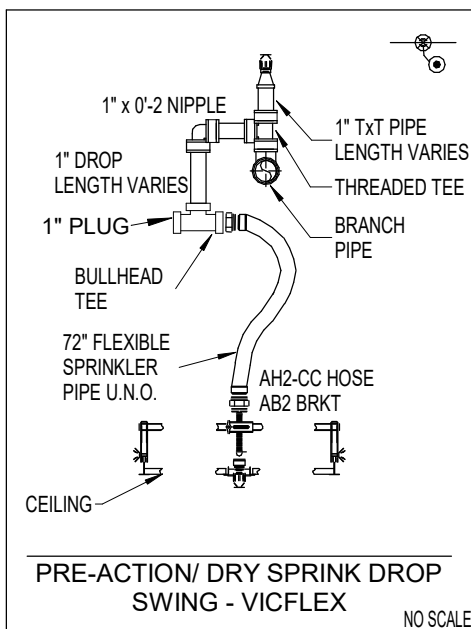
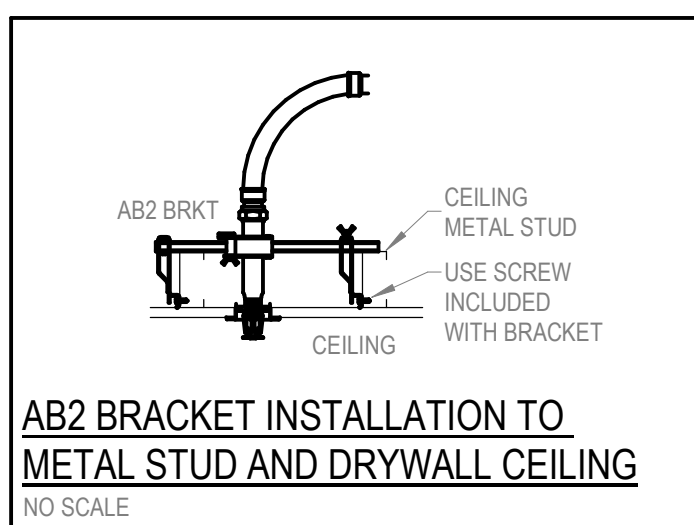


④ LEVEL 1 - DATA HALL RCP 1200
3/32" = 1'-0"



26' 0" 5' 10"
SCALE 1" = 10'-0"

SPRINKLER SCHEDULE DATA HALL RCP 1200										
QTY	THRD	K-FACT.	TEMP.	FINISH	RESP.	MANUF.	MODEL	SIN	DESCRIPTION	WRENCH
227	1/2"	5.6	200 °F	Brass	Quick	Viking	22961	VK4621	CONCEALED PENDENT	23143
Total No. of Sprinklers: 227										



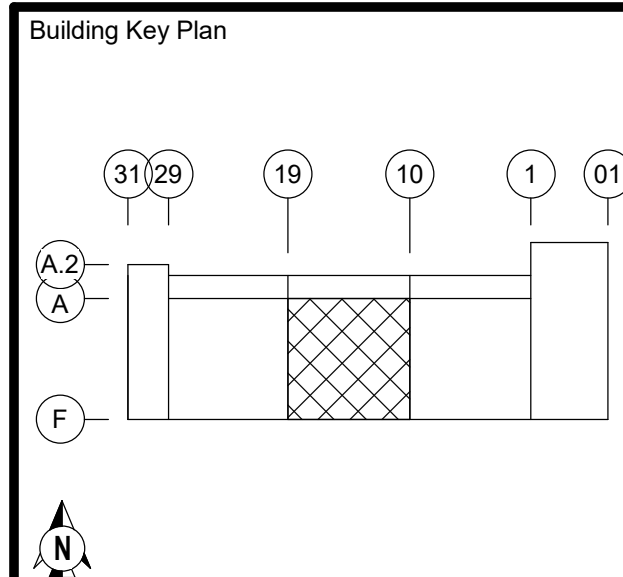
Stamp or Seal			
I certify to the best of my knowledge, information and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.			
Dennis T. Scherr			
Dennis T. Scherr NICET Level IV Water-Based Systems Layout Cert. # 113016 Exp. 3/1/2029			
SYMBOLS LEGEND:			
— = Hanger with rod length — = Trapeze Hanger Location — = Hydraulic Reference point			
Abbreviations: TOS = Top of Steel BOS = Bottom of Steel BOP = Bottom of Purlin TOM = Top of Wood			
BOW = Bottom of Wood BOC = Bottom of Concrete BOD = Bottom of Deck = Centerline of pipe above finished floor			
X TOS = Centerline of pipe below top of steel XX'X" AFF = Centerline of pipe above finished floor			
No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

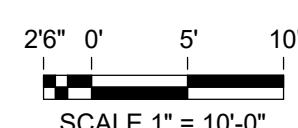
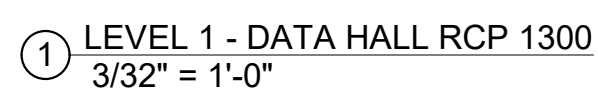
Company	
S&S	
SHAMBAUGH & SON, L.P.	
CONTRACTORS • ENGINEERS	
6445 W. SUNSET RD., SUITE 106 P. 702-832-4545	
LAS VEGAS, NV 89118 www.shambaugh.com	

FIRE PROTECTION - FIRE ALARM	
Date	08/05/26
Designed	ALEX P.
Checked	EV/DS

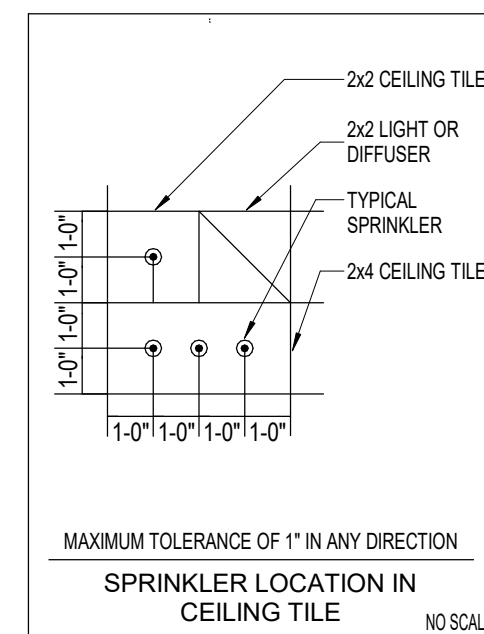
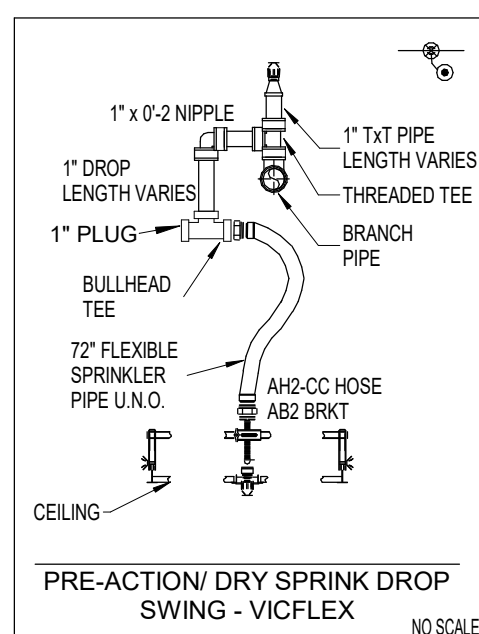
QTS DEN1 - DC2 ESB (FIT-OUT)	
1140 N GUN CLUB RD AURORA, COLORADO 80018	

FIRE PROTECTION SYSTEMS	
LEVEL 1 - DATA HALL 1200 RCP	
Project Number	227361
Sheet Number	FP5.03





