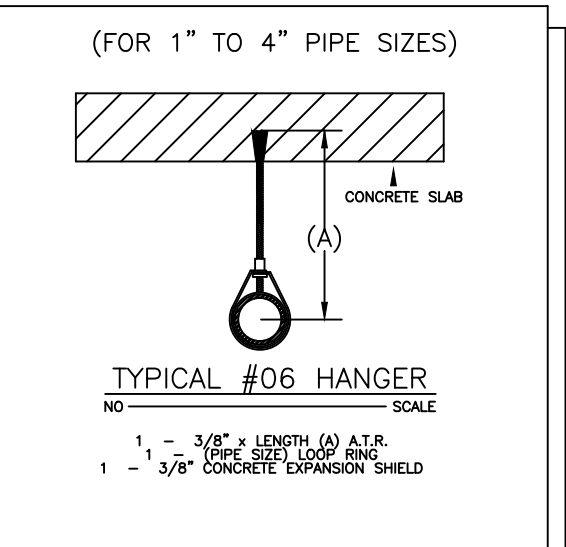
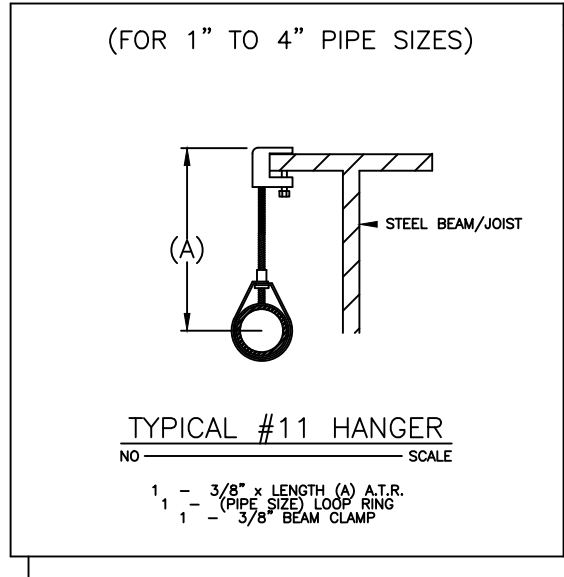
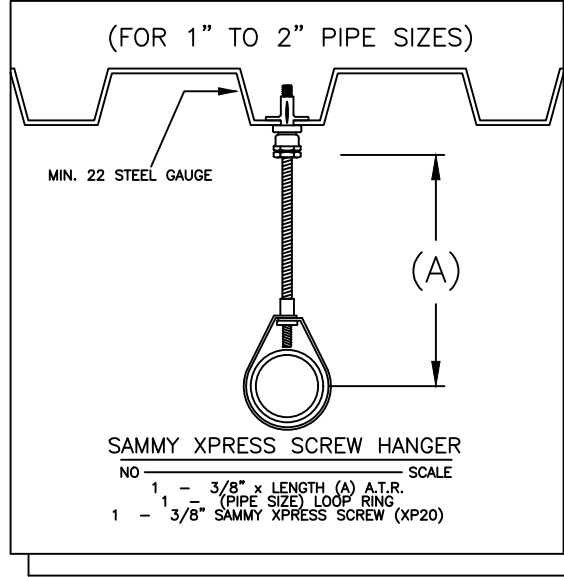
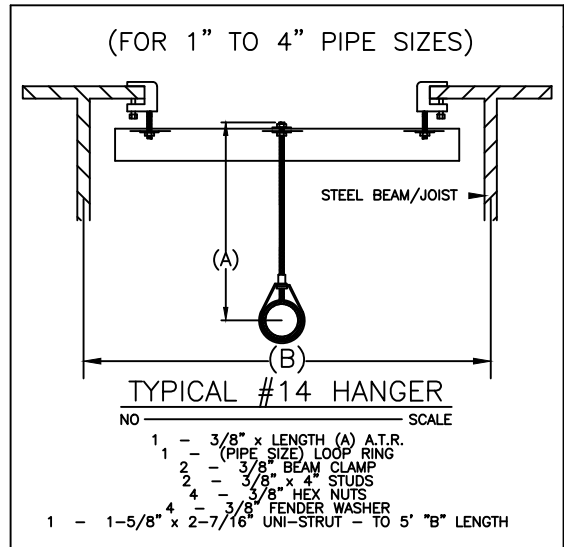
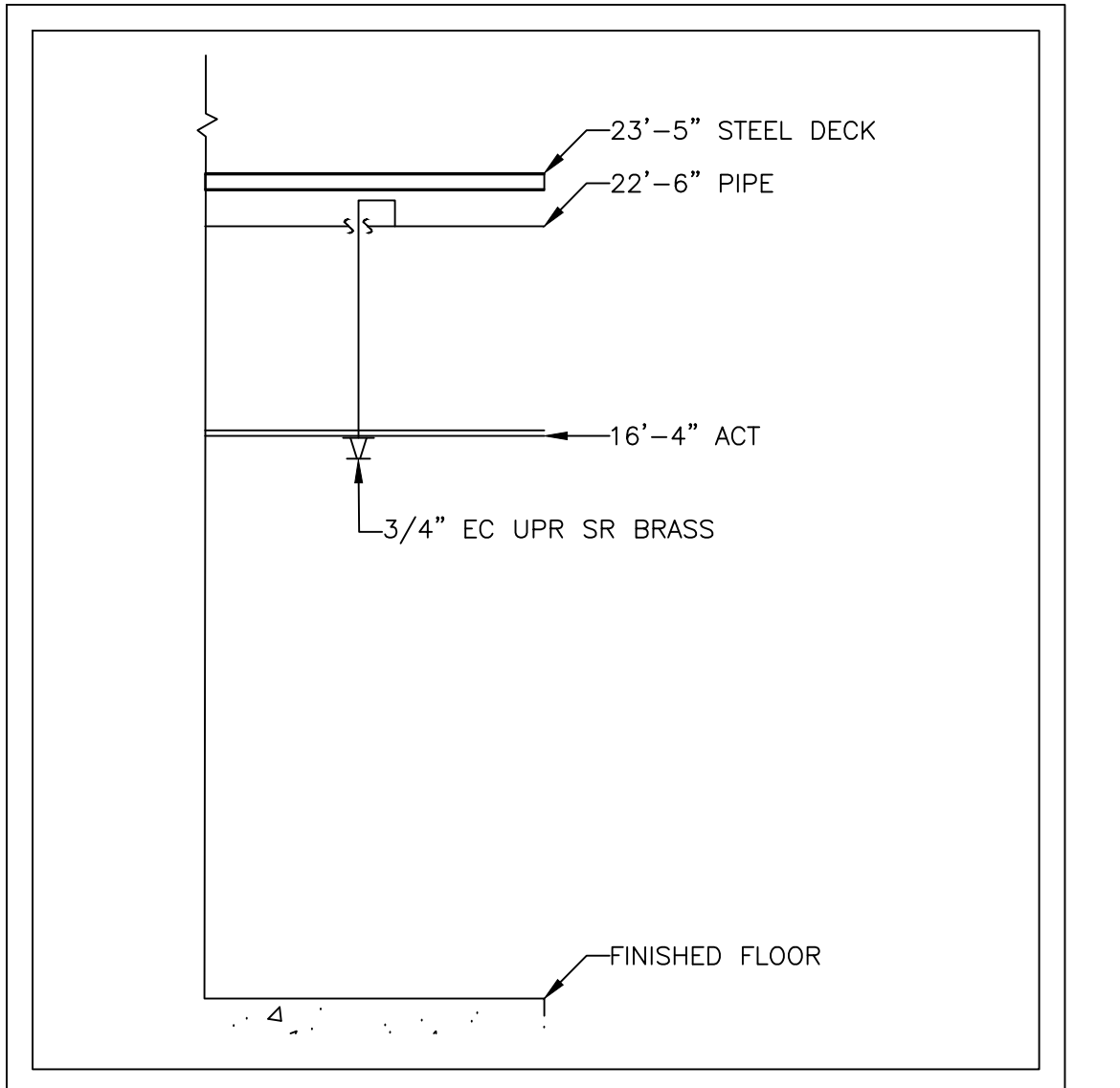


