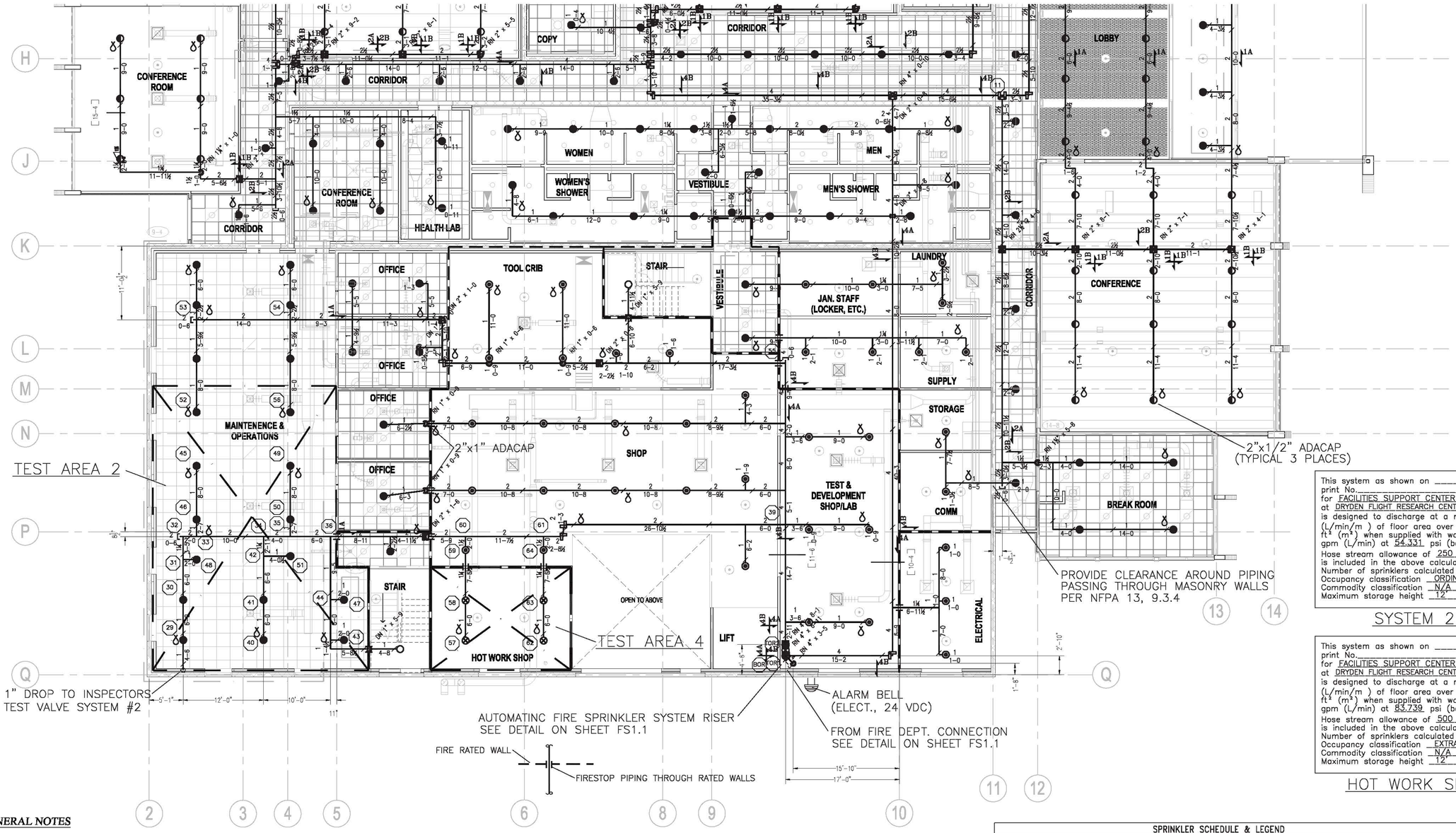


This system as shown on _____ company print No._____ dated 2-1-2011 for FACILITIES SUPPORT CENTER at DRYDEN FLIGHT RESEARCH CENTER contract No. _____ is designed to discharge at a rate of .20 gpm/sq.ft. (L/min/m) of floor area over a max. area of 1500 ft² (m²) when supplied with water at a rate of 257.93 gpm (L/min) at 54.331 psi (bar) at the base of the riser. Hose stream allowance of 250 gpm (L/min) is included in the above calculation.
Number of sprinklers calculated 14
Occupancy classification ORDINARY HAZARD GROUP II
Commodity classification N/A
Maximum storage height 12'

SYSTEM 2 NAMEPLATE

This system as shown on _____ company print No._____ dated 2-1-2011 for FACILITIES SUPPORT CENTER at DRYDEN FLIGHT RESEARCH CENTER contract No. _____ is designed to discharge at a rate of .40 gpm/sq.ft. (L/min/m) of floor area over a max. area of 315 ft² (m²) when supplied with water at a rate of 161.52 gpm (L/min) at 83.739 psi (bar) at the base of the riser. Hose stream allowance of 500 gpm (L/min) is included in the above calculation.
Number of sprinklers calculated 4
Occupancy classification EXTRA HAZARD GROUP II
Commodity classification N/A
Maximum storage height 12'

HOT WORK SHOP NAMEPLATE

N

SCALE: 1/8" = 1'-0"
0 4' 8' 12' 16'

GENERAL NOTES

SCOPE OF WORK IS TO PROVIDE SPRINKLERS NEW OFFICE AND SHOP FACILITY.
POINT OF CONNECTION TO BE 5'-0" OUTSIDE OF BUILDING LINE.

