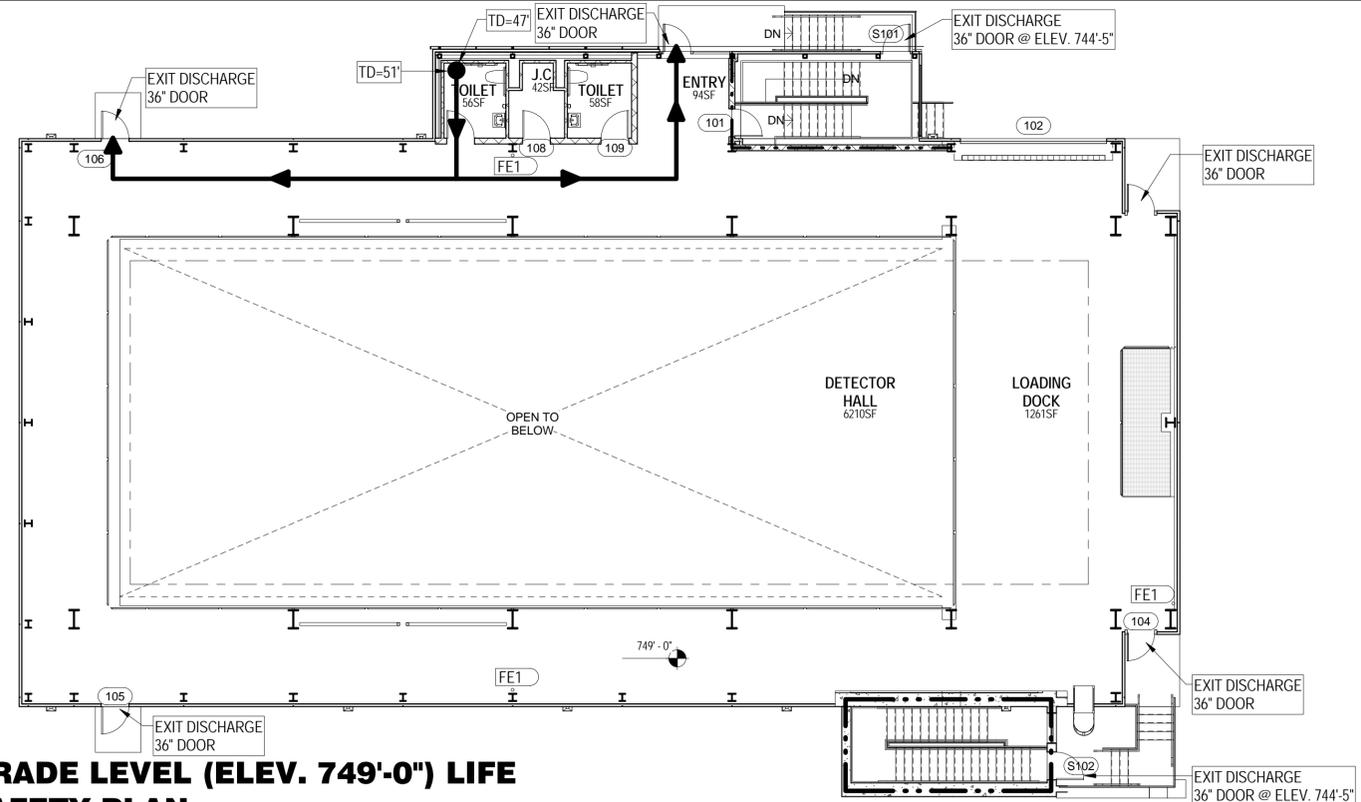


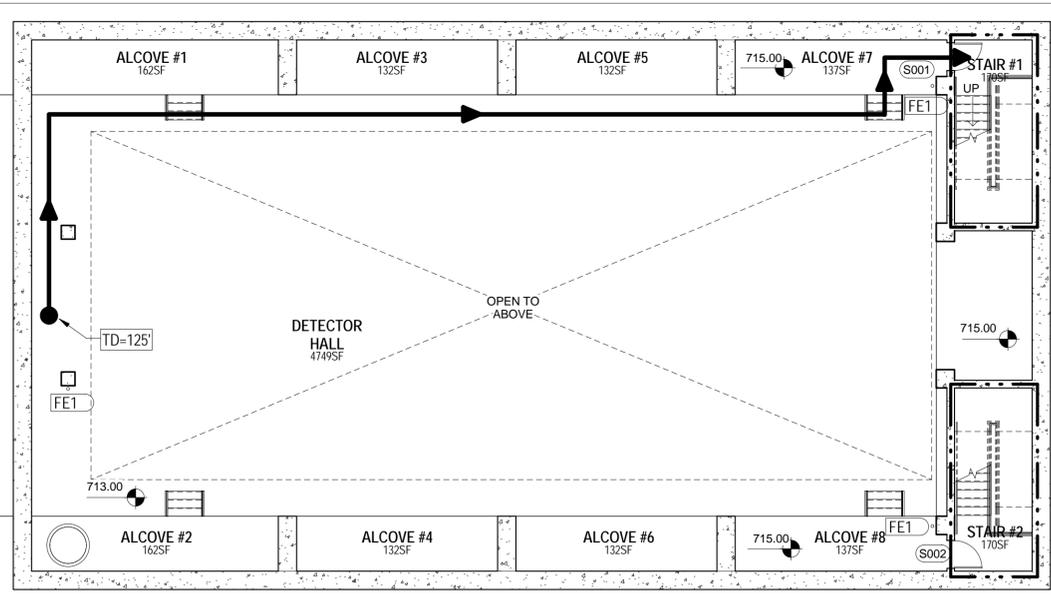
**MEZZANINE LEVEL (ELEV. 727'-0'') LIFE SAFETY PLAN**

SCALE: 1" = 10'-0"



**GRADE LEVEL (ELEV. 749'-0'') LIFE SAFETY PLAN**

SCALE: 1" = 10'-0"



**ENCLOSURE LEVEL (ELEV. 715'-0'') LIFE SAFETY PLAN**

SCALE: 1" = 10'-0"

**SYMBOLS**

- 2-HR FIRE RATED PARTITION
- FIRE EXTINGUISHER TYPE A,B,C, 10 LB. CAPACITY
- TOTAL TRAVEL DISTANCE
- TRAVEL PATH

**CODE INFORMATION**

PROJECT INCLUDES A SUPERVISED AUTOMATED SPRINKLER SYSTEM (SASS)

**APPLICABLE CODES**

THESE PLANS & SPECIFICATIONS HAVE BEEN PREPARED IN ACCORDANCE WITH THE FOLLOWING BUILDING CODES & REGULATIONS.

- ICC INTERNATIONAL BUILDING CODE 2012 EDITION
- ICC INTERNATIONAL FIRE CODE 2012 EDITION
- NFPA 101 - 2012 EDITION, THE LIFE SAFETY CODE
- INTERNATIONAL MECHANICAL CODE 2012 EDITION (IMC)
- ASHRAE STANDARDS: 15, 55, 62, 90.1, GUIDELINE 0, AEDG & HANDBOOK HVAC SYSTEMS AND EQUIPMENT
- NFPA 54 NATIONAL FUEL GAS CODE 2012 EDITION
- NATIONAL ELECTRICAL CODE 2012 EDITION (NFPA 70-2012)
- INTERNATIONAL PLUMBING CODE

BUILDING TO HAVE SUPERVISED AUTOMATIC SPRINKLER SYSTEM (SASS) IN ACCORDANCE WITH IBC SECTION 903.3.1.1

REFERENCE	BASIC BUILDING INFORMATION	REMARKS
CHAPTER 3	USE & OCCUPANCY CLASSIFICATION	
IBC 306.3	FACTORY GROUP F-2:	
NFPA 101 3.3.271.11	LOW HAZARD FACTORY INDUSTRIAL INDUSTRIAL OCCUPANCY UNDERGROUND STRUCTURE	
CHAPTER 5	GENERAL BUILDING HEIGHT & AREA LIMITATIONS	
IBC TABLE 503	TYPE II-B CONSTRUCTION FLOOR AREAS: PER FLOOR	
	LOWER LEVEL 7,042 SF	
	MEZZANINE (BELOW-GRADE) 2,410 SF	
	GRADE LEVEL 4,390 SF	
	FLOOR AREA 13,842 SF	
IBC 504.2	HEIGHT:	
	BUILDING = 1 STORIES & 34'-0" W/ SASS	
	(MAX ALLOWED IS 3 STORIES & 75'-0" HEIGHT W/ SASS)	
IBC 506.1	AREA:	
	BUILDING = 13,842 SF	
	(MAX ALLOWED 46,000 SF W/ SASS)	
		PER IBC CAN INCREASE HEIGHT BY 20'-0" & 1 STORY FOR TABLE 503 W/ SASS PER IBC CAN DOUBLE ALLOWABLE AREA FOR TABLE 503 W/ SASS
CHAPTER 6	TYPES OF CONSTRUCTION: II-A & II-B	
IBC TABLE 601	TYPE II-B CONSTRUCTION	
	RATINGS BUILDING ELEMENTS	
0-HR	STRUCTURAL FRAME:	
	COLUMNS, GIRDERS, TRUSSES	
0-HR	BEARING WALLS:	
0-HR	EXTERIOR	
0-HR	INTERIOR	
1-HR	NONBEARING WALLS & PARTITIONS - EXTERIOR:	
0-HR	FIRE SEPARATION DISTANCE <5', <10'	
0-HR	FIRE SEPARATION DISTANCE >30', ≥30'	
0-HR	NONBEARING WALLS & PARTITIONS:	
0-HR	INTERIOR	
0-HR	FLOOR CONSTRUCTION:	
0-HR	BEAMS & JOISTS	
0-HR	ROOF CONSTRUCTION:	
0-HR	BEAMS & JOISTS	
IBC 603.1	COMBUSTIBLE MATERIALS ARE PERMITTED IN TYPE I & II CONSTRUCTION. SEE IBC 603.1. FOR MATERIALS.	
CHAPTER 10	GENERAL BUILDING HEIGHT & AREA LIMITATIONS	
IBC 1016	TRAVEL DISTANCES:	
NFPA101 A.7.6	MAXIMUM TOTAL 300'-0"	
	COMMON PATH 100'-0"	
	DEAD END CORRIDOR 50'-0"	

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REV.	DATE	DESCRIPTION

140 South Dearborn Chicago, IL 60603  
Tel: 312 357 1771 Fax: 312 357 1909

www.holabird.com

DESIGNED	M.BLEWITT	03/30/2015
DRAWN	M.BLEWITT	03/30/2015
CHECKED	G.GRUNLOH	03/30/2015
APPROVED		
SUBMITTED		

PROJECT NORTH

**SCALE:**

1" = 10'-0"

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

**SBN FAR DETECTOR BUILDING**

**LIFE SAFETY PLANS**

DRAWING NO. **6-7-93**

**G-3** REV.

30 MAR. 2015

























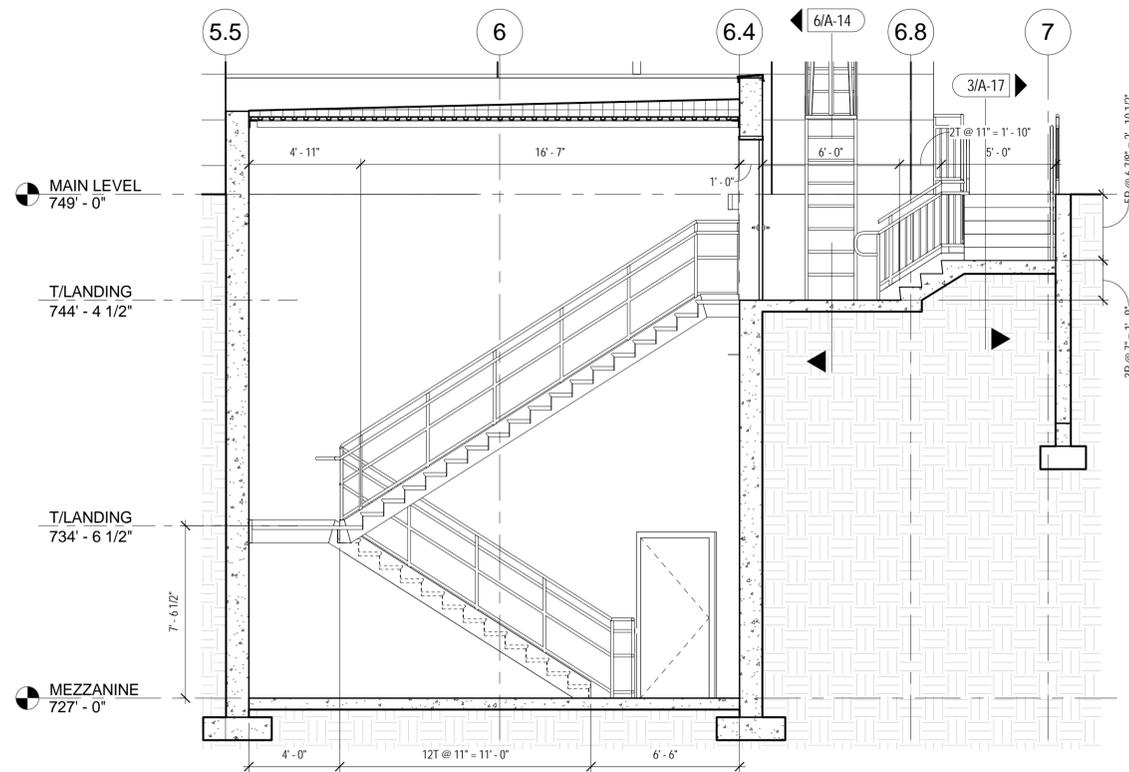








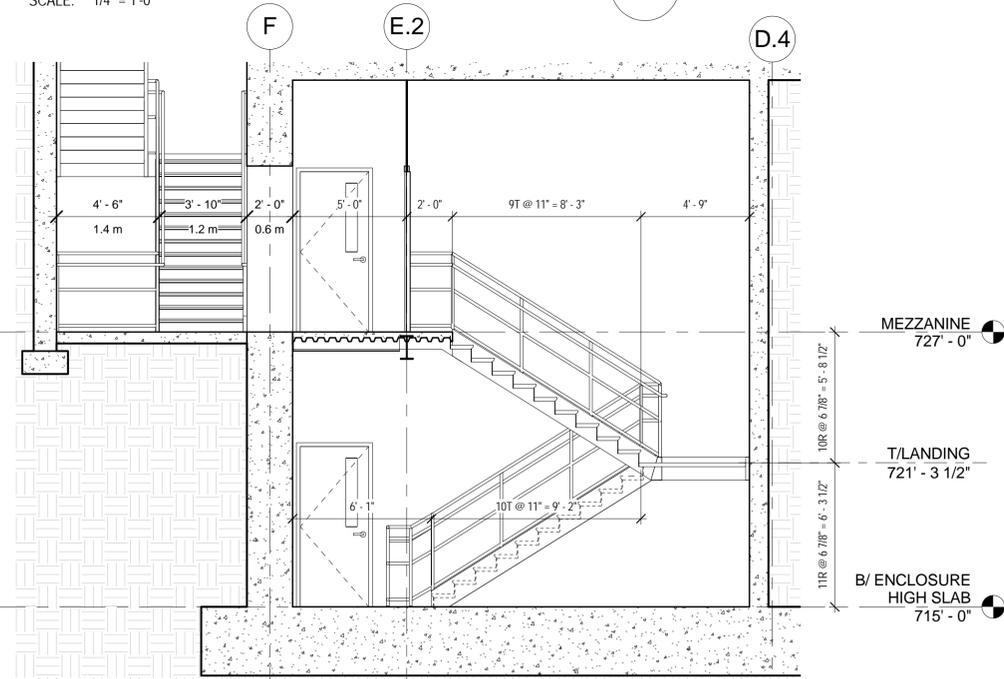




**SECTION - STAIR #2 MEZZANINE TO EXIT LANDING AND MAIN**

**1**

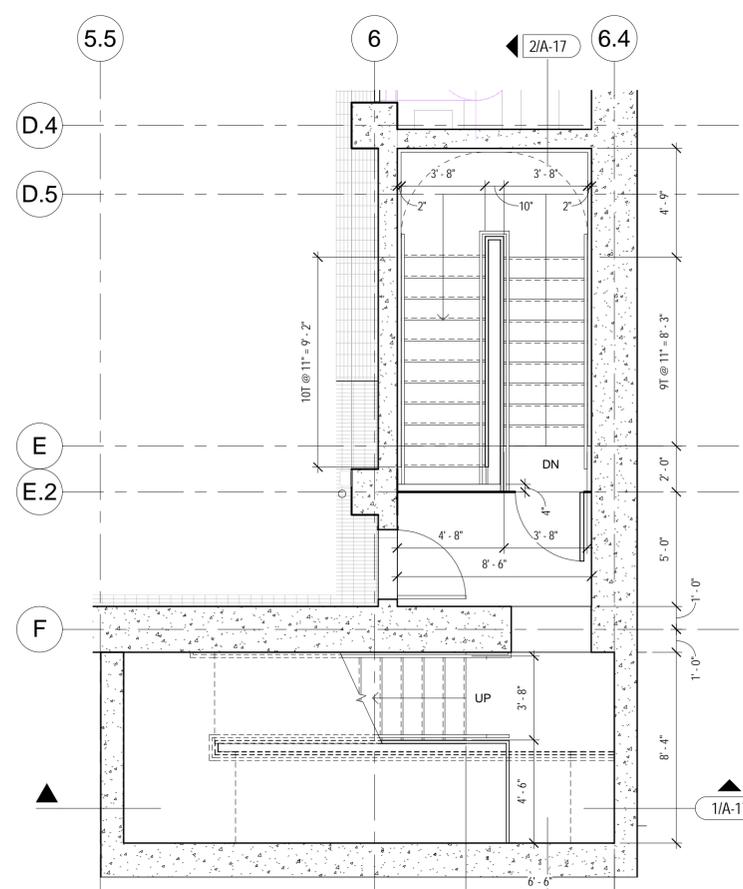
SCALE: 1/4" = 1'-0"



**SECTION - STAIR #2 ENCLOSURE TO MEZZANINE LEVEL**

**2**

SCALE: 1/4" = 1'-0"



**ENLARGED PLAN - STAIR #2 AT ENCLOSURE LEVEL**

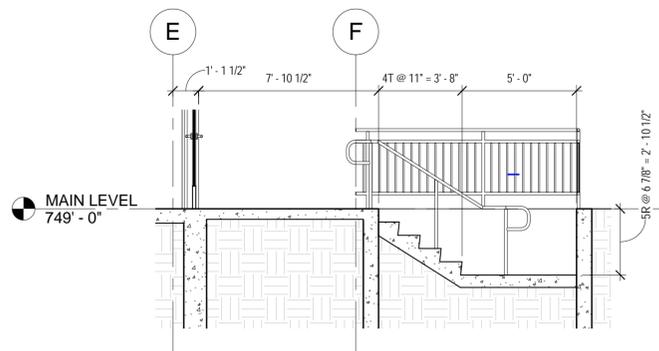
**5**

SCALE: 1/4" = 1'-0" [REF: 1/A-1]

**ENLARGED PLAN - STAIR #2 AT MEZZANINE LEVEL**

**6**

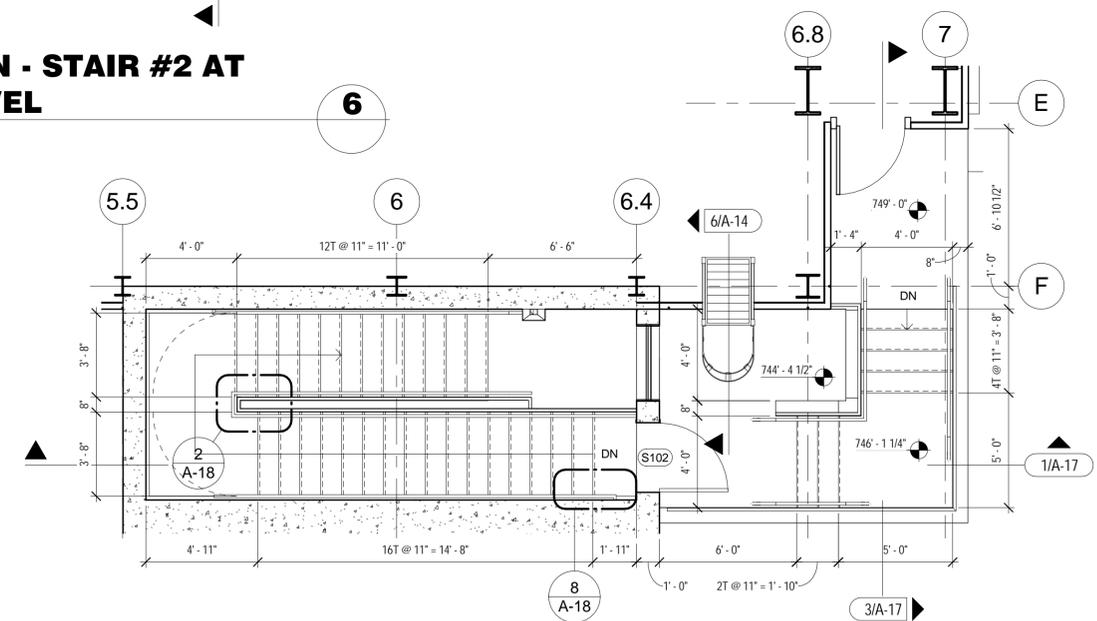
SCALE: 1/4" = 1'-0"



**SECTION - STAIR #2 EXIT LANDING TO MAIN LEVEL**

**3**

SCALE: 1/4" = 1'-0"



**ENLARGED PLAN - STAIR #2 AT EXIT LANDING**

**4**

SCALE: 1/4" = 1'-0"

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**HOLABIRD & ROOT**

140 South Dearborn Chicago, IL 60603  
Tel: 312 357 1771 Fax: 312 357 1909

www.holabird.com

	FERMI LAB	DATE
DESIGNED	M.BLEWITT	03/30/2015
DRAWN	M.STRACK	03/30/2015
CHECKED	G.GRUNLOH	03/30/2015
APPROVED		
SUBMITTED		



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UNITED STATES DEPARTMENT OF ENERGY

**SBN FAR DETECTOR BUILDING**  
**STAIR #2 PLANS & SECTIONS**

DRAWING NO. **6-7-93** **A-17** REV.

30 MAR. 2015















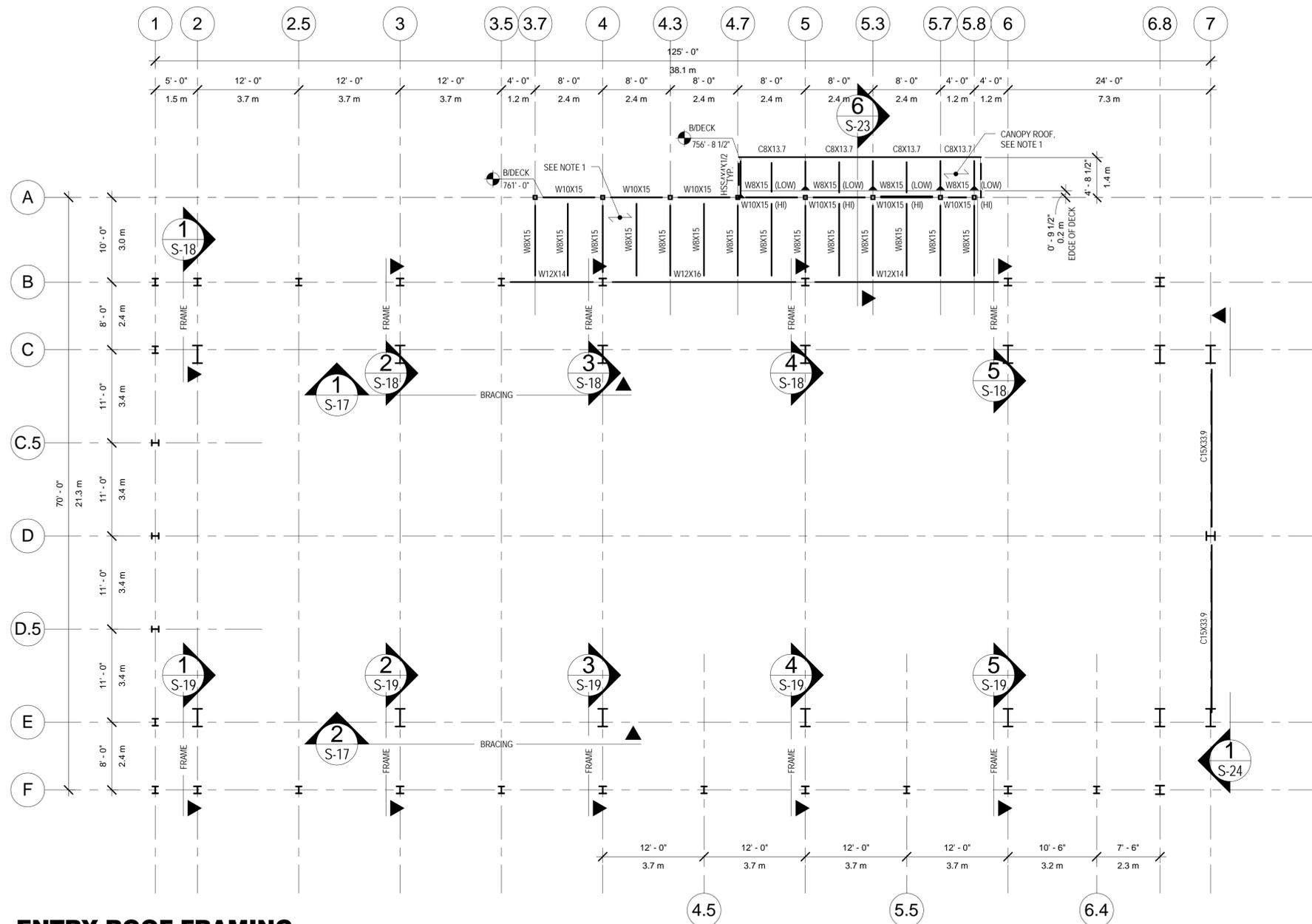








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**ENTRY ROOF FRAMING**

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

**NOTES:**

1. PROVIDE 1-1/2" TYPE B ROOF DECK (18 GA. MIN.) CONT. OVER 3 SPANS MIN. B/DECK EL. VARIES. SEE PLAN FOR DECK ELEVATIONS.
2. WHERE DIMENSION LINES TO MEMBERS ARE NOT SHOWN, MEMBERS ARE INTENDED TO BE EQUALLY SPACED BETWEEN NEAREST DIMENSIONED MEMBERS (OR COLUMN LINES).

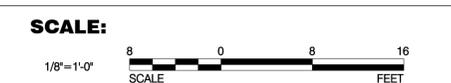
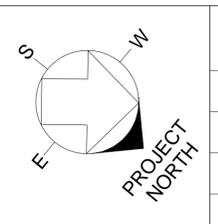
REV.	DATE	DESCRIPTION

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	FERMI LAB	DATE
DESIGNED		
DRAWN	<b>N.PALL</b>	<b>03/30/2015</b>
CHECKED		
APPROVED		
SUBMITTED		



**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

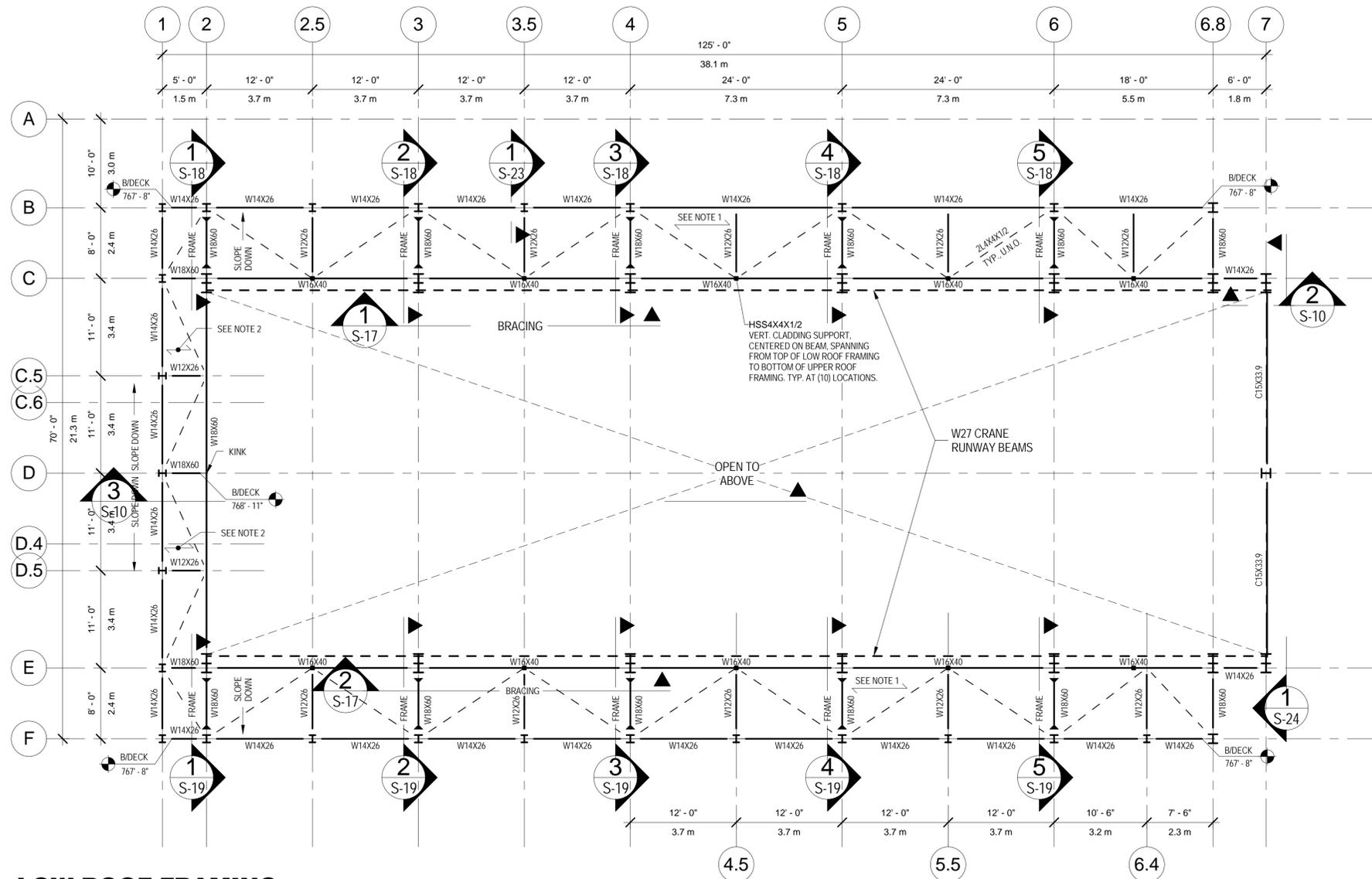
**SBN FAR DETECTOR BUILDING**

**ENTRY ROOF FRAMING PLAN**

DRAWING NO. **6-7-93** **S-7** REV. **30 MAR. 2015**

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**LOW ROOF FRAMING**

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

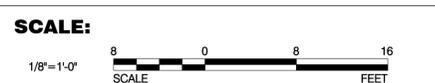
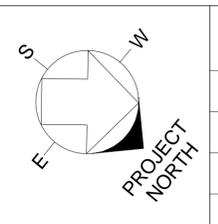
NOTES:

1. PROVIDE 3" TYPE N ROOF DECK (16 GA. MIN.) CONT. OVER 3 SPANS MIN. B/DECK EL. VARIES. SEE PLAN FOR DECK ELEVATIONS.
2. PROVIDE 3" TYPE N ROOF DECK (16 GA. MIN.) SINGLE SPAN. B/DECK EL. VARIES. SEE PLAN FOR DECK ELEVATIONS.
3. WHERE DIMENSION LINES TO MEMBERS ARE NOT SHOWN, MEMBERS ARE INTENDED TO BE EQUALLY SPACED BETWEEN NEAREST DIMENSIONED MEMBERS (OR COLUMN LINES).