HANGER INSTALLATION REQUIREMENTS									
NOMINAL PIPE SIZE	MAXIMUM DISTANCE BETWEEN HANGERS								
	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"
BLAZEMASTER CPVC	5' 6"	6' 0"	6' 6"	7' 0"	8' 0"	9' 0"	10' 0"	N/A	N/A
THREADABLE LIGHTWALL	N/A	12' 0"	12' 0"	12' 0"	12' 0"	12' 0"	12' 0"	N/A	N/A
STEEL PIPE (10/40)	N/A	12' 0"	12' 0"	15' 0"	15' 0"	15' 0"	15' 0"	15' 0"	15' 0"

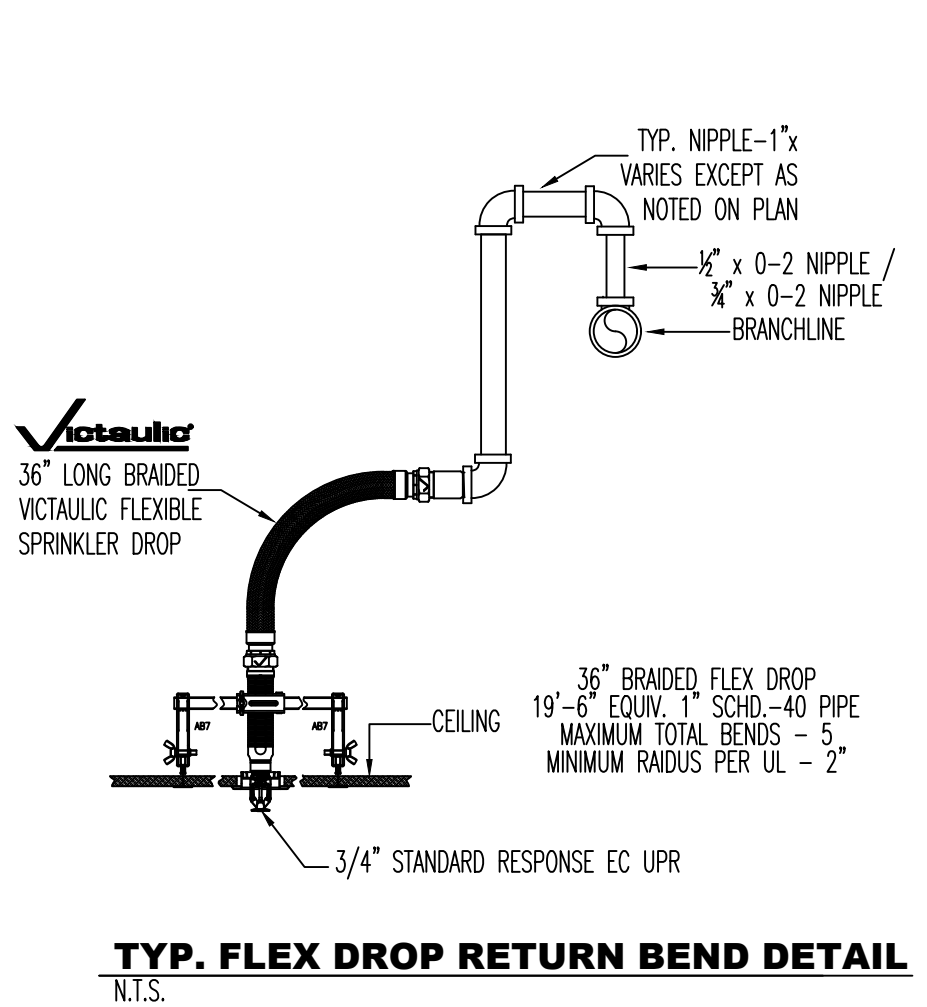
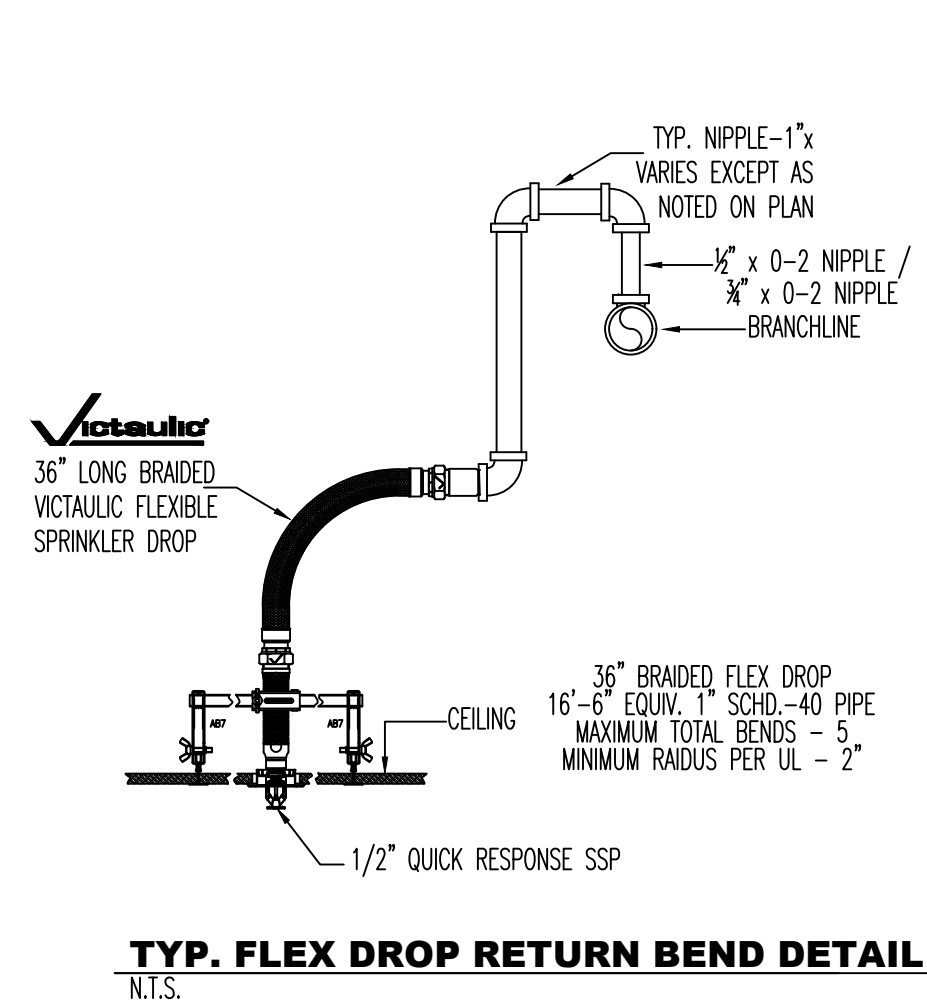
100 PSI STATIC PRESSURE ON SYSTEM REQUIRES UP-LIFT RESTRAINT WITHIN 12 INCHES HORIZONTALLY OF HEAD FOR ARM-OVERS AND END OF BRANCH LINE. THE UNSUPPORTED LENGTH BETWEEN THE END SPRINKLER AND THE LAST HANGER ON THE LINE SHALL NOT EXCEED 36" FOR 1" PIPE, 48" FOR 1-1/4" PIPE AND 60" FOR 1-1/2" PIPE OR LARGER. THE CUMULATIVE HORIZONTAL LENGTH OF AN UNSUPPORTED ARM-OVER TO A SPRINKLER, SPRINKLER DROP, OR SPRING-UP SHALL NOT EXCEED 24".