BRACKET INSTALLATION TO AL STUD AND DRYWALL CEILING



Company

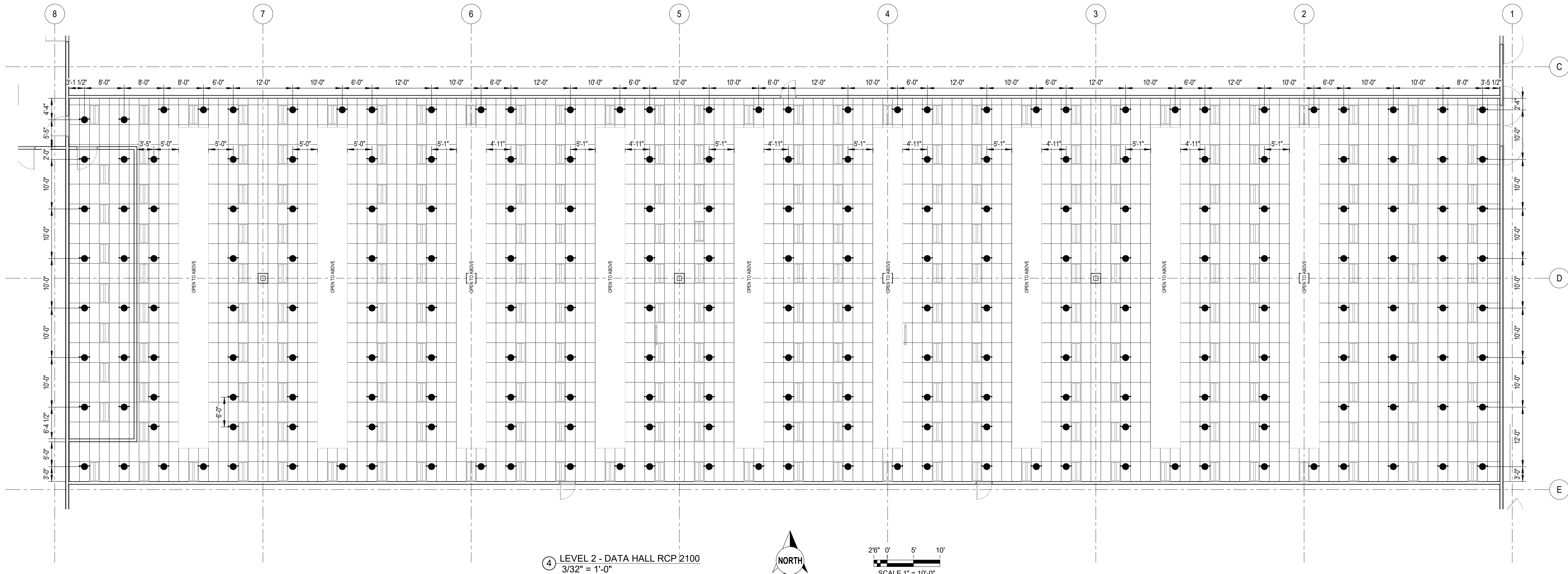


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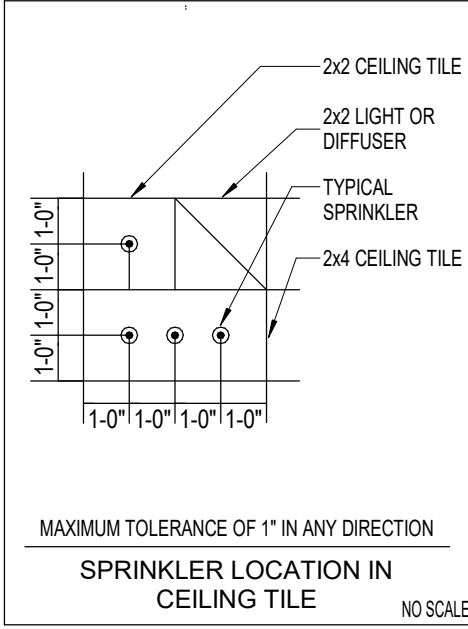
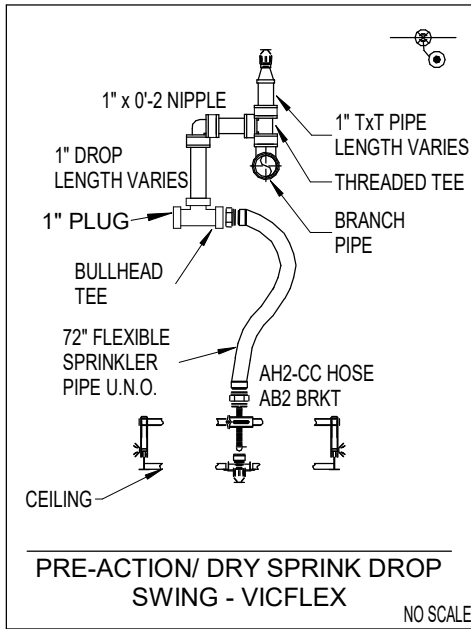
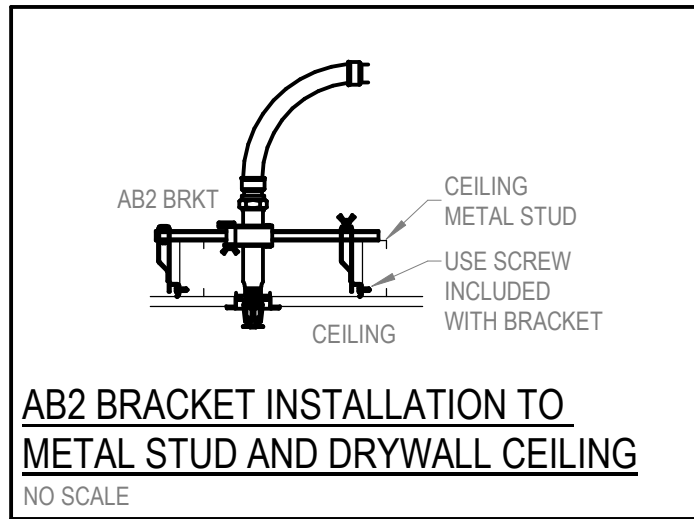
Building Key Plan

The plan shows a series of numbered circles (31, 29, 19, 10, 1, 0) and a north arrow pointing towards the top-left.

FIRE PROTECTION SYSTEMS	
LEVEL 1 - DATA HALL 1300 RCP	
Sheet Number	Project Number 227361
FP5.04	



SPRINKLER SCHEDULE DATA HALL RCP 2100											
	QTY	THRD	K-FACT.	TEMP.	FINISH	RESP.	MANUF.	MODEL	SIN	DESCRIPTION	WRENCH
●	219	1/2"	5.6	200 °F	Brass	Quick	Viking	22961	VK4621	CONCEALED PENDENT	23143
Total No. of Sprinklers: 219											



Stamp or Seal

I certify to the best of my knowledge, information and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.

Dennis T. Scherr

Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

SYMBOLS LEGEND:

— = Hanger with rod length

— = Trapeze Hanger Location

○ = Hydraulic Reference point

Abbreviations:
TOS = Top of Steel
BOS = Bottom of Steel
BOP = Bottom of Purlin
TOW = Top of Wood

X TOS = Centerline of pipe below top of steel

XX X AFF = Centerline of pipe above finished floor

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

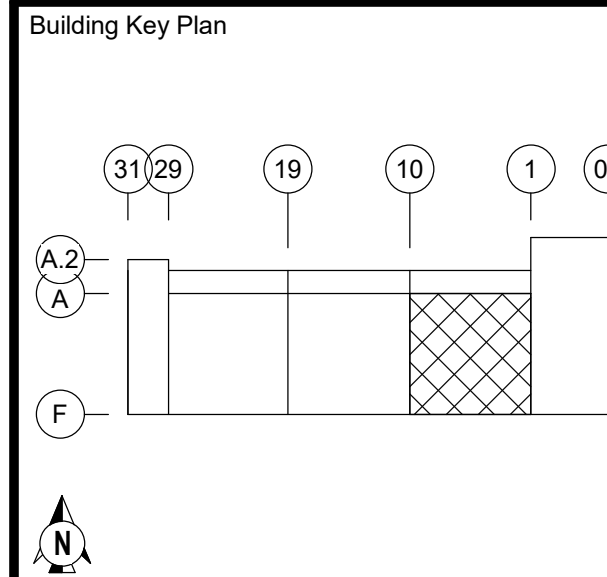
Company

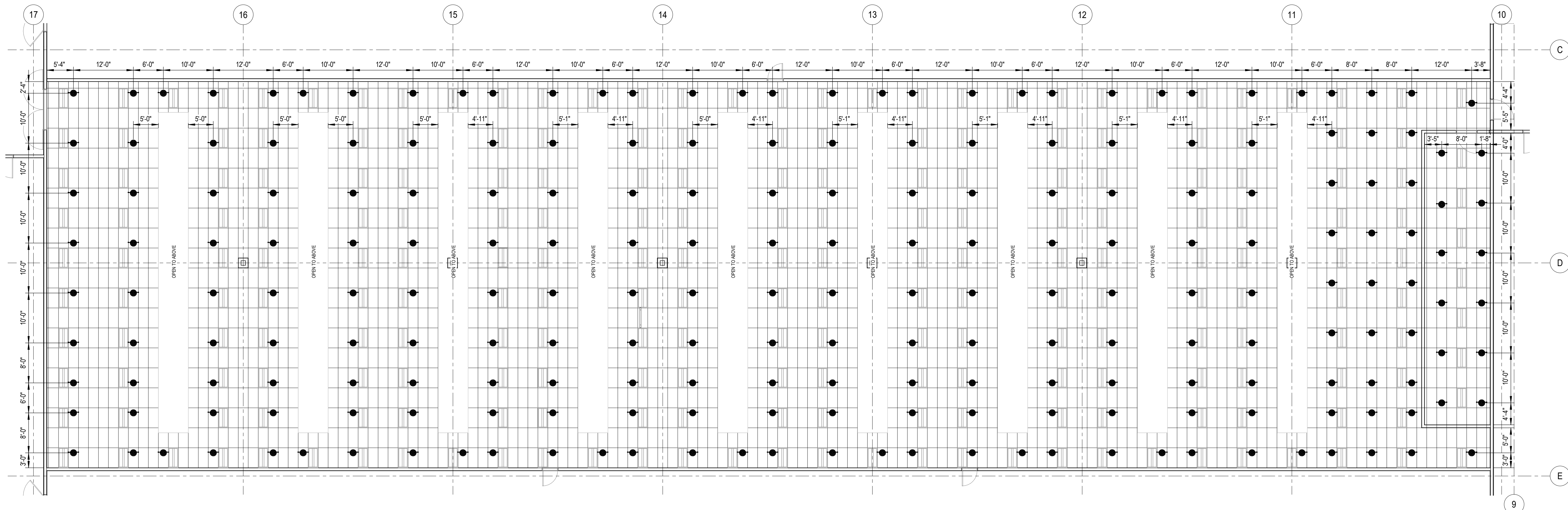
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6445 W. SUNSET RD., SUITE 106 P. 702-832-6545
LAS VEGAS, NV 89118 www.shambaugh.com