REV.	DATE	DESCRIPTION

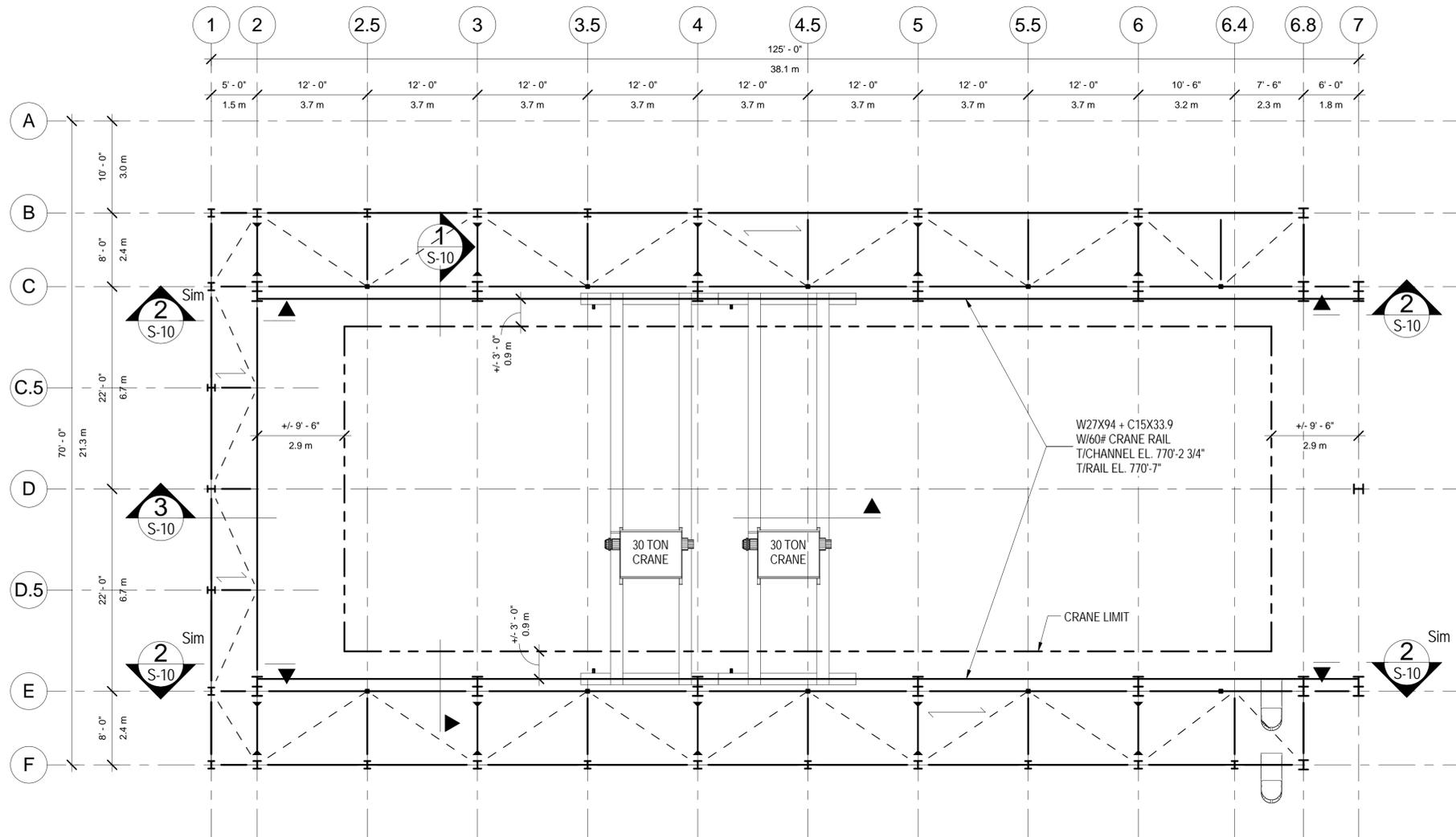
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DESIGNED		
DRAWN	<b>N.PALL</b>	<b>03/30/2015</b>
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APPROVED		
SUBMITTED		



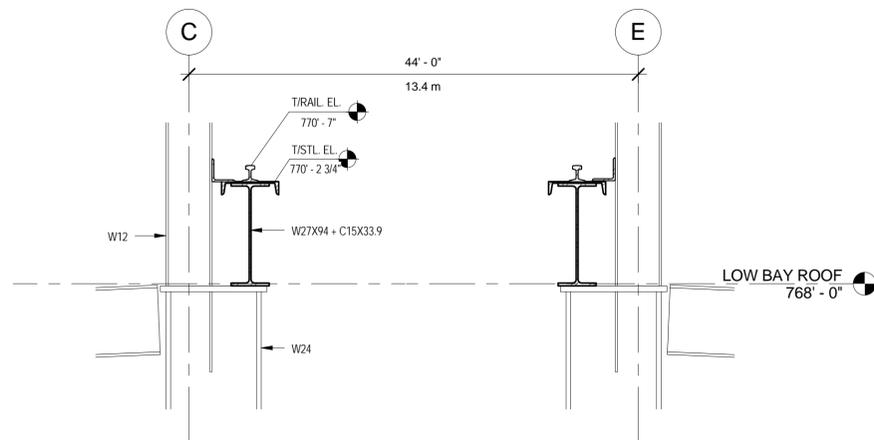
**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY  
  
**SBN FAR DETECTOR BUILDING**  
**LOW ROOF FRAMING PLAN**  
 DRAWING NO. **6-7-93** **S-8** REV. **30 MAR. 2015**





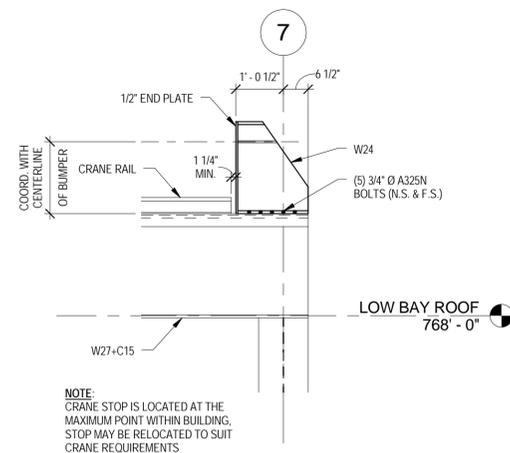
**CRANE RUNWAY FRAMING**

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



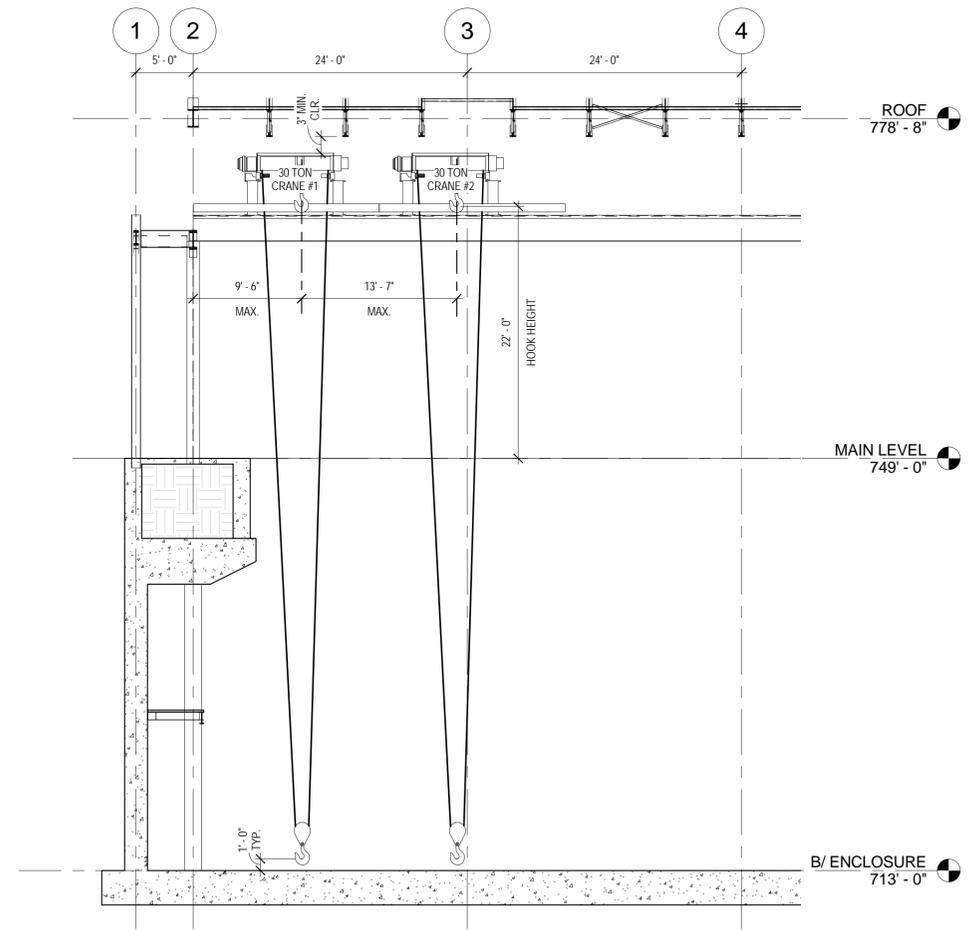
**SECTION AT CRANE SUPPORTS**

SCALE: 1/2" = 1'-0"



**CRANE END STOP DETAIL**

SCALE: 1/2" = 1'-0"



**SECTION AT CRANES**

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

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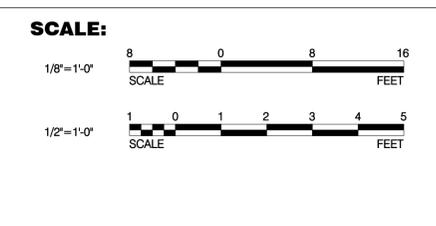
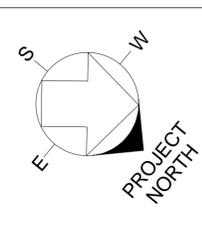
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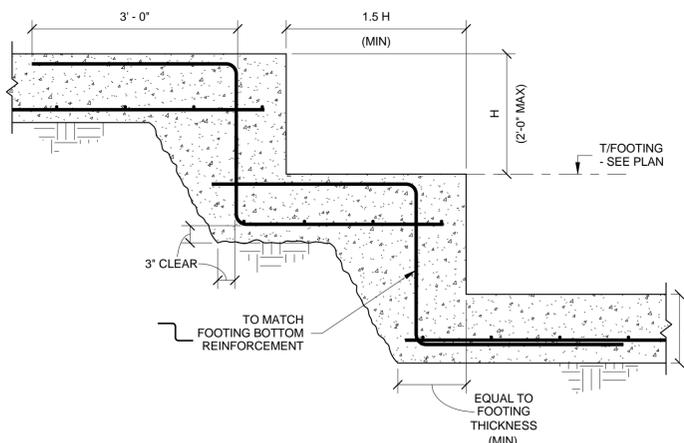
UNITED STATES DEPARTMENT OF ENERGY

**SBN FAR DETECTOR BUILDING**

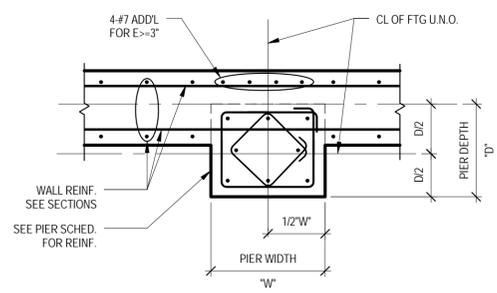
**30t OVERHEAD CRANES - PLAN, SECTIONS AND DETAILS**

DRAWING NO. **6-7-93** **S-10** REV.  

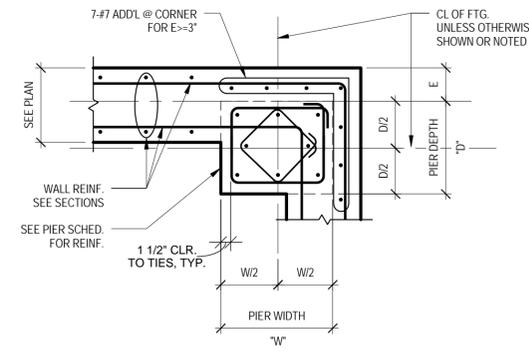
30 MAR. 2015



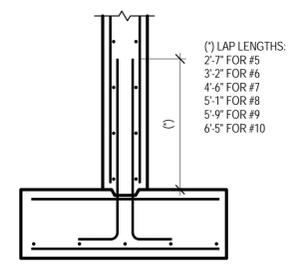
**TYPICAL STEPPED FOOTING** 1  
N.T.S.



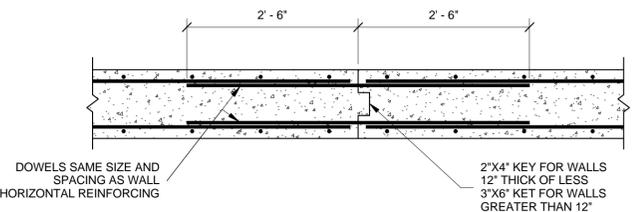
**TYPICAL DETAIL OF WALL PIER** 2  
N.T.S.



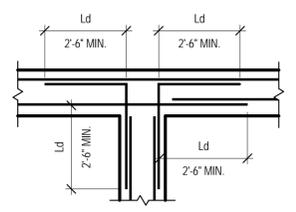
**TYPICAL DETAIL-WALL PIER AT CORNER** 3  
N.T.S.



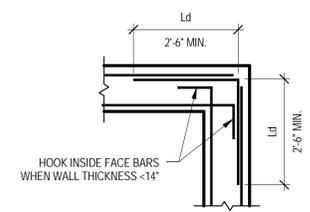
**TYPICAL DOWEL LENGTH AT FOUNDATION WALLS** 4  
N.T.S.



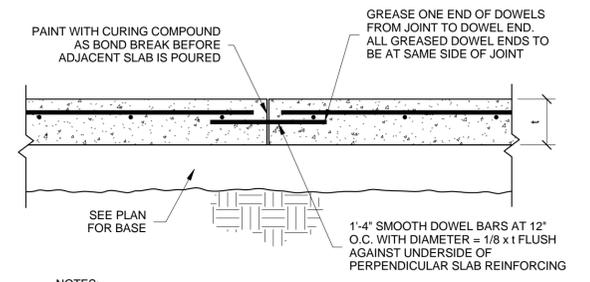
**CONSTRUCTION JOINT AT WALL** 5  
N.T.S.



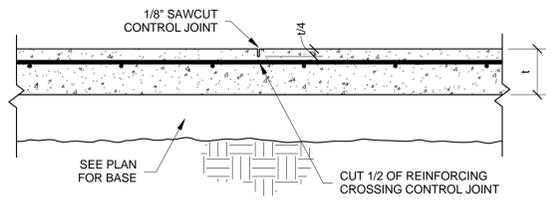
**TYPICAL CORNER DETAILING FOR HORIZ. REINFORCEMENT** 6  
N.T.S.



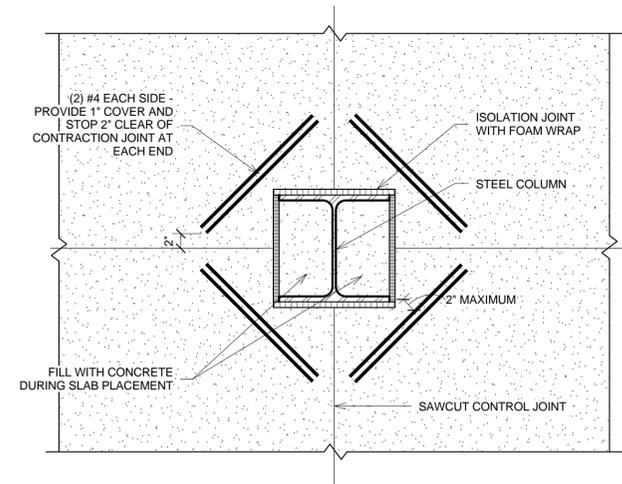
**TYPICAL CORNER DETAILING FOR HORIZ. REINFORCEMENT** 7  
N.T.S.



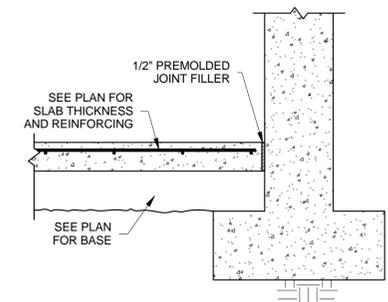
**SLAB ON GRADE CONSTRUCTION JOINT** 8  
N.T.S.



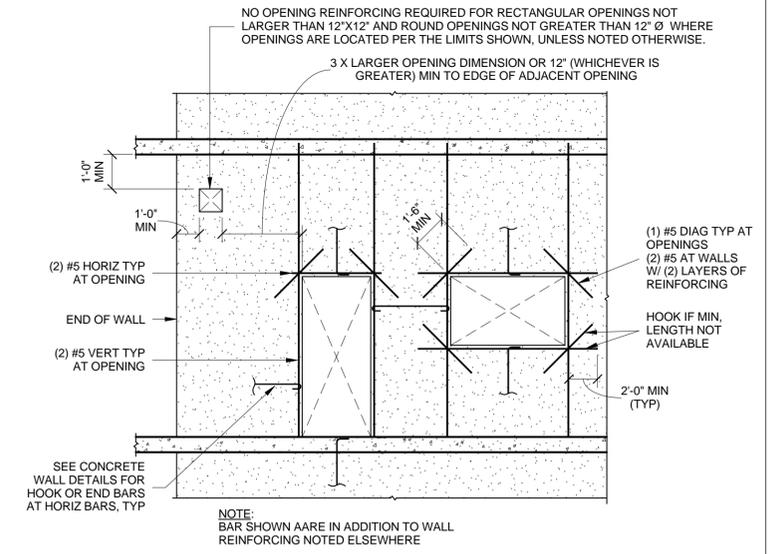
**SLAB ON GRADE CONTROL JOINT** 9  
N.T.S.



**ISOLATION JOINT AT STEEL COLUMN** 10  
N.T.S.



**SLAB ON GRADE AT BASEMENT WALL** 11  
N.T.S.



**CONCRETE WALL REINFORCING AT OPENINGS** 12  
N.T.S.

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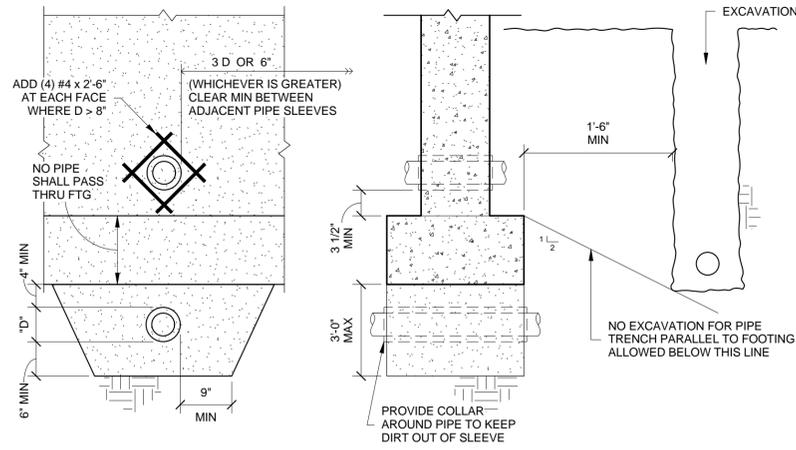
REV.	DATE	DESCRIPTION

**HOLABIRD & ROOT**  
 140 South Dearborn Chicago, IL 60603  
 Tel: 312 357 1771 Fax: 312 357 1909  
 www.holabird.com

DESIGNED	FERMI LAB	DATE
DRAWN	<b>N.PALL</b>	<b>03/30/2015</b>
CHECKED		
APPROVED		
SUBMITTED		

**SCALE:**

**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY  
  
**SBN FAR DETECTOR BUILDING**  
**TYPICAL CONCRETE DETAILS**  
 DRAWING NO. **6-7-93** **S-11** REV. **30 MAR. 2015**



- NOTES:**
- STEP FOOTING PER TYPICAL STEPPED FOOTING DETAILS AS REQUIRED TO SATISFY THESE CONDITIONS.
  - GENERAL CONTRACTOR TO COORDINATE EXACT DEPTH AND LOCATION OF PIPE.

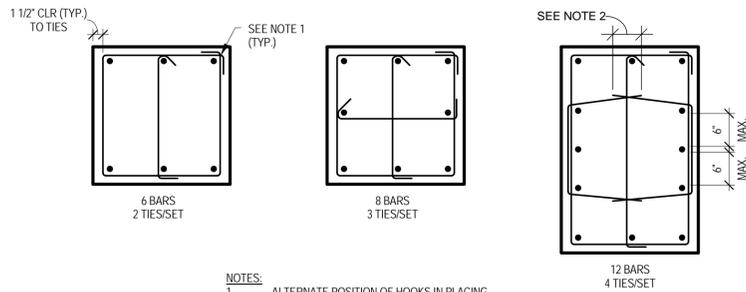
### PIPE AT WALL FOOTING

N.T.S.

1

CONCRETE PIER SCHEDULE					$f_c = 4000$ PSI
					$F_y = 60000$ PSI
MARK	SIZE		REINFORCING		REMARKS
	A (in)	B (in)	VERTICAL	HORIZ.	
P1	18	18	6-#8	#4@15"	
P2	24	24	8-#8	#4@9"	
P3	24	36	12-#8	#4@9"	

NOTE: TIES TO BE @ 3" O.C. IN TOP & BOT. 12" OF PIER

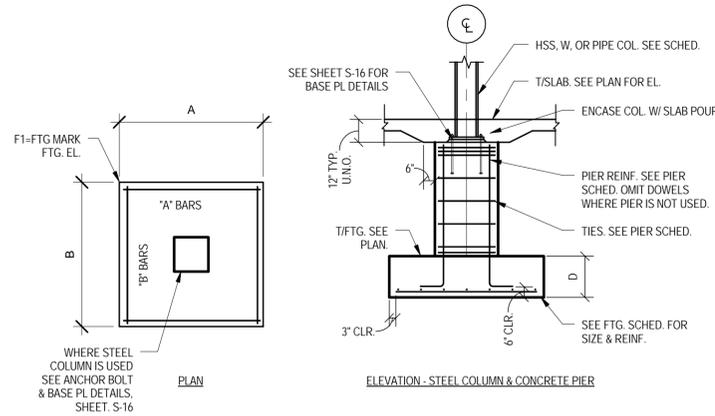


- NOTES:**
- ALTERNATE POSITION OF HOOKS IN PLACING SUCCESSIVE SETS OF TIES.
  - MINIMUM LAP SHALL BE 12 IN. FOR SIZES #5 AND LARGER, SPECIAL MINIMUM TENSION LAP LENGTHS, PER ACI 315, SHALL BE PROVIDED.

### TYPICAL CONCRETE PIER TIE PATTERN

N.T.S.

4



### TYPICAL FOOTING DETAIL FOR STEEL COLUMN

N.T.S.

2

SIZE	$f_c = 5,000$ psi $f_y = 60,000$ psi								
	Ld	Ldt	La	Lat	Lb	Lbt	Lbh	Ldc	Lcl
#4	17 (25)	22 (33)	17 (25)	22 (33)	22 (33)	29 (43)	9	9	15
#5	21 (32)	28 (41)	21 (32)	28 (41)	28 (41)	36 (54)	11	11	19
#6	25 (38)	33 (50)	25 (38)	33 (50)	33 (50)	43 (64)	13	14	23
#7	37 (56)	48 (72)	37 (56)	48 (72)	48 (72)	63 (94)	15	16	26
#8	42 (64)	55 (83)	42 (64)	55 (83)	55 (83)	72 (107)	17	18	30
#9	48 (72)	62 (93)	48 (72)	62 (93)	62 (93)	81 (121)	19	20	34
#10	54 (81)	70 (105)	54 (81)	70 (105)	70 (105)	91 (137)	22	23	38
#11	60 (90)	78 (117)	60 (90)	78 (117)	78 (117)	101 (152)	24	25	42

- NOTES:**
- USE THE LENGTHS IN THIS SCHEDULE UNLESS NOTED OTHERWISE.
  - USE LENGTH IN PARENTHESIS ( ) WHEN BAR COVER IS  $d_b$  OR LESS OR WHEN BAR CLEAR SPACING IS  $S_{db}$  OR LESS.
  - A TOP BAR IS A HORIZONTAL BAR WITH MORE THAN 12" OF FRESH CONCRETE CAST BELOW IT.

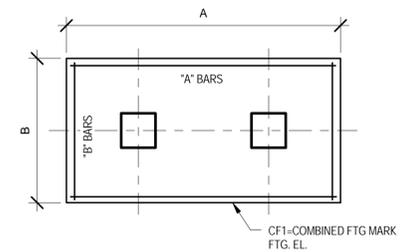
- $d_b$  = BAR DIAMETER
- $L_d$  = TENSION DEVELOPMENT LENGTH
- $L_{dt}$  = TENSION DEVELOPMENT LENGTH FOR TOP BAR
- $L_a$  = CLASS A LAP SPLICE LENGTH, 1.0  $L_d$
- $L_{at}$  = CLASS A LAP SPLICE LENGTH FOR A TOP BAR, 1.3  $L_d$
- $L_b$  = CLASS B LAP SPLICE LENGTH, 1.3  $L_d$
- $L_{bt}$  = CLASS B LAP SPLICE LENGTH FOR A TOP BAR, 1.3  $L_{dt}$
- $L_{dh}$  = TENSION DEVELOPMENT LENGTH FOR A STANDARD HOOK
- $L_{dc}$  = COMPRESSION DEVELOPMENT LENGTH
- $L_{cl}$  = COMPRESSION LAP SPLICE LENGTH

### DEVELOPMENT & SPLICE LENGTH SCHEDULE - $f_c = 5,000$ psi

N.T.S.

5

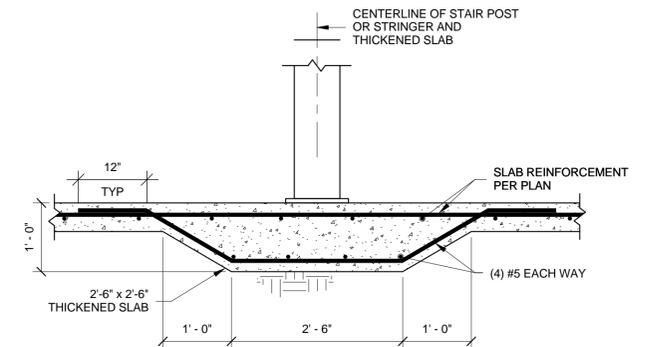
FOOTING SCHEDULE						$f_c = 4000$ PSI
						$F_y = 60000$ PSI
MARK	SIZE			REINFORCING		REMARKS
	A	B	D	"A" BARS	"B" BARS	
F5	5'-0"	5'-0"	1'-6"	9-#5	9-#5	
F6	6'-0"	6'-0"	1'-6"	9-#5	9-#5	
CF7	13'-0"	7'-0"	1'-6"	10-#5	20-#5	COMBINED FOOTING - SEE DETAIL 3



### COMBINED FOOTING PLAN DETAIL

N.T.S.

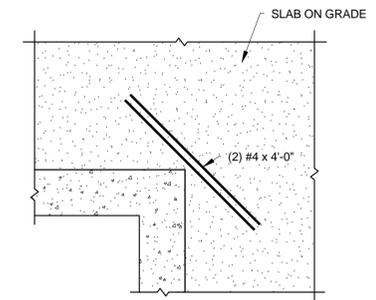
3



### THICKENED SLAB AT STAIR POST OR STRINGER

N.T.S.

9



### SLAB REINFORCEMENT AT RE-ENTRANT CORNER

N.T.S.

7

C:\Users\Matt\_B\Desktop\Revit Locals\15592\_SBN\_Far\_Detector\_blewittm.rvt 3/30/2015 8:43:11 PM

REV.	DATE	DESCRIPTION

**HOLABIRD & ROOT**

140 South Dearborn Chicago, IL 60603  
Tel: 312 357 1771 Fax: 312 357 1909

www.holabird.com

	FERMI LAB	DATE
DESIGNED		
DRAWN	<b>N.PALL</b>	<b>03/30/2015</b>
CHECKED		
APPROVED		
SUBMITTED		

SCALE:

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



**SBN FAR DETECTOR BUILDING**

**TYPICAL CONCRETE DETAILS**

DRAWING NO. **6-7-93**

**S-12** REV.

30 MAR. 2015























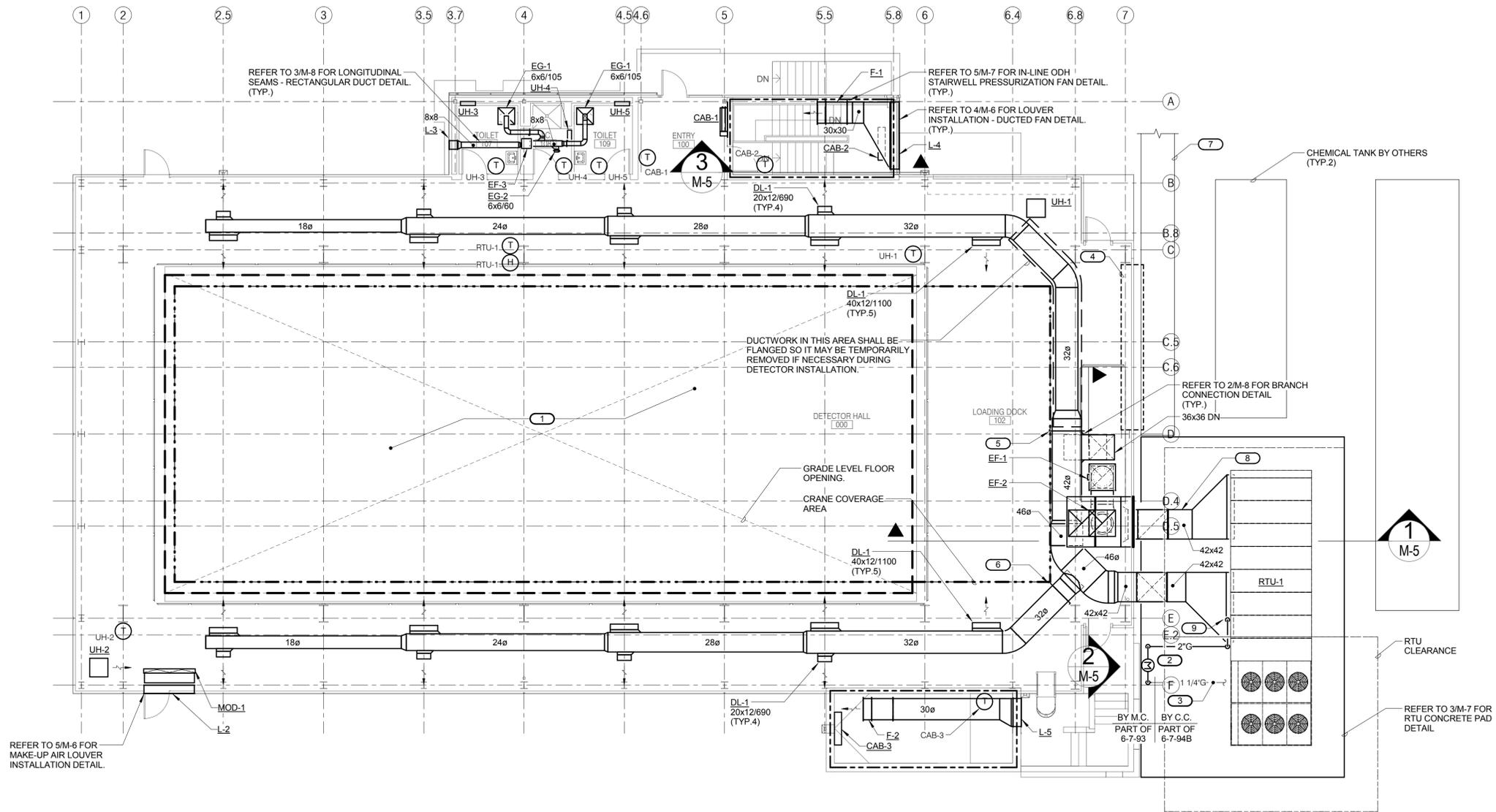












- KEYNOTES (#)**
1. ALL MECHANICAL DUCTWORK, PIPING, EQUIPMENT, AND ACCESSORIES SHALL NOT CROSS OPENING IN GRADE LEVEL FLOOR ABOVE DETECTOR UNLESS OTHERWISE NOTED ON DRAWINGS. REFER TO ARCHITECTURAL DRAWINGS FOR MORE INFORMATION REGARDING THE FLOOR OPENING DIMENSIONS, DETECTOR CLEARANCES, AND OVERHEAD CRANE CLEARANCES.
  2. REFER TO 2/M-6 GAS METER AND REGULATOR PIPING DETAIL.
  3. COORDINATE WITH C.C TO PROVIDE A MINIMUM OF 850 CFH OF NATURAL GAS AT 90 PSI TO GAS METER PAD LOCATION. REFER TO 6-7-94B FOR CONTINUATION.
  4. EXTERIOR WALL IS REMOVABLE TO PROVIDE A PATH FOR LARGE EQUIPMENT TO ENTER THE BUILDING. DUCTWORK, EQUIPMENT, AND ACCESSORIES SHALL NOT BE ATTACHED TO REMOVABLE WALL OR CONFLICT OPENING WITH OPENING CLEARANCE.
  5. BUBBLE TIGHT ISOLATION DAMPER TO ALLOW BRANCH ISOLATION IF DUCTWORK SECTION IS TEMPORARILY REMOVED. DAMPER SHALL BE INSTALLED 100% OPEN DURING INITIAL SYSTEM TESTING AND BALANCING.
  6. PROVIDE AND INSTALL MANUAL BALANCING DAMPER FOR FUTURE SYSTEM BALANCING ADJUSTMENTS. DAMPER SHALL BE INSTALLED 100% OPEN DURING INITIAL SYSTEM TESTING AND BALANCING.
  7. CONCRETE SIDEWALK BY C.C AS PART OF 6-7-94B. COORDINATE EXACT SIDEWALK LENGTH AND LOCATION WITH RTU PAD SIZE AND LOCATION.
  8. REFER TO 2/M-7 FOR EXTERIOR DUCT SUPPORT DETAIL.
  9. REFER TO 6/M-6 FOR ROOF TOP UNIT NATURAL GAS CONNECTION DETAIL.