ALL DESIGN, FABRICATION AND INSTALLATION PER NFPA #13, 2007 EDITION.

ALL CONTROL VALVES AND DRAIN VALVES SHALL HAVE A SIGN AFFIXED FOR IDENTIFICATION.

ALL 2" AND LARGER LINES SHALL BE SCHEDULE 40 WITH GROOVED ENDS AND MECHANICAL FITTINGS. COUPLINGS SHALL BE RIGID TYPE, UNLESS OTHERWISE NOTED.

ALL THREADED PIPING SHALL BE SCHEDULE 40 WITH CUT THREADS AND CLASS 125 CAST IRON FITTINGS.

THE FIRE SPRINKLER SYSTEM SHALL BE MONITORED BY THE FIRE ALARM SYSTEM.

A SPARE SPRINKLER CABINET SHALL BE INSTALLED NEAR THE RISER WITH THE QUANTITY OF SPARE SPRINKLERS REQUIRED BY NFPA 13, SECTION 6.2.9

ALL DEVICES AND COMPONENTS TO BE EITHER LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY FOR FIRE PROTECTION SERVICE OR APPROVED BY THE AUTHORITY HAVING JURISDICTION.

A HYDROSTATIC TEST SHALL BE PERFORMED FOR ALL SYSTEM PIPING AT NOT LESS THEN 200 PSI FOR TWO HOURS, OR 50 PSI ABOVE STATIC PRESSURE IN EXCESS OF 150 PSI FOR TWO HOURS, AND WITNESSED BY A NASA FIRE PROTECTION ENGINEER.

FIRE SPRINKLER FLOW ALARM BELL WILL BE INSTALLED ON THE ADDRESS SIDE OF THE BUILDING AND WILL BE EQUIPPED WITH THE PROPER SIGNAGE IDENTIFYING THE ALARM BELL.

BUILDING DESIGN INFORMATION:
-Governing Building Code= **2007 CBC**
-Building Occupancy= **A-3, B, F-1, S**
-Construction Type= **TYPE II-FR**
-Building Height= **TWO STORY**
-Building Area= **29,700 SQ.FT. FIRST LEVEL**
6,900 SQ.FT. SECOND LEVEL
36,600 SQ.FT. TOTAL
-Governing Fire Code= **NFPA 13, 2007**

DESIGN CRITERIA – **OFFICE AREAS**
-Classification of Occupancy= **ORDINARY HAZARD GR I**
-Design Density= **.15 GPM/SQ.FT.**
-Design Area= **1500 SQ.FT.**
-Construction Type= **UNOBSTRUCTED**
-Defflector Distance= **1" TO 12" BELOW CEILINGS**
-Head Spacing= **130 SQ.FT. MAXIMUM**

DESIGN CRITERIA – **SHOP & SERVICE AREAS**
-Classification of Occupancy= **ORDINARY HAZARD GR II**
-Design Density= **.20 GPM/SQ.FT.**
-Design Area= **1500 SQ.FT.**
-Construction Type= **UNOBSTRUCTED**
-Defflector Distance= **1" TO 12" BELOW CEILINGS**
-Head Spacing= **130 SQ.FT. MAXIMUM**

DESIGN CRITERIA – **HOT WORK SHOP**
-Classification of Occupancy= **EXTRA HAZARD GR II**
-Design Density= **.40 GPM/SQ.FT.**
-Design Area= **2500 SQ.FT.**
-Construction Type= **OBSTRUCTED**
-Defflector Distance= **1" TO 6" BELOW FRAMING MEMBERS**
-Head Spacing= **130 SQ.FT. MAXIMUM**

SPRINKLER SCHEDULE & LEGEND

SYMBOL	SPRINKLER DESCRIPTION	SIN	THREAD SIZE	TEMP.	K-FACTOR	TRIM	FINISH	SYSTEM	SYSTEM	SYSTEM	TOTAL
●	VIKING "MICROFAST" CONCEALED PEND. ON 1" DROP	VK462	1/2"	155'	5.6	CONC.	WHITE	102	27	--	129
○	VIKING "MICROFAST" UPRIGHT ON 1/2" OUTLET	VK300	1/2"	200'	5.6	--	BRASS	--	2	78	80
◉	VIKING "MICROFAST" UPRIGHT ON 1" SPRIG	VK300	1/2"	200'	5.6	--	BRASS	13	4	--	38
◐	VIKING "MICROFAST" CONCEALED PEND. ON 1" DROP	VK462	1/2"	155'	5.6	CONC.	WHITE	125	--	--	125
⊗	VIKING "MICROMATIC" UPRIGHT ON 1" SPRIG	VK300	1/2"	200'	5.6	--	BRASS	--	4	--	4
							TOTAL PER SYSTEM=	240	58	78	
							TOTAL REQUIRED THIS PROJECT=				376

REGISTERED PROFESSIONAL ENGINEER RONALD J. MUDRY No. FP 1504 Exp. 6-30-11 FIRE PROTECTION STATE OF CALIFORNIA

MUDRY & ASSOCIATES
Fire Protection Engineering, Consulting and Design
12752 Valley View Street, Suite D
Garden Grove, California 92845
(714) 373-5761
Fax (714) 373-5781 e-mail: fpe@mudry.us

DATE	SYM	REVISION	BY	A'PD

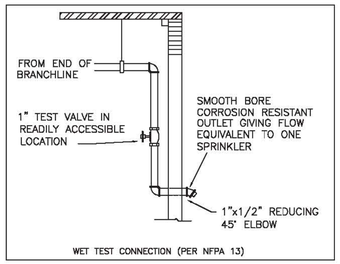
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER PLAN
FIRST FLOOR – SOUTH