Date	08/05/26
Designed	ALEX P.
Checked	EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)
1140 N GUN CLUB RD
AURORA, COLORADO 80018

FIRE PROTECTION SYSTEMS	
LEVEL 2 - DATA HALL 2100 RCP	
Project Number	227361
Sheet Number	FP.05



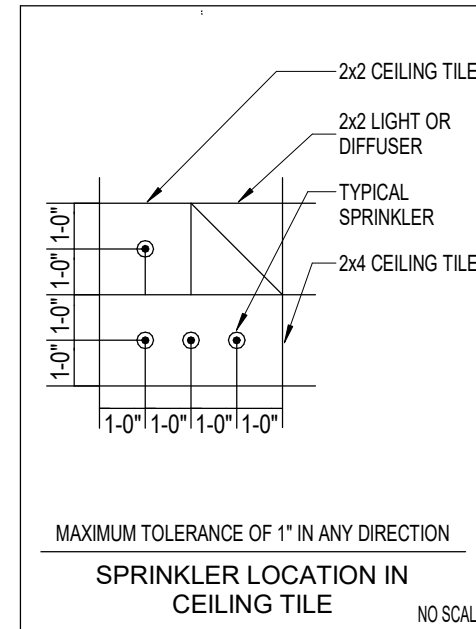
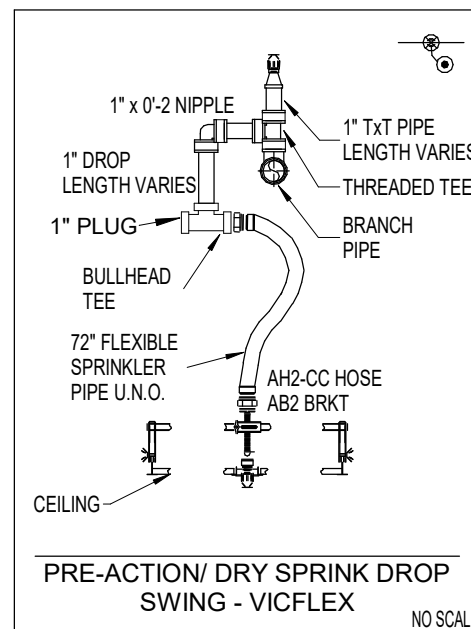
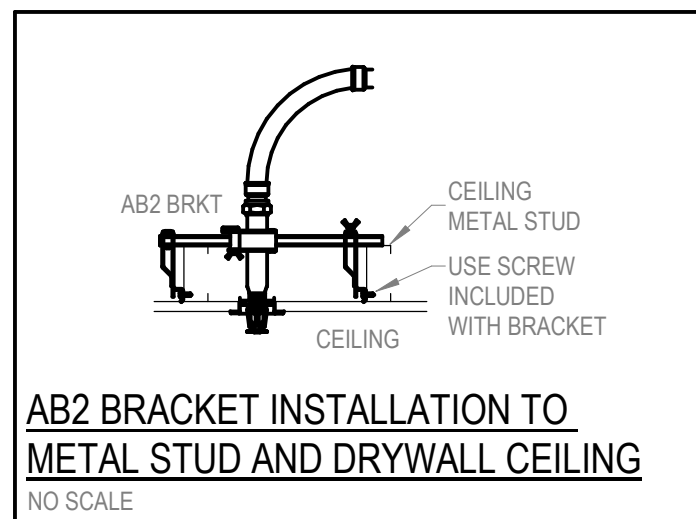


1 LEVEL 2 - DATA HALL RCP 2200
3/32" = 1'-0"



26' 0' 5' 10'
SCALE 1" = 10'-0"

SPRINKLER SCHEDULE DATA HALL RCP 2200										
QTY	THRD	K-FACT.	TEMP.	FINISH	RESP.	MANUF.	MODEL	SIN	DESCRIPTION	WRENCH
221	1/2"	5.6	200 °F	Brass	Quick	Viking	22961	VK4621	CONCEALED PENDENT	23143
Total No. of Sprinklers: 221										



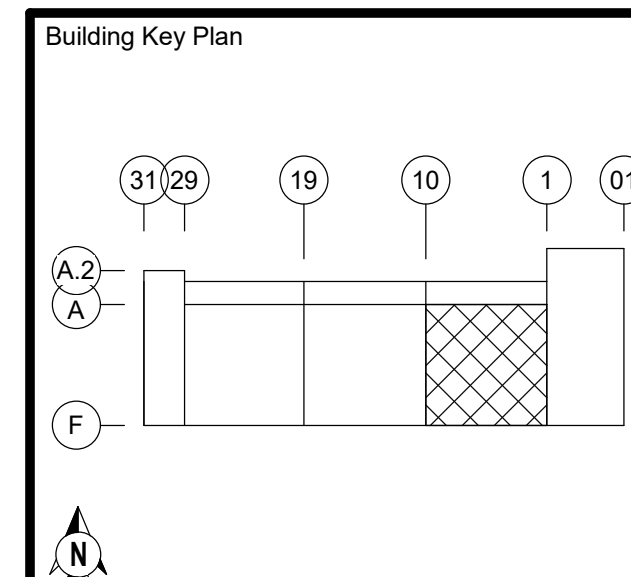
Stamp or Seal			
I certify to the best of my knowledge, information and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.			
<i>Dennis T. Scherr</i>			
Dennis T. Scherr NICET Level IV Water-Based Systems Layout Cert. # 113016 Exp. 3/1/2029			
SYMBOLS LEGEND:			
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BOW = Bottom of Wood BOC = Bottom of Concrete BOD = Bottom of Deck TOW = Top of Wood			
X TOS = Centerline of pipe below top of steel XX'X" AFF = Centerline of pipe above finished floor			
No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

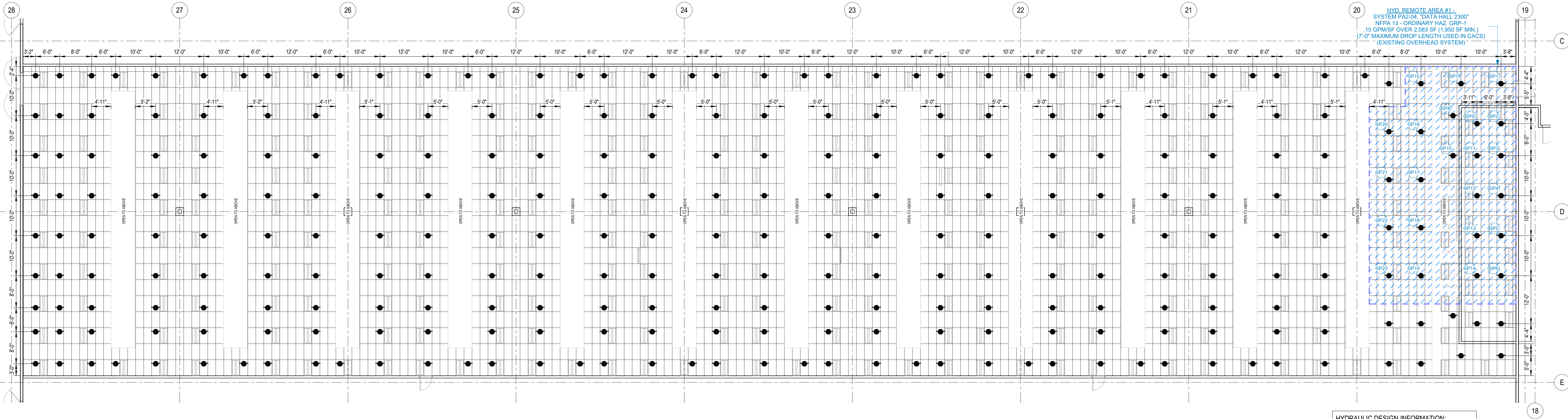
Company	
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FIRE PROTECTION - FIRE ALARM	
Date	08/05/26
Designed	ALEX P.
Checked	EV/DS