**System No. W-L-1054**

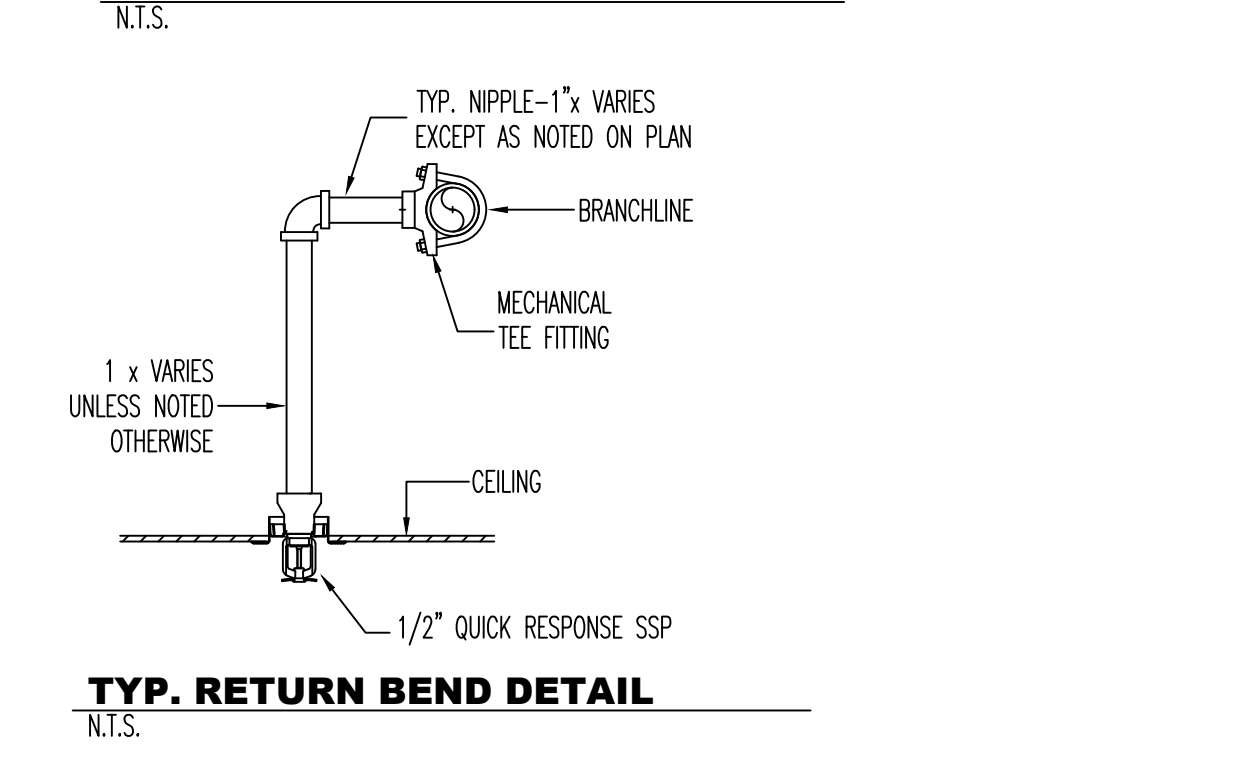
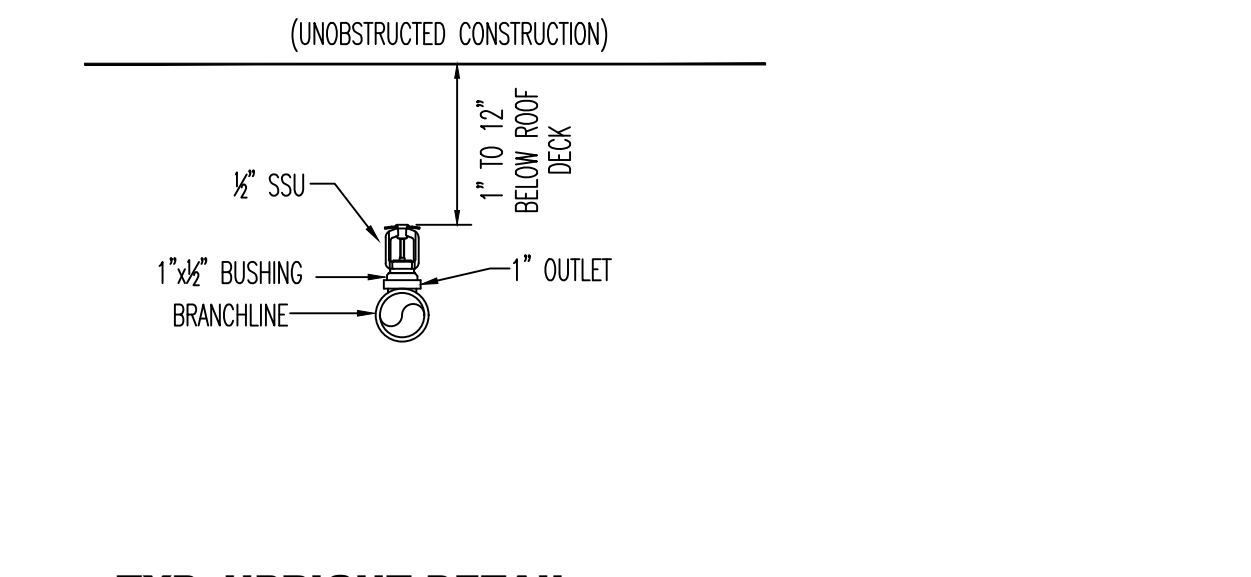
ANSI/UL 479 (ASTM E814)	CAVULC 8115
F Rating - 1 and 2 H (See Items 1 and 3)	F Rating - 1 and 2 H (See Items 1 and 3)
T Rating - 0 H	FT Rating - 0 H
L Rating at Ambient - Less Than 1 CFMsq ft	FTL Rating - 1 and 2 H (See Items 1 and 3)
L Rating at 400 F - Less Than 1 CFMsq ft	FTL Rating - 0 H
L Rating at 400 F - Less Than 1 CFMsq ft	L Rating at Ambient - Less Than 1 CFMsq ft
L Rating at 400 F - Less Than 1 CFMsq ft	L Rating at 400 F - Less Than 1 CFMsq ft

1. Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard/steel assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:  
 A. Studs - Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the depth of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the clear opening. The framing shall be installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.  
 B. Gypsum Board - 5/8 in. (16 mm) thick 4 ft (122 cm) wide with square or beveled edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max. clear opening is 32-1/4 in. (819 mm) for steel stud walls. Max. clear opening is 14-1/2 in. (368 mm) for wood stud walls. The F and FT Ratings of the firestop system are equal to the fire rating of the wall assembly.  
 2. Through-Penetrants - One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be max 6 in. (152 mm) to max 3-1/4 in. (89 mm). Pipes may be installed with continuous point contact. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:  
 A. Steel Pipe - Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.  
 B. Iron Pipe - Nom 30 in. (762 mm) diam (or smaller) cast iron pipe.  
 C. Conduit - Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) diam steel conduit.  
 D. Copper Tubing - Nom 6 in. (152 mm) diam (or smaller) Type 1 (or heavier) copper tubing.  
 E. Copper Pipe - Nom 8 in. (152 mm) diam (or smaller) regular (or heavier) copper pipe.  
 3. Fire Vest or Cavity Material - Sealant. Min 6 in. (152 mm) thickness of fire material applied within the annulus. Flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. (13 mm) diam bead of fire material shall be applied at the pipe wall interface on both surfaces of wall.  
 HLT CONSTRUCTION CHEMICALS, DIV OF HLT INC. - FS-One Sealant or FS-ONE MAX Intumescent Sealant  
 HLT CONSTRUCTION CHEMICALS, DIV OF HLT INC. - FS-One Sealant or FS-ONE MAX Intumescent Sealant  
 \*Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