PROJECT TITLE
8-18-11
FACILITIES SUPPORT CENTER
100% FINAL DESIGN SUBMITTAL

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office DAN CROWLEY	8-18-11
Project Requestor/Customer DAN CROWLEY	8-18-11
Facilities Project Manager GEMMA FLORES	8-18-11
Chief, Office of Protective Services JOHN ZELLMER	8-18-11
Chief – Safety, Health and Environmental Office DAN MULLEN	8-18-11
DFRC Chief Information Officer KEN NORLIN	8-18-11

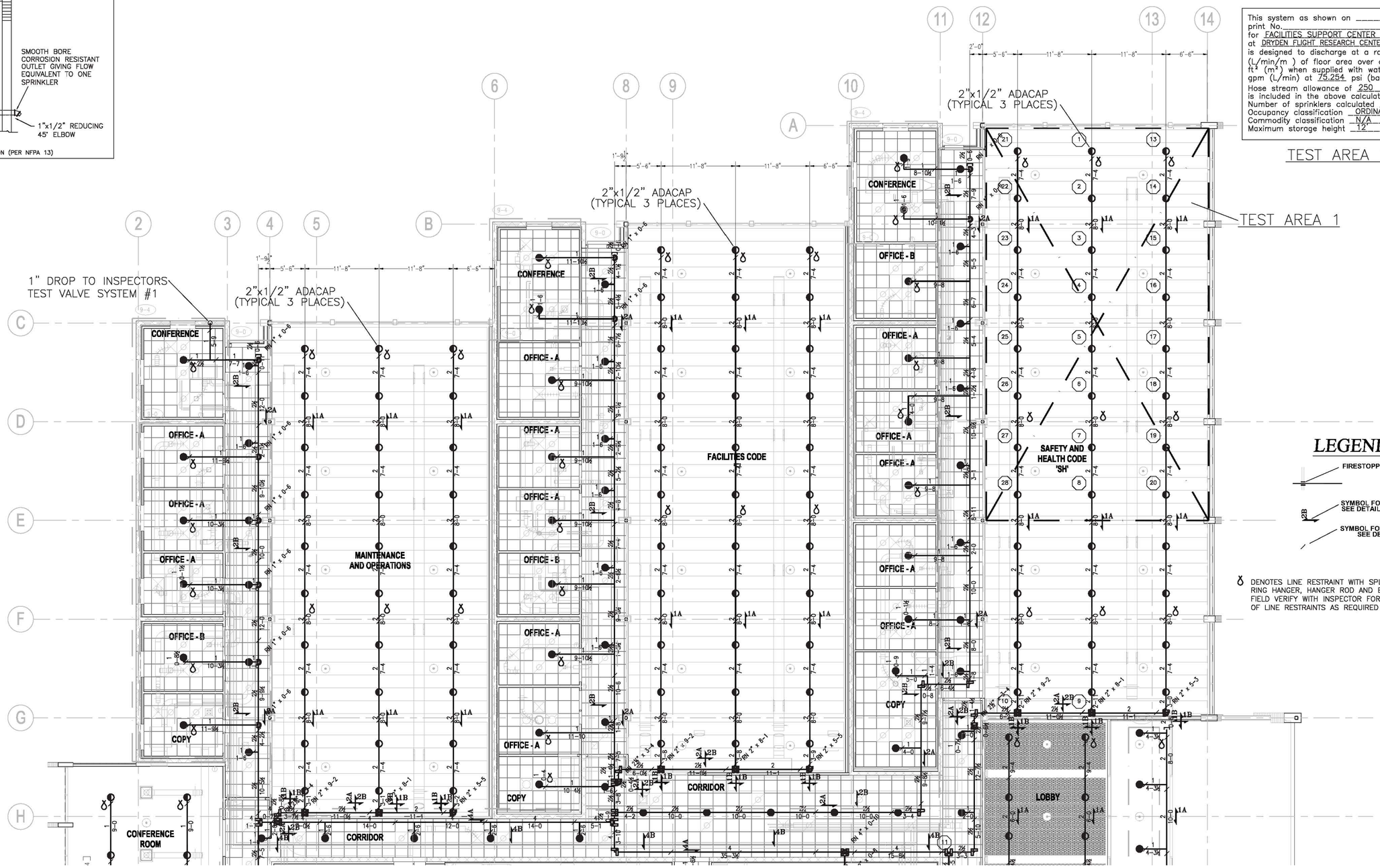
DATE STRTD	11/04/10	DATE PRNTD	5/23/11
DRAWN BY	RJM	EDM-1703	
SCALE	AS INDICATED	TRADE SH. No.	
FILE NAME		FS2.1	SHEET No. 191 of 195



WET TEST CONNECTION (PER NFPA 13)

This system as shown on _____ company print No._____ dated 2-1-2011
for FACILITIES SUPPORT CENTER
at DRYDEN FLIGHT RESEARCH CENTER contract No. _____
is designed to discharge at a rate of .15 gpm/sq.ft. (L/min/m) of floor area over a max. area of 1950 ft² (m²) when supplied with water at a rate of 370.52 gpm (L/min) at 75.254 psi (bar) at the base of the riser.
Hose stream allowance of 250 gpm (L/min) is included in the above calculation.
Number of sprinklers calculated 24
Occupancy classification ORDINARY HAZARD GROUP I
Commodity classification N/A
Maximum storage height 12'

TEST AREA 1 NAMEPLATE



LEGEND

- FIRESTOPPED PENETRATION THRU RATED WALL
- 2B — SYMBOL FOR SWAY BRACE SEE DETAIL ON SHEET F4.0
- SYMBOL FOR PIPE SUPPORT HANGER SEE DETAIL ON THIS SHEET
- DENOTES LINE RESTRAINT WITH SPLAY WIRE, SURGE RESTRAINER, RING HANGER, HANGER ROD AND BEAM CLAMP ASSEMBLY FIELD VERIFY WITH INSPECTOR FOR ADDITION OR DELETION OF LINE RESTRAINTS AS REQUIRED BY UNFORESEEN FIELD CONDITIONS.