QTS DEN1 - DC2 ESB (FIT-OUT)	
1140 N GUN CLUB RD AURORA, COLORADO 80018	

FIRE PROTECTION SYSTEMS	
LEVEL 2 - DATA HALL 2200 RCP	
Project Number	227361
Sheet Number	FP5.06



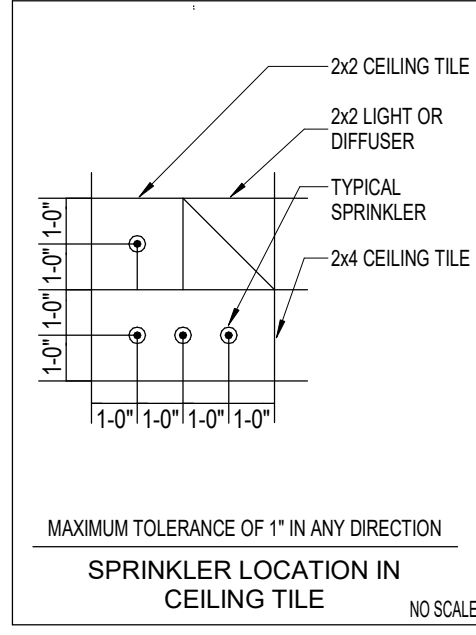
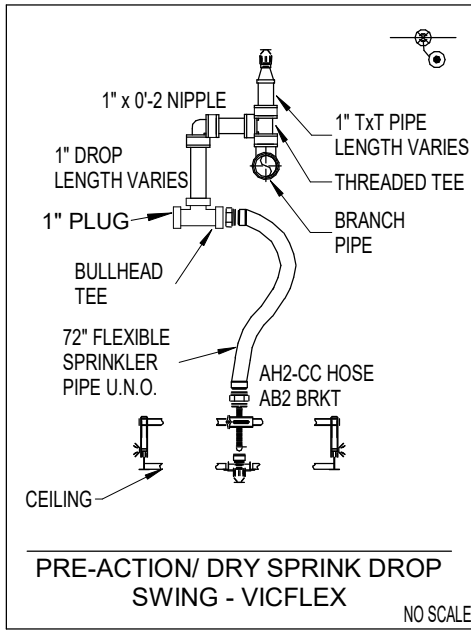
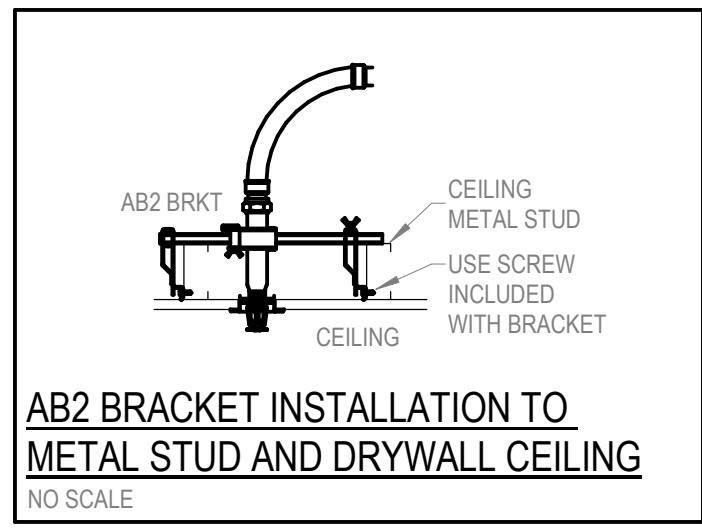


④ LEVEL 2 - DATA HALL RCP 2300
3/32" = 1'-0"



26' 0" 5' 10'
SCALE 1" = 10'-0"

SPRINKLER SCHEDULE DATA HALL RCP 2300											
QTY	THRD	K-FACT.	TEMP.	FINISH	RESP.	MANUF.	MODEL	SIN	DESCRIPTION	WRENCH	
281	1/2"	5.6	200 °F	Brass	Quick	Viking	22961	VK4621	CONCEALED PENDENT	23143	
Total No. of Sprinklers: 281											



HYDRAULIC DESIGN INFORMATION:
PROJECT: QTS DEN1
ADDRESS: 1140 N GUN CLUB RD
CONTRACT: 227317
AS SHOWN ON PRINT NO. FP5.07 DATED 08/05/26
SYSTEM NO. PA2-04
IS DESIGNED FOR 23 SPRINKLERS TO DISCHARGE
AT A DENSITY OF 15 G.P.M. PER SQUARE FOOT
OVER A MAXIMUM FLOOR AREA OF 2,083 SQ. FT.
WHEN SUPPLIED WITH WATER AT A RATE OF 432 G.P.M.
AT A PRESSURE OF 88 P.S.I.
AT BASE OF RISER HOSE ALLOWANCE: 250 G.P.M.
K-FACTOR: 5.6K ORIFICE: 1/2" TEMPERATURE: 200°F
OCCUPANCY CLASS: ORDINARY HAZARD GRP-1
SAFETY MARGIN: 72 P.S.I.
NOTES: CALCULATION NODE "D"
HYDRAULIC CALCULATION FILE NAME:
227361 QTS DC2 - CALC11 - SYS PA2-14 DH2300



City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *whorst*
Date: **Aug 31, 2026**
2021 INTERNATIONAL CODES & 2023 NEC

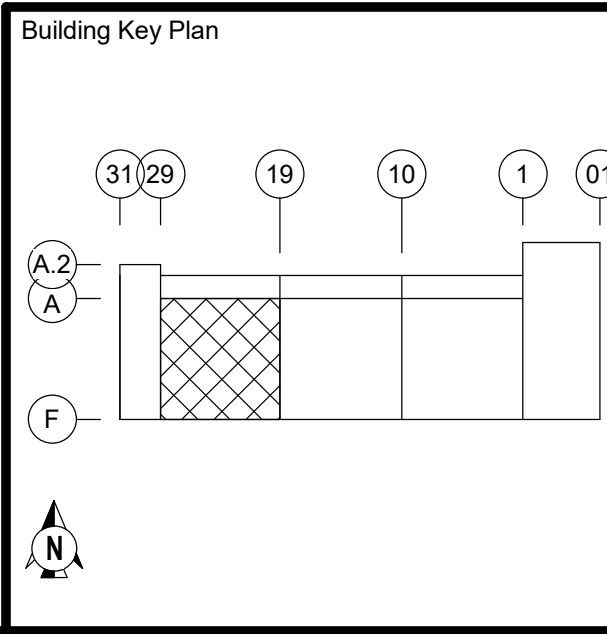
Stamp or Seal
I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.
Dennis T. Scherr
Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

SYMBOLS LEGEND:
= Hanger with rod length
= Trapeze Hanger Location
= Hydraulic Reference point
Abbreviations:
TOS = Top of Steel BOW = Bottom of Wood
BOS = Bottom of Steel BOC = Bottom of Concrete
BOP = Bottom of Purlin BOD = Bottom of Deck
TOW = Top of Wood

No.	Date	By	Description
1	08/05/26	ALEX P.	ISSUED FOR APPROVAL

Company
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CONTRACTORS • ENGINEERS
6445 W. SUNSET RD., SUITE 106 P. 702-832-4545
LAS VEGAS, NV 89118 www.shambaugh.com

FIRE PROTECTION - FIRE ALARM
Date: 08/05/26
Designed: ALEX P.
Checked: EV/DS
QTS DEN1 - DC2 ESB (FIT-OUT)
1140 N GUN CLUB RD
AURORA, COLORADO 80018



FIRE PROTECTION SYSTEMS
LEVEL 2 - DATA HALL 2300 RCP
Project Number: 227361
Sheet Number: FP5.07



Hydraulic Calculations by HydraCALC

Shambaugh & Son LP
6445 W. Sunset Rd.
Las Vegas, NV 89118
702-832-4545

I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.