**SYMBOLS:**

- ⊙ DENOTES A HYDRAULIC CALCULATION POINT OF REFERENCE
- DENOTES EXISTING SPRINKLER PIPE
- DENOTES NEW SPRINKLER PIPE
- DENOTES UNDERGROUND PIPE
- ⚠ DENOTES THE RISER LOCATION
- ⊙ DENOTES THE RUN-IN LOCATION



**GENERAL NOTES:**

- MATERIALS AND INSTALLATION SHALL COMPLY WITH APPLICABLE NFPA CODES, STATE BUILDING CODE, AND LOCAL AUTHORITY HAVING JURISDICTION.
- ALL MATERIALS AND EQUIPMENT SHALL BE NEW, UL LISTED FOR THE INTENDED USE AND SHALL BE INSTALLED IN FULL COMPLIANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- ALL NEW AND EXISTING SPRINKLER PIPE 1" AND SMALLER IS SCHEDULE-40 BLACK STEEL WITH THREADED ENDS AND FITTINGS. ALL NEW AND EXISTING SPRINKLER PIPE 1 1/4" AND LARGER IS SCHEDULE-10 BLACK STEEL WITH GROOVED ENDS AND FITTINGS.
- SPRINKLER HEAD SPACING IS BASED ON THE NFPA STANDARDS FOR LIGHT HAZARD OCCUPANCIES (OFFICE) ALLOWING A MAXIMUM HEAD SPACING OF 225 S.F. PER HEAD, AND FOR ORDINARY HAZARD GROUP I OCCUPANCIES (LAB) ALLOWING A MAXIMUM HEAD SPACING OF 130 S.F. PER HEAD, AND FOR ORDINARY HAZARD GROUP II OCCUPANCIES (WATER TREATMENT) ALLOWING A MAXIMUM HEAD SPACING OF 256 S.F. PER HEAD.
- LOCATIONS OF PIPING AS SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD.
- THE TENANT SHALL REMOVE ANY COMBUSTIBLE MATERIALS LOCATED ABOVE THE EXISTING CEILING.
- THE SPRINKLER CONTRACTOR SHALL NOT BE RESPONSIBLE FOR ANY PRE-EXISTING CODE VIOLATIONS PERTAINING TO THE EXISTING SPRINKLER SYSTEM.
- THE WATER TEST INFORMATION HAS BEEN PROVIDED BY LILLINGTON FIRE DEPT. DATED 9/10/2019 INDICATES THE FOLLOWING...  
 STATIC: 88 PSI  
 RESIDUAL: 58 PSI  
 FLOW: 1186 GPM

**Sprinkler Design Data**

Project Name:	KRIGEN PHARMACEUTICALS	System:	1
Project Street Address:	800 EDWARDS BROTHERS DR.	Floor:	3rd Fl., 30,000
Sub:		Ceiling Height:	VARIABLE
Designed By:	CRAWFORD SPRINKLER	Phone:	919-828-3346
Occupancy:	FACTORY, PACKING	Head:	ORDINARY, LIGHT
		Total Bldg. Hgt.:	27'-0"

**Design Summary**

Design Method	System #1	System #2	System #	System #
Design Area	CALCULATED	CALCULATED		
Design Area #	REMOTE AREA #1	REMOTE AREA #2	REMOTE AREA #3	
Location	WATER TREATMENT	CHEMICAL LAB	OFFICE	
Type of System	WET	WET	WET	
Hazard Class	OH II	OH I	LIGHT	
Criteria From	NFPA 13 (2013)	NFPA 13 (2013)	NFPA 13 (2013)	
Design Area	1057.5	900	900	
Sprinkler Spacing	256	130	256	
Density	20	15	15	
K-factor	14.0	5.6	11.2	
Hose Allowance	250	250	100	
# Design Sprinklers	9	12	6	
Special Application Spk.				
Requirement @ WCR				
G.P.M. Req'd	484.01	249.25	176.33	
P.S.I. Req'd	60.271	64.255	58.630	
Requirement @ TEST				
GPM Required	714.013	499.254	276.331	
PSI Required	68.054	70.989	64.919	
Safety Factor @ TEST	8.213	10.960	21.055	
Dry Sys. Volume (gal)				

**Water Supply Information**

Tested by:	LILLINGTON FIRE DEPT.	Date/Time:	9/10/2019	Pressure Hydrant:	-
Hydrant Elevation:	-	Flow Hydrant # 1:	-	Flow Hydrant # 2:	-
Static (PSI):	88	Residual (PSI):	58	Flow (gpm):	1186

Copy of Water Test Data Included with Calculation is required

**Fire Pump Data**

Rated G.P.M.	-	Rated Pressure	-	Horsepower	-
Design/Model	-	Churn Pressure	-	Style of pump	-
Combined Discharge	-	150% Flow (gpm)	-	150% Flow (gpm)	-