**GRADE LEVEL MECHANICAL PLAN**

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

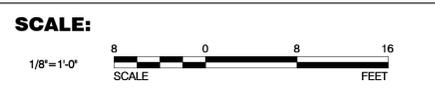
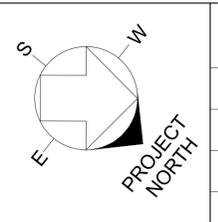
NO.	REVISIONS

**KJW ENGINEERING CONSULTANTS**  
 623 26TH AVENUE  
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DRAWN	<b>D. WILKINS</b>	<b>3/30/2015</b>
CHECKED	<b>B. HAWN</b>	<b>3/30/2015</b>
APPROVED		
SUBMITTED		



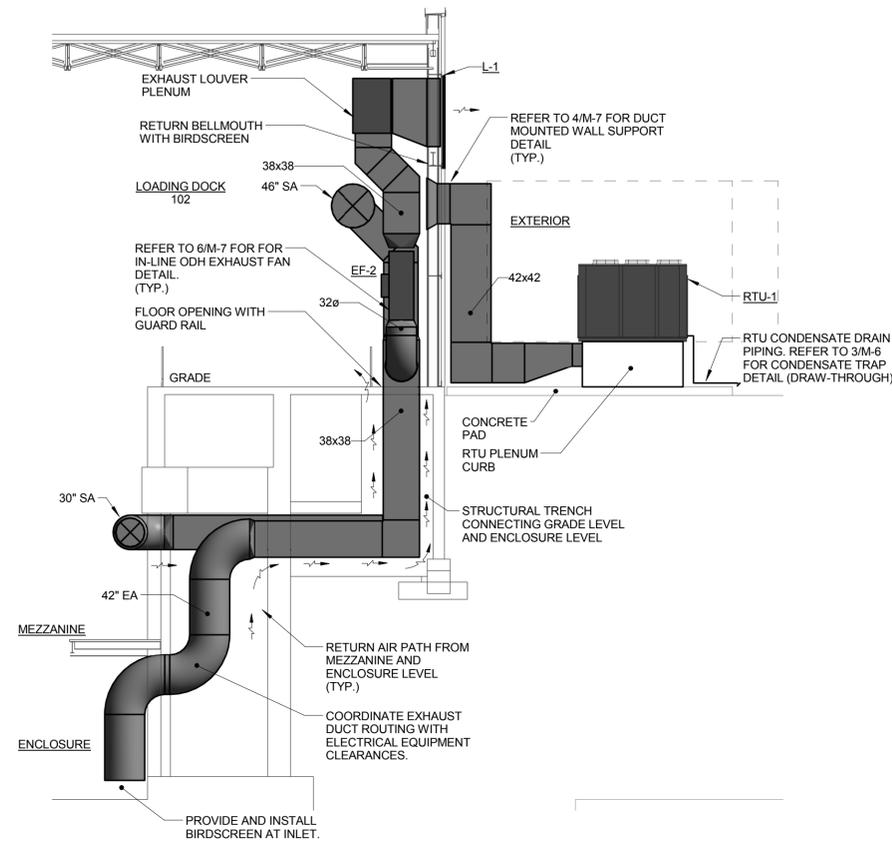
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**SBN FAR DETECTOR BUILDING**  
**GRADE LEVEL MECHANICAL PLAN**

DRAWING NO. **6-7-93** **M-4** REV. **0**

30 MAR. 2015

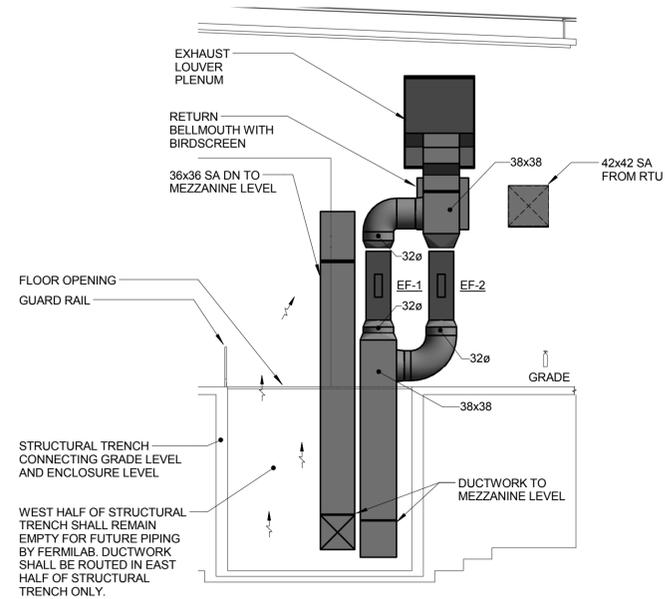
3/30/2015 5:54:52 PM C:\Revit Local Files\MEP15\_14.0872.00 - Fermi Lab - Far Detector\_CENTRAL\_wellisma.rvt



**SECTION DETAIL - LOADING DOCK DUCTWORK FACING WEST**

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

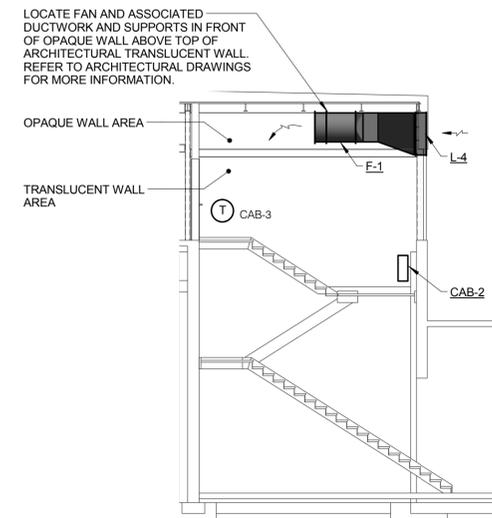
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**SECTION DETAIL - LOADING DOCK DUCTWORK FACING NORTH**

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

2

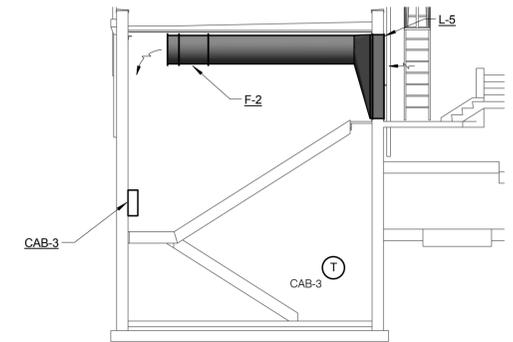


**SECTION DETAIL - STAIR #1 FACING WEST**

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

3

NOTES:  
1. LOCATE FAN ABOVE STAIR LANDING FOR MAINTENANCE ACCESSIBILITY.



**SECTION DETAIL - STAIR #2 FACING WEST**

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

4

NOTES:  
1. LOCATE FAN ABOVE STAIR LANDING FOR MAINTENANCE ACCESSIBILITY.

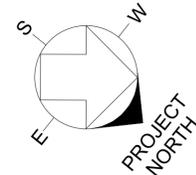
NO.	REVISIONS

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 ILLINOIS DESIGN FIRM REGISTRATION #154-009973

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SUBMITTED		



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 UNITED STATES DEPARTMENT OF ENERGY

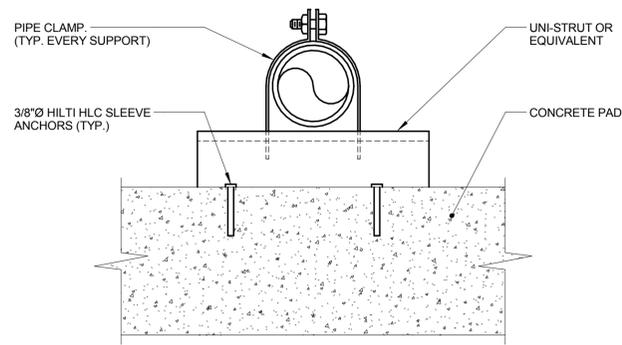
**SBN FAR DETECTOR BUILDING**  
 MECHANICAL DETAILS

DRAWING NO. **6-7-93** **M-5** REV. **0**

30 MAR. 2015

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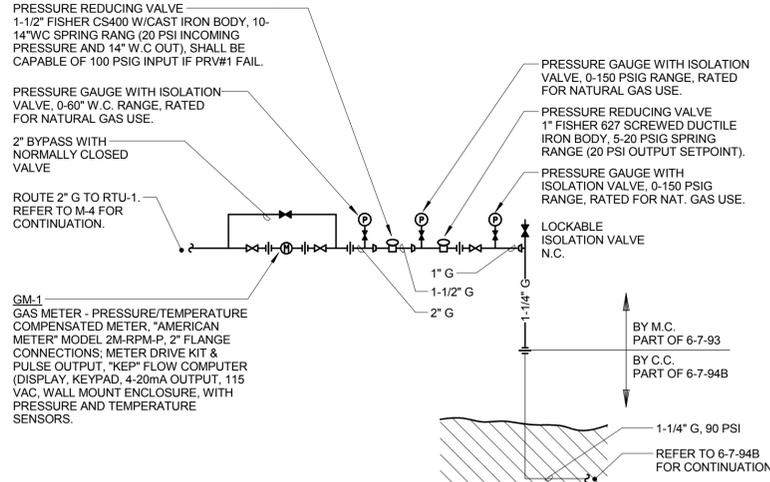
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**EXTERIOR NATURAL GAS PIPE SUPPORT DETAIL**

SCALE: NO SCALE

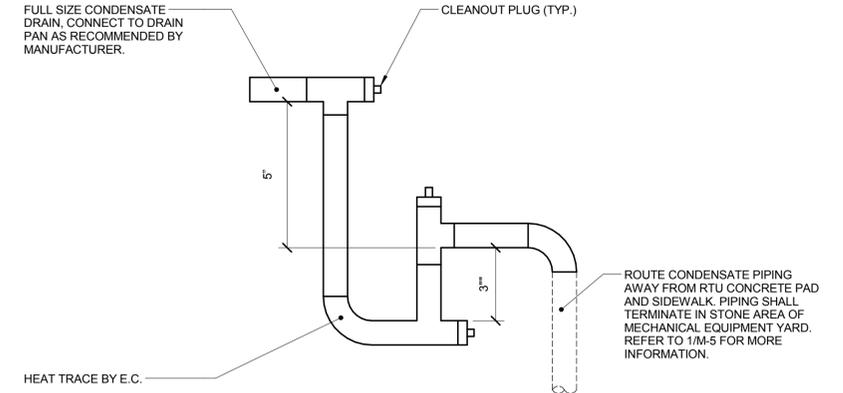
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**GAS METER AND REGULATOR PIPING DETAIL**

SCALE: NO SCALE

2



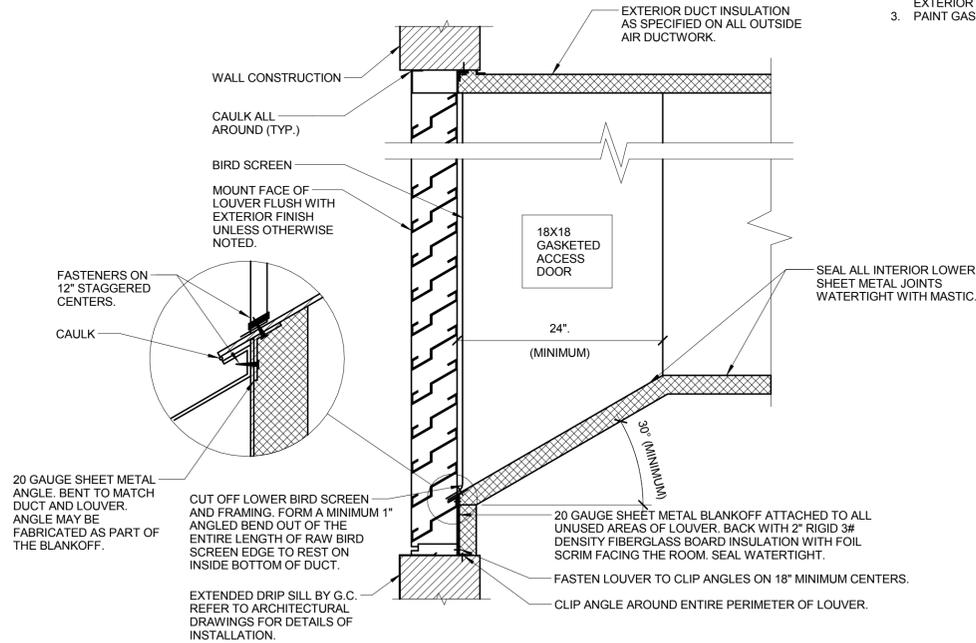
**CONDENSATE TRAP DETAIL (DRAW-THROUGH)**

SCALE: NO SCALE

3

**NOTES:**

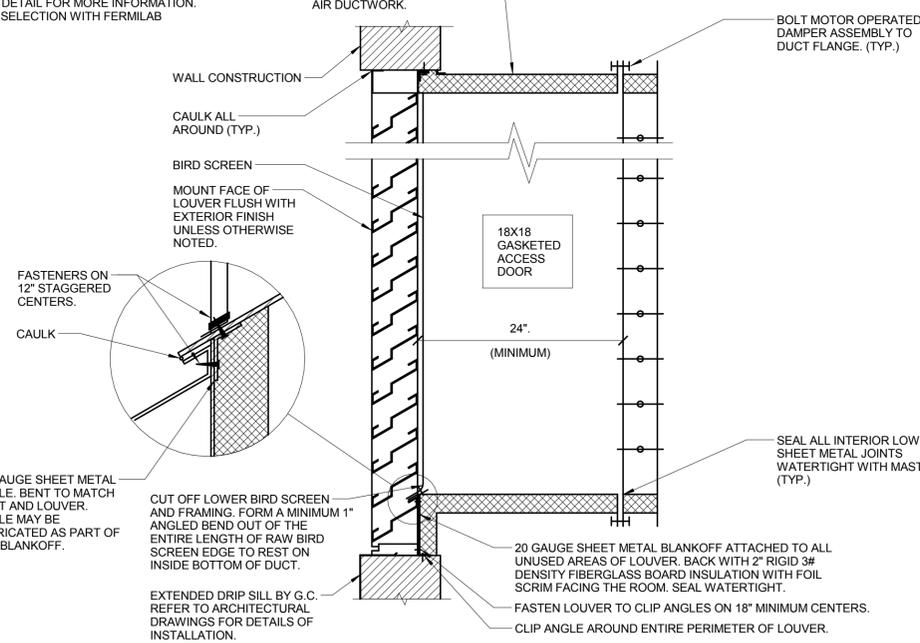
1. MINIMIZE THE SPACE TO BE OCCUPIED BY THIS PIPING. COORDINATE WITH GAS METER CONCRETE SLAB DIMENSIONS AND OTHER EQUIPMENT AND CLEARANCES IN MECHANICAL YARD AREA.
2. PROVIDE PIPE SUPPORTS (NOT SHOWN) PER SPEC AND STANDARD INDUSTRY PRACTICE. REFIAS SPECIFIED ON ALL OUTSIDE EXTERIOR NATURAL GAS PIPE SUPPORT DETAIL FOR MORE INFORMATION.
3. PAINT GAS PIPING. COORDINATE COLOR SELECTION WITH FERMLAB



**LOUVER INSTALLATION - DUCTED FAN DETAIL**

SCALE: NO SCALE

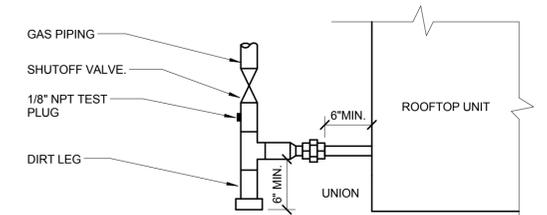
4



**MAKE-UP AIR LOUVER INSTALLATION DETAIL**

SCALE: NO SCALE

5



**ROOFTOP UNIT NATURAL GAS CONNECTION DETAIL**

SCALE: 12" = 1'-0"

6

**NOTES:**

1. SEAL ALL JOINTS ON BOTTOM INTERIOR SURFACE OF DUCT WITHIN 6'-0" OF THE LOUVER WATER TIGHT.
2. MOUNT BOTTOM OF INTAKE LOUVERS AT LEAST 40" ABOVE GRADE OR ROOF ELEVATION TO MINIMIZE CHANCES OF SNOW DRIFTING INTO THE LOUVER.
3. CAULK SHEETMETAL SCREWS WHERE THE PENETRATE METAL.

**NOTES:**

1. SEAL ALL JOINTS ON BOTTOM INTERIOR SURFACE OF DUCT WITHIN 6'-0" OF THE LOUVER WATER TIGHT.
2. MOUNT BOTTOM OF INTAKE LOUVERS AT LEAST 40" ABOVE GRADE OR ROOF ELEVATION TO MINIMIZE CHANCES OF SNOW DRIFTING INTO THE LOUVER.
3. CAULK SHEETMETAL SCREWS WHERE THE PENETRATE METAL.

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CHECKED	<b>B. HAWN</b>	<b>3/30/2015</b>
APPROVED		
SUBMITTED		

SCALE:

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UNITED STATES DEPARTMENT OF ENERGY



**SBN FAR DETECTOR BUILDING**

**MECHANICAL DETAILS**

DRAWING NO. **6-7-93**

**M-6** REV. **0**

30 MAR. 2015







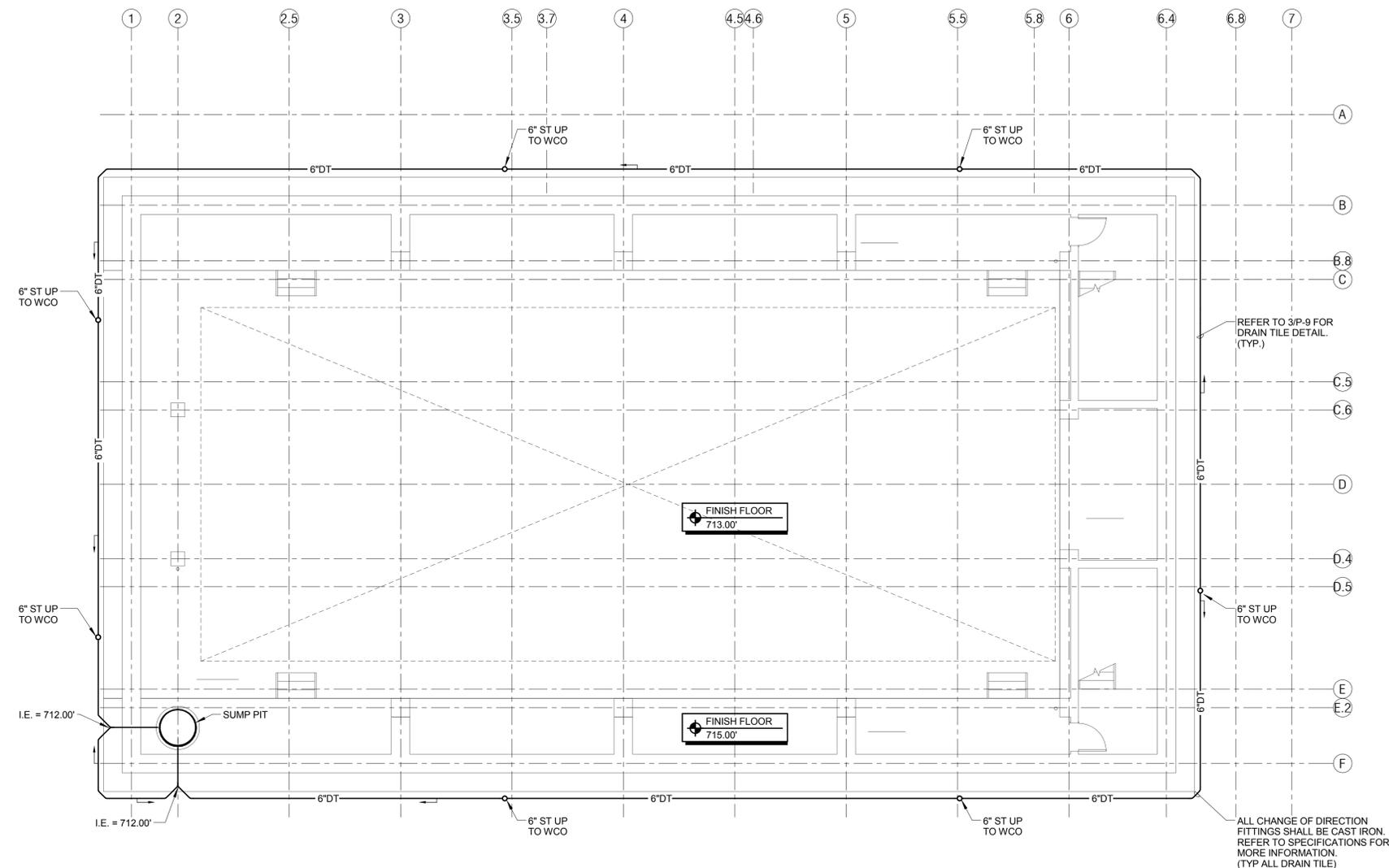








- GENERAL SHEET NOTES**
1. REFER TO ARCHITECTURAL DRAWINGS FOR FINISH FLOOR ELEVATION BOUNDARIES.
  2. INVERT ELEVATIONS ARE SHOWN FOR REFERENCE. COORDINATE FINAL INVERT ELEVATIONS WITH STRUCTURAL DRAWINGS.



**UNDER FLOOR PLUMBING PLAN**  
SCALE: 1/8" = 1'-0"

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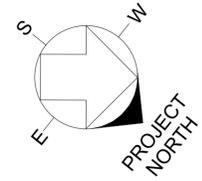
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**SBN FAR DETECTOR BUILDING**  
**UNDER FLOOR PLAN - PLUMBING**

DRAWING NO. **6-7-93** **P-2** REV. **0**

30 MAR. 2015



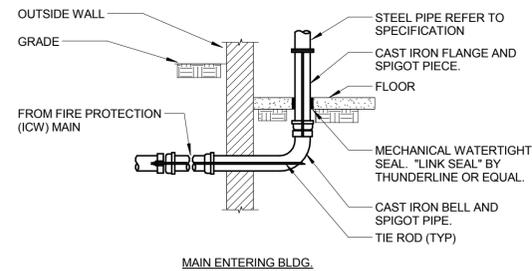




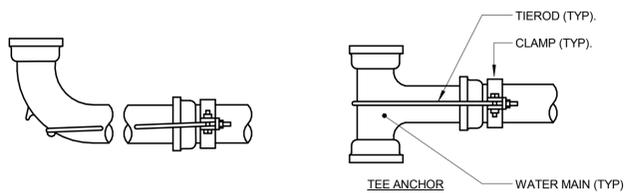




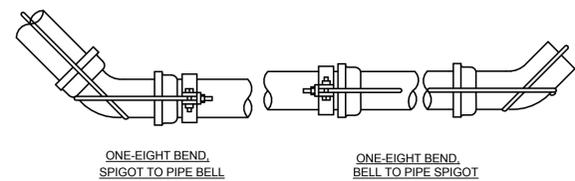
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MAIN ENTERING BLDG.



ANCHOR FOR LONG SPIGOT 1/4 BEND.



ONE-EIGHT BEND, SPIGOT TO PIPE BELL

ONE-EIGHT BEND, BELL TO PIPE SPIGOT

ANCHOR RODS

ROD AND CLAMP ANCHORAGE

PIPING NOMINAL SIZE (IN.)	CLAMP SIZE (IN.)	BOLT SIZE (IN.)	WASHER (IN.)		NUMBER OF RODS AND ROD SIZE (IN.) FOR ROD AND CLAMP ANCHORAGE					
			CAST IRON	STEEL	MECHANICAL JOINT			PUSH ON JOINT		
					90° 1/4 BEND	45° 1/8 BEND	TEE, HYDRANT CAP, PLUG	90° 1/4 BEND	45° 1/8 BEND	TEE, HYDRANT CAP, PLUG
2 1/2	1/2x2	5/8	5/8x3	1/2x3	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4
6					2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4

NOTES:

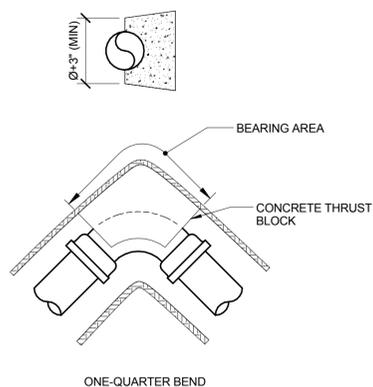
- AFTER INSTALLATION, PROTECT TIE RODS, BOLTS, NUTS, WASHERS AND CLAMPS AGAINST CORROSION WITH A HEAVY COAT OF ASPHALT MATERIAL.
- THE LENGTH OF THE ROD REQUIRED WILL VARY WITH THE PIPE FITTING, AND MUST BE DETERMINED BY FIELD MEASUREMENT. IF THE DISTANCE BETWEEN THE JOINTS IS LESS THAN 12 FEET, EXTEND THE ANCHORAGE TO THE SECOND BELL.

## UNDERGROUND WATER MAIN ANCHORING DETAIL

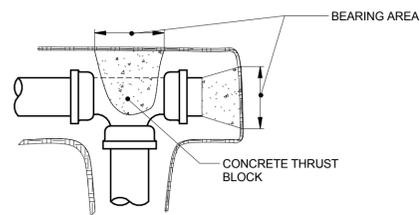
SCALE: NO SCALE

NOTES:

- BOTH THRUST BLOCKING AND ANCHOR RODS ARE REQUIRED.
- REFER TO THE GOVERNING CODE AND NFPA 24 FOR ADDITIONAL REQUIREMENTS.



ONE-QUARTER BEND

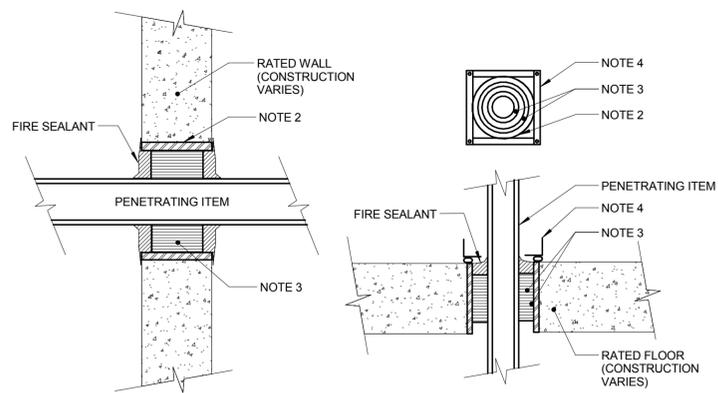


THRUST BLOCKS

AREA OF BEARING FACE OF CONCRETE THRUST BLOCKS

PIPING NOMINAL SIZE (IN.)	MIN. SQ. FT.			
	CAST IRON AND DUCTILE IRON			
	1/4 BEND	1/8 BEND	TEES, PLUGS, CAPS, HYDRANTS	
4	3	2	3	
6	7	4	5	

BASIS: 2,000 LB./SQ. FT. SOIL RESISTANCE.  
250 PSI WATER PRESSURE.  
CORRECTION FACTORS FOR OTHER SOILS:  
SOFT CLAY.....4  
SAND.....2  
SAND&GRAVEL...1.33  
SHALE.....0.4

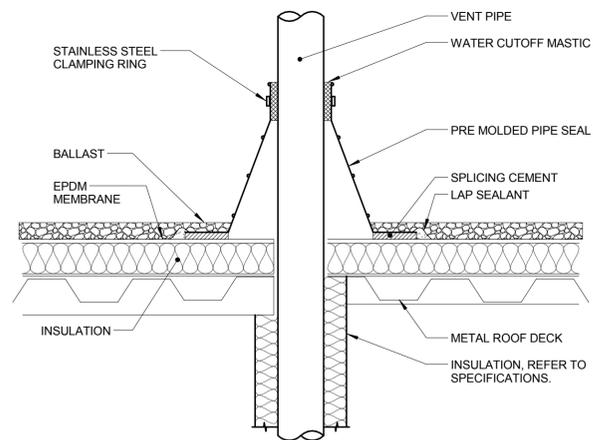


## RATED FIRE BARRIER PENETRATION

SCALE: NO SCALE

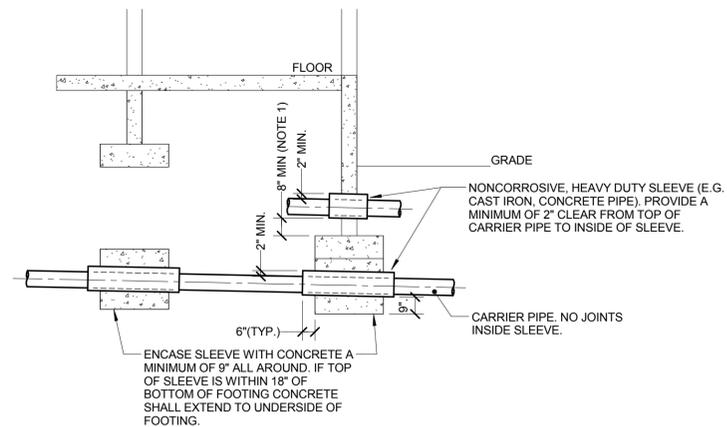
NOTES:

- THIS GENERAL DETAIL APPLIES TO ALL ITEMS PENETRATING FIRE RATED WALLS OR FLOORS. THE INTENT IS TO MAINTAIN THE FIRE RATING AND TO ALLOW LONGITUDINAL MOVEMENT. REFER TO SPECIFICATION SECTION 15080 FOR SELECTION OF THROUGH PENETRATION FIRE STOPPING.
- SCHEDULE 5 PIPE SLEEVE EMBEDDED IN WALL OR FLOOR, OR SMOOTH CORE DRILL. EACH SUBCONTRACTOR FURNISHES SLEEVE TO G.C., COORDINATES SLEEVE LOCATIONS AND DEBURS SLEEVE. G.C. BUILDS SLEEVE INTO WALL OR FLOOR ALLOWING NO GAP AROUND SLEEVE. IF SLEEVE IS NOT PROVIDED WHEN WALL OR FLOOR IS BUILT, SUBCONTRACTOR SHALL INSTALL SLEEVE. SLEEVE SIZE SHALL ALLOW ANNULAR SPACE REQUIRED BY THE SELECTED FIRE STOP SYSTEM.
- INSTALL BACKING MATERIAL, SUCH AS MINERAL WOOL SAFING, AS REQUIRED FOR FIRE STOP SYSTEM. INSTALL IN ACCORDANCE WITH FIRE STOP SYSTEM APPLICATION LISTING. SECURE TO WALL OR FLOOR TO ALLOW LONGITUDINAL MOVEMENT OF PENETRATING ITEM WITHOUT MOVEMENT OF FIRE BARRIER.
- WATER-TIGHT WELDED 1"x1" 20 GAUGE MINIMUM GALVANIZED SHEET METAL ANGLE FRAME, BY SUBCONTRACTOR IN EQUIPMENT ROOMS FOR WATER STOP. PLACE A BEAD OF WATERPROOF SEALANT BETWEEN FLOOR AND BOTTOM OF ANGLE FRAME. SECURE TO FLOOR WITH MASONRY ANCHORS IN CORNERS AND ON 12" MAXIMUM CENTERS. MULTIPLE PENETRATING ITEMS MAY BE ENCLOSED IN ONE FRAME.