Dennis T. Scherr

Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029



City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *chorst*
Date: *Aug 31, 2026*
2021 INTERNATIONAL CODES & 2023 NEC

Job Name : 227361 QTS DC2 - CALC11 - SYS PA 2-04 DH2300
Drawing : FP5.07
Location : 1140 N GUN CLUB RD
Remote Area : CALC 10 SYS PA 2-04
Contract : 227361
Data File : 227361 QTS DC2 - CALC11 - SYS PA 2-04 DH2300.WXF

Water Supply Curve

PERMIT #2026 2513934- CM06 | RSN:1997673

Shambaugh & Son LP
227361 QTS DC2 - CALC11 - SYS PA 2-04 DH2300

Page 1
Date 08.05.26

City Water Supply:

C1 - Static Pressure : 64
C2 - Residual Pressure: 52
C2 - Residual Flow : 4000

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

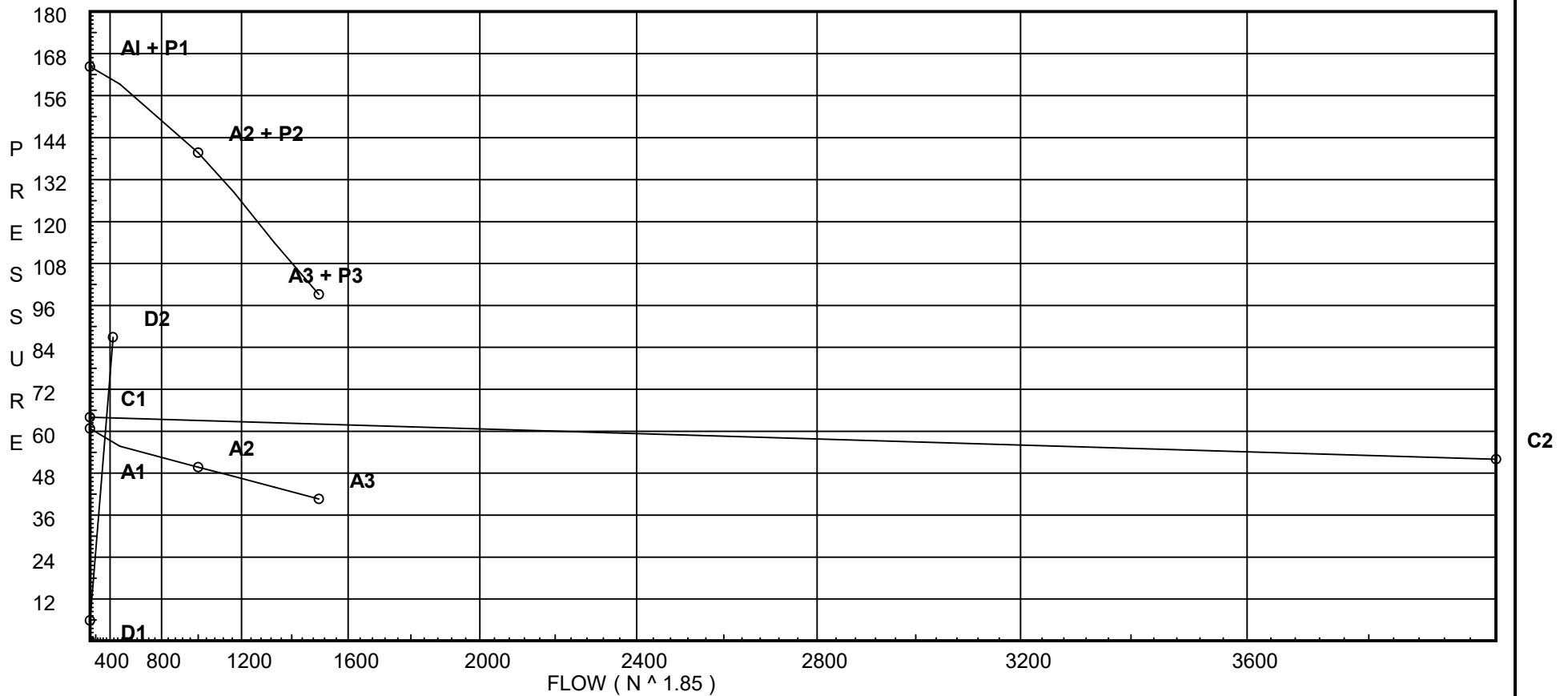
A1 - Adjusted Static: 60.777
A2 - Adj Resid : 49.711 @ 1000
A3 - Adj Resid : 40.625 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 103.5
P2 - Pump Rated Pressure : 90
P2 - Pump Rated Flow : 1000
P3 - Pump Pressure @ Max Flow : 58.5
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 9886.27
City Residual Flow @ 20 = 8073.68
City Water @ 150% of Pump = 62.05

Demand:

D1 - Elevation : 5.847
D2 - System Flow : 432.811
D2 - System Pressure : 86.875
Hose (Demand) :
D3 - System Demand : 432.811
Hose (Adj City) : 250
Safety Margin : 72.676



Fittings Used Summary

PERMIT #2026 2513934- CM06 | RSN:1997673

Shambaugh & Son LP
227361 QTS DC2 - CALC11 - SYS PA 2-04 DH2300

Page 2
Date 08.05.26

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	23	25	0	0	0
E	90 - NFPA	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	45 - NFPA	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
S	Swing Check NFPA 13	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
T	TEE - NFPA	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45 - GROOVED	0	0	0.8	2.13	2.75	1.8	2.2	2.6	0	3.4	4.2	5	6.5	8.3	10.0	18.5	21	23.5	25.5	29.5
V	90 - GROOVED	0	0	1.7	2	2.6	3.5	4.3	5	0	6.8	8.5	10	13	17	20	24.5	28	31	34	42
Vcfd *	1/2 in VicFlex AH2 - 60 in Long	0	0	30.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
X	TEE - GROOVED	0	0	4.2	7.5	6.63	8.5	10.8	13	0	16	21	25	33	41	50	70	80	90	100	120
Zaf	Ames 3000SS	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Shambaugh & Son LP
227361 QTS DC2 - CALC11 - SYS PA 2-04 DH2300

Page 3
Date 08.05.26

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
DIS	See Information on Pump Curve			159.552	432.81	86.875
TEST	64.0	52	4000.0	63.544	682.81	63.544

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes	
SP1	15.5	5.6	11.87	19.29	0.15	42
SP2	15.5	5.6	11.93	19.35	0.15	110.25
SP3	15.5	5.6	11.93	19.35	0.15	110.25
SP4	15.5	5.6	12.3	19.64	0.15	42
SP5	15.5	5.6	12.94	20.14	0.15	110.25
SP6	15.5	5.6	13.91	20.89	0.15	110.25
SP7	15.5	5.6	8.7	16.52	0.15	42
SP8	15.5	5.6	8.72	16.54	0.15	110.25
SP9	15.5	5.6	8.72	16.54	0.15	110.25
SP10	15.5	5.6	8.99	16.8	0.15	42
SP11	15.5	5.6	8.99	16.8	0.15	110.25
SP12	15.5	5.6	9.71	17.45	0.15	110.25
SP13	15.5	5.6	10.73	18.34	0.15	42
SP14	15.5	5.6	12.12	19.5	0.15	110.25
SP15	15.5	5.6	13.78	20.79	0.15	110.25
SP16	15.5	5.6	13.86	20.85	0.15	42
SP17	15.5	5.6	14.06	21.0	0.15	42
SP18	15.5	5.6	14.49	21.31	0.15	110.25
SP19	15.5	5.6	15.22	21.85	0.15	42
SP21	15.5	5.6	17.17	23.21	0.15	110.25
SP22	15.5	5.6	17.24	23.25	0.15	42
SP23	15.5	5.6	17.49	23.42	0.15	110.25
S1	52.167		3.18			
S2	52.167		3.29			
S3	52.167		3.86			
S4	52.167		4.85			
S5	52.167		6.37			
T1	52.167		13.53			
S6	52.167		-1.77			
S7	52.167		-1.75			
S8	52.167		-1.32			
S9	52.167		-0.19			
S10	52.167		1.41			
S11	52.167		3.59			
T2	52.167		13.12			
S12	52.167		6.16			
S13	52.167		6.28			
S14	52.167		6.6			
S15	52.167		7.26			
S16	52.167		8.4			
T3	52.167		14.2			

NODE ANALYSIS (cont.)

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
S17	52.167		11.42		
S18	52.167		11.53		
S19	52.167		11.91		
S20	52.167		12.73		
T4	52.167		15.42		
M1	0.0		37.27		
M2	51.292		15.46		
M3	51.292		15.76		
M4	47.917		17.81		
TR1	47.917		53.59		
BR1	47.917		58.03		
X3	24.333		72.91		
X4	24.333		72.9		
X1	24.333		73.24		
X5	24.0		75.07		
XR1	24.0		76.8		
XBR	2.0		86.75		
DIS	2.0		86.88		
SUC	2.0		56.06		
SPG	1.0		61.39		
IBP	-5.0		64.04		
UG1	-5.0		64.32	250.0	
TEST	2.0		63.54		