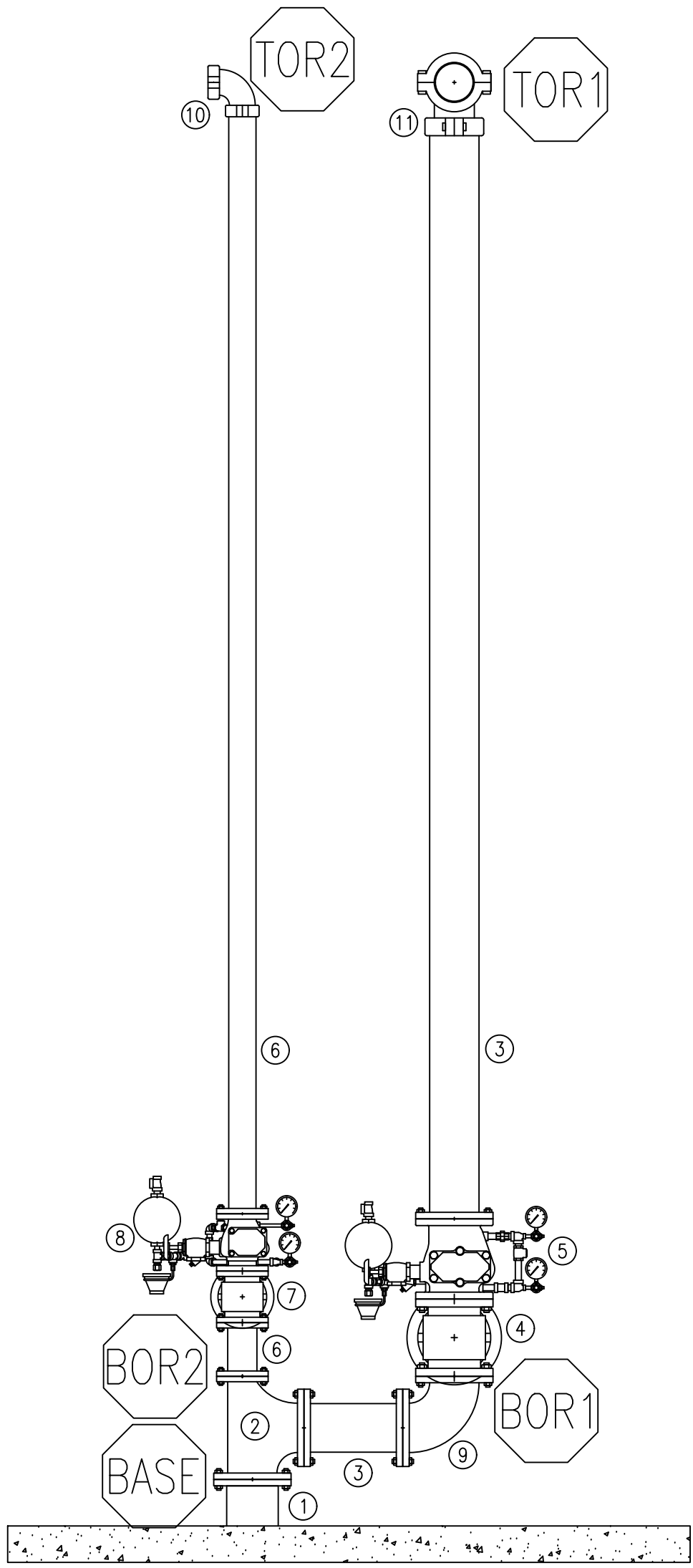
Certified pump curve required

**If Storage is Greater than 12 Feet Complete Commodity Storage Design Information**

Commodity Description	Storage Height	Storage Type (Tank, Bin, Pile)	Clearance
Stable/Unstable	Open/Close	Wet/Dry	System
Figure #	Curve #	Density	Height
		Area	Clear Factor
		Area	Array Factor
			Dry Penalty
			Design
			Minimum Design
			Final Design

System compliant with Chapter 23 (FPC) - Is storage area layout, rack, and pile plan included? -

- EXIST. RISER LEGEND**
- EXIST. 8" D.I. RUN-IN
  - EXIST. 8"x8"x4" RED. TEE
  - EXIST. 8" SCHD-10 PIPE
  - EXIST. 8" WALL POST OS&Y
  - EXIST. 8" ALARM VALVE
  - EXIST. 4" SCHD-10 PIPE
  - EXIST. 4" WALL POST OS&Y
  - EXIST. 4" ALARM VALVE
  - EXIST. 6" FLG ELL
  - EXIST. 4" GRV ELL
  - EXIST. 6" GRV ELL



**HEAD LEGEND**

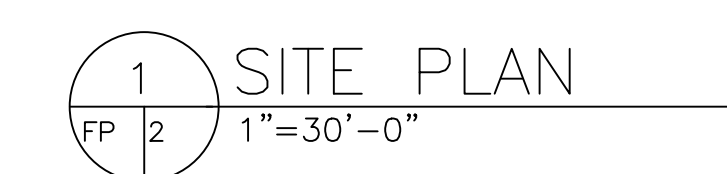
SYM	CNT	NAME	METAL	TEMP	K	NPT	MFG.	MODEL#	MIN SPACING	MAX SPACING	RESPONSE	ESCU T
○	-	EXIST UPRIGHT	BRASS	200	5.60	1/2"	-	-	6'-0"	15'-0"	STANDARD RESP.	N/A
⊗	-	EXIST UPRIGHT	BRASS	286	5.60	3/4"	-	-	8'-0"	12'-0"	STANDARD RESP.	N/A
⊕	-	EXIST PEND	CHROME	165	5.60	1/2"	-	-	8'-0"	15'-0"	STANDARD RESP.	CHR REC
⊙	168	NEW EC PEND	CHROME	155	14.0	3/4"	VIKING	VK572	8'-0"	16'x16'	STANDARD RESP.	CHR REC
⊙	9	NEW EC PEND	CHROME	155	11.2	3/4"	VIKING	VK534	8'-0"	16'x16'	QUICK RESP.	CHR REC
⊙	111	NEW PEND	CHROME	155	5.60	1/2"	VIKING	VK3021	6'-0"	15'-0"	QUICK RESP.	CHR REC
⊙	63	NEW PEND	STN STL	155	5.60	1/2"	VIKING	VK339	6'-0"	15'-0"	QUICK RESP.	STAINLESS STL
⊙	16	NEW UPRIGHT	BRASS	200	5.60	1/2"	VIKING	VK100	8'-0"	15'-0"	STANDARD RESP.	N/A
⊙	12	NEW ELO UPRIGHT	BRASS	286	11.2	3/4"	VIKING	VK530	8'-0"	12'-0"	STANDARD RESP.	N/A
⊙	3	NEW HSW	BRASS	155	5.60	1/2"	VIKING	VK104	6'-0"	14'-0"	STANDARD RESP.	N/A

**HYDRAULIC TEST INFORMATION**

FLOW:	1186 GPM
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**HYDRAULIC TEST INFORMATION**

STATIC PRESSURE:	88 PSI
RESIDUAL PRESSURE:	58 PSI



**tem**

By Others	By CSCO	Item
X	X	City Water Connection
X	X	Valve House or Pit
N/A	N/A	Connection to Plant Air
X	N/A	Air Compressor
X	N/A	Air Maintenance Device
X	X	Electric Alarm
X	X	Electric Wire
X	X	Hose Cabinet and Equipment
X	X	Painting
X	X	Sleeves
X	X	Cutting Hole and Patch
N/A	N/A	Trench and Backfill
N/A	N/A	Repairing
X	X	Underground Piping

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**Crawford SPRINKLER CO.**  
 OF RALEIGH, NC  
 27275 S. SAUNDERS STREET - RALEIGH, NC 27603 • PO BOX 26207 - RALEIGH, NC 27611  
 PHONE 919-828-3346 • FAX 919-839-8164

**KRIGEN PHARMACEUTICALS**  
 FIRE PROTECTION NOTES AND DETAILS  
 800 EDWARDS BROTHERS DR.  
 LILLINGTON, NORTH CAROLINA

**UNDERWRITERS:**

INDEX NO.:

REVISIONS:

**DESIGN CRITERIA**

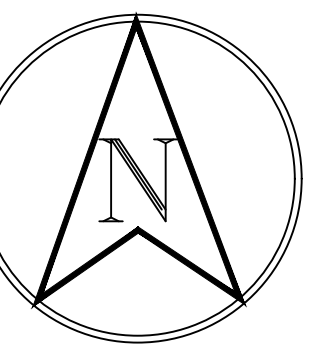
SYSTEM TYPE	WET
SYSTEM DESIGN	CALCULATED
DESIGN DENSITY	0.20 gpm/1500 sq ft
MAX HEAD CVRG	256 ft
HOSE ALLOWANCE	200 gpm

DRAWN BY: *EVJ* DATE: 1/22/2021  
 CHECK BY: DATE:  
 SCALE: AS NOTED

CONTRACT NO.: J213010  
 FILE NO.:

DWG. NO.: FPI0F3  
*P. J. ...*

N.C License No. 29772 FS Cls I



Important: In locations subject to freezing conditions, it is the owner's responsibility to provide adequate heat throughout wet pipe sprinkler system areas and enclosures for dry-pipe, deluge and other types of valves controlling water supplies to sprinkler systems

By Others	By CSCO	Item
X		City Water Connection Valve House or Pit
X		Connection to Plant Air
N/A		Air Compressor
N/A		Air Maintenance Device
X		Electric Alarm
X		Electric Wire
X		Hose Cabinet and Equipment
X		Painting
X		Sleeves
X		Cutting Hole and Patch
N/A		Trench and Backfill
N/A		Repaving
X		Underground Piping