## VENT PIPE FLASHING

SCALE: NO SCALE

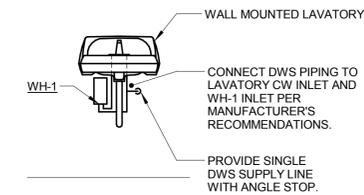


## PIPE UNDER FOOTING DETAIL

SCALE: NO SCALE

NOTES:

- STEP FOOTING DOWN AS REQUIRED TO MAINTAIN 8" MINIMUM DIMENSION.



## LAVATORY PIPING DETAIL

SCALE: NO SCALE

NOTES:

- PROVIDE STRAINER OR INLET FILTER AT DWV CONNECTION TO WH-1 INLET.

NO.	REVISIONS

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APPROVED		
SUBMITTED		

SCALE:

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

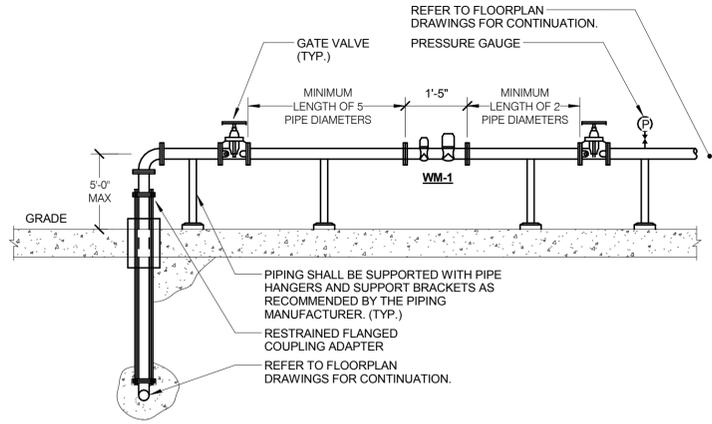


**SBN FAR DETECTOR BUILDING**  
**PLUMBING DETAILS**

DRAWING NO. **6-7-93**

**P-8** REV. **0**

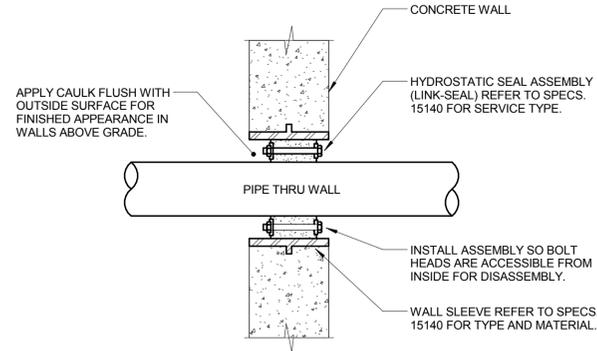
30 MAR. 2015



### DOMESTIC WATER ENTRANCE

SCALE: NO SCALE

1



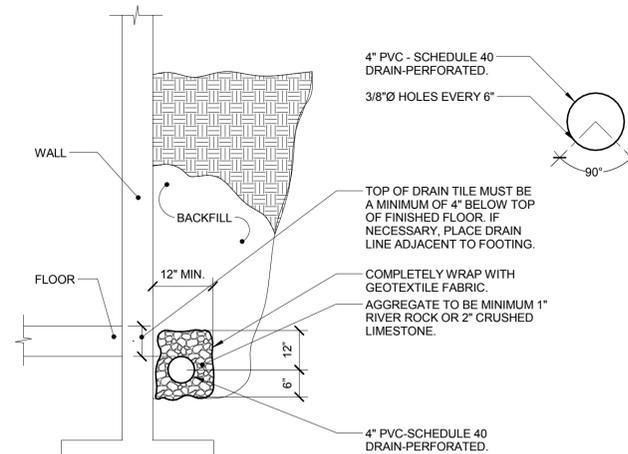
### EXTERIOR WALL PENETRATION

SCALE: NO SCALE

NOTES:

- SUBCONTRACTOR MAY FABRICATE PIPE SLEEVE.
- SEAL SELECTION BASED ON OLD. OF PIPE THRU WALL AND I.D. OF SLEEVE.
- SLEEVE NOT REQUIRED FOR CORE DRILLED PENETRATIONS.

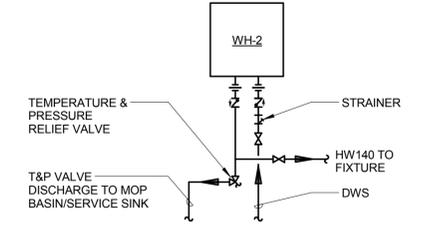
2



### DRAIN TILE DETAIL

SCALE: NO SCALE

3



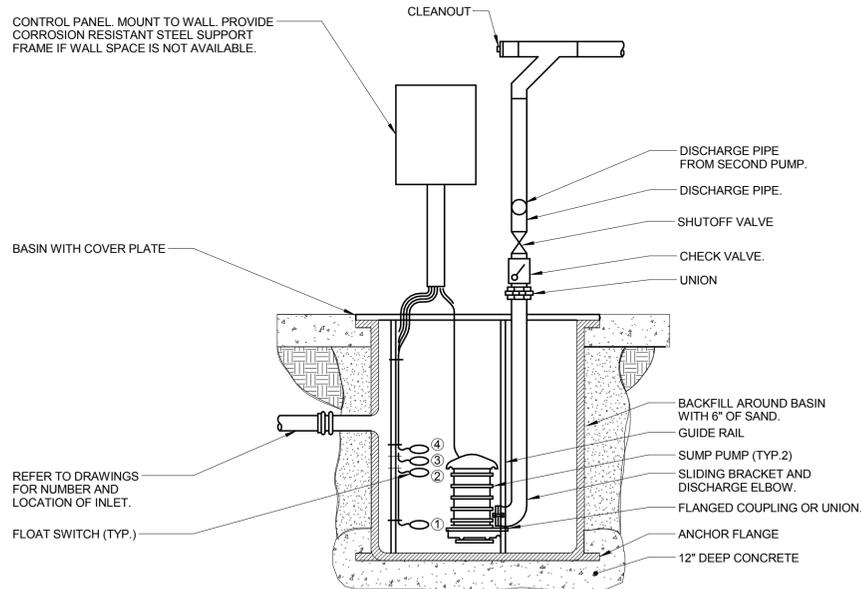
### MOP BASIN PIPING DETAIL

SCALE: NO SCALE

NOTES:

- MOUNT WATER HEATER PER DIRECTIONS ON DRAWINGS AND PLUMBING MATERIAL LIST.
- INSTALL STRAINER UPSTREAM OF WATER HEATER.

4



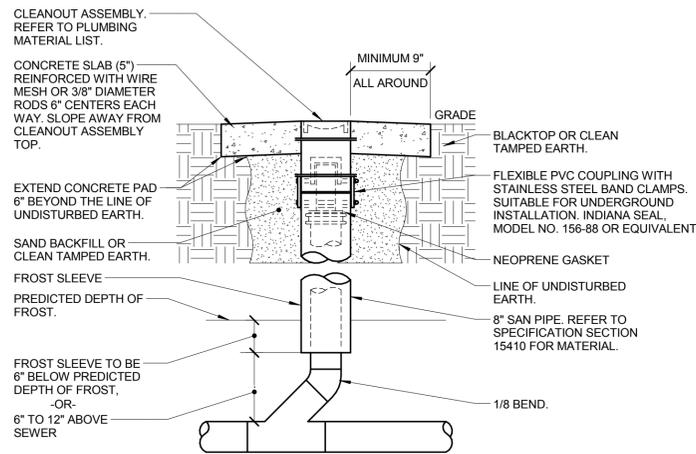
### SUMP PUMP (DUPLEX) DETAIL

SCALE: NO SCALE

NOTES:

- SUMP PUMPS THAT DISCHARGE TO STORM SHALL BE INSTALLED WITH THE TOP OF THE SUMP BASIN 2\"/>

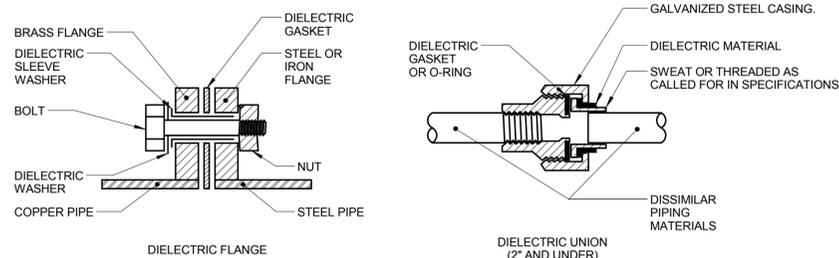
5



### YARD CLEANOUT DETAIL

SCALE: NO SCALE

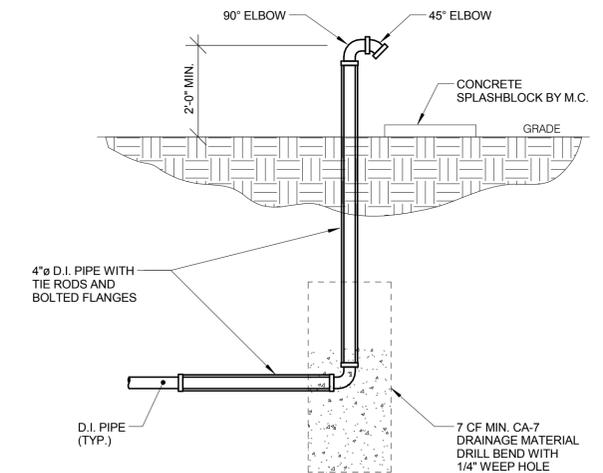
6



### DIELECTRIC CONNECTION DETAIL

SCALE: NO SCALE

7



### SUMP PUMP DISCHARGE OUTLET DETAIL

SCALE: NO SCALE

NOTES:

- DISCHARGE OUTLET SHALL BE LOCATED 10'-0\"/>

8

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NO.	REVISIONS

**KJW ENGINEERING CONSULTANTS**  
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REFERENCE SCALE IN INCHES

	FERMI LAB	DATE
DESIGNED	<b>P. MUELLER</b>	<b>3/30/2015</b>
DRAWN	<b>D. WILKINS</b>	<b>3/30/2015</b>
CHECKED	<b>B. FORTIER</b>	<b>3/30/2015</b>
APPROVED		
SUBMITTED		

SCALE:

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



**SBN FAR DETECTOR BUILDING**  
**PLUMBING DETAILS**

DRAWING NO. **6-7-93**

**P-9** REV. 0

30 MAR. 2015

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PLUMBING MATERIAL LIST	
<p>THE SYMBOLS AND THE MATERIAL LIST ARE FOR THE CONVENIENCE OF THE SUBCONTRACTOR. SUBCONTRACTOR SHALL VERIFY QUANTITIES AND FURNISH ALL MATERIALS REQUIRED FOR FULLY OPERATIONAL SYSTEMS, WHETHER SPECIFIED OR NOT.</p> <p>CATALOG NUMBERS SHALL NOT BE CONSIDERED COMPLETE, BUT ARE GIVEN AS AN AID TO THE SUBCONTRACTOR AND TO INDICATE THE QUALITY REQUIRED. SUBCONTRACTOR IS RESPONSIBLE FOR COMPLETE DESCRIPTION OF MATERIAL ON THESE DRAWINGS AND IN THE SPECIFICATIONS BEFORE ORDERING. THE DESCRIPTION OF THE MATERIAL TAKES PRECEDENCE OVER THE CATALOG NUMBER. THE FIRST MANUFACTURER LISTED IS THE BASIS OF DESIGN.</p> <p>SUBCONTRACTOR SHALL VERIFY THAT FIXTURES SUPPLIED ARE APPROVED PER ALL APPLICABLE STATE, LOCAL AND GOVERNING AUTHORITIES.</p> <p>ALL FIXTURES SHALL CONFORM TO FEDERAL ACT S.3874.</p>	
<u>AD-1</u>	<p>AREA DRAIN - CAST IRON BODY, HEAVY DUTY CAST/DUCTILE IRON TOP, 12" ROUND, 4" BOTTOM OUTLET, MEDIUM SUMP, FREE STANDING SEDIMENT BUCKET, FLASHING COLLAR.</p> <p>ACCEPTABLE MANUFACTURERS: ZURN (Z-541), SMITH (2142), WADE (1210), WATTS (FD-340), MIFAB (F1340)</p>
<u>FCO-1</u>	<p>FLOOR CLEANOUT - ADJUSTABLE, CAST IRON HOUSING, ANCHOR FLANGE, TAPERED THREAD PLUG, SECURED NICKEL BRONZE TOP. TOP STYLE SHALL MATCH FLOOR FINISH AS FOLLOWS:</p> <p>UNFINISHED FLOOR - ROUND SOLID SCORLATED TOP</p> <p>ACCEPTABLE MANUFACTURERS: ZURN (Z1400), JOSAM (55000), MIFAB (C1100), SMITH (4000), WADE (6000), WATTS (CO-200)</p>
<u>FD-1</u>	<p>FLOOR DRAIN - CAST IRON BODY, NICKEL BRONZE ADJUSTABLE TOP, 8" ROUND, 4" BOTTOM OUTLET, FLASHING COLLAR, DEEP SEAL TRAP.</p> <p>TRAP SEAL - 4" PLASTIC HOUSING WITH FLEXIBLE DIAPHRAGM, SEALING GASKETS, RECLOSES AND SEALS WHEN DISCHARGE IS COMPLETED, ASSE 1072.</p> <p>ACCEPTABLE MANUFACTURERS: FLOOR DRAIN - ZURN (Z-415), SMITH (2005), WADE (1100), JOSAM (30000), WATTS (FD-100), MIFAB (F1100)</p> <p>TRAP SEAL - SURE SEAL (SS), PROVENT (TRAP GUARD), SMITH (QUAD CLOSE)</p>
<u>HB-1</u>	<p>HOSE BIBB - FREEZELESS WALL HYDRANT, BRASS VALVE BODY AND SEAT, STANDARD FINISH, NON-FERROUS METAL STEM, AUTOMATIC DRAINING, VACUUM BREAKER, 3/4" MALE HOSE THREAD, WALL CLAMP, CONCEALED IN FLUSH MOUNTED LOCKABLE WALL BOX, KEY OPERATED, ASSE 1019 APPROVED AND LISTED.</p> <p>VERIFY NUMBER OF KEY OPERATORS TO BE PROVIDED WITH FERMILAB. BOX COVER AND HYDRANT SHALL USE A COMMON KEY. MOUNT AT 18" ABOVE GRADE UNLESS NOTED OTHERWISE ON DRAWINGS.</p> <p>ACCEPTABLE MANUFACTURERS: WOODFORD (B67), ZURN (Z1300), JOSAM (71000), WATTS (HY-725), PRIER (C-534-WB), MIFAB (MHY-20), SMITH (5509QT)</p>
<u>HB-2</u>	<p>HOSE BIBB - INDOOR WALL HYDRANT, BRASS CONSTRUCTION, STANDARD FINISH, VACUUM BREAKER, 3/4" MALE HOSE THREAD, METAL WHEEL HANDLE.</p> <p>MOUNT AT 18" ABOVE FINISH FLOOR.</p> <p>ACCEPTABLE MANUFACTURERS: WOODFORD (24), CHICAGO FAUCET (293), ACORN (8121), PRIER (C-135AS), T&amp;S BRASS (B-0736), MIFAB (MHY-90).</p>
<u>L-1</u>	<p>LAVATORY - ACCESSIBLE, WALL MOUNTED, WHITE VITREOUS CHINA, 20"x18", 4" HIGH CONTOURED BACKSPASH, SINGLE FAUCET HOLE, DRILLED FOR CONCEALED ARM CARRIER.</p> <p>LAVATORY TRIM - SENSOR ACTIVATED MIXING FAUCET, HARD-WIRED, BRASS CONSTRUCTION, CHROME-PLATED FINISH, CONVENTIONAL SPOUT WITH VANDAL-RESISTANT AERATOR OUTLET, SINGLE HOLE, INTEGRAL CHECK VALVES, PERFORATED GRID STRAINER WITH 1-1/4" 17 GAUGE TAILPIECE, INTERNAL ADJUSTABLE TEMPERATURE LIMIT STOP, INTEGRAL TEMPERATURE ADJUSTMENT LEVER FOR USER ADJUSTMENT WITHOUT TOOL, FAUCET MOUNTED CONTROLS, WATERPROOF CONNECTORS AND 10' LONG CABLE, UL APPROVED TRANSFORMER.</p> <p>ELECTRICAL REQUIREMENTS - 120 VAC INPUT</p> <p>MOUNT TRANSFORMER ABOVE CEILING OR IN ACCESSIBLE PIPE CHASE. MAXIMUM FLOW TO BE 0.5 GPM IN COMPLIANCE WITH ENERGY POLICY ACT OF 2005 AND ASME/ANSI STANDARD A112.18.1M. FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. PROVIDE RESTRICTIVE DEVICE AND ESCUTCHEON PLATE AS REQUIRED.</p> <p>INSULATION KIT - PRE-MANUFACTURED FOR P-TRAP, STOP VALVES AND SUPPLY LINES.</p> <p>ACCESSORIES - QUARTER-TURN 3/8" CHROME PLATED HEAVY BRASS ANGLE SUPPLY LOOSE KEY STOPS, CHROME PLATED SOFT COPPER SUPPLY LINES, DRAIN AND OFFSET TAILPIECE, 1-1/4" 20 GAUGE CAST BRASS P-TRAP, SUPPORT CARRIER.</p> <p>MOUNT LAVATORY WITH SUPPORT CARRIER BOLTED SECURELY TO FLOOR. TOP OF RIM SHALL BE AT 34" ABOVE FLOOR IN COMPLIANCE WITH LATEST ADA STANDARD. PROVIDE 29" MINIMUM CLEARANCE FROM FLOOR TO BOTTOM OF APRON IN COMPLIANCE WITH LATEST ANSI A117.1 AND ADA STANDARDS. ARMAFLEX WITH TAPE IS NOT ACCEPTABLE IN LIEU OF INSULATION KIT.</p> <p>ACCEPTABLE MANUFACTURERS: LAVATORY - AMERICAN STANDARD (0356.421), KOHLER (K-2007), SLOAN (SS-3103), TOTO (LT307), ZURN (Z5361)</p> <p>LAVATORY TRIM - SYMMONS (S-6980), DELTA (DEM-111), AMERICAN STANDARD (7055.215), CHICAGO FAUCET (116.221.AB.1), HYDROTEK (5000EM-LR), MOEN (8307), SLOAN (EAF-150)</p> <p>INSULATION KIT - TRUEBRO (LAV-GUARD), BROCAR PRODUCTS (TRAP WRAP), MCGUIRE (PROWRAP), PLUMBEREX (PRO-EXTREME).</p>

PLUMBING MATERIAL LIST (CONTINUED)	
<u>MB-1</u>	<p>MOP BASIN - PRECAST TERRAZZO, 24"x24"x12", STAINLESS STEEL INTEGRAL DRAIN WITH REMOVABLE STRAINER, 3" OUTLET, CONTINUOUS STAINLESS STEEL CAP ON ALL EDGES.</p> <p>TRIM - EXPOSED TWO HANDLE MIXING FAUCET, BRASS CONSTRUCTION, CHROME-PLATED FINISH, SINGLE WING HANDLES, 1/4 TURN CERAMIC DISC CARTRIDGE, 3/4" HOSE THREAD SPOUT WITH INTEGRAL VACUUM BREAKER, WALL BRACE, PAIL HOOK, CHECK STOPS OR INLINE CHECK VALVES TO PREVENT THERMAL CROSSOVER. FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874.</p> <p>ACCESSORIES - MOP HANGER, HOSE AND HOSE BRACKET, DEEP SEAL TRAP.</p> <p>ACCEPTABLE MANUFACTURERS: MOP BASIN - FIAT (TSB), ACORN (TSH), CREATIVE INDUSTRIES (MC), WILLIAMS (SB)</p> <p>TRIM - DELTA (28C2393), AMERICAN STANDARD (8344.012), MOEN (8124), SPEAKMAN (SC-5812), SYMMONS (S-2490), ZURN (Z841M1-XL).</p>
<u>SP-1</u>	<p>SUMP PUMP - DUPLEX SUBMERSIBLE, SINGLE-STAGE, CENTRIFUGAL, END-SUCTION PUMPS, STAINLESS STEEL FASTENERS, GUARDS AND HANDLES, UL LISTED.</p> <p>CASING - CAST IRON, INTEGRAL SUPPORT FEET, MINIMUM 3' HORIZONTAL DISCHARGE.</p> <p>IMPELLER - CAST IRON STATICALLY AND DYNAMICALLY BALANCED, SEMIOPEN NONCLOS DESIGN, KEYED AND SECURED TO SHAFT, PASSES 2" SOLIDS MINIMUM.</p> <p>SHAFT - STAINLESS STEEL WITH FACTORY SEALED, GREASE-LUBRICATED BALL BEARINGS, CARBON AND CERAMIC UPPER SEAL, SILICON CARBIDE LOWER SEAL.</p> <p>MOTOR - 5 HP, 480 VOLTS, 3 PHASE, 3450 RPM, AIR-FILLED, HERMETICALLY SEALED WITH AUTO THERMAL OVERLOAD PROTECTION, THREE CONDUCTOR WATERPROOF POWER CABLE OF SUFFICIENT LENGTH.</p> <p>CAPACITY (EACH PUMP): 150 GPM, 55 FEET OF HEAD.</p> <p>CONTROLS - WALL MOUNTED NEMA 4X ENCLOSURE, DUPLEX (4) FLOAT WITH AUTOMATIC ALTERNATOR TO LEAD-LAG PUMPS AND ALSO ALLOW BOTH PUMPS TO RUN DURING HIGH LOAD, RUN LIGHT, TEST-OFF-AUTO AND DISCONNECTING MEANS FOR EACH PUMP, HIGH WATER ALARM WITH HORN, STROBE, SILENCING BUTTON AND DRY CONTACTS FOR ALARM AND PUMP STATUS, UL LISTED. FLOATS SHALL BE MERCURY-FREE.</p> <p>REMOVAL SYSTEM - QUICK REMOVAL SYSTEM WITH BASE ELBOW, 3" ANSI DISCHARGE FITTINGS AND UPPER GUIDE BRACKET. SUBCONTRACTOR TO FURNISH (2) 2" GUIDE RAILS FOR EACH PUMP.</p> <p>BASIN - 48" FIBERGLASS CONSTRUCTION, 48" DIAMETER X 84" DEEP, ANCHOR FLANGE, PIPE INLET(S) AS SHOWN ON DRAWING, CAST IRON OR STEEL GASKETED SOLID COVER WITH OPENINGS FOR PUMP ACCESS, 4" DISCHARGE PIPE FLANGE(S), CONTROL AND POWER CORDS, INSPECTION PORT, STAINLESS STEEL LIFTING CABLE SECURED TO SIDE OF BASIN GALVANIZED STEEL. GUIDE RAIL SUPPORTS ANCHORED TO BASIN BASE AND COVER OR SIDEWALL WITH DISCHARGE ELBOW, SEALING PLATE AND STAINLESS STEEL LIFTING CABLE. BASIN SHALL BE BUILT WITH GLASSED IN REMOVAL SYSTEM STUDS AT FACTORY.</p> <p>COVER SHALL BE SECURED AND FLUSH TO TOP OF BASIN CURB. COORDINATE COVER MOUNTING AND SECURING METHOD WITH GENERAL SUBCONTRACTOR.</p> <p>ACCEPTABLE MANUFACTURERS:</p> <p>PUMP - WEIL (2562DS) REMOVAL SYSTEM - WEIL (2613) CONTROLS - WEIL (SERIES 8100)</p>
<u>TD-1</u>	<p>TRENCH DRAIN - MODULAR, PRE-SLOPED, HEAVY DUTY PRECAST POLYMER CONCRETE, 4" WIDE CHANNEL, 0.6% SLOPE, EXTRA HEAVY DUTY LOCKING DUCTILE IRON GRATE, CLASS E RATED, INTEGRAL CATCH BASIN(S) WITH SEDIMENT BUCKET(S), 4" OUTLET(S), LENGTH AS SHOWN ON DRAWINGS. COORDINATE OVERALL DIMENSIONS AND OUTLET LOCATIONS PRIOR TO SUBMITTAL.</p> <p>ACCEPTABLE MANUFACTURERS: SMITH (9814), ABT (POLYDRAIN), WATTS (600 SERIES), ACO (100K)</p>
<u>WC-1</u>	<p>WATER CLOSET - ACCESSIBLE, WALL HUNG, FLUSH VALVE TYPE, WHITE VITREOUS CHINA, SIPHON JET, HIGH EFFICIENCY RATED FOR 1.28 GPF, ELONGATED BOWL, 1-1/2" TOP SPUD.</p> <p>FLUSH VALVE - EXPOSED, SENSOR OPERATED, HARDWIRED, 1.1 GALLONS PER FLUSH, CHROME PLATED 1" I.P.S. SCOREDRIVER STOP-CHECK VALVE, CHEMICAL RESISTANT MATERIAL, VACUUM BREAKER, WALL AND SPUD FLANGES, MECHANICAL OVER-RIDE BUTTON, RANGE ADJUSTMENT SCREW, CHROME PLATED COVER PLATE WITH TAMPER-PROOF SCREWS, TRANSFORMER CAPABLE OF OPERATING UP TO 10 UNITS, 3 YEAR WARRANTY.</p> <p>SEAT - WHITE, EXTRA HEAVY, OPEN FRONT, INJECTION MOLDED SOLID ANTI-MICROBIAL PLASTIC, SELF-SUSTAINING CHECK HINGE, STAINLESS STEEL OR PLATED STEEL POSTS AND NUTS.</p> <p>SUBCONTRACTOR OPTION: COMBINATION WATER CLOSET/FLUSH VALVE PACKAGED SYSTEM BY AMERICAN STANDARD, SLOAN, OR ZURN.</p> <p>ELECTRICAL REQUIREMENTS - 120VAC INPUT</p> <p>ACCESSORIES - WATER CLOSET SUPPORT CARRIER RATED FOR 500 LBS.</p> <p>MOUNT WATER CLOSET WITH CARRIER BOLTED SECURELY TO FLOOR. TOP OF SEAT SHALL BE AT 17"-19" ABOVE FINISHED FLOOR (VERIFY EXACT MOUNTING HEIGHT WITH MANUFACTURER). FLUSH HANDLE SHALL BE LOCATED ON THE WIDE SIDE OF THE TOILET STALL AND BE AT 12" (MAXIMUM) ABOVE BOWL RIM AND OPERATE WITH NO GREATER THAN 5 LB FORCE IN COMPLIANCE WITH LATEST ADA STANDARDS. VERIFY EQUIPMENT REQUIREMENTS AND ROUGH-IN LOCATIONS.</p> <p>ACCEPTABLE MANUFACTURERS: WATER CLOSET - AMERICAN STANDARD 3351.101, SLOAN, ZURN, GERBER, KOHLER, TOTO</p> <p>FLUSH VALVE - AMERICAN STANDARD (6088.111.002), ZURN, SLOAN, HYDROTEK, MOEN , TOTO</p> <p>SEAT - BEMIS (3155C), CHURCH (3155C), BENEKE (533PC), OLSONITE (95), SAME AS WATER CLOSET MANUFACTURER.</p>
<u>WCO-1</u>	<p>WALL CLEANOUT - END CAP, CAST IRON ACCESS BODY, GAS AND WATERTIGHT BRONZE OR BRASS THREADED PLUG, ROUND STAINLESS STEEL ACCESS COVER, EXTENDED MACHINE SCREW.</p> <p>ACCEPTABLE MANUFACTURERS: ZURN (Z-1441), SMITH (4422), WADE (W-8480-R/8550), JOSAM (58600-CO), WATTS (CO-380-RD).</p>

PLUMBING MATERIAL LIST (CONTINUED)	
<u>WH-1</u>	<p>WATER HEATER - ELECTRIC INSTANTANEOUS POINT-OF-USE (FOR SINGLE LOW FLOW FIXTURE), 0.3 GPM TURN ON, ABS COVER, 3/8" COMPRESSION FITTINGS, REPLACEABLE ELEMENT, REPLACEABLE FILTER AT INLET CONNECTION, ENCLOSED DIGITAL MICROPROCESSING TEMPERATURE CONTROL CAPABLE OF MAINTAINING OUTLET TEMPERATURE OF +/- 1°F, 150 PSI WORKING PRESSURE, 1-YEAR WARRANTY ON ELEMENT, 5-YEAR WARRANTY ON HEATER BODY/ELEMENT ASSEMBLY, UL LISTED.</p> <p>66°F RISE AT 0.5 GPM, 6.5 KW ELEMENT</p> <p>ELECTRICAL REQUIREMENTS - 208V-3 PHASE, HARD-WIRED</p> <p>MOUNT WATER HEATER ON WALL BELOW SINK OR LAVATORY. OUTPUT WATER TEMPERATURE FACTORY SET TO 110°F.</p> <p>ACCEPTABLE MANUFACTURERS: EEMAX (EX85TML), BRADFORD WHITE, CHRONOMITE.</p>
<u>WH-2</u>	<p>WATER HEATER - ELECTRIC INSTANTANEOUS POINT-OF-USE (FOR MULTIPLE FIXTURES), 0.3 GPM TURN ON, STEEL POWDER COATED COVER, 1/2" COMPRESSION FITTINGS, THERMOSTATICALLY CONTROLLED, ENCLOSED CONTROLS, FULLY ADJUSTABLE THERMOSTAT (100-140°F), HIGH TEMPERATURE LIMIT SWITCH, 150 PSI WORKING PRESSURE, REPLACEABLE ELEMENT, 1-YEAR WARRANTY ON ELEMENT, 5-YEAR WARRANTY ON HEATER BODY/ELEMENT ASSEMBLY, UL LISTED.</p> <p>109°F RISE AT 2.0 GPM, 32 KW ELEMENT, 38 AMPS/PHASE - TURN ON AT 0.3 GPM OR LESS</p> <p>ELECTRICAL REQUIREMENTS - 480V-3 PHASE, HARD-WIRED</p> <p>MOUNT WATER HEATER ON WALL. SET OUTPUT WATER TEMPERATURE AT 140°F.</p> <p>ACCEPTABLE MANUFACTURERS: EEMAX (ED032480T2T ML), BRADFORD WHITE (EFT), CHRONOMITE (S)</p>
<u>WHA-1</u>	<p>WATER HAMMER ARRESTER - PISTON TYPE, PRE-CHARGED WITH 60 PSIG AIR, LEAD FREE, COPPER BODY, BRASS OR HIGH HEAT POLY-PROPYLENE PISTON WITH DUAL EPDM O-RING SEALS LUBRICATED WITH FDA APPROVED SILICONE LUBRICANT. PDI CERTIFIED, A.S.S.E. 1010 APPROVED FOR SEALED WALL INSTALLATION, RATED FOR 1-11 FIXTURE UNITS.</p> <p>INSTALL PER MANUFACTURER'S RECOMMENDATIONS.</p> <p>ACCEPTABLE MANUFACTURERS: WATTS (LF15M2-DR), SIOUX CHIEF (650 SERIES), MIFAB (MWH), PPP (SC SERIES), ZURN WILKINS (1250XL), JR SMITH (5201-5250), WADE (WPS-100), JOSAM (75000-S)</p>
<u>WM-1</u>	<p>WATER METER - DISC TYPE, ALL BRONZE CONSTRUCTION, 2 1/2" SIZE, TOP READING CUMULATIVE DIAL WITH FACE PLATE CAP AND REMOTE READOUT, AWWA COMPLIANT.</p> <p>PROVIDE STRAINER, TEST PORT AND FULL SIZE BYPASS WITH LOCKABLE VALVE.</p> <p>ACCEPTABLE MANUFACTURERS: NEPTUNE, BADGER, HERSEY</p>
<u>YCO-1</u>	<p>YARD CLEANOUT - ROUND, DURA-COATED CAST IRON, SIZE AS LISTED ON DRAWINGS, DOUBLE FLANGED HOUSING, HEAVY DUTY SECURED SCORLATED DURA-COATED CAST IRON COVER, LIFTING DEVICE, BRONZE CLEANOUT PLUG WITH GAS/WATER-TIGHT SEAL.</p> <p>ACCEPTABLE MANUFACTURERS: ZURN (Z1474), SMITH (4261), WADE (W-8300), JOSAM (58680), WATTS (CO-300).</p>

	FERMI LAB	DATE
DESIGNED	<b>P. MUELLER</b>	<b>3/30/2015</b>
DRAWN	<b>D. WILKINS</b>	<b>3/30/2015</b>
CHECKED	<b>B. FORTIER</b>	<b>3/30/2015</b>
APPROVED		
SUBMITTED		

**SCALE:**

### FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



## SBN FAR DETECTOR BUILDING

### PLUMBING MATERIAL LIST

DRAWING NO. **6-7-93** **P-10** REV. **0**



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Illinois Design Firm Registration #154-009973  
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**REFERENCE SCALE IN INCHES**  
 0 1 2 3

CONTACT PERSONS	
DESCRIPTION:	PERSON:
PROJECT MANAGER	JEFF OKE
MECHANICAL ENGINEER	PAUL MUELLER

**ICW SYSTEM MODEL CALCULATIONS**

**CALCULATION #1:**  
 TEST DATE: 1/22/2015  
 LOCATION: 5 FT OUTSIDE BUILDING  
 TOTAL FLOW: 838 GPM  
 RESIDUAL PRESSURE: 58 PSI

**CALCULATION #2:**  
 TEST DATE: 2/18/2015  
 LOCATION: 5 FT OUTSIDE BUILDING  
 TOTAL FLOW: 770 GPM  
 RESIDUAL PRESSURE: 60.5 PSI

SIZE OF MAIN: 6"

**NOTES:**  
 1. RESIDUAL PRESSURE DATA WAS PROVIDED BY PROJECT CIVIL ENGINEER. VALUES ARE BASED ON SYSTEM MODEL CALCULATIONS WHICH INCLUDE FUTURE CAMPUS SYSTEM IMPROVEMENTS WHICH ARE CURRENTLY BEING DESIGNED AND IMPLEMENTED. THE CURRENT CAMPUS SYSTEM WITHOUT IMPROVEMENTS HAS A VERY LIMITED AVAILABLE FLOW AND RESIDUAL PRESSURE. SUBCONTRACTOR SHALL COORDINATE FLOW TEST ONCE CAMPUS SYSTEM IMPROVEMENTS ARE COMPLETE TO VERIFY ACTUAL FLOW AND RESIDUAL PRESSURE AVAILABLE.  
 2. FIRE PROTECTION SYSTEM SHALL BE DESIGNED FOR A MAXIMUM RESIDUAL PRESSURE OF 58 PSI AT 5 FT OUTSIDE BUILDING.