N

SCALE: 1/8" = 1'-0"
0 4' 8' 12' 16'

NOTE:

1. ALL WALLS ARE FULL HEIGHT, UNLESS OTHERWISE NOTED
2. ALL SPRINKLER PIPING IS ROUTED 0'-6" BELOW ROOF AND FLOOR DECK FRAMING MEMBERS, UNLESS OTHERWISE NOTED
3. EXTERIOR OVERHANGS ARE NONCOMBUSTIBLE CONSTRUCTION, SPRINKLER COVERAGE IS OMITTED PER NFPA 13, 2007 SECTION 8.15.7.2

REGISTERED PROFESSIONAL ENGINEER RONALD J. MUDRY No. FP 1500 Exp. 6-30-11 FIRE PROTECTION STATE OF CALIFORNIA

MUDRY & ASSOCIATES
Fire Protection Engineering, Consulting and Design
12752 Valley View Street, Suite D
Garden Grove, California 92845
(714) 373-5741
Fax (714) 373-5781 e-mail: fpe@mudry.us

DATE	SYM	REVISION	BY	A'PD

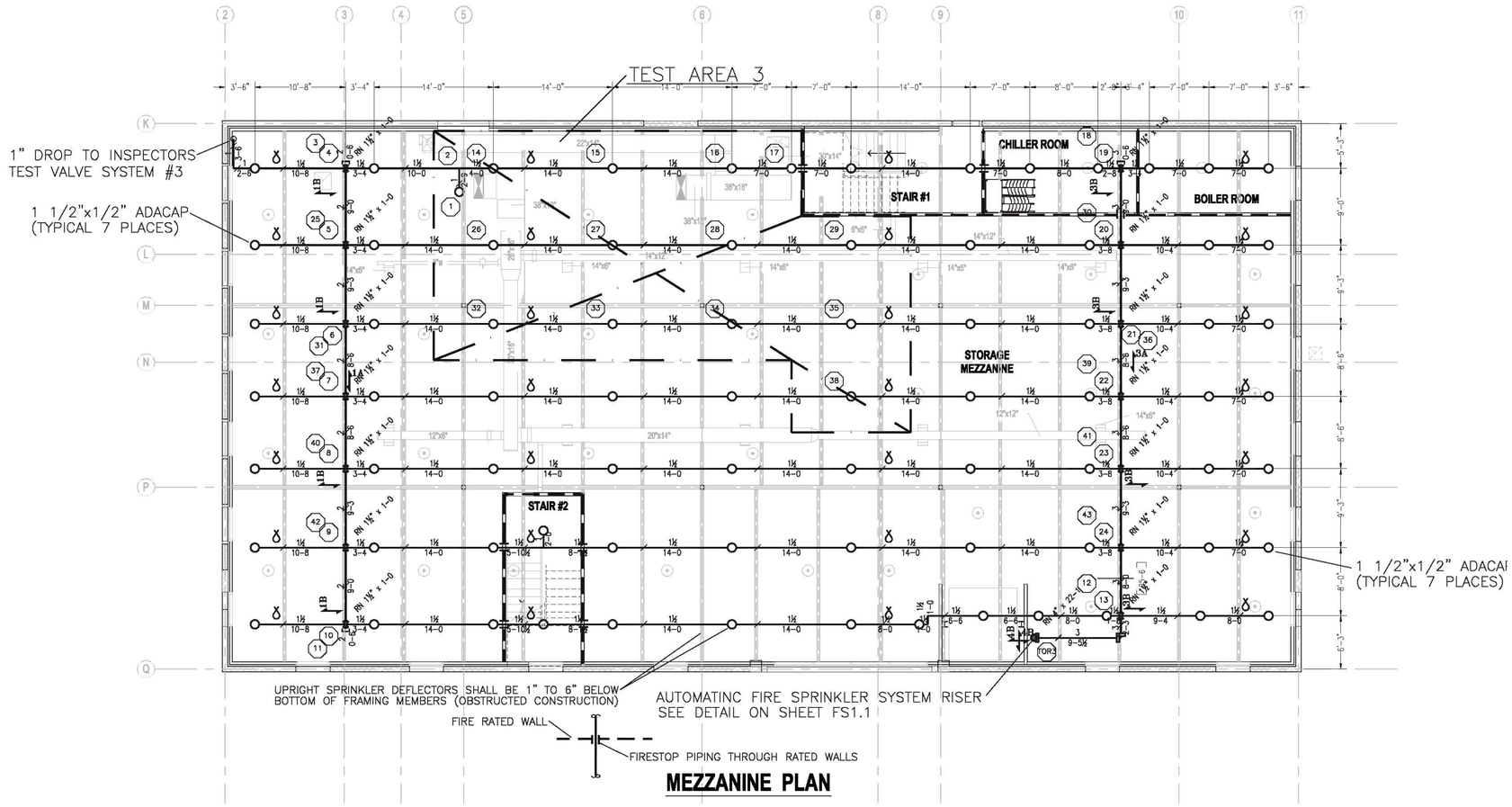
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER PLAN
FIRST FLOOR – NORTH