Shambaugh & Son LP
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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
SP1 to S1	15.500 52.167	5.60	19.29 19.29	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1705	11.867 -15.880 7.196		Vel = 7.16	
S1			0.0 19.29						3.183		K Factor = 10.81	
SP2 to S2	15.500 52.167	5.60	19.35 19.35	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1714	11.934 -15.880 7.234		Vel = 7.18	
S2			0.0 19.35						3.288		K Factor = 10.67	
SP3 to S2	15.500 52.167	5.60	19.35 19.35	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1714	11.934 -15.880 7.234		Vel = 7.18	
S2			0.0 19.35						3.288		K Factor = 10.67	
SP4 to S3	15.500 52.167	5.60	19.64 19.64	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1763	12.304 -15.880 7.441		Vel = 7.29	
S3			0.0 19.64						3.865		K Factor = 9.99	
SP5 to S4	15.500 52.167	5.60	20.14 20.14	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1848	12.938 -15.880 7.796		Vel = 7.48	
S4			0.0 20.14						4.854		K Factor = 9.14	
SP6 to S5	15.500 52.167	5.60	20.89 20.89	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1976	13.912 -15.880 8.337		Vel = 7.75	
S5			0.0 20.89						6.369		K Factor = 8.28	
SP7 to S6	15.500 52.167	5.60	16.52 16.52	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1280	8.704 -15.880 5.402		Vel = 6.13	
S6			0.0 16.52						-1.774		K Factor = 12.40	
SP8 to S7	15.500 52.167	5.60	16.54 16.54	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1283	8.721 -15.880 5.412		Vel = 6.14	
S7			0.0 16.54						-1.747		K Factor = 12.51	
SP9 to S7	15.500 52.167	5.60	16.54 16.54	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1283	8.721 -15.880 5.412		Vel = 6.14	
S7			0.0 16.54						-1.747		K Factor = 12.51	
SP10 to S8	15.500 52.167	5.60	16.80 16.8	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1320	8.995 -15.880 5.570		Vel = 6.24	

Shambaugh & Son LP
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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
S8			0.0 16.80						-1.315		K Factor = 14.65	
SP11 to S8	15.500 52.167	5.60	16.80 16.8	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1320	8.995 -15.880 5.570		Vel = 6.24	
S8			0.0 16.80						-1.315		K Factor = 14.65	
SP12 to S9	15.500 52.167	5.60	17.45 17.45	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1417	9.711 -15.880 5.977		Vel = 6.48	
S9			0.0 17.45						-0.192		K Factor = 39.82	
SP13 to S10	15.500 52.167	5.60	18.34 18.34	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1554	10.731 -15.880 6.556		Vel = 6.81	
S10			0.0 18.34						1.407		K Factor = 15.46	
SP14 to S11	15.500 52.167	5.60	19.50 19.5	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1740	12.125 -15.880 7.341		Vel = 7.24	
S11			0.0 19.50						3.586		K Factor = 10.30	
SP15 to S12	15.500 52.167	5.60	20.79 20.79	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1958	13.779 -15.880 8.263		Vel = 7.72	
S12			0.0 20.79						6.162		K Factor = 8.38	
SP16 to S13	15.500 52.167	5.60	20.85 20.85	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1968	13.857 -15.880 8.306		Vel = 7.74	
S13			0.0 20.85						6.283		K Factor = 8.32	
SP17 to S14	15.500 52.167	5.60	21.00 21.0	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.1995	14.058 -15.880 8.417		Vel = 7.80	
S14			0.0 21.00						6.595		K Factor = 8.18	
SP18 to S15	15.500 52.167	5.60	21.31 21.31	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.2051	14.486 -15.880 8.654		Vel = 7.91	
S15			0.0 21.31						7.260		K Factor = 7.91	
SP19 to S16	15.500 52.167	5.60	21.85 21.85	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.2147	15.222 -15.880 9.061		Vel = 8.11	
S16			0.0 21.85						8.403		K Factor = 7.54	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
SP21 to S17	15.500 52.167	5.60	23.21 23.21	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.2401	17.174 -15.880 10.130		Vel = 8.62	
S17			0.0 23.21						11.424		K Factor = 6.87	
SP22 to S18	15.500 52.167	5.60	23.25 23.25	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.2410	17.242 -15.880 10.168		Vel = 8.63	
S18			0.0 23.25						11.530		K Factor = 6.85	
SP23 to S19	15.500 52.167	5.60	23.42 23.42	1 1.049	T E Vcfd	3.568 1.427 30.2	7.000 35.195 42.195	100 0.2442	17.490 -15.880 10.302		Vel = 8.69	
S19			0.0 23.42						11.912		K Factor = 6.79	
S1 to S2	52.167 52.167		19.29 19.29	2 2.067			16.792 16.792	100 0.0063	3.183 0.0 0.105		Vel = 1.84	
S2 to S3	52.167 52.167		38.69 57.98	2 2.067			12.000 12.000	100 0.0481	3.288 0.0 0.577		Vel = 5.54	
S3 to S4	52.167 52.167		19.65 77.63	2 2.067			12.000 12.000	100 0.0824	3.865 0.0 0.989		Vel = 7.42	
S4 to S5	52.167 52.167		20.14 97.77	2 2.067			12.000 12.000	100 0.1262	4.854 0.0 1.515		Vel = 9.35	
S5 to T1	52.167 52.167		20.89 118.66	2 2.067	X	6.066	33.583 6.066 39.649	100 0.1807	6.369 0.0 7.163		Vel = 11.35	
T1 to M1	52.167 0		0.0 118.66	2 2.067	T	7.137	1.000 7.137 8.137	100 0.1807	13.532 22.269 1.470		Vel = 11.35	
M1			0.0 118.66						37.271		K Factor = 19.44	
S6 to S7	52.167 52.167		16.52 16.52	2 2.067			5.750 5.750	100 0.0047	-1.774 0.0 0.027		Vel = 1.58	
S7 to S8	52.167 52.167		33.08 49.6	2 2.067			12.000 12.000	100 0.0360	-1.747 0.0 0.432		Vel = 4.74	
S8 to S9	52.167 52.167		33.59 83.19	2 2.067			12.000 12.000	100 0.0936	-1.315 0.0 1.123		Vel = 7.95	
S9 to S10	52.167 52.167		17.45 100.64	2 2.067			12.000 12.000	100 0.1332	-0.192 0.0 1.599		Vel = 9.62	

Shambaugh & Son LP
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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
S10 to S11	52.167 52.167		18.34 118.98	2 2.067			12.000 12.000	100 0.1816	1.407 2.179		Vel = 11.38	
S11 to T2	52.167 52.167		19.50 138.48	2 2.067	X	6.066	33.583 6.066 39.649	100 0.2404	3.586 0.0 9.533		Vel = 13.24	
T2 to M2	52.167 51.292		0.0 138.48	2 2.067	T	7.137	1.000 7.137 8.137	100 0.2405	13.119 0.379 1.957		Vel = 13.24	
M2			0.0 138.48						15.455		K Factor = 35.23	
S12 to S13	52.167 52.167		20.79 20.79	2 2.067			16.792 16.792	100 0.0072	6.162 0.0 0.121		Vel = 1.99	
S13 to S14	52.167 52.167		20.84 41.63	2 2.067			12.000 12.000	100 0.0260	6.283 0.0 0.312		Vel = 3.98	
S14 to S15	52.167 52.167		21.00 62.63	2 2.067			12.000 12.000	100 0.0554	6.595 0.0 0.665		Vel = 5.99	
S15 to S16	52.167 52.167		21.31 83.94	2 2.067			12.000 12.000	100 0.0952	7.260 0.0 1.143		Vel = 8.03	
S16 to T3	52.167 52.167		21.85 105.79	2 2.067	X	6.066	33.583 6.066 39.649	100 0.1461	8.403 0.0 5.793		Vel = 10.11	
T3 to M3	52.167 51.292		0.0 105.79	2 2.067	T	7.137	1.000 7.137 8.137	100 0.1460	14.196 0.379 1.188		Vel = 10.11	
M3			0.0 105.79						15.763		K Factor = 26.65	
S17 to S18	52.167 52.167		23.21 23.21	2 2.067			12.000 12.000	100 0.0088	11.424 0.0 0.106		Vel = 2.22	
S18 to S19	52.167 52.167		23.25 46.46	2 2.067			12.000 12.000	100 0.0318	11.530 0.0 0.382		Vel = 4.44	
S19 to S20	52.167 52.167		23.42 69.88	2 2.067			12.000 12.000	100 0.0678	11.912 0.0 0.814		Vel = 6.68	
S20 to T4	52.167 52.167		0.0 69.88	2 2.067	X	6.066	33.583 6.066 39.649	100 0.0678	12.726 0.0 2.690		Vel = 6.68	
T4 to M4	52.167 47.917		0.0 69.88	2 2.067	T	7.137	1.000 7.137 8.137	100 0.0678	15.416 1.841 0.552		Vel = 6.68	
M4			0.0 69.88						17.809		K Factor = 16.56	