**GENERAL FIRE PROTECTION NOTES:**

- ALL PRODUCTS AND MATERIALS PROVIDED AND INSTALLED SHALL BE PRODUCED IN THE UNITED STATES AND SHALL BE IN COMPLIANCE WITH THE PROVISIONS OF THE BUY AMERICAN ACT UNLESS OTHERWISE APPROVED BY FERMI LAB.
- DRAWINGS SHOWING LOCATIONS OF EQUIPMENT, DUCTWORK, PIPING, ETC. ARE DIAGRAMMATIC AND MAY NOT ALWAYS REFLECT ACTUAL INSTALLATION CONDITIONS. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL PIPING, EQUIPMENT, ETC., AND MAY NOT INCLUDE ALL OFFSETS AND FITTINGS REQUIRED FOR COMPLETE INSTALLATION. THE DRAWINGS SHALL BE FOLLOWED AS CLOSELY AS ACTUAL BUILDING CONSTRUCTION AND THE WORK OF OTHERS WILL PERMIT.
- DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS AND CLEARANCES FROM ARCHITECTURAL, STRUCTURAL, SUBMITTALS, AND OTHER APPROPRIATE DRAWINGS OR PHYSICALLY AT SITE. READ ALL SPECIFICATIONS. REVIEW ALL DRAWINGS, INCLUDING THOSE OF OTHER TRADES.
- LAYOUT AND COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO INSTALLATION TO PROVIDE CLEARANCES REQUIRED FOR OPERATION, MAINTENANCE, CODE COMPLIANCE, AND TO VERIFY NON-INTERFERENCE WITH OTHER WORK. DO NOT FABRICATE PRIOR TO VERIFICATION OF NECESSARY CLEARANCES FOR ALL TRADES. BRING ANY INTERFERENCES OR CONFLICTS TO THE ATTENTION OF FERMI LAB BEFORE PROCEEDING WITH ANY FABRICATION OR EQUIPMENT ORDERS.
- SUBCONTRACTOR IS RESPONSIBLE FOR REVIEW OF SPACE REQUIREMENTS OF EQUIPMENT SPECIFIED OR ACCOMMODATIONS IN LAYOUT AND POSITIONING TO PROVIDE PROPER ACCESS.
- ANY CHANGES THAT ARE REQUIRED TO ELIMINATE CONFLICTS AND RESULT FROM A FAILURE TO COORDINATE SHALL BE MADE BY THE SUBCONTRACTOR WITHOUT ADDITIONAL COST OR EXPENSE TO FERMI LAB.
- CAULK ALL PIPE PENETRATIONS OF FULL HEIGHT NON FIRE RATED WALLS, PARTITIONS, FLOORS AND ROOF ASSEMBLIES.
- SUBCONTRACTOR IS RESPONSIBLE FOR ALL COST ASSOCIATED WITH ELECTRICAL CHANGES REQUIRED FOR EQUIPMENT DIFFERENT THAN THE BASIS OF DESIGN.
- THE MINIMUM DESIGN DENSITY SHALL BE BASED ON ORDINARY HAZARD GROUP 1.
- THE MINIMUM SPRINKLER SPACING SHALL BE 130 SQUARE FEET AND 100 SQUARE FEET FOR EXPERIMENTAL ASSEMBLY, AND GENERAL INDUSTRIAL HIGH BAY AREAS.
- THE MINIMUM SPRINKLER K-FACTOR SHALL BE 8.0 FOR EXPERIMENTAL ASSEMBLY, AND GENERAL INDUSTRIAL HIGH BAY AREAS.
- RETURN BENDS (ARM-OVERS) SHALL BE PROVIDED ON ALL PENDENT SPRINKLERS.
- ALL FIRE PROTECTION PIPING SHALL BE SCHEDULE 40.

FIRE PROTECTION SYMBOLS LIST	
SYMBOL:	DESCRIPTION:
	NEW
	NO HATCH
	ORDINARY GROUP 1
	DRAIN LINE
	INDUSTRIAL COOLING WATER
	PIPE CAP
	PIPE DOWN
	PIPE UP OR UP/DOWN
	PITCH PIPE IN DIRECTION
	DIRECTION OF FLOW IN PIPE
	SHUTOFF VALVE NORMALLY OPEN
	SHUTOFF VALVE NORMALLY CLOSED
	ANGLE VALVE
	BUTTERFLY VALVE WITH MONITOR SWITCH
	INSPECTOR TEST AND DRAIN VALVE
	PRESSURE SWITCH
	SPRINKLER - SIDEWALL
	SPRINKLER
E.C.	ELECTRICAL SUBCONTRACTOR
F.P.C.	FIRE PROTECTION SUBCONTRACTOR
G.C.	GENERAL SUBCONTRACTOR
M.C.	MECHANICAL SUBCONTRACTOR
P.C.	PLUMBING SUBCONTRACTOR

FIRE BARRIER DESIGNATIONS	
THE SYMBOLS SHOWN ARE FOR THE CONVENIENCE OF THE SUB CONTRACTOR. THE SUBCONTRACTOR SHALL VERIFY RATINGS WITH THE LATEST SET OF ARCHITECTURAL PLANS AND FURNISH ALL MATERIALS REQUIRED TO COMPLY WITH THOSE RATINGS WHETHER SHOWN OR NOT.	
ALL FLOOR, FLOOR CEILING, AND ROOF CEILING ASSEMBLIES SHALL BE DESIGNATED AS 2 HOUR FIRE BARRIER(S), UNLESS NOTED OTHERWISE ON THE PLANS. RATINGS WERE ACQUIRED FROM THE ARCHITECTURAL PLANS DATED [03/30/15].	
2 HOUR FIRE BARRIER	

FIRE PROTECTION SHEET INDEX	
FP-1	FIRE PROTECTION COVER SHEET
FP-2	ENCLOSURE LEVEL FIRE PROTECTION PLAN
FP-3	MEZZANINE LEVEL FIRE PROTECTION PLAN
FP-4	GRADE LEVEL FIRE PROTECTION PLAN
FP-5	FIRE PROTECTION DETAILS
FP-6	FIRE PROTECTION DETAILS & SCHEDULES

NO.	REVISIONS

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 The FUTURE Built SMARTER™  
 Illinois Design Firm Registration #154-000973

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DESIGNED	<b>P. MUELLER</b>	<b>3/30/2015</b>
DRAWN	<b>D. WILKINS</b>	<b>3/30/2015</b>
CHECKED	<b>B. GARBRECHT</b>	<b>3/30/2015</b>
APPROVED		
SUBMITTED		

**SCALE: NONE**

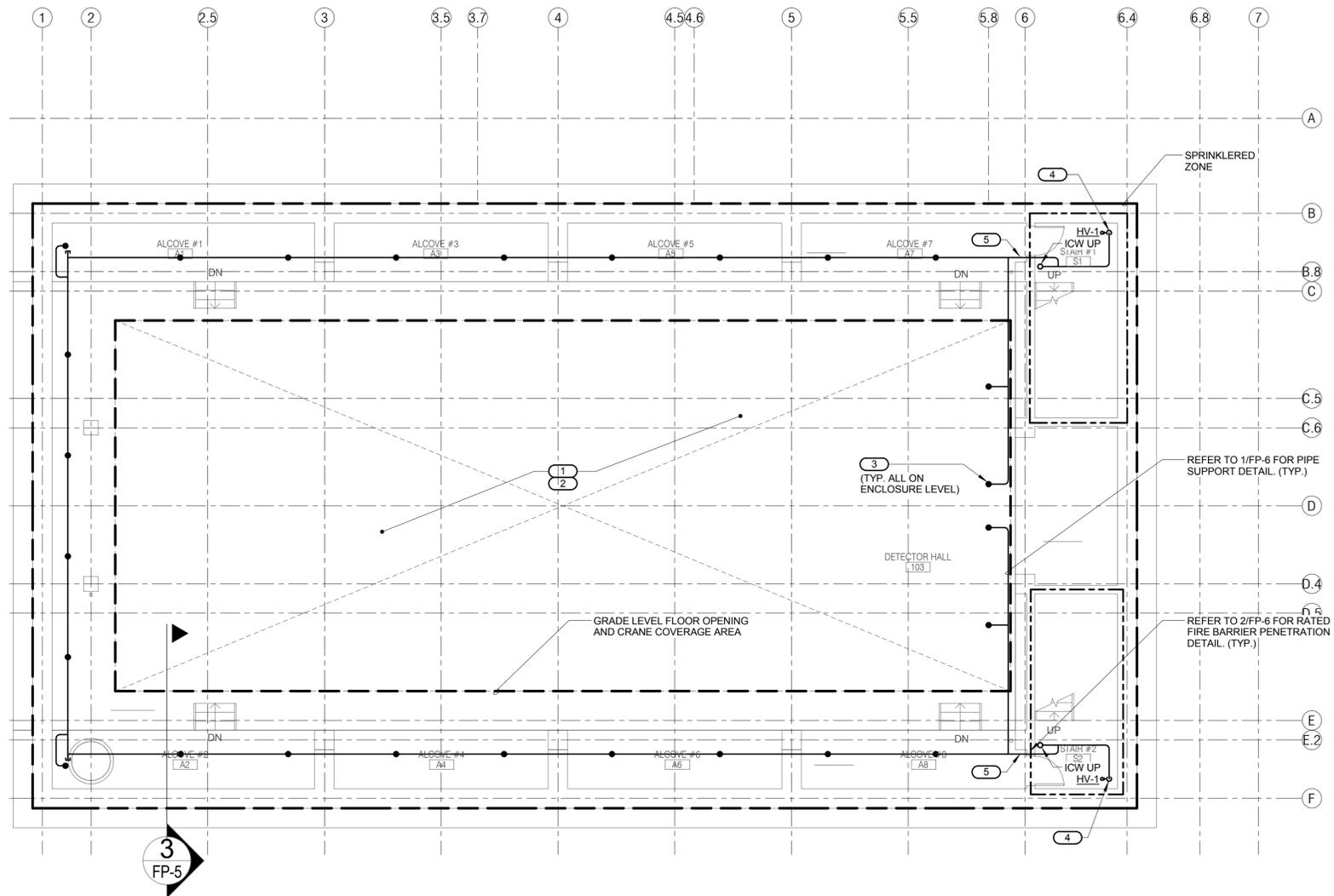
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UNITED STATES DEPARTMENT OF ENERGY

**SBN FAR DETECTOR BUILDING**

**FIRE PROTECTION COVER SHEET**

DRAWING NO. **6-7-93** **FP-1** REV. **0**



**ENCLOSURE LEVEL FIRE PROTECTION PLAN**

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

**GENERAL SHEET NOTES**

1. ALL SPRINKLERS AND PIPING SHOWN ON DRAWINGS IS DIAGRAMMATIC AND MAY NOT REFLECT ACTUAL INSTALLATION CONDITIONS. INSTALLATION, SPRINKLER HEAD QUANTITIES, AND SPRINKLER SPACING SHALL CONFORM TO NFPA 13 REQUIREMENTS. F.P.C. SHALL COORDINATE ALL FP PIPING AND SPRINKLER LOCATIONS WITH OTHER TRADES PRIOR TO INSTALLATION.
2. PROVIDE SPRINKLERS ABOVE AND BELOW STAIR LANDINGS PER NFPA 13.
3. SPRINKLERS SHALL BE INSTALLED UNDER FIXED OBSTRUCTIONS OVER 4'-0" WIDE INCLUDING BUT NOT LIMITED TO DUCTS AND OPEN GRATE FLOORING PER NFPA 13.
4. ALL SPRINKLERS ON ENCLOSURE LEVEL SHALL BE STANDARD RESPONSE TYPE.
5. ALL WORK SHOWN ON DRAWINGS SHALL BE PART OF BASE BID. BASE BID SHALL INCLUDE ALL SPRINKLERS, PIPING, AND ACCESSORIES REQUIRED BY NFPA 13 FOR A COMPLETE SYSTEM WITH OPEN GRATE FLOOR AT MEZZANINE LEVEL INSTALLED. OPEN GRATE FLOOR AT MEZZANINE LEVEL WILL BE REMOVED FROM ARCHITECTURAL DESIGN AS PART OF ALTERNATE BID #1. ALTERNATE BID #1 SHALL INCLUDE ALL SPRINKLERS, PIPING, AND ACCESSORIES REQUIRED FOR A COMPLETE SYSTEM PER NFPA 13. HYDRAULIC CALCULATIONS AND SIZING OF PIPING MAINS FOR BOTH BASE BID AND ALTERNATE BID #1 BE THE SAME AND SHALL INCLUDE TOTAL SPRINKLER FLOWS FOR BASE BID DESIGN WITH MEZZANINE LEVEL OPEN GRATE FLOOR INSTALLED. REFER TO SPECIFICATION SECTION 01230 FOR MORE INFORMATION.

**KEYNOTES (#)**

1. SPRINKLERS AND SPRINKLER PIPING SHALL NOT CROSS OPENING IN GRADE LEVEL FLOOR ABOVE FAR DETECTOR. REFER TO ARCHITECTURAL DRAWINGS FOR MORE INFORMATION REGARDING OPENING, DETECTOR, CLEARANCES, AND OVERHEAD CRANE CLEARANCES.
2. AREA BELOW OPENING IN GRADE LEVEL FLOOR SHALL BE SERVED BY EXTENDED COVERAGE ORDINARY HAZARD HORIZONTAL SIDEWALL SPRINKLERS AT THE MEZZANINE LEVEL CEILING. SPRINKLERS SHALL BE LOCATED PER NFPA 13.
3. SPRINKLE BELOW OPEN GRATING MEZZANINE LEVEL WALKWAY. SPRINKLERS INSTALLED UNDER OPEN GRATINGS SHALL BE OF THE INTERMEDIATE LEVEL/RACK STORAGE TYPE OR OTHERWISE SHIELDED FROM DISCHARGE OF OVERHEAD SPRINKLERS PER NFPA 13.
4. REFER TO 2/FP-5 FOR FIRE PROTECTION STANDPIPE PIPING DIAGRAM FOR MORE INFORMATION.
5. SPRINKLERS AND SPRINKLER PIPING OUTSIDE OF STAIR ENCLOSURES ON ENCLOSURE LEVEL PLAN ARE REQUIRED FOR BASE BID PER NFPA 13 FOR COVERAGE BELOW OPEN GRATE FLOOR AT MEZZANINE LEVEL. IF SPRINKLERS AT ENCLOSURE LEVEL ARE NOT REQUIRED BY NFPA 13 FOR ALTERNATE BID #1, SUBCONTRACTOR SHALL ROUTE SPRINKLER PIPING MAIN THROUGH STAIR ENCLOSURE WALL AND CAP TO PROVIDE CONNECTION FOR FUTURE SPRINKLER PIPING BELOW FUTURE MEZZANINE LEVEL. SUBCONTRACTOR SHALL COORDINATE PENETRATION LOCATIONS WITH BASE BID MEZZANINE FLOOR GRATING ELEVATION. REFER TO SPECIFICATION SECTION 01230 FOR MORE INFORMATION.

NO.	REVISIONS

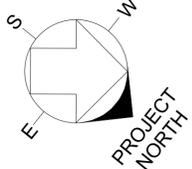
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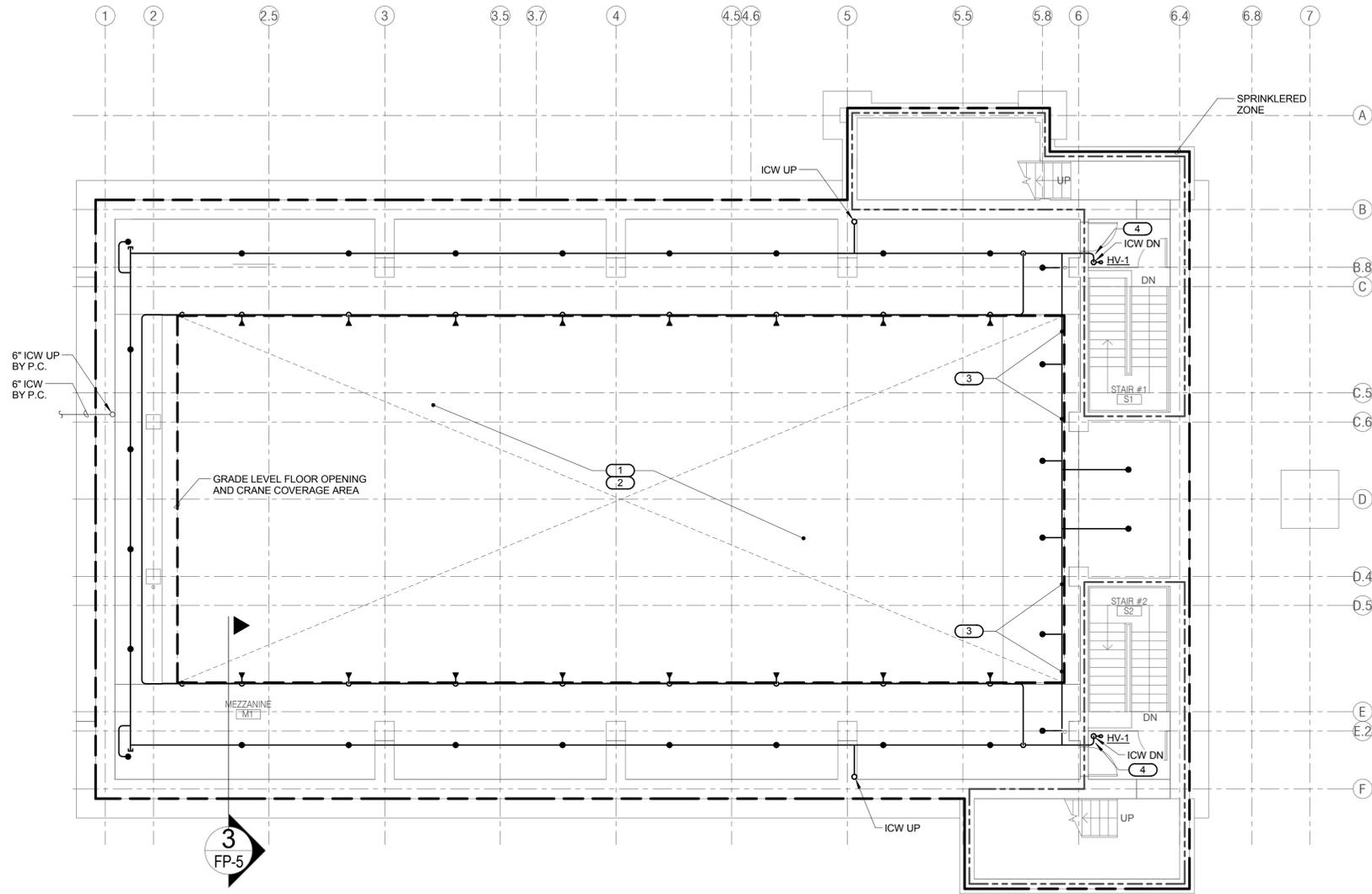


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**SBN FAR DETECTOR BUILDING**  
**ENCLOSURE LEVEL FIRE PROTECTION PLAN**

DRAWING NO. **6-7-93** **FP-2** REV. **0**

30 MAR. 2015



### MEZZANINE LEVEL FIRE PROTECTION PLAN

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

#### GENERAL SHEET NOTES

1. ALL SPRINKLERS AND PIPING SHOWN ON DRAWINGS IS DIAGRAMMATIC AND MAY NOT REFLECT ACTUAL INSTALLATION CONDITIONS. INSTALLATION, SPRINKLER HEAD QUANTITIES, AND SPRINKLER SPACING SHALL CONFORM TO NFPA 13 REQUIREMENTS. F.P.C. SHALL COORDINATE ALL FP PIPING AND SPRINKLER LOCATIONS WITH OTHER TRADES PRIOR TO INSTALLATION.
2. PROVIDE SPRINKLERS ABOVE AND BELOW STAIR LANDINGS PER NFPA 13.
3. SPRINKLERS SHALL BE INSTALLED UNDER FIXED OBSTRUCTIONS OVER 4'-0" WIDE INCLUDING BUT NOT LIMITED TO DUCTS AND OPEN GRATE FLOORING PER NFPA 13.
4. ALL SPRINKLERS ON MEZZANINE LEVEL SHALL BE STANDARD RESPONSE TYPE.

#### KEYNOTES (#)

1. SPRINKLERS AND SPRINKLER PIPING SHALL NOT CROSS OPENING IN GRADE LEVEL FLOOR ABOVE FAR DETECTOR. REFER TO ARCHITECTURAL DRAWINGS FOR MORE INFORMATION REGARDING OPENING, DETECTOR, CLEARANCES, AND OVERHEAD CRANE CLEARANCES.
2. AREA BELOW OPENING IN GRADE LEVEL FLOOR SHALL BE SERVED BY EXTENDED COVERAGE ORDINARY HAZARD HORIZONTAL SIDEWALL SPRINKLERS. SPRINKLERS SHALL BE LOCATED PER NFPA 13.
3. ROUTE SPRINKLER MAIN TIGHT TO NORTH WALL.
4. REFER TO 2/FP-5 FOR FIRE PROTECTION STANDPIPE PIPING DIAGRAM FOR MORE INFORMATION.

NO.	REVISIONS

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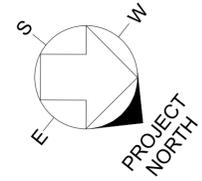
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**SCALE:**

1/8" = 1'-0"



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## SBN FAR DETECTOR BUILDING

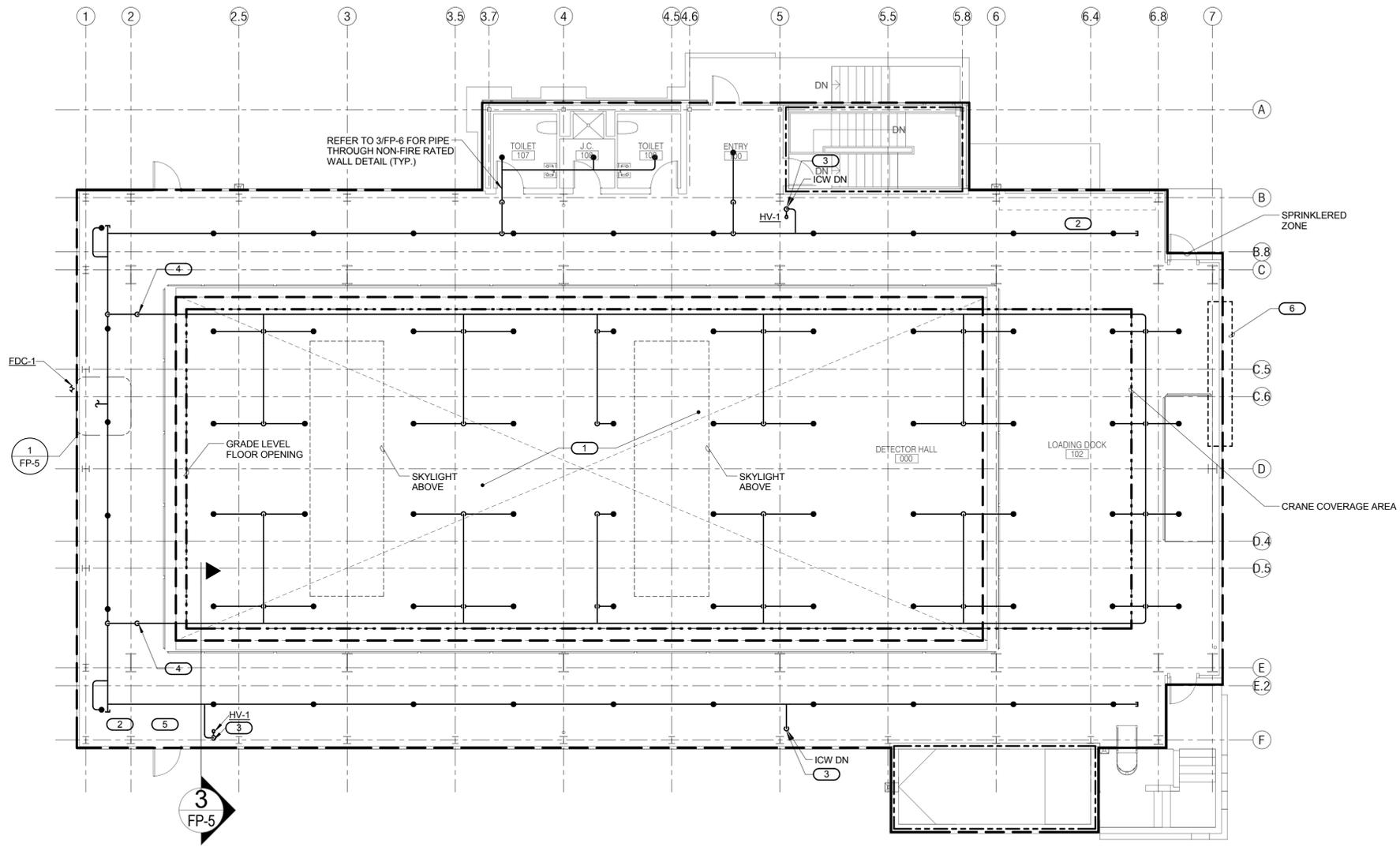
### MEZZANINE LEVEL FIRE PROTECTION PLAN

DRAWING NO. **6-7-93**

FP-3

REV. **0**

30 MAR. 2015



**GRADE LEVEL FIRE PROTECTION PLAN**

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

**GENERAL SHEET NOTES**

1. ALL SPRINKLERS AND PIPING SHOWN ON DRAWINGS IS DIAGRAMMATIC AND MAY NOT REFLECT ACTUAL INSTALLATION CONDITIONS. INSTALLATION, SPRINKLER HEAD QUANTITIES, AND SPRINKLER SPACING SHALL CONFORM TO NFPA 13 REQUIREMENTS. F.P.C. SHALL COORDINATE ALL FP PIPING AND SPRINKLER LOCATIONS WITH OTHER TRADES PRIOR TO INSTALLATION.
2. PROVIDE SPRINKLERS ABOVE AND BELOW STAIR LANDINGS PER NFPA 13.
3. SPRINKLERS SHALL BE INSTALLED UNDER FIXED OBSTRUCTIONS OVER 4'-0" WIDE INCLUDING BUT NOT LIMITED TO DUCTS AND OVERHEAD DOORS PER NFPA 13.
4. ALL SPRINKLERS ON GRADE LEVEL SHALL BE QUICK RESPONSE TYPE.

**KEYNOTES (#)**

1. REFER TO ARCHITECTURAL DRAWINGS FOR MORE INFORMATION REGARDING OVERHEAD CRANE CLEARANCES AND SKYLIGHT LOCATIONS. SPRINKLERS AND SPRINKLER PIPING IN HIGH ROOF AREA SHALL NOT BE ROUTED BELOW SKYLIGHTS.
2. COORDINATE SPRINKLERS AND PIPING WITH ELECTRIC UNIT HEATER BY M.C. SPRINKLERS AND PIPING SHALL NOT BE LOCATED WITHIN UNIT HEATER FAN THROW PATTERN.
3. REFER TO 2/FP-5 FOR FIRE PROTECTION STANDPIPE PIPING DIAGRAM FOR MORE INFORMATION.
4. ROUTE FP PIPING UP TO HIGH ROOF ELEVATION. PIPING SHALL AVOID CONFLICT WITH CRANE CLEARANCES.
5. COORDINATE LOCATION OF SPRINKLERS AND PIPING WITH OUTSIDE AIR LOUVER AND ASSOCIATED DUCTWORK BY M.C. SPRINKLERS AND PIPING SHALL NOT BE LOCATED WITHIN 10 FT OF OUTSIDE AIR DUCT OPENING LOCATION. SPRINKLER PIPING LOCATED WITHIN 30 FT OF OUTSIDE AIR DUCT OPENING SHALL BE INSULATED.
6. EXTERIOR WALL IS REMOVABLE TO PROVIDE A PATH FOR LARGE EQUIPMENT TO ENTER THE BUILDING. ALL PIPING ROUTED IN THIS AREA SHALL BE WITHIN STRUCTURAL JOIST SPACE.

NO.	REVISIONS

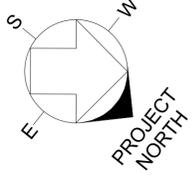
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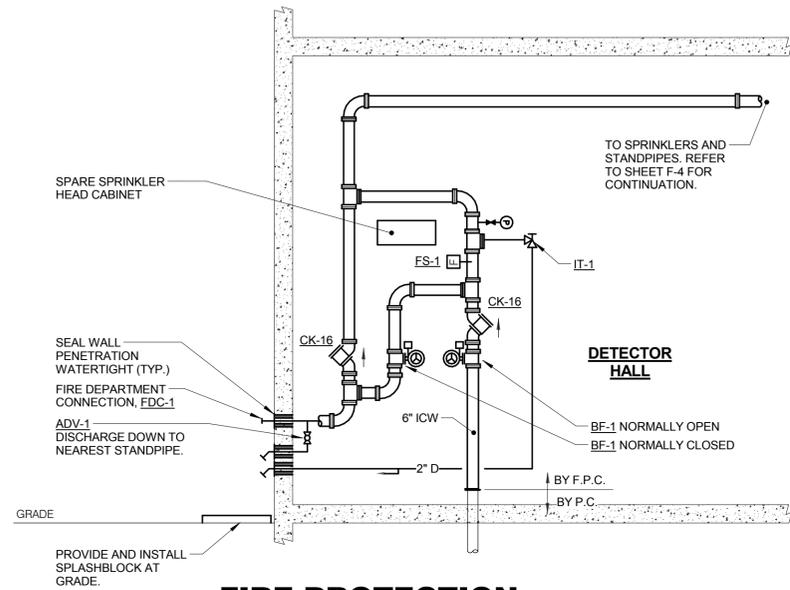
**SBN FAR DETECTOR BUILDING**  
**GRADE LEVEL FIRE PROTECTION PLAN**

DRAWING NO. **6-7-93** **FP-4** REV. **0**

30 MAR. 2015

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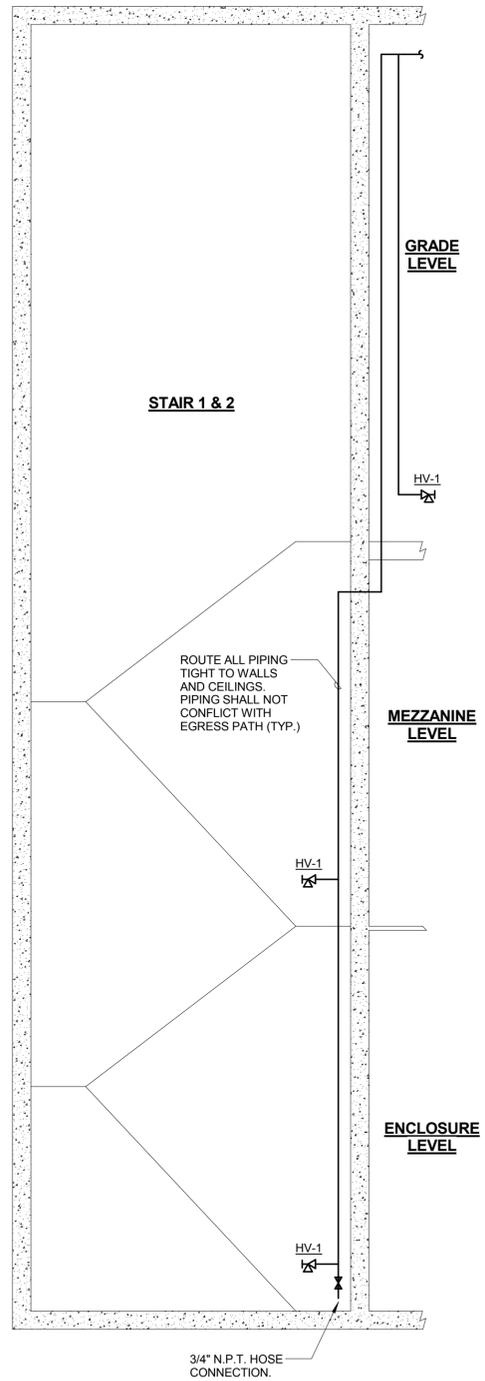
### FIRE PROTECTION RISER DIAGRAM

1

SCALE: NONE

NOTES:

1. SIZE ALL PIPING PER NFPA 13, INCLUDING THE SAFETY FACTOR STATED IN DOE-STD-1066-2012.
2. CONDUIT FROM MONITORING DEVICES SHALL BE ROUTED TO NEAREST FIRE ALARM ADDRESSABLE DATA CIRCUIT.