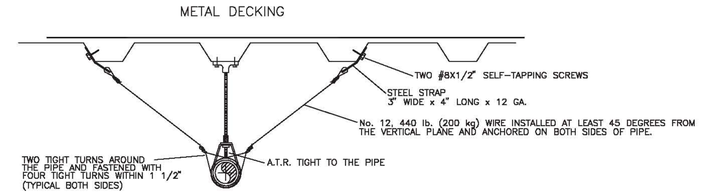
PROJECT TITLE
8-18-11
FACILITIES SUPPORT CENTER
100% FINAL DESIGN SUBMITTAL

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office DAN CROWLEY	8-18-11
Project Requestor/Customer DAN CROWLEY	8-18-11
Facilities Project Manager GEMMA FLORES	8-18-11
Chief, Office of Protective Services JOHN ZELLMER	8-18-11
Chief – Safety, Health and Environmental Office DAN MULLEN	8-18-11
DFRC Chief Information Officer KEN NORLIN	8-18-11

DATE STRTD	11/04/10	DATE PRNTD	5/23/11
DRAWN BY	RJM	EDM–1703	
SCALE	AS INDICATED	TRADE SH. No.	
FILE NAME		FS2.2	SHEET No. 192 of 195

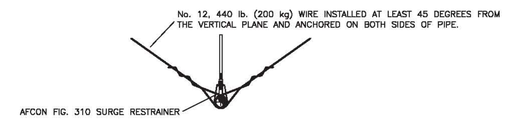


MEZZANINE PLAN



DETAIL 4

ALTERNATE END OF BRANCH LINE SEISMIC RESTRAINT
(NFPA 13, SECTION 9.3.6.1(5))



END OF BRANCH LINE SEISMIC RESTRAINT
(NFPA 13, SECTION 9.3.6.1(3))

δ DENOTES LINE RESTRAINT WITH SPLAY WIRE, SURGE RESTRAINER, RING HANGER, HANGER ROD AND BEAM CLAMP ASSEMBLY FIELD VERIFY WITH INSPECTOR FOR ADDITION OR DELETION OF LINE RESTRAINTS AS REQUIRED BY UNFORESEEN FIELD CONDITIONS.

NOTE:

THE END SPRINKLER ON A BRANCH LINE SHALL BE RESTRAINED AGAINST EXCESSIVE VERTICAL OR LATERAL MOVEMENT (NFPA 13, 9.3.6.3, 2007 EDITION.)

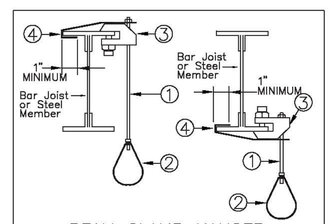
MAXIMUM SPACING OF BRANCH LINE RESTRAINTS

$C_P = 0.50$

PIPE SIZE	SPACING
1"	38'
1 1/4"	40'
1 1/2"	43'
2"	46'

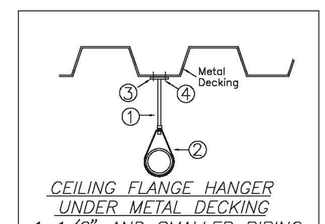
This system as shown on _____ company
print No._____ dated 12-1-2011
for FACILITIES SUPPORT CENTER
at DRYDEN FLIGHT RESEARCH CENTER contract No. _____
is designed to discharge at a rate of .20 gpm/sq.ft.
(L/min/m) of floor area over a max. area of 1500
ft² (m²) when supplied with water at a rate of 391.77
gpm (L/min) at 92.574 psi (bar) at the base of the riser.
Hose stream allowance of 250 gpm (L/min)
is included in the above calculation.
Number of sprinklers calculated 13
Occupancy classification ORDINARY HAZARD GROUP II
Commodity classification N/A
Maximum storage height 12'

TEST AREA 3 NAMEPLATE



BEAM CLAMP HANGER

①	3/8" ALL THREAD ROD
②	RING HANGER, AFCON FIG. 300
③	BEAM CLAMP, AFCON FIG. 100
④	RETAINING STRAP, AFCON FIG.160



CEILING FLANGE HANGER UNDER METAL DECKING 1 1/2" AND SMALLER PIPING

①	3/8" ALL THREAD ROD
②	RING HANGER, AFCON FIG. 300
③	CEILING PLATE, AFCON FIG. 610
④	SCREW 4-#10 (self tapping)

NOTE:
1. PROVIDE A PIPE HANGER WITHIN 12" FROM PENDENT SPRINKLERS IN CEILINGS.
2. AFCON FIG. 310 SURGE RESTRAINER SHALL BE INSTALLED AT LAST PIPE HANGER ADJACENT TO PENDENT SPRINKLERS IN CEILINGS.