Shambaugh & Son LP
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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
M1 to M2	0 51.292		118.66	4			10.500	100	37.271 -21.890			
M2 to M3	51.292 51.292		118.66	4.026			10.500	0.0070	0.074	Vel =	2.99	
M3 to M4	51.292 47.917		138.48	4			10.500	100	15.455 0.0	Vel =	6.48	
M4 to TR1	51.292 47.917		257.14	4.026			10.500	0.0293	0.308	Vel =	9.15	
M4 to TR1	51.292 47.917		105.79	4			10.500	100	15.763 1.462	Vel =	10.91	
TR1 to BR1	47.917 47.917		362.93	4.026			10.500	0.0556	0.584	Vel =	10.91	
TR1 to BR1	47.917 47.917		69.88	4	2V X	9.706 11.419	443.500 21.125	100	17.809 0.0	Vel =	10.91	
BR1 to X4	47.917 24.333		432.81	4.026			464.625	0.0770	35.781	Vel =	10.91	
BR1 to X4	47.917 24.333		0.0	4	T Eq	14.274 23.409	20.000 37.683	100	53.590 0.0	Vel =	10.91	
X4 to X5	24.333 24		432.81	4.026	2V X T B	13.6 16.0 20.0 12.0	23.000 61.600 84.600	120	58.032 10.214 4.651	Vel =	10.91	
X4 to X5	24.333 24		0.0 432.81						72.897	K Factor =	50.69	
X3 to X4	24.333 24.333		-196.06	6			8.750	120	72.909 0.0	Vel =	1.98	
X4 to X5	24.333 24		-196.06	6.357			8.750	-0.0014	-0.012	Vel =	2.39	
X4 to X5	24.333 24		432.81	6	X V	31.433 12.573	999.000 44.006	120	72.897 0.144	Vel =	2.39	
X5 to X1	24 24.333		0.0 236.75				1043.006	0.0019	2.030	K Factor =	27.32	
X5 to X1	24 24.333		236.75						75.071	K Factor =	27.32	
X3 to X1	24.333 24.333		196.06	6	2X 2V	62.867 25.147	150.000 88.014	120	72.909 0.0	Vel =	1.98	
X1 to X5	24.333 24		196.06	6.357			238.014	0.0014	0.326	Vel =	1.98	
X1 to X5	24.333 24		0.0	6	4V X	50.294 31.433	1150.000 81.727	120	73.235 0.144	Vel =	1.98	
X5 to XR1	24 24		196.06	6.357			1231.727	0.0014	1.692	Vel =	4.38	
X5 to XR1	24 24		236.75	6	5V 2U	62.867 12.573	215.000 75.440	120	75.071 0.0	Vel =	4.38	
XR1 to XBR	24 2		432.81	6.357			290.440	0.0059	1.726	Vel =	4.38	
XR1 to XBR	24 2		0.0	6	B T	12.573 37.72	21.167 50.293	120	76.797 9.528	Vel =	4.38	
XBR to DIS	2 2		432.81	6.357			71.460	0.0059	0.425	Vel =	4.38	
XBR to DIS	2 2		0.0 432.81						86.750	K Factor =	46.47	
XBR to DIS	2 2		432.81	8	B S	14.094 52.853	8.250 66.947	120	86.750 0.0	Vel =	2.60	
DIS to DIS	2 2		432.81	8.249			75.197	0.0017	0.125	Vel =	2.60	
DIS to DIS	2 2		0.0 432.81						86.875	K Factor =	46.44	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
System Demand Pressure									86.875			
Safety Margin									72.676			
Continuation Pressure									159.552			
Pressure @ Pump Outlet									159.552			
Pressure From Pump Curve									-103.492			
Pressure @ Pump Inlet									56.060			
SUC to SPG	2 1		0.0 432.81	8 8.249	Zaf E G	0.0 21.141 4.698	8.000 25.839 33.839	120 0.0017	56.060 5.269 0.057	* * Fixed Loss = 4.836 Vel = 2.60		
SPG to IBP	1 -5		0.0 432.81	8 8.249	E	21.141	15.000 21.141 36.141	120 0.0016	61.386 2.599 0.059	Vel = 2.60		
IBP to UG1	-5 -5		0.0 432.81	8 7.68	F T	11.278 43.857	120.000 55.135 175.135	150 0.0016	64.044 0.0 0.274	Vel = 3.00		
UG1			0.0 432.81						64.318	K Factor = 53.97		
UG1 to TEST	-5 2	H250	682.81 682.81	8 7.68	F T	11.278 43.857	565.000 55.135 620.135	150 0.0036	64.318 -3.032 2.259	Vel = 4.73		
TEST			0.0 682.81						63.545	K Factor = 85.66		



Hydraulic Calculations by HydraCALC

Shambaugh & Son LP
6445 W. Sunset Rd.
Las Vegas, NV 89118
702-832-4545

I certify to the best of my knowledge, information, and belief that the design of this system complies with all applicable provisions of NFPA standards and local fire codes.

Dennis T. Scherr

Dennis T. Scherr
NICET Level IV
Water-Based Systems Layout
Cert. # 113016 Exp. 3/1/2029

Job Name : 227361 QTS DC2 - CALC12 - SYS PA 1.17 UPS PODS
Drawing : FP4
Location : 1140 N GUN CLUB RD
Remote Area : CALC 12 SYS PA 1-17
Contract : 227361
Data File : 227361 QTS DC2 - CALC12 - SYS PA1-17 UPS PODS.WXF

Water Supply Curve

PERMIT #2026 2513934- CM06 | RSN:1997673

Shambaugh & Son LP
227361 QTS DC2 - CALC12 - SYS PA 1.17 UPS PODS

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City Water Supply:

C1 - Static Pressure : 64
C2 - Residual Pressure: 52
C2 - Residual Flow : 4000

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

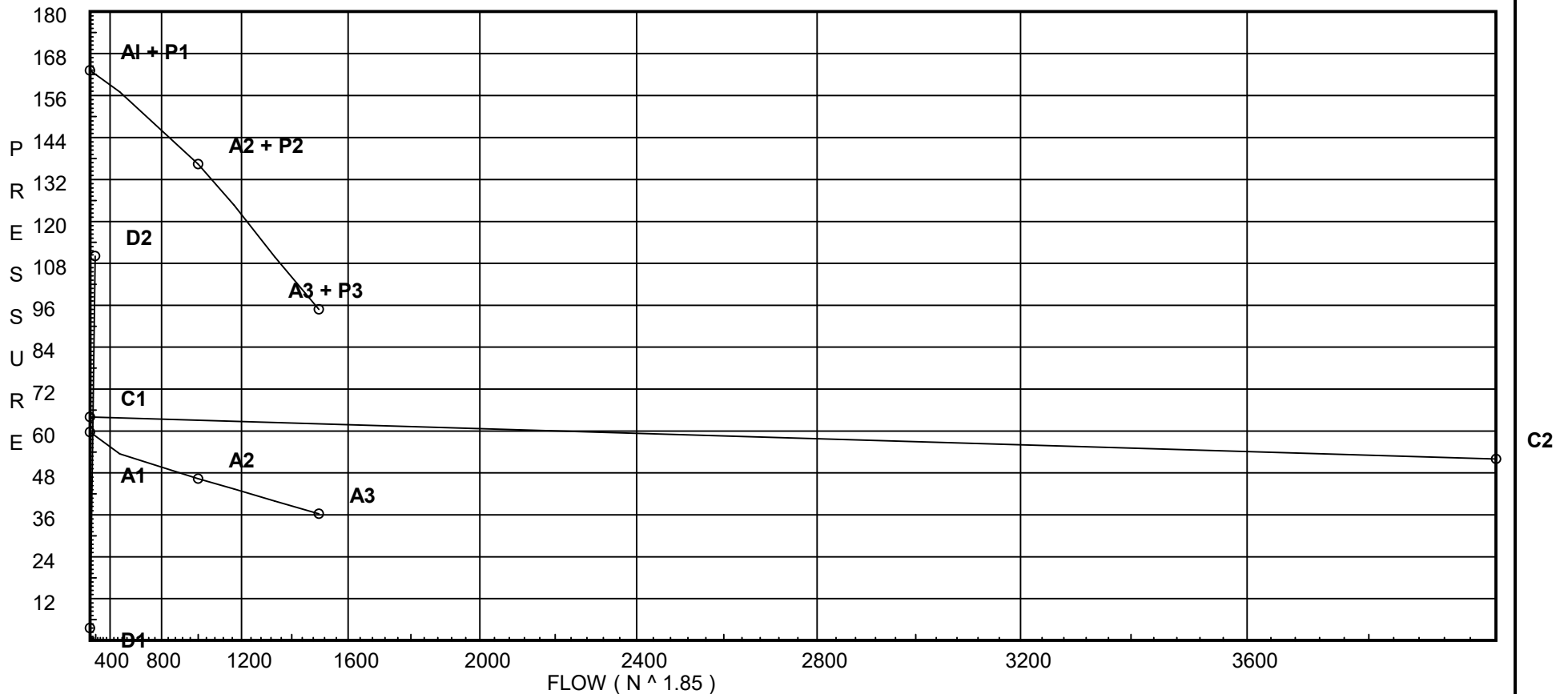
A1 - Adjusted Static: 59.676
A2 - Adj Resid : 46.38 @ 1000
A3 - Adj Resid : 36.288 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 103.5
P2 - Pump Rated Pressure : 90
P2 - Pump Rated Flow : 1000
P3 - Pump Pressure @ Max Flow : 58.5
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 9886.27
City Residual Flow @ 20 = 8073.68
City Water @ 150% of Pump = 62.05

Demand:

D1 - Elevation : 3.609
D2 - System Flow : 191.438
D2 - System Pressure : 110.046
Hose (Demand) :
D3 - System Demand : 191.438
Hose (Adj City) : 500
Safety Margin : 49.530



Fittings Used Summary

PERMIT #2026 2513934- CM06 | RSN:1997673

Shambaugh & Son LP
227361 QTS DC2 - CALC12 - SYS PA 1.17 UPS PODS

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	23	25	0	0	0
E	90 - NFPA	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	45 - NFPA	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
S	Swing Check NFPA 13	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
T	TEE - NFPA	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45 - GROOVED	0	0	0.8	2.13	2.75	1.8	2.2	2.6	0	3.4	4.2	5	6.5	8.3	10.0	18.5	21	23.5	25.5	29.5
V	90 - GROOVED	0	0	1.7	2	2.6	3.5	4.3	5	0	6.8	8.5	10	13	17	20	24.5	28	31	34	42
X	TEE - GROOVED	0	0	4.2	7.5	6.63	8.5	10.8	13	0	16	21	25	33	41	50	70	80	90	100	120
Y	Deluge Rel DDX	0	0	0	0	0	4.4	6	12.6		14		29.4	53.5							
Zaf	Ames 3000SS	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

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SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
DIS	See Information on Pump Curve			159.576	191.44	110.046
TEST	64.0	52	4000.0	63.533	691.44	63.534

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes	
PS1	10.333	8	8.67	23.55	0.3	70
PS2	10.333	8	7.0	21.17	0.3	70
PS3	10.333	8	8.95	23.93	0.3	70
PS4	10.333	8	7.23	21.51	0.3	70
PS5	10.333	8	9.98	25.28	0.3	70
PS6	10.333	8	8.08	22.74	0.3	70
PS7	10.333	8	12.26	28.02	0.3	70
PS8	10.333	8	9.95	25.24	0.3	70
P1	10.333		9.14			
P2	10.333		9.44			
P3	10.333		10.53			
P4	10.333		12.92			
P5	23.5		20.31			
P6	23.5		88.94			
TR2	23.5		92.67			
BR2	1.0		108.46			
X3	24.333		99.42			
X4	24.333		99.42			
X1	24.333		99.5			
X5	24.0		100.02			
XR1	24.0		100.4			
XBR	2.0		110.02			
DIS	2.0		110.05			
SUC	2.0		56.08			
SPG	1.0		61.58			
IBP	-5.0		64.19			
UG1	-5.0		64.25	500.0		
TEST	2.0		63.53			

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
PS1 to P1	10.333 10.333	8.00	23.55 23.55	1 1.049	E 1.427	0.500 1.427 1.927	100 0.2470	8.666 0.0 0.476		Vel = 8.74	
P1			0.0 23.55					9.142		K Factor = 7.79	
PS2 to P1	10.333 10.333	8.00	21.17 21.17	1 1.049	E T 1.427 3.568	5.583 4.995 10.578	100 0.2025	7.000 0.0 2.142		Vel = 7.86	
P1			0.0 21.17					9.142		K Factor = 7.00	
PS3 to P2	10.333 10.333	8.00	23.93 23.93	1 1.049	E 1.427	0.500 1.427 1.927	100 0.2543	8.949 0.0 0.490		Vel = 8.88	
P2			0.0 23.93					9.439		K Factor = 7.79	
PS4 to P2	10.333 10.333	8.00	21.51 21.51	1 1.049	E T 1.427 3.568	5.583 4.995 10.578	100 0.2086	7.232 0.0 2.207		Vel = 7.99	
P2			0.0 21.51					9.439		K Factor = 7.00	
PS5 to P3	10.333 10.333	8.00	25.28 25.28	1 1.049	E 1.427	0.500 1.427 1.927	100 0.2813	9.984 0.0 0.542		Vel = 9.38	
P3			0.0 25.28					10.526		K Factor = 7.79	
PS6 to P3	10.333 10.333	8.00	22.74 22.74	1 1.049	E T 1.427 3.568	5.583 4.995 10.578	100 0.2312	8.080 0.0 2.446		Vel = 8.44	
P3			0.0 22.74					10.526		K Factor = 7.01	
PS7 to P4	10.333 10.333	8.00	28.02 28.02	1 1.049	E 1.427	0.500 1.427 1.927	100 0.3404	12.265 0.0 0.656		Vel = 10.40	
P4			0.0 28.02					12.921		K Factor = 7.80	
PS8 to P4	10.333 10.333	8.00	25.24 25.24	1 1.049	E T 1.427 3.568	5.583 4.995 10.578	100 0.2805	9.954 0.0 2.967		Vel = 9.37	
P4			0.0 25.24					12.921		K Factor = 7.02	
P1 to P2	10.333 10.333		44.72 44.72	2 2.067		10.000 10.000	100 0.0297	9.142 0.0 0.297		Vel = 4.28	
P2 to P3	10.333 10.333		45.44 90.16	2 2.067		10.000 10.000	100 0.1087	9.439 0.0 1.087		Vel = 8.62	
P3 to P4	10.333 10.333		48.02 138.18	2 2.067		10.000 10.000	100 0.2395	10.526 0.0 2.395		Vel = 13.21	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
P4 to P5	10.333 23.500		53.26 191.44	2 2.067	3V	7.494	22.417 7.494 29.911	100 0.4377	12.921 -5.703 13.092		Vel = 18.30	
P5 to P6	23.500 23.500		0.0 191.44	2.5 2.469	T	8.564	364.000 8.564 372.564	100 0.1842	20.310 0.0 68.630		Vel = 12.83	
P6 to TR2	23.500 23.500		0.0 191.44	2.5 2.469	T	8.564	11.667 8.564 20.231	100 0.1842	88.940 0.0 3.727		Vel = 12.83	
TR2 to BR2	23.500 1		0.0 191.44	2.5 2.469	T Y	8.564 4.282	20.000 12.846 32.846	100 0.1842	92.667 9.745 6.051		Vel = 12.83	
BR2 to X4	1 24.333		0.0 191.44	4 4.026	2V X T B	13.6 16.0 20.0 12.0	26.000 61.600 87.600	120 0.0122	108.463 -10.106 1.065		Vel = 4.82	
X4			0.0 191.44								K Factor = 19.20	
X3 to X4	24.333 24.333		-86.72 -86.72	6 6.357			8.750 8.750	120 -0.0002	99.424 0.0 -0.002		Vel = 0.88	
X4 to X5	24.333 24		191.44 104.72	6 6.357	X V	31.433 12.573	999.000 44.006 1043.006	120 0.0004	99.422 0.144 0.449		Vel = 1.06	
X5			0.0 104.72								K Factor = 10.47	
X3 to X1	24.333 24.333		86.72 86.72	6 6.357	2X 2V	62.867 25.147	150.000 88.014 238.014	120 0.0003	99.424 0.0 0.073		Vel = 0.88	
X1 to X5	24.333 24		0.0 86.72	6 6.357	4V X	50.294 31.433	1150.000 81.727 1231.727	120 0.0003	99.497 0.144 0.374		Vel = 0.88	
X5 to XR1	24 24		104.72 191.44	6 6.357	5V 2U	62.867 12.573	215.000 75.440 290.440	120 0.0013	100.015 0.0 0.381		Vel = 1.94	
XR1 to XBR	24 2		0.0 191.44	6 6.357	B T	12.573 37.72	21.167 50.293 71.460	120 0.0013	100.396 9.528 0.095		Vel = 1.94	
XBR			0.0 191.44								K Factor = 18.25	
XBR to DIS	2 2		191.44 191.44	8 8.249	B S	14.094 52.853	8.250 66.947 75.197	120 0.0004	110.019 0.0 0.027		Vel = 1.15	
DIS			0.0 191.44								K Factor = 18.25	
System Demand Pressure									110.046			
Safety Margin									49.530			
Continuation Pressure									159.576			

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
Pressure @ Pump Outlet									159.576			
Pressure From Pump Curve									-103.498			
Pressure @ Pump Inlet									56.078			
SUC	2		0.0	8	Zaf	0.0	8.000	120	56.078			
to					E	21.141	25.839		5.492	* * Fixed Loss = 5.059		
SPG	1		191.44	8.249	G	4.698	33.839	0.0004	0.013	Vel = 1.15		
SPG	1		0.0	8	E	21.141	15.000	120	61.583			
to							21.141		2.599			
IBP	-5		191.44	8.249			36.141	0.0003	0.012	Vel = 1.15		
IBP	-5		0.0	8	F	11.278	120.000	150	64.194			
to					T	43.857	55.135		0.0			
UG1	-5		191.44	7.68			175.135	0.0003	0.061	Vel = 1.33		
			0.0									
UG1			191.44						64.255	K Factor = 23.88		
UG1	-5	H500	691.44	8	F	11.278	565.000	150	64.255			
to					T	43.857	55.135		-3.032			
TEST	2		691.44	7.68			620.135	0.0037	2.311	Vel = 4.79		
			0.0									
TEST			691.44						63.534	K Factor = 86.75		