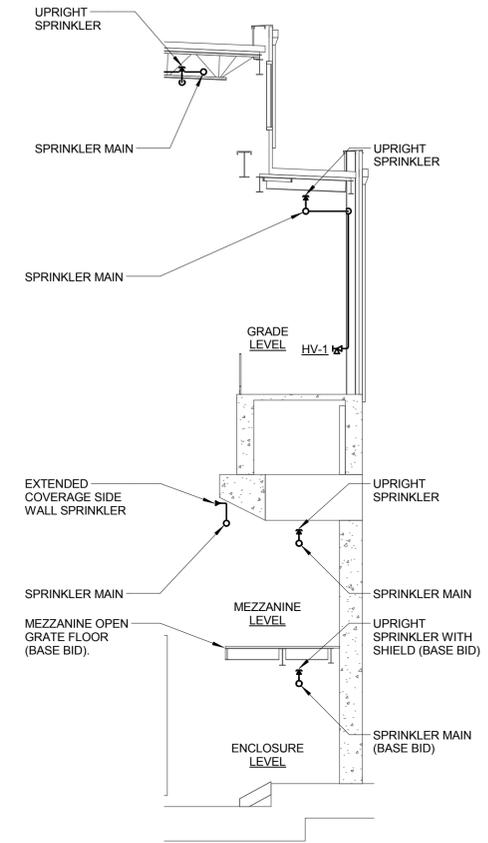
### FIRE PROTECTION STANDPIPE PIPING DIAGRAM

2

SCALE: NONE

NOTES:

1. REFER TO FLOOR PLAN DRAWINGS FOR EXACT LOCATIONS OF HOSE VALVES.
2. PIPING SHOWN IS DIAGRAMMATIC AND MAY NOT REFLECT ACTUAL INSTALLATION CONDITIONS.
3. PROVIDE SPRINKLERS ABOVE AND BELOW STAIR LANDINGS PER NFPA 13.



### SECTION DETAIL - TYPICAL SPRINKLER LOCATIONS

3

SCALE: NONE

NOTES:

1. REFER TO SHEET F-2 AND SPECIFICATION SECTION 01230 FOR ALTERNATE BID #1 SCOPE.

NO.	REVISIONS

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SUBMITTED		

SCALE:

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UNITED STATES DEPARTMENT OF ENERGY



**SBN FAR DETECTOR BUILDING**

**FIRE PROTECTION DETAILS**

DRAWING NO. **6-7-93**

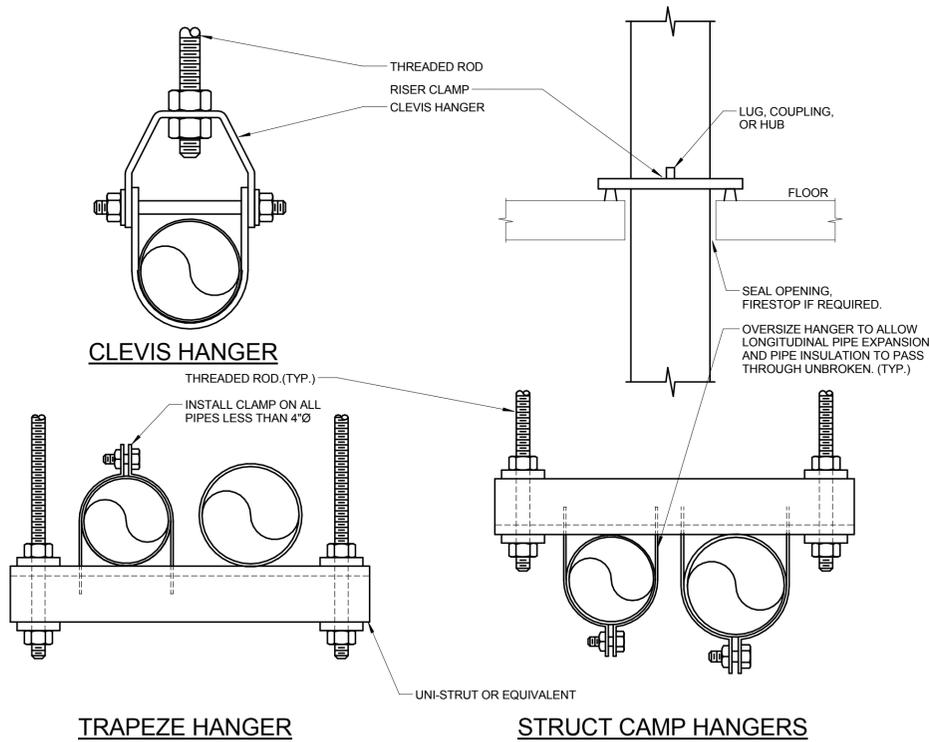
**FP-5** REV. **0**

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**FIRE SPRINKLER USAGE SCHEDULE**

AREA TYPE (NOTE 1 & 6)	AREA HAZARD (NOTE 7)	SPRINKLER					MANUFACTURER & MODEL	REMARKS
		SYMBOL (NOTES 4 & 8)	TYPE	RESPONSE	FINISH	TEMPERATURE °F		
GRADE LEVEL, UNFINISHED CEILINGS	SEE PLANS	SPR-1	PENDENT	QUICK	ROUGH BRASS	NOTE 2	VIKING VK, TYCO TY-FRB, VICTAULIC V2708	NOTE 3
GRADE LEVEL, UNFINISHED CEILINGS	SEE PLANS	SPR-2	UPRIGHT	QUICK	ROUGH BRASS	NOTE 2	VIKING VK, TYCO TY-FRB, VICTAULIC V2704	NOTE 3
GRADE LEVEL, FINISHED CEILINGS	SEE PLANS	SPR-3	CONCEALED	QUICK	WHITE	155	VIKING VK, TYCO RFI, VICTAULIC V3802	NOTES 3, 10
MEZZANINE & ENCLOSURE LEVEL	SEE PLANS	SPR-4	PENDENT	STANDARD	ROUGH BRASS	155	VIKING VK, TYCO TY-B, VICTAULIC V2707	NOTES 3, 8, 9, 10
MEZZANINE & ENCLOSURE LEVEL	SEE PLANS	SPR-5	UPRIGHT	STANDARD	ROUGH BRASS	155	VIKING VK, TYCO TY-B, VICTAULIC V2703	NOTES 3, 8, 9
MEZZANINE & ENCLOSURE LEVEL	SEE PLANS	SPR-6	SIDEWALL	STANDARD	ROUGH BRASS	155	VIKING VK, TYCO TY-B, VICTAULIC V2709	NOTES 3, 8, 9
BELOW OPEN GRATE MEZZANINE FLOOR	SEE PLANS	SPR-7	UPRIGHT WITH WATER SHIELD	STANDARD	ROUGH BRASS	155	VIKING VK, TYCO TY-B, VICTAULIC V2703	NOTES 3, 8, 9
MEZZANINE & ENCLOSURE LEVEL	SEE PLANS	SPR-8	SIDEWALL	STANDARD	ROUGH BRASS	155	VIKING VK, TYCO TY-B, VICTAULIC V2709	NOTES 3, 8, 9
MEZZANINE LEVEL AT FLOOR OPENING	SEE PLANS	SPR-9	EXTENDED COVERAGE SIDEWALL	STANDARD	ROUGH BRASS	155	TYCO SW-20 ECOH	NOTES 3, 9

- NOTES:**
- SEE FLOOR PLANS FOR ZONING REQUIREMENTS.
  - SPRINKLERS LOCATED NEAR UNIT HEATERS AND SKYLIGHTS SHALL BE 175°F, ALL OTHER SPRINKLERS SHALL BE 155°F.
  - ALL SPRINKLERS SHALL BE UL LISTED.
  - SUBCONTRACTOR TO VERIFY SPRINKLER REQUIREMENTS BASED ON ACTUAL INSTALLATION, USAGE, ARCHITECTURAL CEILING PLAN AND NFPA 13 REQUIREMENTS.
  - SYMBOL IS PRIMARILY FOR IDENTIFYING SPRINKLERS IN SUBMITTALS. IT MAY OR MAY NOT BE FOUND ELSEWHERE ON THE DRAWINGS. SUBCONTRACTOR TO SUBMIT ALL SPRINKLER TYPES TO BE USED.
  - AREAS ARE GENERAL IN NATURE. SUBCONTRACTOR TO MATCH UNSCHEDULED AREAS TO SIMILAR SPACES.
  - THE MINIMUM DESIGN DENSITY SHALL BE BASED ON ORDINARY HAZARD GROUP 1.
  - THE MINIMUM SPRINKLER SPACING SHALL BE 130 SQUARE FEET AND 100 SQUARE FEET FOR EXPERIMENTAL, ASSEMBLY, AND GENERAL INDUSTRIAL HIGH BAY AREAS.
  - THE MINIMUM SPRINKLER K-FACTOR SHALL BE 8.0 FOR EXPERIMENTAL, ASSEMBLY, AND GENERAL INDUSTRIAL HIGH BAY AREAS.
  - RETURN BENDS (ARM-OVERS) SHALL BE PROVIDED ON ALL PENDENT SPRINKLERS.

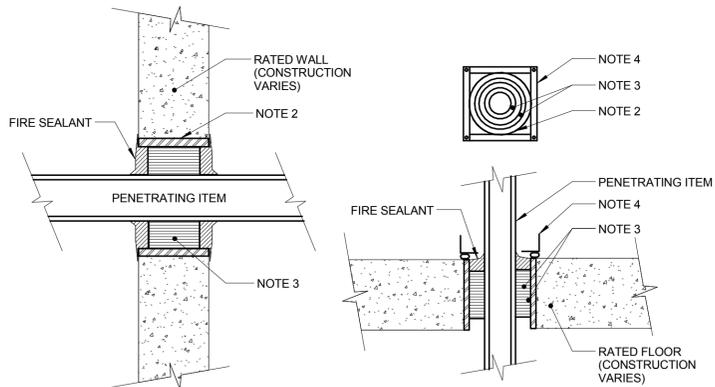


**PIPE SUPPORT DETAIL**

SCALE: NO SCALE

NOTES:

- REFER TO SPECIFICATION SECTION SECTION 15140.

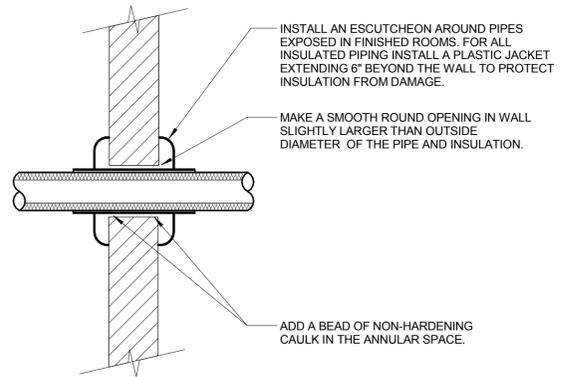


**RATED FIRE BARRIER PENETRATION**

SCALE: NO SCALE

NOTES:

- THIS GENERAL DETAIL APPLIES TO ALL ITEMS PENETRATING FIRE RATED WALLS OR FLOORS. THE INTENT IS TO MAINTAIN THE FIRE RATING AND TO ALLOW LONGITUDINAL MOVEMENT REFER TO SPECIFICATION SECTION 15080 FOR SELECTION OF THROUGH PENETRATION FIRE STOPPING.
- SCHEDULE 5 PIPE SLEEVE EMBEDDED IN WALL OR FLOOR, OR SMOOTH CORE DRILL. EACH SUBCONTRACTOR FURNISHES SLEEVE TO G.C. COORDINATES SLEEVE LOCATIONS AND DEBURS SLEEVE. G.C. BUILDS SLEEVE INTO WALL OR FLOOR ALLOWING NO GAP AROUND SLEEVE. IF SLEEVE IS NOT PROVIDED WHEN WALL OR FLOOR IS BUILT, SUBCONTRACTOR SHALL INSTALL SLEEVE. SLEEVE SIZE SHALL ALLOW ANNULAR SPACE REQUIRED BY THE SELECTED FIRE STOP SYSTEM.
- INSTALL BACKING MATERIAL, SUCH AS MINERAL WOOL SAFING, AS REQUIRED FOR FIRE STOP SYSTEM. INSTALL IN ACCORDANCE WITH FIRE STOP SYSTEM APPLICATION LISTING. SECURE TO WALL OR FLOOR TO ALLOW LONGITUDINAL MOVEMENT OF PENETRATING ITEM WITHOUT MOVEMENT OF FIRE BARRIER.
- WATER-TIGHT WELDED 1"x1" 20 GAUGE MINIMUM GALVANIZED SHEET METAL ANGLE FRAME, BY SUBCONTRACTOR IN EQUIPMENT ROOMS FOR WATER STOP. PLACE A BEAD OF WATERPROOF SEALANT BETWEEN FLOOR AND BOTTOM OF ANGLE FRAME. SECURE TO FLOOR WITH MASONRY ANCHORS IN CORNERS AND ON 12" MAXIMUM CENTERS. MULTIPLE PENETRATING ITEMS MAY BE ENCLOSED IN ONE FRAME.



**PIPE THROUGH NON-FIRE RATED WALL**

SCALE: NO SCALE

NOTES:

- THIS DETAIL APPLIES TO ALL PIPES. THE INTENTION IS TO CONTINUE THE INSULATION AND VAPOR BARRIER THROUGH ALL PENETRATIONS. PERMIT THERMAL EXPANSION WITHOUT DAMAGING INSULATION, AND TO SEAL AIRTIGHT AROUND INSULATED AND UNINSULATED PIPES FOR NOISE TRANSMISSION CONTROL.
- FLOOR OPENINGS ARE SIMILAR REFER TO SPECIFICATION SECTION 15140 FOR DIFFERENCES BETWEEN FLOOR AND WALL PENETRATIONS.
- REFER TO SPECIFICATION SECTIONS 15080 AND 15140 FOR ADDITIONAL INFORMATION.

FIRE PROTECTION MATERIAL LIST
THE SYMBOLS AND THE MATERIAL LIST ARE FOR THE CONVENIENCE OF THE SUBCONTRACTOR. SUBCONTRACTOR SHALL VERIFY QUANTITIES AND FURNISH ALL MATERIALS REQUIRED FOR FULLY OPERATIONAL SYSTEMS, WHETHER SPECIFIED OR NOT.
CATALOG NUMBERS SHALL NOT BE CONSIDERED COMPLETE, BUT ARE GIVEN AS AN AID TO THE SUBCONTRACTOR AND TO INDICATE THE QUALITY REQUIRED. SUBCONTRACTOR IS RESPONSIBLE FOR COMPLETE DESCRIPTION OF MATERIAL ON THESE DRAWINGS AND IN THE SPECIFICATIONS BEFORE ORDERING. THE DESCRIPTION OF THE MATERIAL TAKES PRECEDENCE OVER THE CATALOG NUMBER. THE FIRST LISTED MANUFACTURER IS THE BASIS OF DESIGN.
<b>ADV-1</b>
<b>DESCRIPTION:</b> AUTOMATIC DRIP VALVE, 175 PSI WP, BRASS BAR, STAINLESS STEEL SPRING AND RETAINING RING, CLOSING PRESSURE 13.5 PSI WITH INCREASING PRESSURE, OPENING PRESSURE 12.5 PSI WITH DECREASING PRESSURE, 1/2" NPT INLET AND 1/4" NPT DRAIN OUTLET.
<b>MANUFACTURER &amp; CATALOG NO.:</b> VIKING B-1, TYCO AD-1.
<b>AV-1</b>
<b>DESCRIPTION:</b> ANGLE VALVE, 1/2" TO 2", 175 PSI, BRONZE BODY, INTEGRAL SEAT, SOFT DISC, HANDWHEEL, THREADED, UL.
<b>MANUFACTURER &amp; CATALOG NO.:</b> UNITED 126S UL, NIBCO KT-67-UL / T-301-W, KENNEDY 98 SD, FPPI.
<b>BF-1</b>
<b>DESCRIPTION:</b> 2" TO 12" BUTTERFLY VALVE, 175 PSI WP, LUGGED OR GROOVED TYPE, IRON BODY, ALUMINUM BRONZE OR EPDM COATED IRON DISC, STAINLESS STEEL STEM AND SCREWS, EPDM SEAT, INTEGRAL MONITOR SWITCH, RATED FOR DEAD END SERVICE, UL/FM.
<b>MANUFACTURER &amp; CATALOG NO.:</b> GEM 8000FP, TYCO BFV, KENNEDY 01, NIBCO LD3510-8, GD-4765-8N, VICTAULIC 705-W, KENNEDY
<b>DESCRIPTION:</b> 1" TO 2-1/2" SLOW CLOSE BUTTERFLY VALVE, 175 PSI WP, BRONZE BODY, TYPE 304 STAINLESS STEEL ELASTOMER COATED DISK, SLOW CLOSE MANUAL OPERATOR WITH INTEGRAL TAMPER SWITCH, GROOVED OR THREADED ENDS, UL/FM.
<b>MANUFACTURER &amp; CATALOG NO.:</b> MILWAUKEE BB-SCS OR APPROVED EQUAL
<b>CK-16</b>
<b>DESCRIPTION:</b> 2-1/2" TO 12" SWING CHECK VALVE, 175 PSI WP, FLANGED OR GROOVED, IRON BODY, BRONZE MOUNTED, BRONZE SEAT RING AND RUBBER CLAPPER FACING, SWING TYPE, UL/FM.
<b>MANUFACTURER &amp; CATALOG NO.:</b> VIKING D-1/G-1, TYCO CV-1F, KENNEDY 126A OR 426, ANVILSTAR 78FP
<b>DESCRIPTION:</b> 1-1/2" TO 2" CHECK VALVE, 250 PSI WP, THREADED OR GROOVED, BRASS BODY, BRASS SEAT AND RUBBER CLAPPER FACING, SPRING LOADED IN-LINE TYPE, UL/FM.
<b>MANUFACTURER &amp; CATALOG NO.:</b> VIKING L-1/K-1.

FIRE PROTECTION MATERIAL LIST (CONTINUED)

<b>EDC-1</b>
<b>DESCRIPTION:</b> EXPOSED FIRE DEPT. INLET CONNECTION, POLISHED CHROME PLATED TWO-WAY INLET BODY WITH DROP CLAPPERS, PIN LUG SWIVELS, PLUGS, CHAINS, STAINLESS STEEL "LOCKING STORZ" FDC CAPS WITH MATCHING THREADS AND CHROME FINISH, "LOCKING STORZ" QUICK CONNECT WITH A 22-1/4" DEGREE ELBOW ON THE EXTERIOR INLET PIPE TO THE "LOCKING STORZ" CONNECTION. GASKET SHALL BE REMOVED FROM THE "LOCKING STORZ" STORZ CAP, POLISHED CHROME PLATED WALL PLATE LABELED "AUTO. SPR." 4" X 2-1/2" X 2-1/2". UL. THREADS TO MATCH FERMLAB FIRE DEPARTMENT.
SUBCONTRACTOR TO COORDINATE PURCHASE OF KNOX LOCKING CAP WITH FERMLAB FIRE DEPARTMENT.
<b>MANUFACTURER &amp; CATALOG NO.:</b> POTTER-ROEMER 5750 SERIES, CROKER 6430 SERIES, GUARDIAN 6124, ELKHART 156.
<b>ES-1</b>
<b>DESCRIPTION:</b> FLOW SWITCH - VANE TYPE FOR USE ON WET PIPE SPRINKLER SYSTEM TO DETECT A MINIMUM FLOW OF 10 GPM. TWO SINGLE POLE DOUBLE THROW SWITCHES WITH PNEUMATIC RETARD-ADJUSTABLE FROM 0-90 SECONDS WITH AUTOMATIC RESET, TAMPER RESISTANT METAL HOUSING, UL/FM.
<b>MANUFACTURER &amp; CATALOG NO.:</b> SYSTEM SENSOR WFD SERIES, POTTER ELECTRIC VSR-F.
<b>HV-1</b>
<b>DESCRIPTION:</b> 2-1/2" HOSE VALVE, ANGLE TYPE, CAST BRASS BODY AND TRIM, RISING STEM, CAP AND CHAIN, RED HAND WHEEL. HOSE THREADS TO MATCH LOCAL FIRE DEPARTMENT.
<b>MANUFACTURER &amp; CATALOG NO.:</b> POTTER-ROEMER 4060, CROKER 5035, ELKHART U-25, KENNEDY 936.
<b>IT-1</b>
<b>DESCRIPTION:</b> 2" COMBINATION INSPECTOR'S TEST AND DRAIN VALVE WITH INTEGRAL SIGHT GLASS, BALL VALVE WITH INTEGRAL LABELED PLATE SHOWING OFF-TEST-DRAIN POSITIONS, FURNISHED WITH TEST ORIFICE GIVING FLOW EQUIVALENT TO ONE SPRINKLER OF A TYPE HAVING THE SMALLEST ORIFICE INSTALLED ON THE SYSTEM, UL.
<b>MANUFACTURER &amp; CATALOG NO.:</b> AGF MODEL 1000.

NO.	REVISIONS

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CHECKED	<b>B. GARBRECHT</b>	<b>3/30/2015</b>
APPROVED		
SUBMITTED		

**SCALE:**

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



**SBN FAR DETECTOR BUILDING**  
**FIRE PROTECTION DETAILS & SCHEDULES**

DRAWING NO. **6-7-93**

**FP-6** REV. **0**

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**ONE LINE DIAGRAM NOTES**

- SCCR RATINGS LISTED FOR EQUIPMENT ARE MINIMUM REQUIREMENTS FOR BUS BRACING AND DEVICE RATING. ALL EQUIPMENT SHALL BE FULLY RATED UNLESS SPECIFICALLY NOTED AS SERIES RATED.
- INDICATES DIRECT CONNECTION OF GROUND CONDUCTOR TO GROUND BUS.
- INDICATES O.Z. GEDNEY OR EQUAL GROUND BUSHING BONDED TO GROUND BUS WITH CONDUCTOR SIZED TO MAXIMUM FEEDER GROUND CAPACITY.
- AF INDICATES MOLDED/INSULATED CASE BREAKER FRAME SIZE, FOR ADJUSTABLE TRIP BREAKERS.
- AT INDICATES MOLDED/INSULATED CASE BREAKER TRIP UNIT RATING, FOR ADJUSTABLE TRIP BREAKERS.
- [LSIG] INDICATES FEATURES PROVIDED WITH SOLID STATE CIRCUIT BREAKER. [LONG TIME (w/DELAY), SHORT TIME (w/DELAY), INSTANTANEOUS, GROUND FAULT].
- CONDUCTOR AND CONDUIT SIZES ON THE LINE AND LOAD SIDES OF ALL VFDs AND DISCONNECT SWITCHES SHALL BE IDENTICAL UNLESS NOTED OTHERWISE.
- INDICATES DIGITAL POWER MONITOR.
- INDICATES CURRENT TRANSFORMER.

**ABBREVIATION KEY**

ABBR:	DESCRIPTION:
AFF	ABOVE FINISHED FLOOR
C	CONDUIT
TYP	TYPICAL
+#	MOUNTING HEIGHT ABOVE FINISHED FLOOR
E.C.	ELECTRICAL CONTRACTOR
M.C.	MECHANICAL CONTRACTOR
P.C.	PLUMBING CONTRACTOR

ALL MATERIAL AND EQUIPMENT SHALL COMPLY WITH BUY AMERICAN ACT UNLESS APPROVED BY FERMLAB.

**ELECTRICAL SHEET INDEX**

- E-1 ELECTRICAL COVER SHEET
- E-2 ELECTRICAL SITE PLAN
- E-3 ENCLOSURE LEVEL GROUNDING PLAN
- E-4 MEZZANINE LEVEL GROUNDING PLAN
- E-5 BUILDING GROUNDING PLAN
- E-6 ENCLOSURE LEVEL POWER PLAN
- E-7 MEZZANINE LEVEL POWER PLAN
- E-8 GRADE LEVEL POWER PLAN
- E-9 ENCLOSURE LEVEL LIGHTING PLAN
- E-10 MEZZANINE LEVEL LIGHTING PLAN
- E-11 GRADE LEVEL LIGHTING PLAN
- E-12 ONE LINE DIAGRAM - NORMAL
- E-13 ONE LINE DIAGRAM - EMERGENCY
- E-14 ELECTRICAL DETAILS
- E-15 ELECTRICAL DETAILS
- E-16 ELECTRICAL DETAILS
- E-17 ELECTRICAL DETAILS
- E-18 PANEL SCHEDULES
- E-19 PANEL SCHEDULES
- E-20 PANEL SCHEDULES
- E-21 ELECTRICAL SCHEDULES
- E-22 ELECTRICAL SCHEDULES
- E-23 ELECTRICAL SCHEDULES

**FIRE ALARM SHEET INDEX**

- FA-1 ENCLOSURE LEVEL FIRE ALARM PLAN
- FA-2 MEZZANINE LEVEL FIRE ALARM PLAN
- FA-3 GRADE LEVEL FIRE ALARM PLAN
- FA-4 FIRE ALARM SCHEDULE AND DETAILS

**ELECTRICAL GENERAL NOTES**

- ~~###~~ INDICATES ELECTRICAL EQUIPMENT DEFINED IN ELECTRICAL SCHEDULES OR SPECIFICATION. REFER TO DRAWINGS CONTAINING ELECTRICAL SCHEDULES. PERMANENT NAMEPLATE SHALL MATCH FINAL EQUIPMENT NOMENCLATURE, NOT ELECTRICAL EQUIPMENT TAG NAME. REFER TO SPECIFICATIONS.
- "NL" INDICATES LUMINAIRE IS UNSWITCHED FOR NIGHT LIGHT.

**LUMINAIRE KEY:**

	F1 = FIXTURE TAG
	1 = CIRCUIT NUMBER
	a = SWITCH NUMBER
	NL = SUBSCRIPT (IF APPLICABLE)

\*IF LABEL IS ORIENTED HORIZONTALLY A SLASH WILL SEPARATE THIS INFORMATION.  
EX: F1 / 1 / A / NL

**DEVICE KEY:**

	A = MOUNTING (IF APPLICABLE)
	1 = CIRCUIT NUMBER

\*IF LABEL IS ORIENTED HORIZONTALLY A SLASH WILL SEPARATE THIS INFORMATION. EX: A / 1

**ELECTRICAL MOUNTING SUBSCRIPT KEY:**  
A MOUNT ABOVE COUNTER (+6" TO CENTERLINE ABOVE COUNTER OR BACKSPLASH)

**TELECOM ROOM ABBREVIATION KEY:**  
HC# HORIZONTAL CROSS-CONNECT

**LINE TYPE KEY:**  
 NEW WORK BY SUB-CONTRACTOR (DARK SOLID LINE)  
 NEW WORK UNDER FLOOR OR UNDERGROUND BY SUB-CONTRACTOR (DARK LONG DASHED LINE)  
 NEW WORK BY OTHERS AND/OR EXISTING TO REMAIN (LIGHT SOLID LINE)

**ELECTRICAL INSTALLATION NOTES**

- THE COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH THE ADA STANDARDS FOR ACCESSIBLE DESIGN.
- CIRCUIT NUMBERS ARE SHOWN FOR CIRCUIT IDENTIFICATION. CIRCUITING SHALL AGREE WITH NUMBERING ON THE PANEL PROVIDED. COMMON NEUTRALS MAY NOT BE USED FOR BRANCH CIRCUITS. BALANCE THE LOAD ON PANEL AS EVENLY AS POSSIBLE BETWEEN EACH PHASE.
- MOUNT ALL LIGHTING CONTROLS AT +42" FROM FLOOR (CENTERLINE DIMENSION), EXCEPT WHERE OTHERWISE NOTED. TOGGLE SWITCHES MAY BE SURFACE MOUNTED WHEN CONDUIT IS SPECIFIED EXPOSED.
- MOUNT ALL DUPLEX RECEPTACLES AND TELECOMMUNICATION OUTLETS AT +18" FROM FLOOR (CENTERLINE DIMENSION), EXCEPT WHERE OTHERWISE NOTED. RECEPTACLES AND OUTLETS MAY BE SURFACE MOUNTED WHEN CONDUIT IS SPECIFIED EXPOSED.
- ALL MATERIALS USED TO SEAL PENETRATIONS OF FIRE RATED WALLS AND FLOORS SHALL BE TESTED AND CERTIFIED AS A SYSTEM PER ASTM E814 STANDARDS FOR FIRE TESTS OF THROUGH-PENETRATION FIRESTOPS.
- MOUNT ALL FIRE ALARM PULL STATIONS AT +42" FROM FLOOR (CENTERLINE DIMENSION) EXCEPT WHERE OTHERWISE NOTED.
- INSTALL ALL WALL MOUNTED FIRE ALARM NOTIFICATION DEVICES AT 90" ABOVE FINISHED FLOOR OR 6" BELOW THE CEILING, WHICHEVER IS LOWER, EXCEPT WHERE OTHERWISE NOTED. HEIGHT SHALL BE MEASURED TO THE TOP OF THE DEVICE.
- SUB-CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL DETECTORS AND/OR SPEAKERS WITH LUMINAIRES, SPRINKLER, AND CEILING DIFFUSERS.
- SUB-CONTRACTOR SHALL VERIFY ALL EQUIPMENT LOCATIONS WITH ARCHITECTURAL PLANS, ELEVATIONS, AND REVIEWED SHOP DRAWINGS. PRIOR TO MAKING THE ACTUAL ELECTRICAL INSTALLATION, THIS SUB-CONTRACTOR SHALL ADJUST RECEPTACLES, OUTLETS, OR CONNECTION LOCATIONS TO ACCOMMODATE EQUIPMENT.
- ELECTRICAL AND TELECOMMUNICATIONS EQUIPMENT SHALL BE MOUNTED TO AVOID IMPEDANCE OF OPERATION OF AND/OR ACCESS TO ELECTRICAL AND MECHANICAL EQUIPMENT. ALL MOUNTING OF ELECTRICAL AND TELECOMMUNICATIONS EQUIPMENT, ON EQUIPMENT SUPPLIED BY ANOTHER SUB-CONTRACTOR, SHALL BE APPROVED IN ADVANCE BY THE OTHER SUB-CONTRACTOR.
- SUB-CONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPENINGS REQUIRED IN WALLS. ALL OPENINGS SHALL BE REPAIRED TO MATCH EXISTING BY A QUALIFIED SUB-CONTRACTOR AT THE EXPENSE OF THIS SUB-CONTRACTOR. ALL CONDUITS THROUGH WALLS SHALL BE GROUTED OR SEALED INTO OPENINGS.
- ALL WELDING SHALL BE ACCORDING TO AMERICAN WELDING SOCIETY STANDARDS. SUB-CONTRACTOR SHALL FURNISH TO THE FERMLAB CERTIFICATES QUALIFYING EACH WELDER, PRIOR TO START OF WORK. THE FERMLAB RESERVES THE RIGHT TO REQUIRE QUALIFYING DEMONSTRATION, AT THE SUB-CONTRACTOR'S EXPENSE, OF ANY WELDERS ASSIGNED TO THE JOB.
- FEEDER CONNECTION TO BRANCH PANELS AND CONNECTIONS TO TRANSFORMERS PRIMARY AND SECONDARY SHALL BE IN LIQUID TIGHT FLEXIBLE CONDUIT.
- FIRESTOPPING REFERS TO THE ITEMS SPECIFICALLY ADDRESSED IN DIVISION 16 DOCUMENTS. REFER TO THE INDIVIDUAL SPECIFICATION SECTIONS FOR INFORMATION SPECIFIC TO FIRESTOPPING.
- ALL "LADDER RACK" AND "CABLE TRAY" SIZES ARE AS DEFINED ON THE DRAWINGS. REFER TO SPECIFICATIONS SECTION 17110 FOR APPROVED MANUFACTURERS AND INSTALLATION REQUIREMENTS.