MAXIMUM HANGER SPACING FOR STEEL PIPE

PIPE SIZE	HANGER SPACING
1 1/4"& SMALLER	12'-0"
1 1/2"& LARGER	15'-0"

N

SCALE: 1/8" = 1'-0"
0 4' 8' 12' 16'

REGISTERED PROFESSIONAL ENGINEER RONALD J. MUDRY No. FP 150 Exp. 6-30-11 FIRE PROTECTION STATE OF CALIFORNIA

MUDRY & ASSOCIATES
Fire Protection Engineering, Consulting and Design
12752 Valley View Street, Suite D
Garden Grove, California 92845
(714) 373-5741
Fax (714) 373-5781
e-mail: fpe@mudry.us

DATE	SYM	REVISION	BY	A'PD

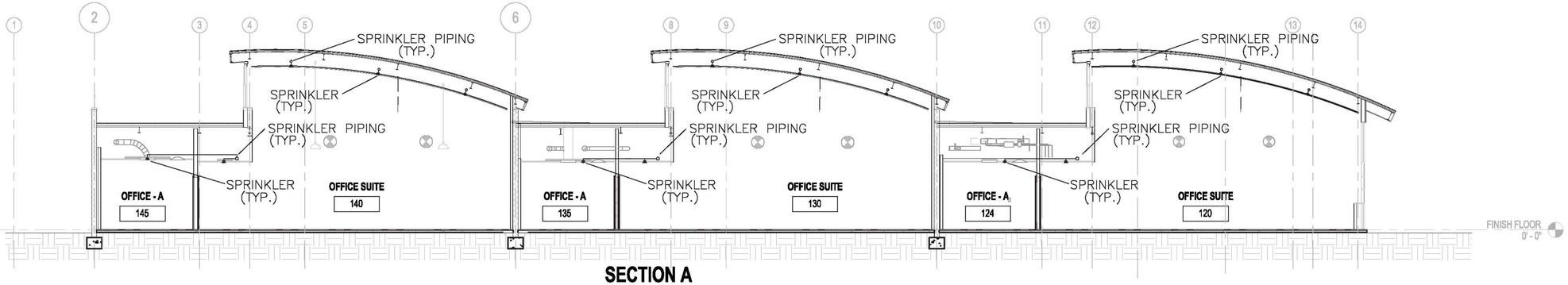
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER PLAN
SECOND FLOOR

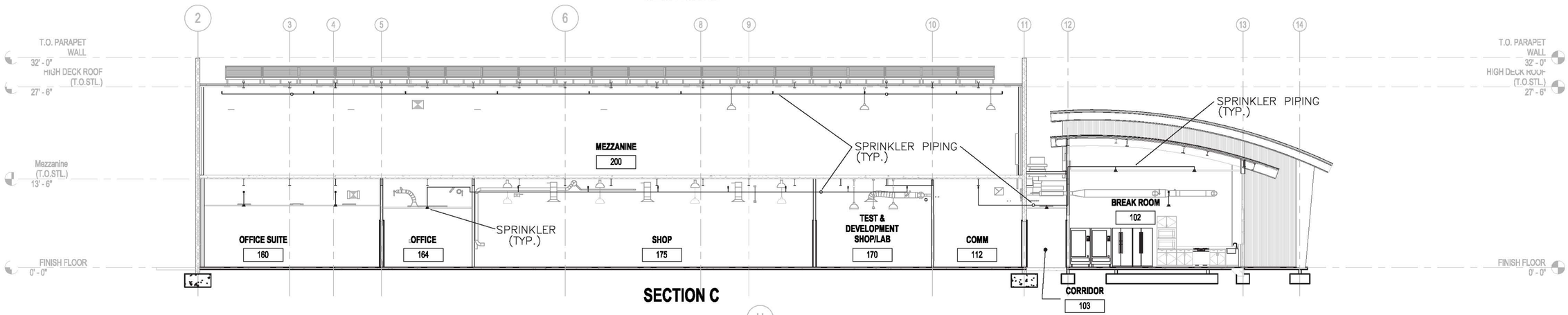
PROJECT TITLE
8-18-11
FACILITIES SUPPORT CENTER
100% FINAL DESIGN SUBMITTAL

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office DAN CROWLEY	8-18-11
Project Requestor/Customer DAN CROWLEY	8-18-11
Facilities Project Manager GEMMA FLORES	8-18-11
Chief, Office of Protective Services JOHN ZELLMER	8-18-11
Chief – Safety, Health and Environmental Office DAN MULLEN	8-18-11
DFRC Chief Information Officer KEN NORLIN	8-18-11

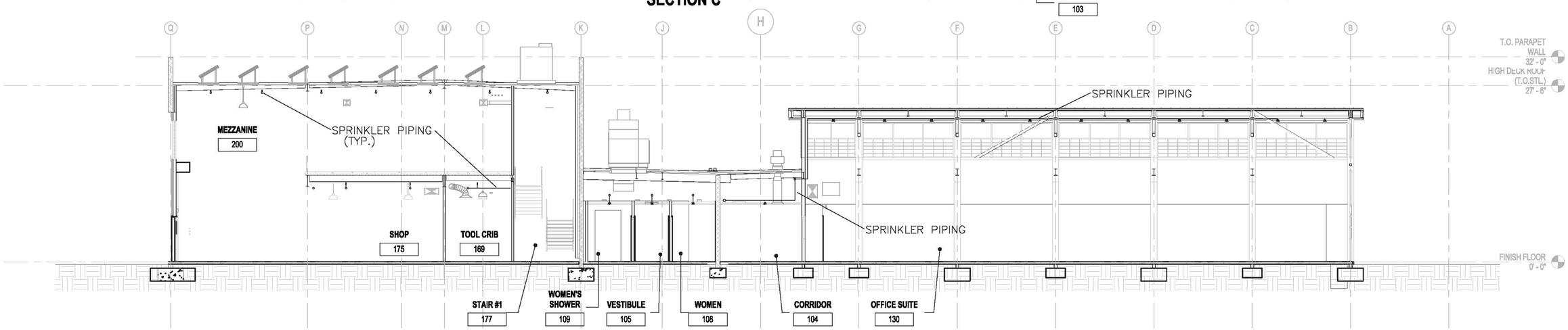
DATE STRTD	11/04/10	DATE PRNTD	5/23/11
DRAWN BY	RJM	EDM-1703	
SCALE	AS INDICATED	TRADE SH. No.	
FILE NAME		FS2.3	SHEET No. 193 of 195