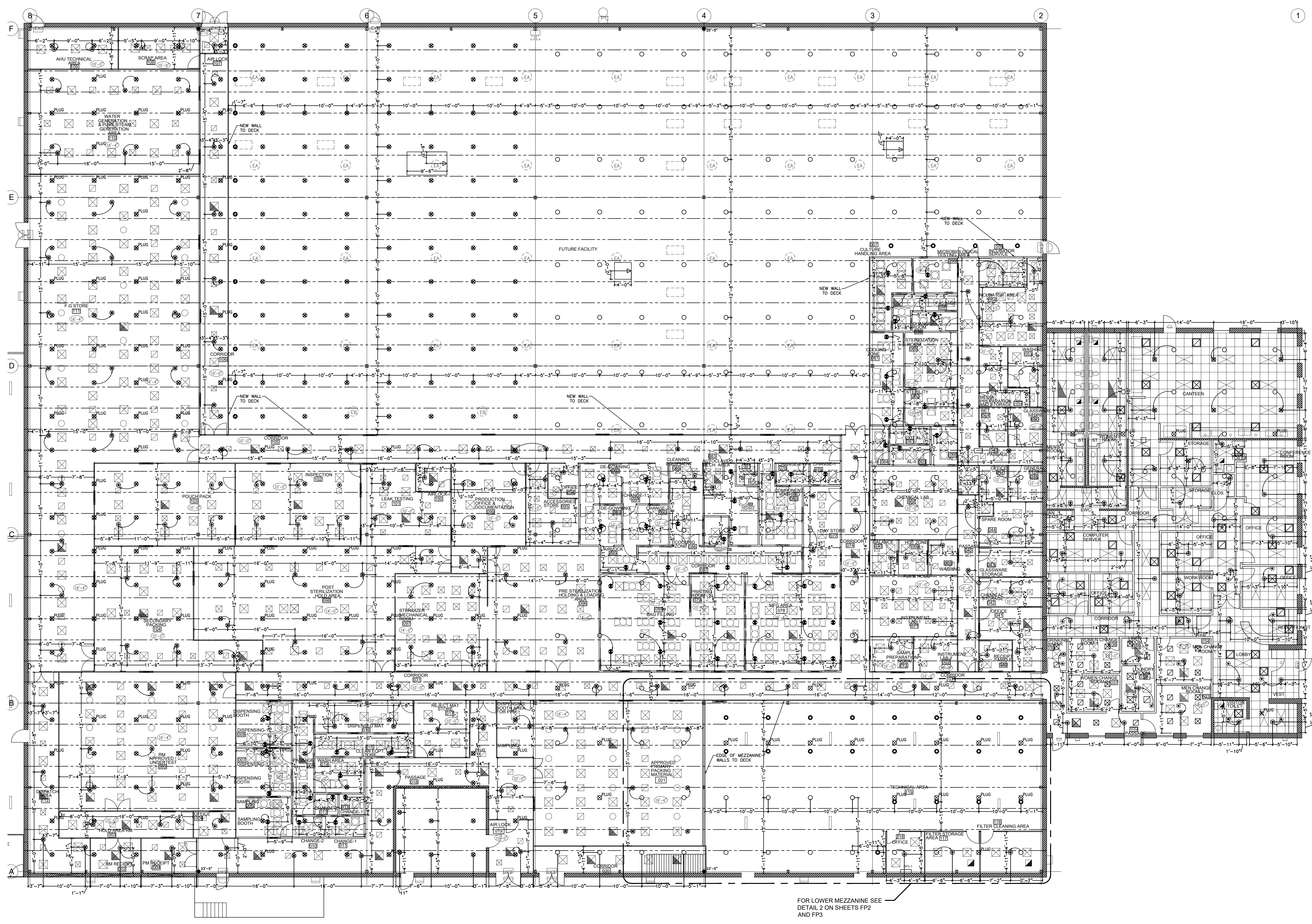
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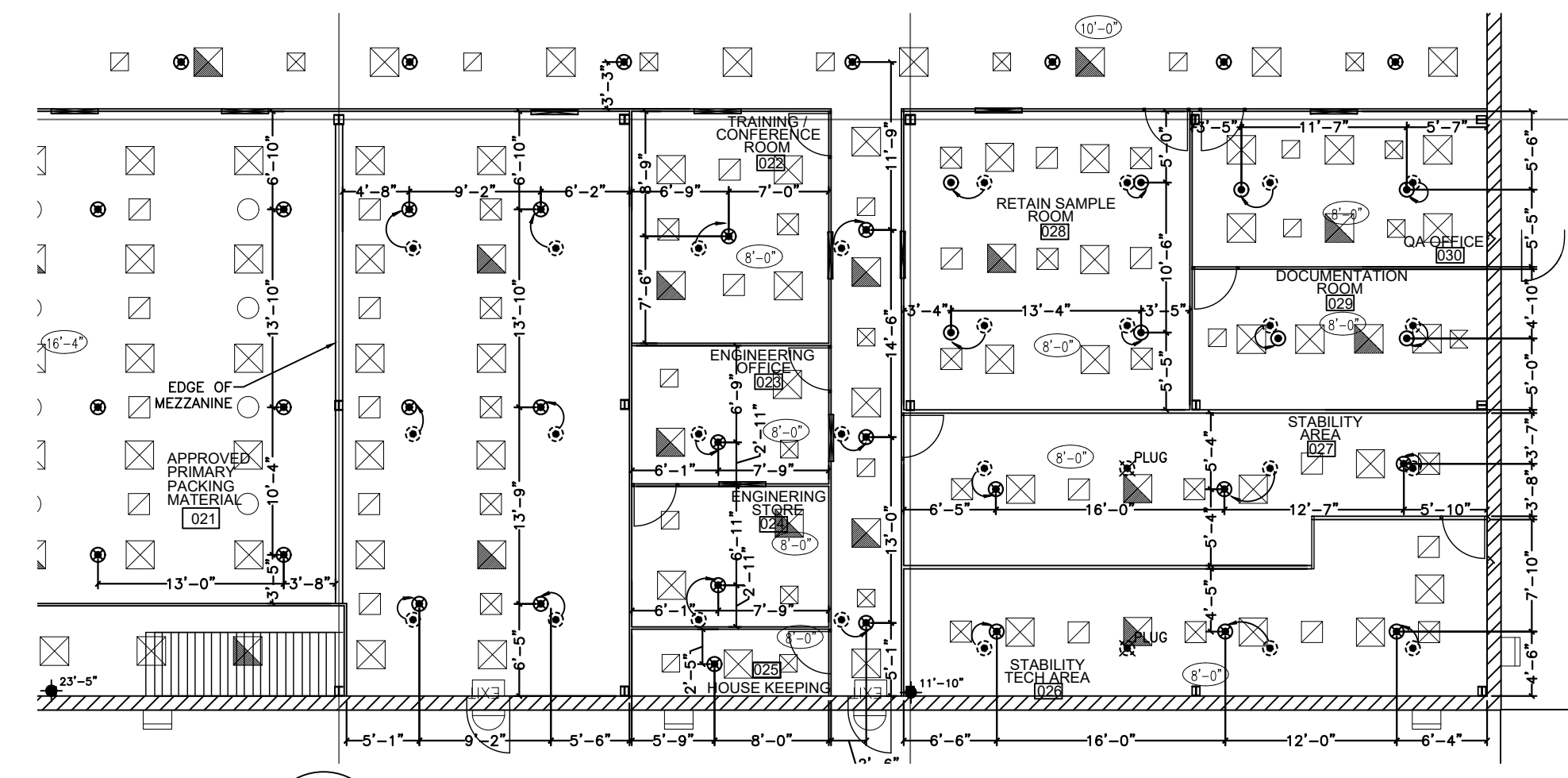
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PHONE 919-828-3346 • FAX 919-839-8164

KRIGEN PHARMACEUTICALS  
CEILING PLAN  
800 EDWARDS BROTHERS DR.  
LILLINGTON, NORTH CAROLINA

UNDERWRITERS:  
INDEX NO.  
REVISIONS:



1 CEILING PLAN  
3/32"=1'-0"



2 BELOW MEZZ. CEILING PLAN  
3/32"=1'-0"

**SYMBOLS:**

- (M) DENOTES A HYDRAULIC CALCULATION POINT OF REFERENCE
- DENOTES A HYDRAULIC REMOTE AREA
- DENOTES EXISTING SPRINKLER PIPE
- DENOTES NEW SPRINKLER PIPE
- DENOTES UNDERGROUND PIPE
- ▲ DENOTES THE RISER LOCATION
- DENOTES THE RUN-IN LOCATION

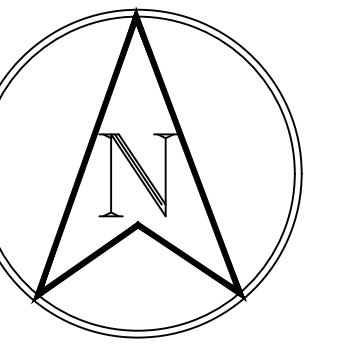
Reviewed For Code Compliance By:  
**D. Banks Wallace**  
Chief Deputy Fire Marshal  
02/11/2021 12:45:34 PM

**HEAD LEGEND**

SYM	CNT	NAME	METAL	TEMP	K	NPT	MFG.	MODEL#	MIN SPACING	MAX SPACING	RESPONSE	ESCU
○	-	EXIST UPRIGHT	BRASS	200	5.60	1/2"	-	-	6'-0"	15'-0"	STANDARD RESP.	N/A
○	-	EXIST UPRIGHT	BRASS	286	5.60	3/4"	-	-	8'-0"	12'-0"	STANDARD RESP.	N/A
○	-	EXIST PEND	CHROME	165	5.60	1/2"	-	-	6'-0"	15'-0"	STANDARD RESP.	CHR REC
⊙	166	NEW EC PEND	CHROME	155	14.0	3/4"	VIKING	VK572	8'-0"	16'x16'	STANDARD RESP.	CHR REC
⊙	9	NEW EC PEND	CHROME	155	11.2	3/4"	VIKING	VK534	8'-0"	16'x16'	QUICK RESP.	CHR REC
⊙	111	NEW PEND	CHROME	155	5.60	1/2"	VIKING	VK3021	6'-0"	15'-0"	QUICK RESP.	CHR REC
⊙	63	NEW PEND	STN STL	155	5.60	1/2"	VIKING	VK339	6'-0"	15'-0"	QUICK RESP.	STAINLESS STL
⊙	16	NEW UPRIGHT	BRASS	200	5.60	1/2"	VIKING	VK100	6'-0"	15'-0"	STANDARD RESP.	N/A
⊙	12	NEW ELO UPRIGHT	BRASS	286	11.2	3/4"	VIKING	VK530	8'-0"	12'-0"	STANDARD RESP.	N/A
△	3	NEW HSW	BRASS	155	5.60	1/2"	VIKING	VK104	6'-0"	14'-0"	STANDARD RESP.	N/A

**DESIGN CRITERIA**

SYSTEM TYPE	WET
SYSTEM DESIGN	CALCULATED
DESIGN DENSITY	0.20 gpm/1500 ft
MAX HEAD CVRG	206 ft
HOSE ALLOWANCE	200 gpm
DRAWN BY:	EV3
CHECK BY:	DATE: 1/22/2021
SCALE:	AS NOTED
CONTRACT NO.:	21-3010
FILE NO.:	
DWG. NO.:	FP2 OF 3
N.C. License No.	29772 FS Cls I



Important: In locations subject to freezing conditions, it is the owner's responsibility to provide adequate heat throughout wet pipe sprinkler system areas and enclosures for dry-pipe, deluge and other types of valves controlling water supplies to sprinkler systems

By Others	By CSCO	Item
X		City Water Connection
X		Valve House or Pit
N/A		Connection to Plant Air
N/A		Air Compressor
N/A		Air Maintenance Device
X		Electric Alarm
X		Electric Wire
X		Hose Cabinet and Equipment
X		Painting
X		Sleeves
X		Cutting Hole and Patch
N/A		Trench and Backfill
N/A		Re-paving
X		Underground Piping

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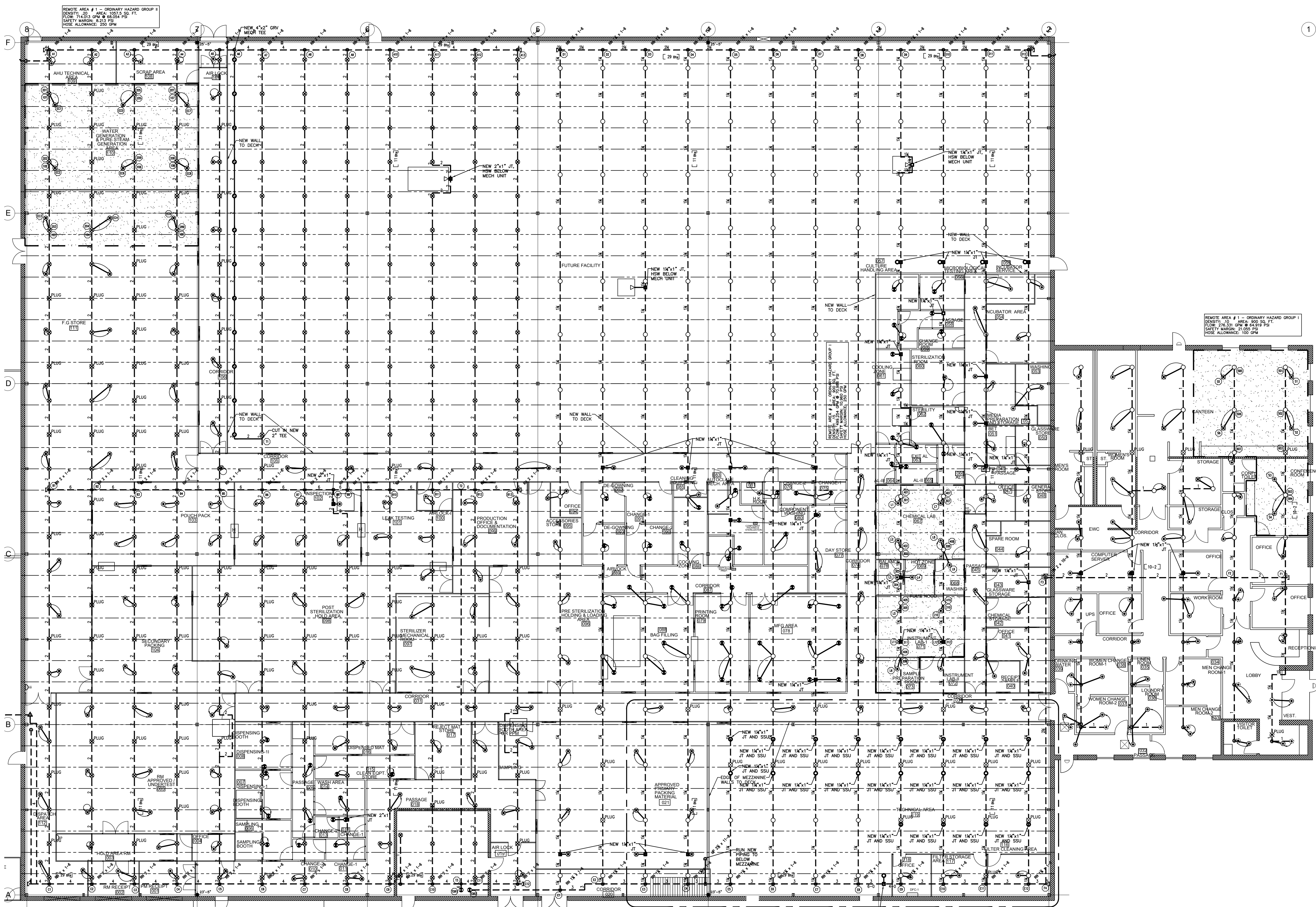
**Crawford**  
**SPRINKLER CO.**  
OF RALEIGH, INC.  
2725 S. SAUNDERS STREET - RALEIGH, NC 27603 • PO BOX 26207 - RALEIGH, NC 27611  
PHONE 919-828-8346 • FAX 919-839-8164