**FIRE BARRIER DESIGNATIONS**

THE SYMBOLS SHOWN ARE FOR THE CONVENIENCE OF THE SUB CONTRACTOR. THE SUB CONTRACTOR SHALL VERIFY RATINGS WITH THE LATEST SET OF ARCHITECTURAL PLANS AND FURNISH ALL MATERIALS REQUIRED TO COMPLY WITH THOSE RATINGS WHETHER SHOWN OR NOT.

ALL FLOOR, FLOOR CEILING, AND ROOF CEILING ASSEMBLIES SHALL BE DESIGNATED AS 2 HOUR FIRE BARRIER(S), UNLESS NOTED OTHERWISE ON THE PLANS. RATINGS WERE ACQUIRED FROM THE ARCHITECTURAL PLANS DATED 03/30/15.

2 HOUR FIRE BARRIER	
---------------------	--

NO.	REVISIONS

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CHECKED	J. LEESMAN	3/30/2015
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SUBMITTED		

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UNITED STATES DEPARTMENT OF ENERGY



**SBN FAR DETECTOR BUILDING**  
**ELECTRICAL COVER SHEET**

DRAWING NO. **6-7-93** **E-1** REV. 0

30 MAR. 2015

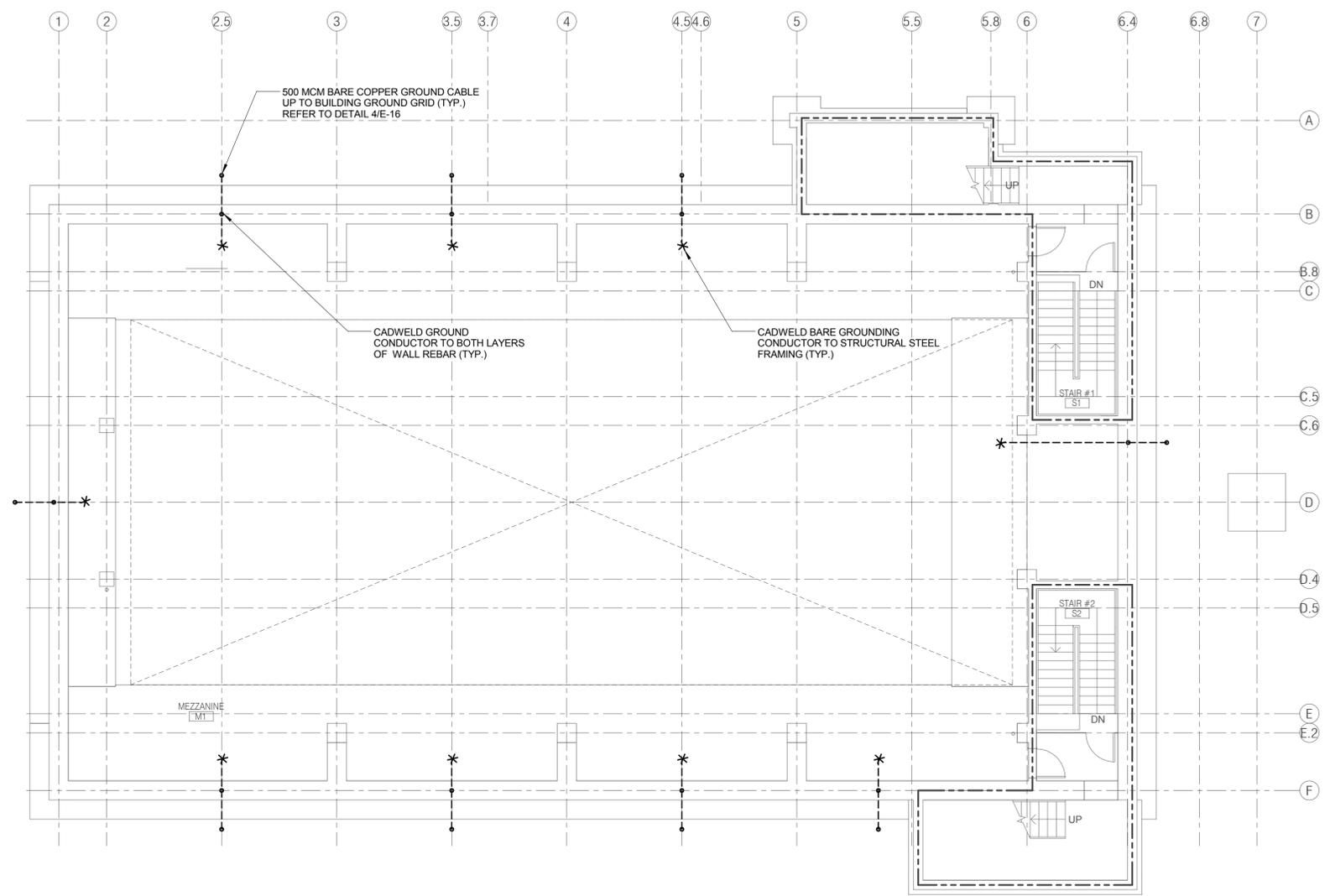




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BASE BID: COIL GROUNDING CONDUCTOR FOR FUTURE STRUCTURAL STEEL FRAMING.  
ALTERNATE #1: PROVIDE CADWELD CONNECTIONS TO STRUCTURAL STEEL FRAMING AS SHOWN.

**GENERAL SHEET NOTES**  
1. REFER TO SHEET E-1 FOR GENERAL ELECTRICAL NOTES AND ELECTRICAL INSTALLATION NOTES.  
2. REFER TO SHEET E-21 FOR GENERAL ELECTRICAL EQUIPMENT SCHEDULE.



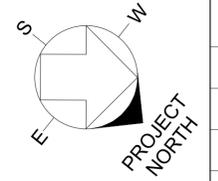
**MEZZANINE LEVEL GROUNDING PLAN**  
SCALE: 1/8" = 1'-0"

NO.	REVISIONS

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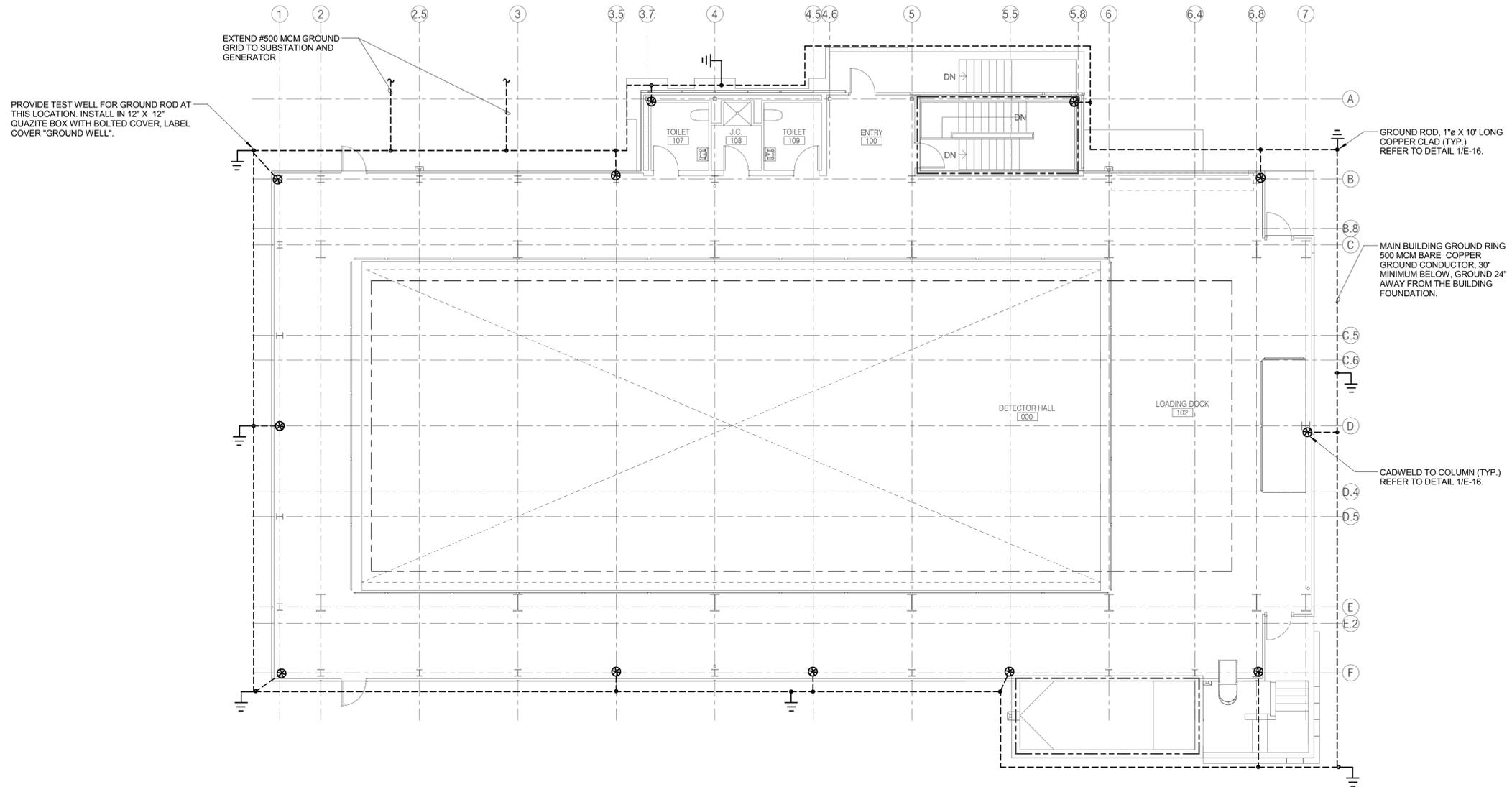
**SBN FAR DETECTOR BUILDING**  
**MEZZANINE LEVEL GROUNDING PLAN**

DRAWING NO. **6-7-93** **E-4** REV. **0**

30 MAR. 2015

**GENERAL SHEET NOTES**

1. REFER TO SHEET E-1 FOR GENERAL ELECTRICAL NOTES AND ELECTRICAL INSTALLATION NOTES.
2. REFER TO SHEET E-21 FOR GENERAL ELECTRICAL EQUIPMENT SCHEDULE.



**BUILDING GROUNDING PLAN**

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

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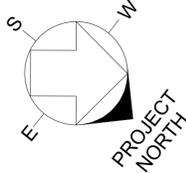
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**SCALE:**

1/8" = 1'-0"



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**SBN FAR DETECTOR BUILDING**

**BUILDING GROUNDING PLAN**

DRAWING NO. **6-7-93**

**E-5** REV. **0**

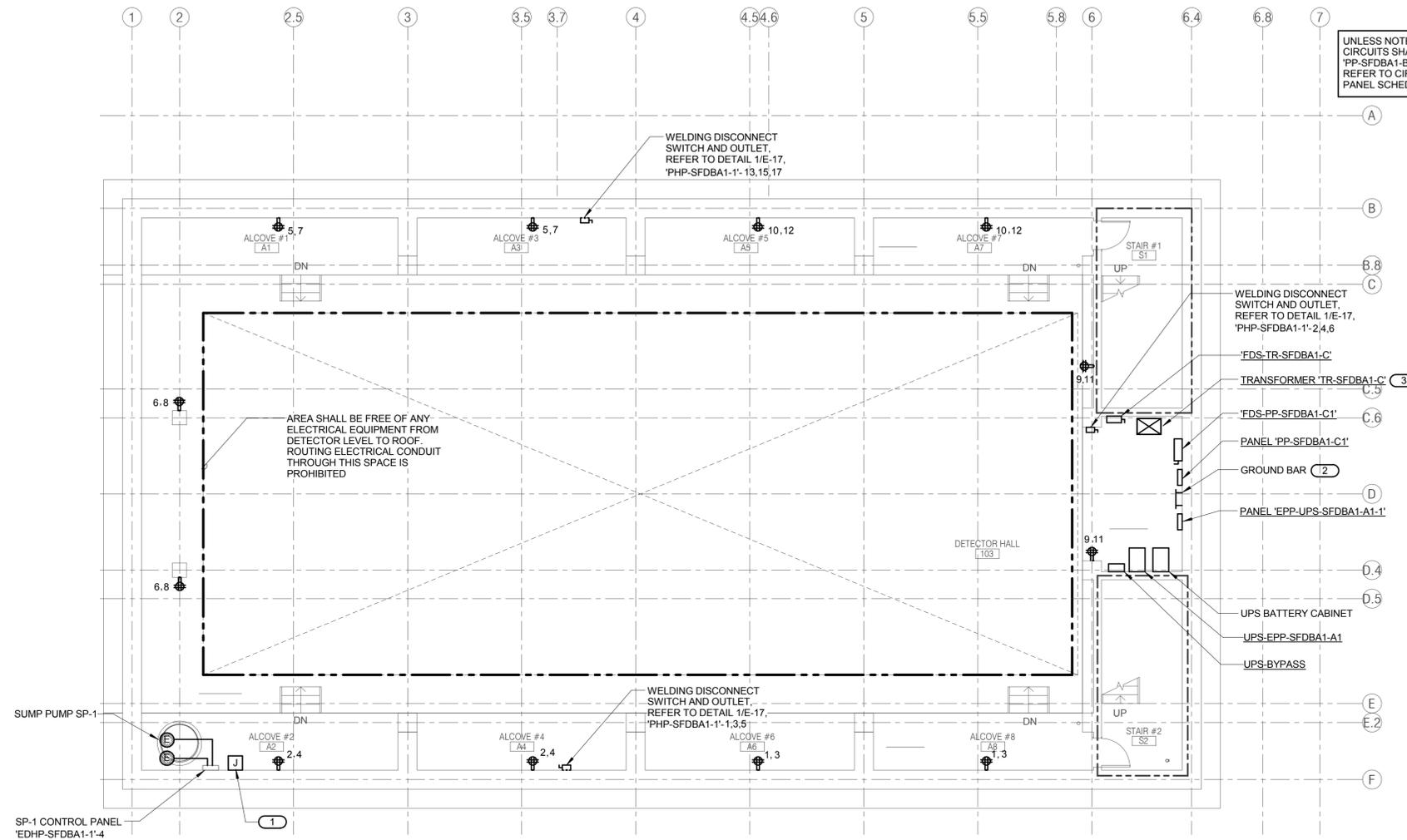
30 MAR. 2015

**GENERAL SHEET NOTES**

1. REFER TO SHEET E-1 FOR GENERAL ELECTRICAL NOTES AND ELECTRICAL INSTALLATION NOTES.
2. REFER TO SHEET E-18 THROUGH E-20 FOR PANEL SCHEDULES.
3. REFER TO SHEET E-23 FOR GENERAL ELECTRICAL EQUIPMENT SCHEDULE.
4. REFER TO SHEET E-22 FOR DISCONNECT AND STARTER SCHEDULE, VARIABLE FREQUENCY DRIVE SCHEDULE, TRANSFORMER SCHEDULE AND TRANSFER SWITCH SCHEDULE.
5. REFER TO SHEET E-12 AND E-13 FOR ELECTRICAL ONE LINE DIAGRAMS.

**KEYNOTES (#)**

1. ROUTE 1" EMPTY CONDUIT FROM SUMP PUMP CONTROL PANEL TO THE GRADE LEVEL ENTRY 100 FOR FIRUS CONNECTION BY FERMLAB.
2. REFER TO GROUND BAR DETAIL 2/E-16.
3. INSTALL TRANSFORMER ON THE WALL.



UNLESS NOTED OTHERWISE ALL 120V RECEPTACLES CIRCUITS SHALL BE CONNECTED TO NORMAL PANEL 'PP-SFDBA1-B1' (PANEL LOCATED ON GRADE LEVEL). REFER TO CIRCUIT NUMBER NEXT TO RECEPTACLE AND PANEL SCHEDULE FOR ADDITIONAL INFORMATION.

**ENCLOSURE LEVEL POWER PLAN**

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

NO.	REVISIONS

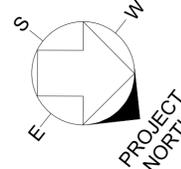
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**SBN FAR DETECTOR BUILDING**  
**ENCLOSURE LEVEL POWER PLAN**

DRAWING NO. **6-7-93**

**E-6** REV. **0**

BASE BID: MOVE DISCONNECT SWITCHES, PANELS, TRANSFORMERS, GROUND BARS TO THE ENCLOSURE LEVEL.  
ALTERNATE #1: INSTALL AS SHOWN.

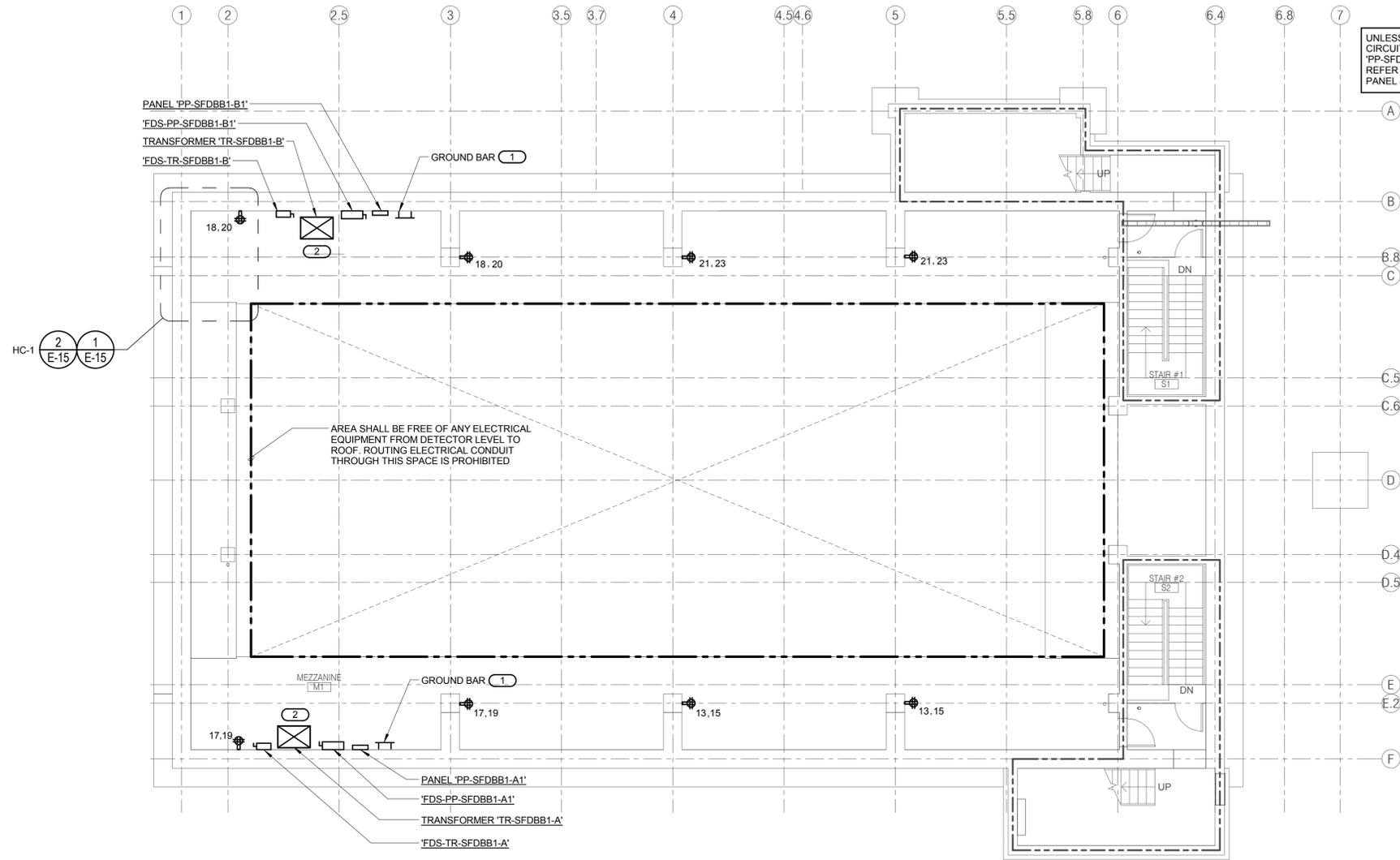
### GENERAL SHEET NOTES

1. REFER TO SHEET E-1 FOR GENERAL ELECTRICAL NOTES AND ELECTRICAL INSTALLATION NOTES.
2. REFER TO SHEET E-18 THROUGH E-20 FOR PANEL SCHEDULES.
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5. REFER TO SHEET E-12 AND E-13 FOR ELECTRICAL ONE LINE DIAGRAMS.

### KEYNOTES (#)

1. REFER TO GROUND BAR DETAIL 2/E-16.
2. MOUNT TRANSFORMER ON THE WALL. REFER TO DETAIL 3/E-17.

UNLESS NOTED OTHERWISE ALL 120V RECEPTACLES SHALL BE CONNECTED TO NORMAL PANEL 'PP-SFDBA1-B1' (PANEL LOCATED ON GRADE LEVEL). REFER TO CIRCUIT NUMBER NEXT TO RECEPTACLE AND PANEL SCHEDULE FOR ADDITIONAL INFORMATION.



## MEZZANINE LEVEL POWER PLAN

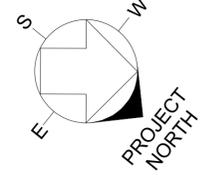
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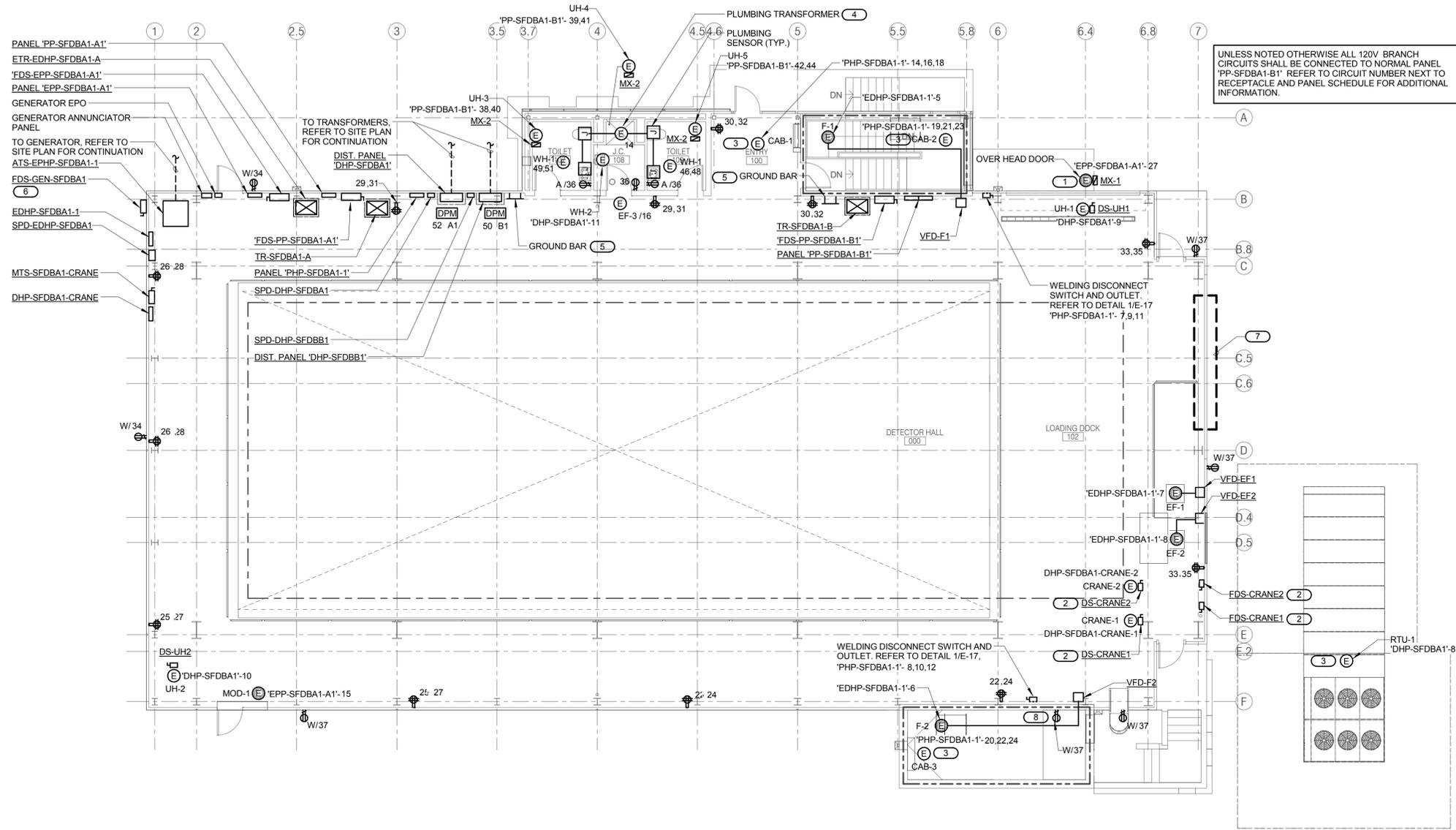


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UNITED STATES DEPARTMENT OF ENERGY

**SBN FAR DETECTOR BUILDING**  
**MEZZANINE LEVEL POWER PLAN**

DRAWING NO. **6-7-93** **E-7** REV. 0

30 MAR. 2015



- GENERAL SHEET NOTES**
- REFER TO SHEET E-1 FOR GENERAL ELECTRICAL NOTES AND ELECTRICAL INSTALLATION NOTES.
  - REFER TO SHEET E-18 THROUGH E-20 FOR PANEL SCHEDULES.
  - REFER TO SHEET E-23 FOR GENERAL ELECTRICAL EQUIPMENT SCHEDULE.
  - REFER TO SHEET E-22 FOR DISCONNECT AND STARTER SCHEDULE, VARIABLE FREQUENCY DRIVE SCHEDULE, TRANSFORMER SCHEDULE AND TRANSFER SWITCH SCHEDULE.
  - REFER TO SHEET E-12 AND E-13 FOR ELECTRICAL ONE LINE DIAGRAMS.
  - INSTALL WALL MOUNTED ELECTRICAL GEAR (PANELS, DISCONNECT SWITCHES, ATS, ETC.) ON UNISTRUT.
  - INSTALL TRANSFORMERS ON 3 1/2" CONCRETE HOUSE KEEPING PAD.

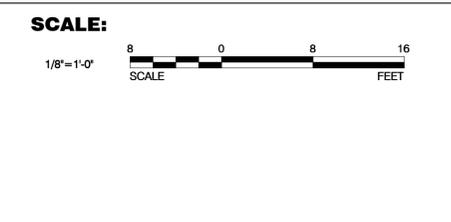
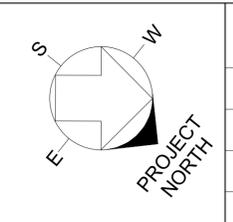
- KEYNOTES**
- WIRE OVERHEAD DOOR MOTOR. PROVIDE CONDUIT AND WIRE FOR DOOR CONTROLS PER MANUFACTURER REQUIREMENTS. COORDINATE LOCATIONS WITH EQUIPMENT SUPPLIER.
  - COORDINATE DISCONNECT LOCATIONS WITH CRANE APPROVED SHOP DRAWING PRIOR TO ROUGH-IN. FUSED DISCONNECT SHALL BE MOUNTED ON WALL. NON FUSED SHALL BE MOUNTED HIGH BY THE CRANE.
  - DISCONNECT PROVIDED WITH MECHANICAL EQUIPMENT.
  - TRANSFORMER FOR PLUMBING SENSORS PROVIDED BY P.C. INSTALLED AND WIRED BY E.C. E.C. SHALL ROUTE 3/4" C. FROM TRANSFORMER TO EACH SENSOR. P.C. TO INSTALL AND WIRE LOW VOLTAGE CABLE. COORDINATE LOCATION WITH P.C.
  - REFER TO GROUND BAR DETAIL 2/E-16.
  - FUSED DISCONNECT SWITCH FOR THE CONNECTION OF PORTABLE GENERATOR TO SERVE THE CRANES.
  - REMOVABLE WALL. DO NOT ROUTE CONDUITS THROUGH THIS SPACE.
  - MOUNT RECEPTACLE INSIDE BY THE ACCESS TO THE CRANE. COORDINATE LOCATION WITH FERMILAB.

**GRADE LEVEL POWER PLAN**

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

NO.	DATE	REVISIONS

	FERMI LAB	DATE
DESIGNED	<b>T. BALA</b>	<b>3/30/2015</b>
DRAWN	<b>M. WELLS</b>	<b>3/30/2015</b>
CHECKED	<b>J. LEESMAN</b>	<b>3/30/2015</b>
APPROVED		
SUBMITTED		



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**SBN FAR DETECTOR BUILDING**

**GRADE LEVEL POWER PLAN**

DRAWING NO. **6-7-93** **E-8** REV. **0**

30 MAR. 2015

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BASE BID: INSTALL FIXTURES ON THE WALL.  
 ALTERNATE #1: INSTALL FIXTURES AS SHOWN TO THE BOTTOM OF MEZZANINE STEEL STRUCTURE.

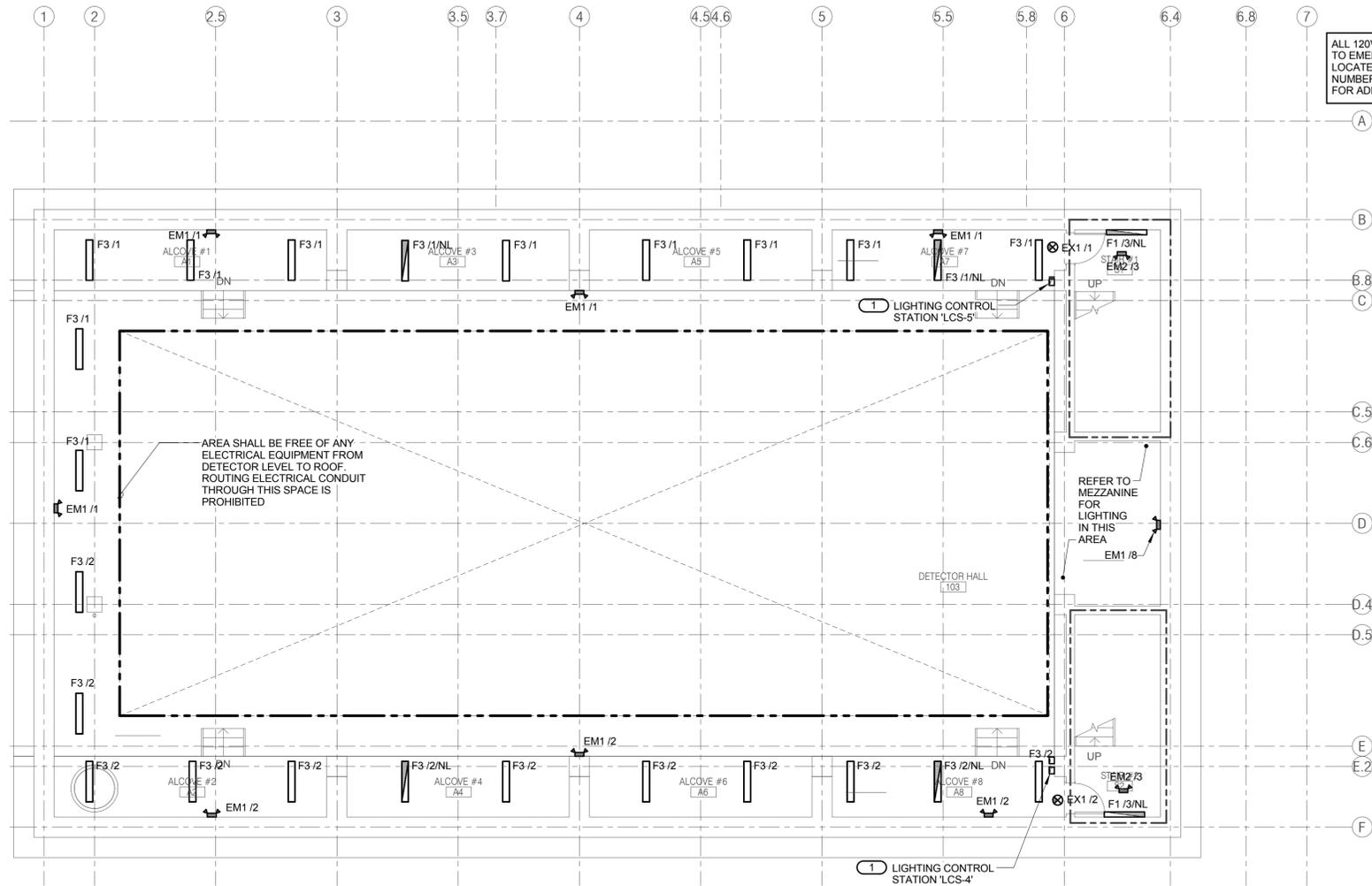
ALL 120V BRANCH CIRCUITS SHALL BE CONNECTED TO EMERGENCY PANEL 'EPP-SFDBA1-A1' (PANEL LOCATED ON GRADE LEVEL). REFER TO CIRCUIT NUMBER NEXT TO LUMINAIRE AND PANEL SCHEDULE FOR ADDITIONAL INFORMATION.