SECTION A



SECTION C



SECTION E

REGISTERED PROFESSIONAL ENGINEER
RONALD J. MUDRY
No. FP 1500
Exp. 6-30-11
FIRE PROTECTION
STATE OF CALIFORNIA

MUDRY & ASSOCIATES
Fire Protection Engineering, Consulting and Design
12752 Valley View Street, Suite D
Garden Grove, California 92845
(714) 373-5761
Fax (714) 373-5781
e-mail: fpe@mudry.us

DATE	SYM	REVISION	BY	A'PD

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER PLAN
BUILDING SECTIONS

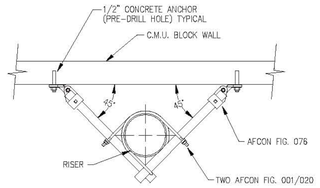
PROJECT TITLE
8-18-11
FACILITIES SUPPORT CENTER
100% FINAL DESIGN SUBMITTAL

APPROVALS		DATE
Chief, Facilities Engineering & Asset Mgmt. Office DAN CROWLEY		8-18-11
Project Requestor/Customer DAN CROWLEY		8-18-11
Facilities Project Manager GEMMA FLORES		8-18-11
Chief, Office of Protective Services JOHN ZELLMER		8-18-11
Chief – Safety, Health and Environmental Office DAN MULLEN		8-18-11
DFRC Chief Information Officer KEN NORLIN		8-18-11

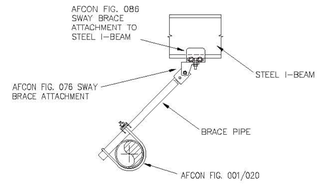
DATE STRTD	11/04/10	DATE PRNTD	5/23/11
DRAWN BY	RJM	EDM–1703	
SCALE	AS INDICATED	TRADE SH. No.	
FILE NAME		FS3.0	SHEET No. 194 of 195

PIPE BRACE SCHEDULE	
PIPE (SCH. 40)	MAXIMUM LENGTH OF BRACE
1-INCH	7 FT. 0 IN.
1 1/4-INCH	13 FT. 6 IN.
1 1/2-INCH	15 FT. 6 IN.
2-INCH	19 FT. 6 IN.

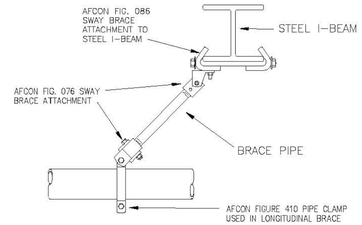
1 PIPE BRACE SCHEDULE
N.T.S.



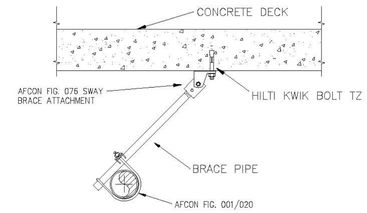
2 RISER BRACE DETAIL
N.T.S.



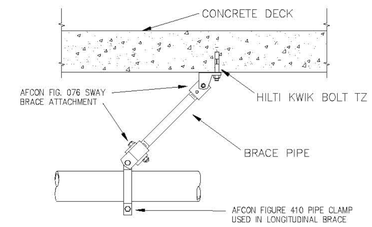
3 LATERAL SEISMIC BRACE TO STEEL I-BEAM
N.T.S.



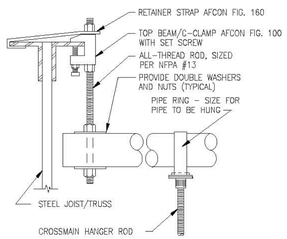
4 LONGITUDINAL SEISMIC BRACE TO STEEL I-BEAM
N.T.S.



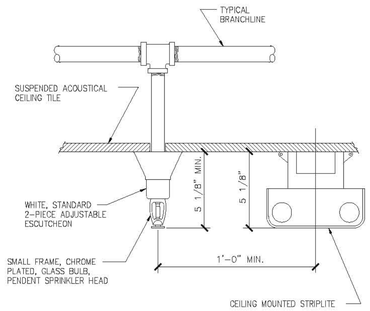
5 LATERAL SEISMIC BRACE WITH CONCRETE ANCHOR
N.T.S.



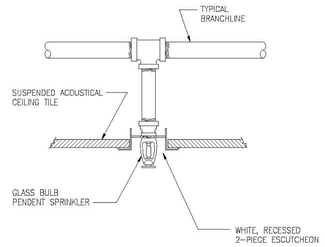
6 LONGITUDINAL SEISMIC BRACE WITH CONCRETE ANCHOR
N.T.S.



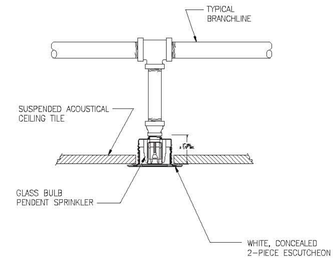
7 TRAPEZE HANGER DETAIL
N.T.S.



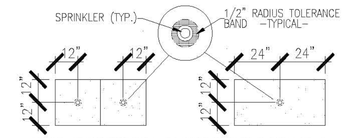
8 SPRINKLER WITH 2-PC. ESCUTCHEON
N.T.S.