**KRIGEN PHARMACEUTICALS**  
**PIPING PLAN**  
**800 EDWARDS BROTHERS DR.**  
**LILLINGTON, NORTH CAROLINA**

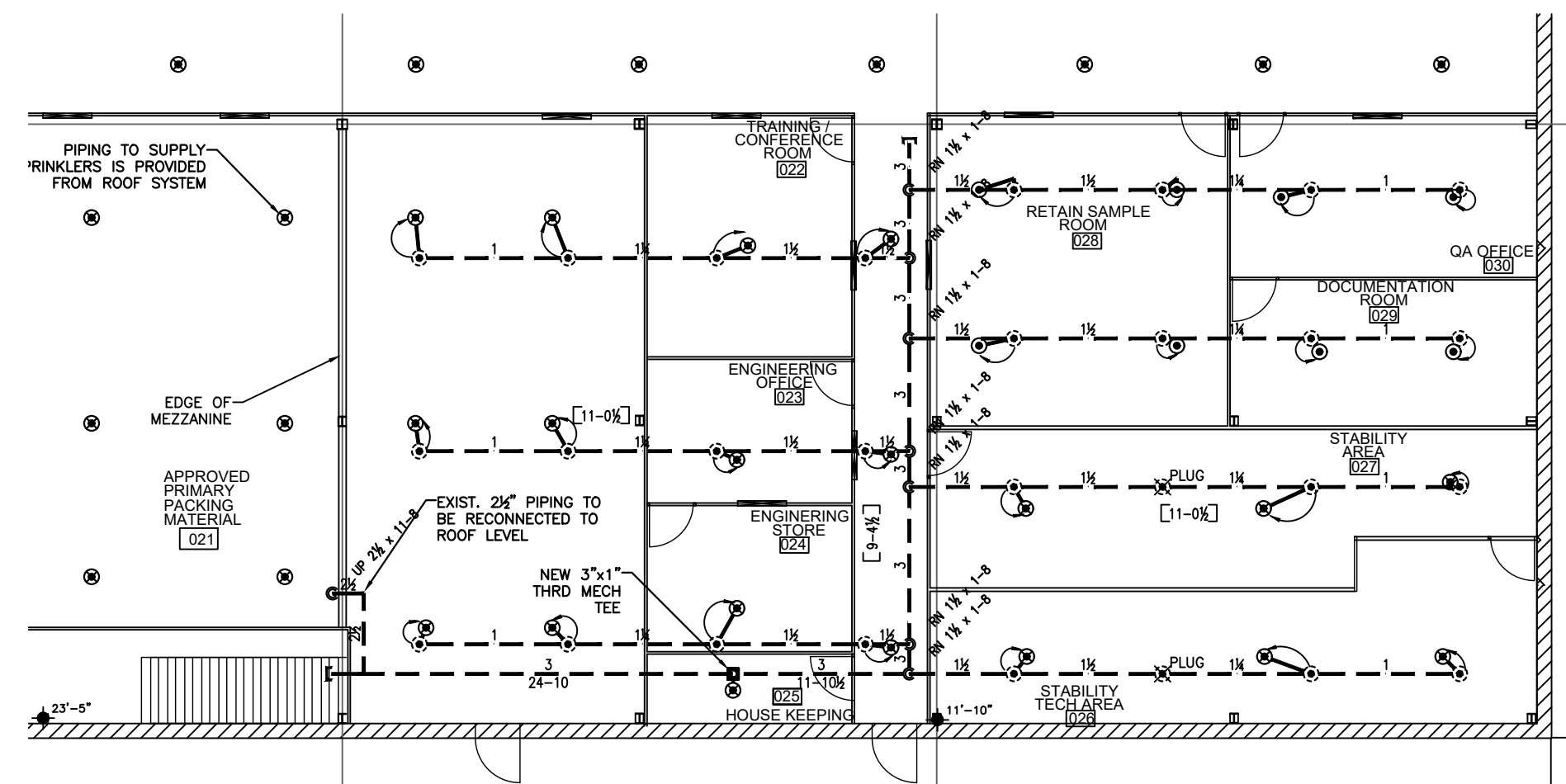
UNDERWRITERS:  
INDEX NO.  
REVISIONS:

**DESIGN CRITERIA**

SYSTEM TYPE	WET
SYSTEM DESIGN	CALCULATED
DESIGN DENSITY	0.20 gpm/1000 sq ft
MAX HEAD CVRG	200 psi
HOSE ALLOWANCE	200 gpm
DRAWN BY:	EV3
CHECK BY:	DATE: 1/22/2021
SCALE:	AS NOTED
CONTRACT NO.:	21-3010
FILE NO.:	
DWG. NO.:	FP3 OF 3
	<i>Patricia Walker</i>
	N.C. License No. 29772 FS Cls I



1 PIPING PLAN  
FP 3 3/32"=1'-0"



2 BELOW MEZZ. PIPING PLAN  
FP 3 3/32"=1'-0"

**SYMBOLS:**

- (M) DENOTES A HYDRAULIC CALCULATION POINT OF REFERENCE
- DENOTES A HYDRAULIC REMOTE AREA
- - - - DENOTES EXISTING SPRINKLER PIPE
- — — DENOTES NEW SPRINKLER PIPE
- — — DENOTES UNDERGROUND PIPE
- ▲ DENOTES THE RISER LOCATION
- DENOTES THE RUN-IN LOCATION

**HEAD LEGEND**

SYM	CNT	NAME	METAL	TEMP	K	NPT	MFG.	MODEL#	MIN SPACING	MAX SPACING	RESPONSE	ESCU
○	-	EXIST UPRIGHT	BRASS	200	5.60	1/2"	-	-	6'-0"	15'-0"	STANDARD RESP.	N/A
⊗	-	EXIST UPRIGHT	BRASS	286	5.60	3/4"	-	-	8'-0"	12'-0"	STANDARD RESP.	N/A
⊙	-	EXIST PEND	CHROME	165	5.60	1/2"	-	-	6'-0"	15'-0"	STANDARD RESP.	CHR REC
⊗	168	NEW EC PEND	CHROME	155	14.0	3/4"	VIKING	VK572	8'-0"	16'x16'	STANDARD RESP.	CHR REC
⊙	9	NEW EC PEND	CHROME	155	11.2	3/4"	VIKING	VK534	8'-0"	16'x16'	QUICK RESP.	CHR REC
⊙	111	NEW PEND	CHROME	155	5.60	1/2"	VIKING	VK3021	6'-0"	15'-0"	QUICK RESP.	CHR REC
●	63	NEW PEND	STN STL	155	5.60	1/2"	VIKING	VK339	6'-0"	15'-0"	QUICK RESP.	STAINLESS STL
○	16	NEW UPRIGHT	BRASS	200	5.60	1/2"	VIKING	VK100	6'-0"	15'-0"	STANDARD RESP.	N/A
○	12	NEW ELO UPRIGHT	BRASS	286	11.2	3/4"	VIKING	VK530	8'-0"	12'-0"	STANDARD RESP.	N/A
△	3	NEW HSW	BRASS	155	5.60	1/2"	VIKING	VK104	6'-0"	14'-0"	STANDARD RESP.	N/A