9 SPRINKLER WITH RECESSED ESCUTCHEON
N.T.S.

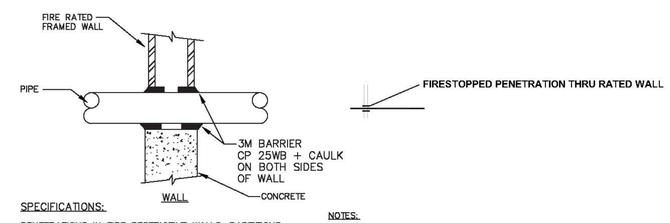


10 CONCEALED SPRINKLER
N.T.S.



NOTE: SPRINKLERS SHALL BE POSITIONED AS SHOWN WITH A 1/2" TOLERANCE.

11 TYPICAL SPRINKLER LOCATIONS
N.T.S.



SPECIFICATIONS:

PENETRATIONS IN FIRE RESTRICTIVE WALLS, PARTITIONS AND FLOORS WHERE PROTECTED OPENINGS ARE REQUIRED SHALL BE FIRE STOPPED USING APPROVED MATERIALS, SECURELY INSTALLED AND CAPABLE OF MAINTAINING THIER INTEGRITY AND PREVENTING THE MOVEMENT OF FLAMES AND/OR GASES THROUGH THE VOID SPACES BETWEEN PENETRATING MATERIALS AND WALLS, PARTITIONS AND FLOORS WHEN TESTED IN ACCORDANCE WITH ASTM STANDARD E-814 OR UL STANDARD 1479 (UBC SECTIONS 709.6, 709.7 & 714).

DESIGNS ARE LISTED BY UNDERWRITER'S LABORATORIES (FIRE RESISTANCE DIRECTORY) AND THE CALIFORNIA STATE FIRE MARSHALL (BUILDING MATERIAL LISTINGS). SPECIFIC DESIGN INFORMATION IS AVAILABLE FROM U.L CSFM OR THE PRODUCT MANUFACTURER.

NOTES:

3M FIRE BARRIER PRODUCTS:
CP 25WB
CALIFORNIA STATE FIRE MARSHALL LISTING
No. 4485-941:100

UNINSULATED PIPE:

3 HOUR RATING
U.L. DESIGN No. CAJ1001 (CONC. WALL OR FLOOR)

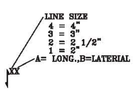
1, 2, 3 OR 4 HOUR RATING
U.L. DESIGN No. WL1002 (STUD WALL)

FIRESTOP ASSEMBLY FOR PIPE PENETRATIONS USING 3M BARRIER CAULK "CP 25WB"

NOTE: SEE SEISMIC BRACE CALCULATION SUBMITTALS FOR EACH PIPE SIZE AND BRACE CONFIGURATION. SEISMIC BRACE LOAD CALCULATIONS ARE FOR "WORST CASE" CONDITION FOR EACH PIPE SIZE. SWAY BRACE DESIGN IS BASED ON A SHORT PERIOD RESPONSE, $S_S = 0.95$ HORIZONTAL LOAD FACTOR $C_P = 0.50$

DEFINITION:
"ZONE OF INFLUENCE" CONSISTS OF ALL THE AUTOMATIC SPRINKLER PIPING AND RELATED COMPONENTS THAT CONTRIBUTE TO THE SEISMIC LOADS THE SWAY BRACE MUST RESTRAIN. EXAMPLES OF "ZONES OF INFLUENCE" ARE SHOWN IN NFPA 13, 2002, FIG. A.9.3.5.6(c)

NOTE:
NFPA 13, 2002 DOES NOT REQUIRE THAT THE "ZONE OF INFLUENCE" BE SHOWN ON THE FIRE SPRINKLER PLAN, ONLY THAT THE EXAMPLES SHOWN IN FIG. A.9.3.5.6(c) BE USED AS A GUIDE FOR DETERMINING THE LOADS TO BE INCLUDED IN THE BRACE LOAD CALCULATIONS.



SWAY BRACE LEGEND

REGISTERED PROFESSIONAL ENGINEER
RONALD J. MUDRY
No. FP 150
Exp. Exp. 6-30-11
FIRE PROTECTION
STATE OF CALIFORNIA

MUDRY & ASSOCIATES
Fire Protection Engineering, Consulting and Design
12752 Valley View Street, Suite D
Garden Grove, California 92845
(714) 373-5741
Fax (714) 373-5781
e-mail: fpe@mudry.us

DATE	SYM	REVISION	BY	A'PD

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS, CA

DRAWING TITLE
FIRE SPRINKLER DETAILS

PROJECT TITLE
8-18-11
FACILITIES SUPPORT CENTER
100% FINAL DESIGN SUBMITTAL

APPROVALS		DATE
Chief, Facilities Engineering & Asset Mgmt. Office DAN CROWLEY		8-18-11
Project Requestor/Customer DAN CROWLEY		8-18-11
Facilities Project Manager GEMMA FLORES		8-18-11
Chief, Office of Protective Services JOHN ZELLMER		8-18-11
Chief - Safety, Health and Environmental Office DAN MULLEN		8-18-11
DFRC Chief Information Officer KEN NORLIN		8-18-11

DATE STRTD	11/04/10	DATE PRNTD	5/23/11
DRAWN BY	RJM	EDM-1703	
SCALE	AS INDICATED	TRADE SH. No.	
FILE NAME		FS4.0	SHEET No. 195 of 195