**GENERAL SHEET NOTES**

- REFER TO SHEET E-1 FOR GENERAL ELECTRICAL NOTES AND ELECTRICAL INSTALLATION NOTES.
- REFER TO SHEET E-18 THROUGH E-20 FOR PANEL SCHEDULES.
- REFER TO SHEET E-23 FOR GENERAL ELECTRICAL EQUIPMENT SCHEDULE.
- REFER TO SHEET E-21 FOR LUMINAIRE SCHEDULE.
- CONNECT EMERGENCY LIGHTING, EXIT SIGNS AND NIGHT LIGHT TO UNSWITCHED LEG OF THE NORMAL LIGHTING CIRCUIT UPSTREAM OF LIGHTING CONTROL.
- REFER TO ARCHITECTURAL ELEVATIONS FOR LIGHTING FIXTURES MOUNTING HEIGHTS.

**KEYNOTES ( # )**

- REFER TO 1/E-14 FOR LIGHTING CONTROL RELAY PANEL CONTROL DIAGRAM 'LCP-SFDB'.



**ENCLOSURE LEVEL LIGHTING PLAN**

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

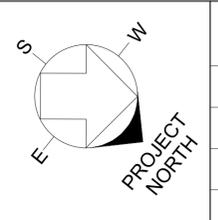
NO.	REVISIONS

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 Illinois Design Firm Registration #154-000973

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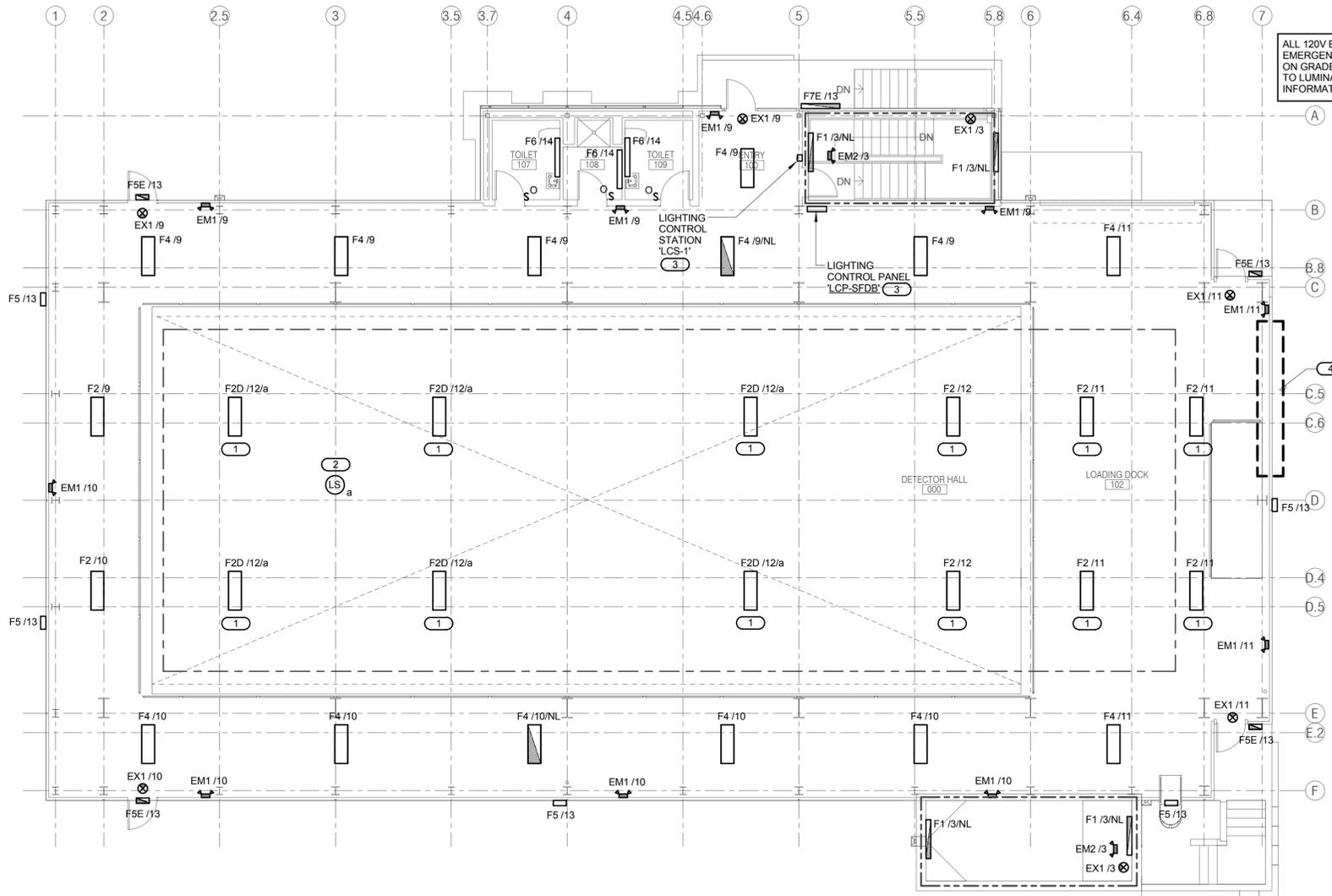
**SBN FAR DETECTOR BUILDING**  
**ENCLOSURE LEVEL LIGHTING PLAN**

DRAWING NO. **6-7-93** **E-9** REV. **0**

30 MAR. 2015



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**GENERAL SHEET NOTES**

1. REFER TO SHEET E-1 FOR GENERAL ELECTRICAL NOTES AND ELECTRICAL INSTALLATION NOTES.
2. REFER TO SHEET E-18 THROUGH E-20 FOR PANEL SCHEDULES.
3. REFER TO SHEET E-23 FOR GENERAL ELECTRICAL EQUIPMENT SCHEDULE.
4. REFER TO SHEET E-21 FOR LUMINAIRE SCHEDULE.
5. CONNECT EMERGENCY LIGHTING, EXIT SIGNS AND NIGHT LIGHT TO UNSWITCHED LEG OF THE NORMAL LIGHTING CIRCUIT UPSTREAM OF LIGHTING CONTROL.
6. REFER TO ARCHITECTURAL ELEVATIONS FOR LIGHTING FIXTURES MOUNTING HEIGHTS.

**KEYNOTES (#)**

1. MOUNT FIXTURES ABOVE THE CRANE, TIGHT TO THE CEILING.
2. COORDINATE LOCATION WITH MANUFACTURER. DAYLIGHT SENSOR SHALL CONTROL ALL F2D FIXTURES. CONNECT DOWNSTREAM OF THE LIGHTING CONTROL PANEL RELAY.
3. REFER TO 1/E-14 FOR LIGHTING CONTROL RELAY PANEL CONTROL DIAGRAM 'LCP-SFDB'.
4. REMOVABLE WALL. DO NOT ROUTE CONDUITS THROUGH THIS SPACE.

**GRADE LEVEL LIGHTING PLAN**

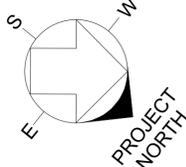
SCALE: 1/8" = 1'-0"

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NO.	REVISIONS

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CHECKED	<b>J. LEESMAN</b>	<b>3/30/2015</b>
APPROVED		
SUBMITTED		



**SCALE:**



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UNITED STATES DEPARTMENT OF ENERGY



**SBN FAR DETECTOR BUILDING**  
**GRADE LEVEL LIGHTING PLAN**

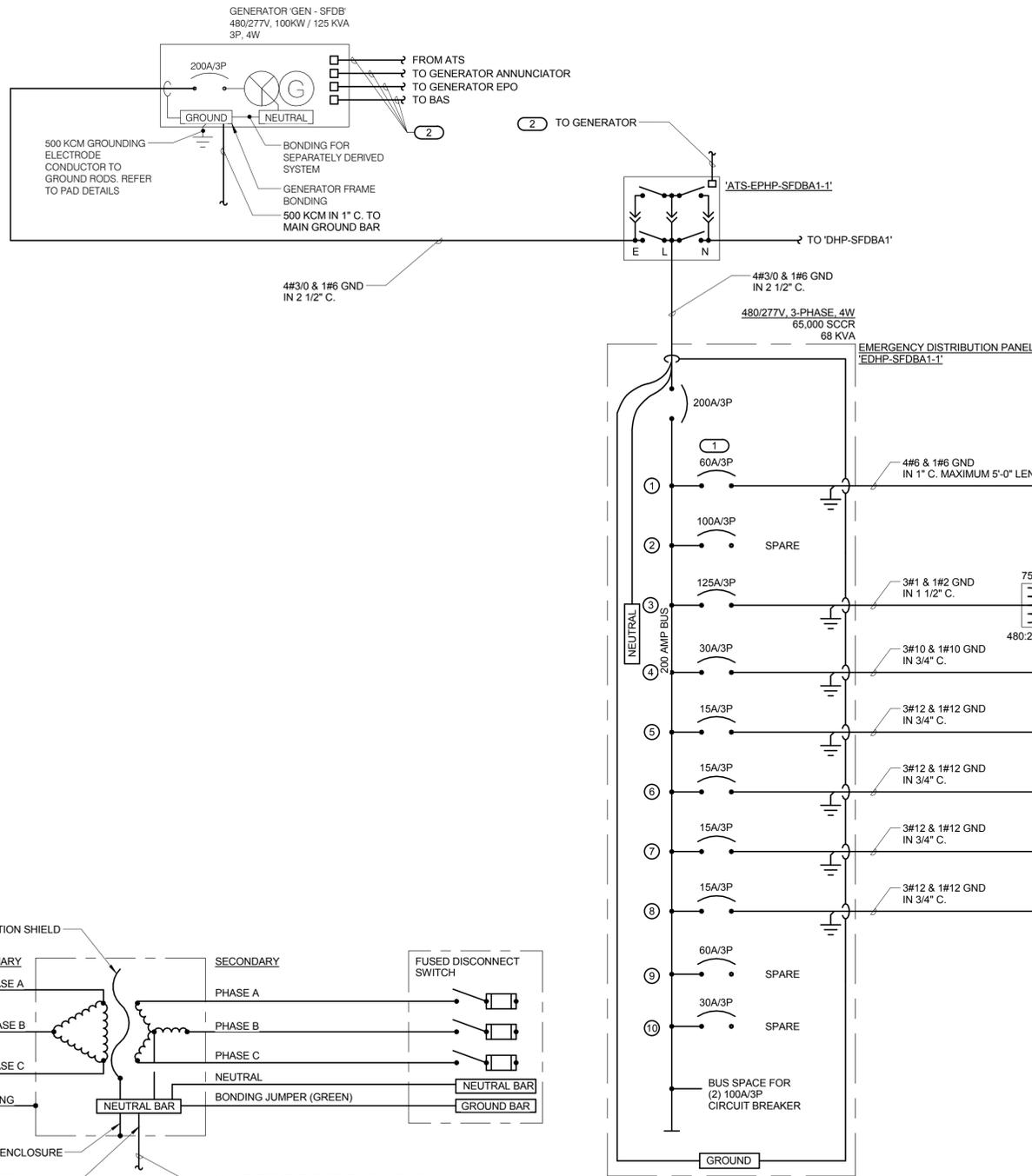
DRAWING NO. **6-7-93**

**E-11** REV. **0**

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**TRANSFORMER WIRING DETAIL**

NO SCALE

**ONE LINE DIAGRAM - EMERGENCY**

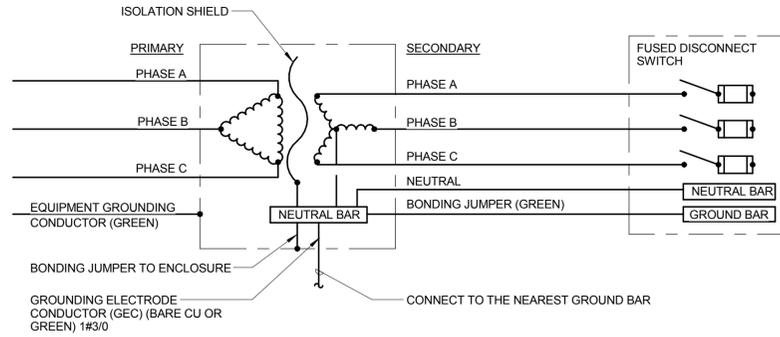
NO SCALE

**GENERAL SHEET NOTES**

1. REFER TO SHEET E-1 FOR GENERAL ELECTRICAL NOTES, ELECTRICAL INSTALLATION NOTES AND ONE LINE DIAGRAM NOTES.
2. REFER TO SHEET E-18 THROUGH E-20 FOR PANEL SCHEDULES.
3. REFER TO SHEET E-23 FOR GENERAL ELECTRICAL EQUIPMENT SCHEDULE.
4. REFER TO SHEET E-22 FOR DISCONNECT AND STARTER SCHEDULE, VARIABLE FREQUENCY DRIVE SCHEDULE, TRANSFORMER SCHEDULE AND TRANSFER SWITCH SCHEDULE.
5. ALL CIRCUIT BREAKERS SHALL HAVE FACTORY INSTALLED PERMANENTLY MOUNTED LOCKS.

**KEYNOTES (#)**

1. VERIFY CIRCUIT BREAKER AND WIRE SIZE WITH SPD MANUFACTURER.
2. ROUTE CONTROL WIRING PER MANUFACTURER REQUIREMENTS IN CONDUIT.
3. REFER TO TRANSFORMER WIRING DETAIL 2/E-13.



**TRANSFORMER WIRING DETAIL**

NO SCALE

**ONE LINE DIAGRAM - EMERGENCY**

NO SCALE

NO.	REVISIONS

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UNITED STATES DEPARTMENT OF ENERGY



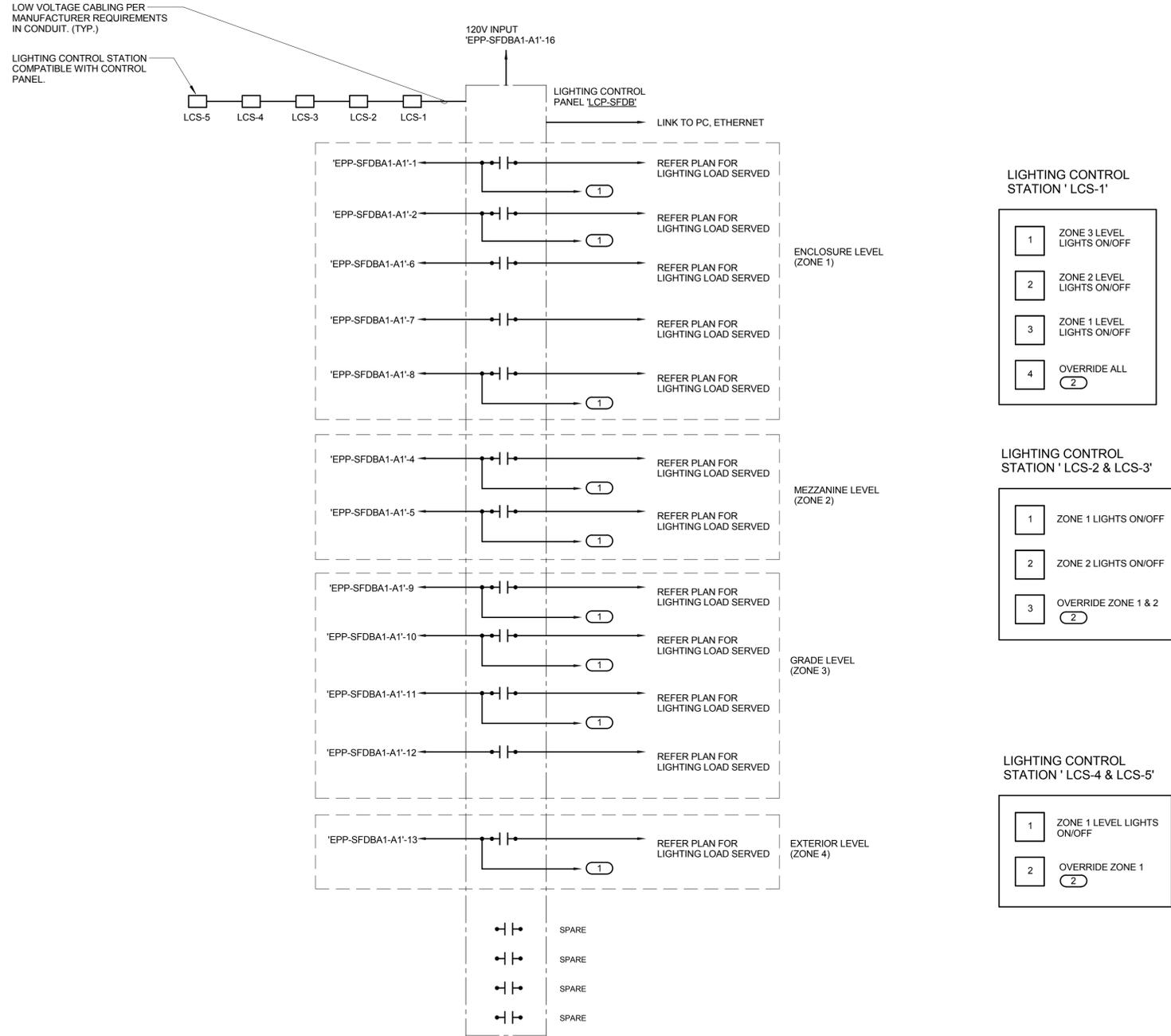
**SBN FAR DETECTOR BUILDING**

**ONE LINE DIAGRAM - EMERGENCY**

DRAWING NO. **6-7-93**

**E-13** REV. 0

30 MAR. 2015



**NOTES:**

- COORDINATE ALL WIRING REQUIREMENTS AND INTERFACES TO EXTERNAL DEVICES WITH EQUIPMENT MANUFACTURER AND APPROVED SHOP DRAWINGS.
- COORDINATE ALL SCHEDULING WITH OWNER.
- PROVIDE LIGHTING CONTROL SOFTWARE UNITY 2.2 AND PROGRAMMING.

**KEYNOTES:**

- 1 TO EXIT SIGNS, EMERGENCY LIGHTS AND NIGHT LIGHTS.
- 2 AFTER HOURS OVERRIDE SHALL BE SET TO MAXIMUM 2 HOURS. LIGHTS SHALL BLINK 1 MINUTE PRIOR TO TURNING OFF.

**LIGHTING CONTROL RELAY PANEL CONTROL DIAGRAM LCP-SFDB**

NO SCALE

NO.	REVISIONS

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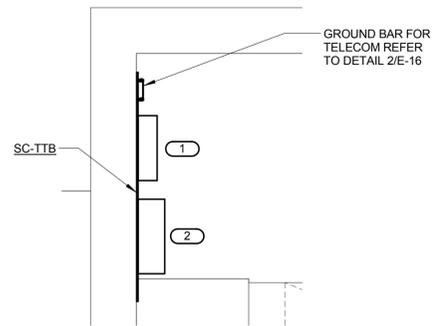


**SBN FAR DETECTOR BUILDING**

**ELECTRICAL DETAILS**

DRAWING NO. **6-7-93**

**E-14** REV. 0



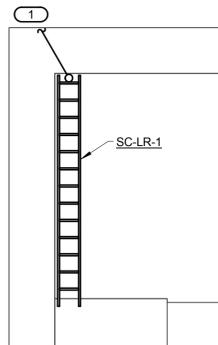
### TELECOM EQUIPMENT LAYOUT

1/4" = 1'-0" LE  
NOTES:

1. REFER TO E-23 FOR ELECTRICAL EQUIPMENT SCHEDULE.

KEYNOTES: ( # )

1. SPACE RESERVED FOR FUTURE LIGHTNING PROTECTION AND COPPER DEMARCATION.
2. SPACE RESERVED FOR FUTURE FIBER DISTRIBUTION CABINET.



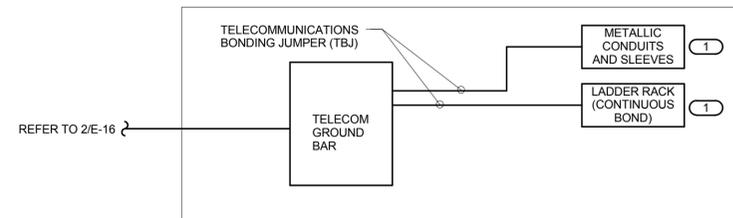
### TELECOM EQUIPMENT PATHWAY

1/4" = 1'-0" LE  
NOTES:

1. REFER TO E-23 FOR ELECTRICAL EQUIPMENT SCHEDULE.

KEYNOTES: ( # )

1. INCOMING TELECOM PATHWAYS ROUTED FROM GRADE LEVEL. REFER TO SITE PACKAGE DRAWING FOR CONTINUATION.



### TYPICAL TELECOM ROOM BONDING FLOW DIAGRAM

NO SCALE  
NOTES:

1. THIS FLOW DIAGRAM IS DIAGRAMMATIC AND MAY NOT SHOW ACTUAL ROUTING OR QUANTITIES OF MATERIALS. THIS FLOW DIAGRAM IS SHOWN FOR CLARIFICATION OF CONNECTION LOCATIONS AND CONDUCTOR TYPE. ALL CONNECTIONS AND SYSTEM DEVICES SHOWN ARE TYPICAL AND NOT REPRESENTATIVE OF ACTUAL PROJECT QUANTITIES. REFER TO FLOOR PLANS AND ENLARGED FLOOR PLANS FOR ACTUAL QUANTITIES AND LOCATIONS OF DEVICES AND MORE SPECIFIC ROUTING INFORMATION. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. ALL CONDUCTORS IN THE TECHNOLOGY BONDING SYSTEM SHALL BE MINIMUM SIZE OF 3/0 AWG COPPER (GREEN OR MARKED WITH A DISTINCTIVE GREEN COLOR) UNLESS CONDUCTOR LENGTH IS LESS THAN 66 FEET. REFER TO BONDING CONDUCTOR SIZING SCHEDULE FOR SIZING CRITERIA FOR CONDUCTORS LESS THAN 66 FEET IN LENGTH. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. ALL BONDING CONDUCTORS AND BONDING JUMPERS SHALL BE CONNECTED BY COMPRESSION LUGS, EXOTHERMIC WELDING, OR IRREVERSIBLE COMPRESSION CONNECTORS. SOLDER IS NOT AN ACCEPTABLE MEANS OF CONNECTION. SHEET METAL SCREWS SHALL NOT BE USED TO CONNECT COMMUNICATIONS BONDING CONDUCTORS TO EQUIPMENT. WHERE NECESSARY, REMOVE PAINT AND/OR USE PAINT-PIERCING WASHERS TO PROVIDE PROPER ELECTRICAL BOND AT ALL CONNECTIONS.

KEYNOTES:

1. INCLUDES HORIZONTAL AND VERTICAL CONDUIT SLEEVES FOR TECHNOLOGY CABLING.

BONDING CONDUCTOR SIZING SCHEDULE	
CONDUCTOR LENGTH IN FEET	MINIMUM ACCEPTABLE SIZE - AWG
LESS THAN 13'	6
14' - 20'	4
21' - 26'	3
27' - 33'	2
34' - 41'	1
42' - 52'	1/0
53' - 66'	2/0
GREATER THAN 66'	3/0

NO.	REVISIONS

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APPROVED		
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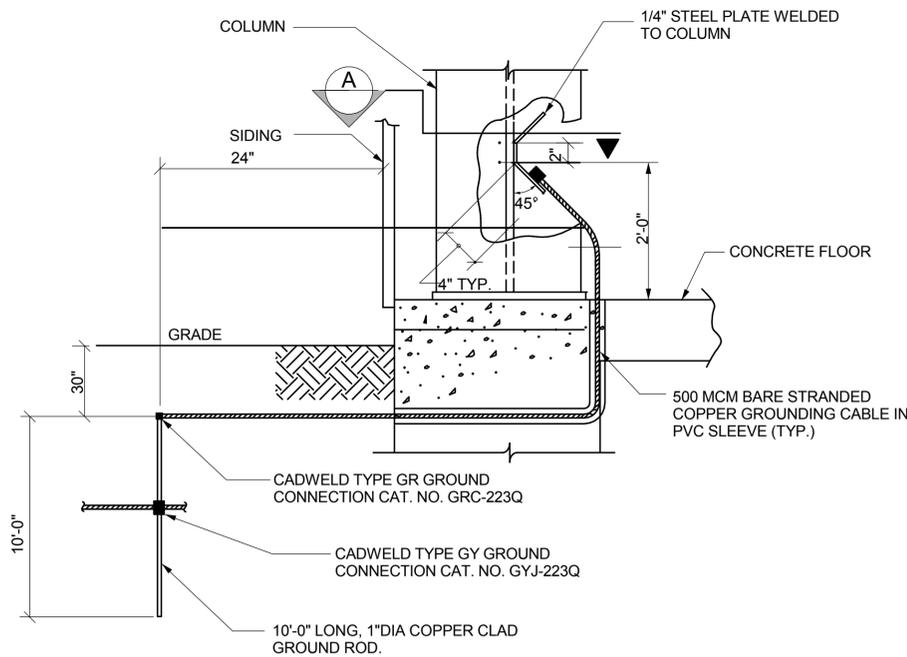
SCALE:

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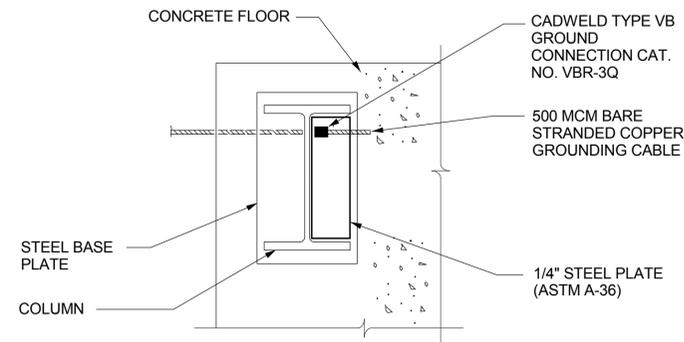
**SBN FAR DETECTOR BUILDING**  
ELECTRICAL DETAILS

DRAWING NO. **6-7-93** **E-15** REV. **0**

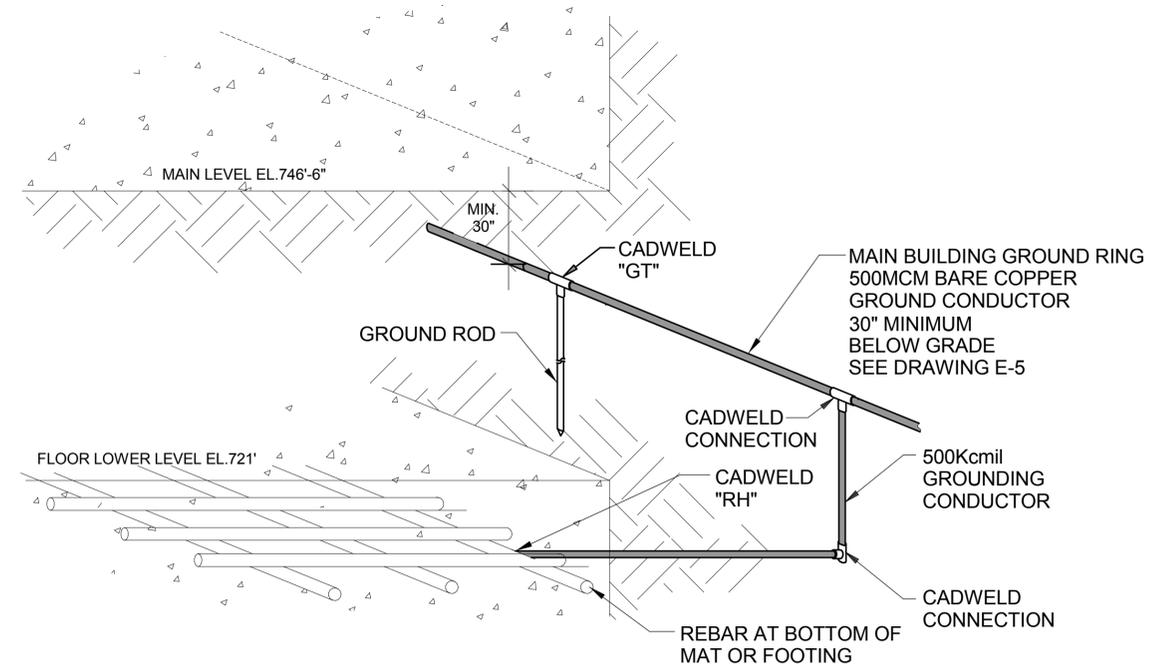
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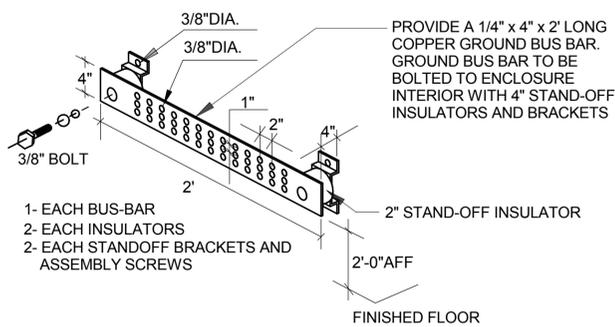
**GROUND ROD DETAIL**  
NO SCALE  
1  
E-16



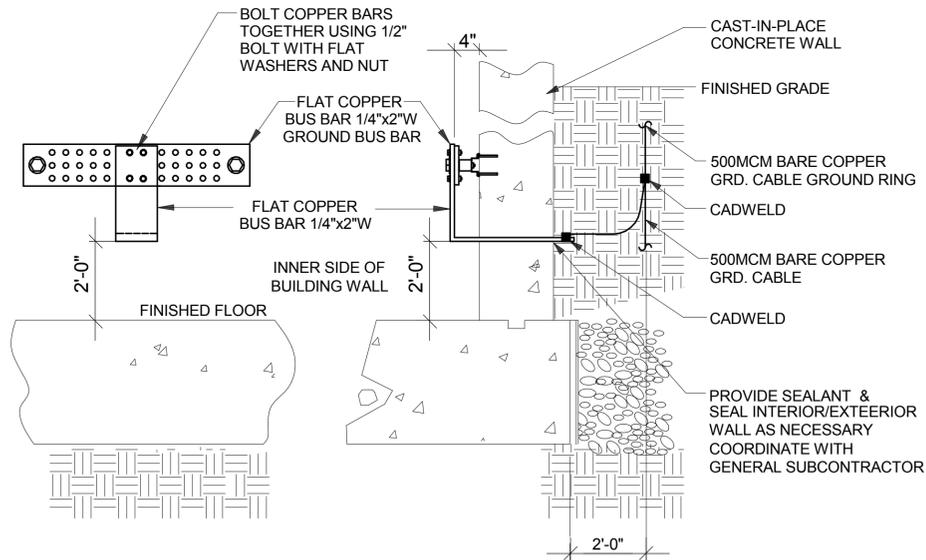
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A  
-



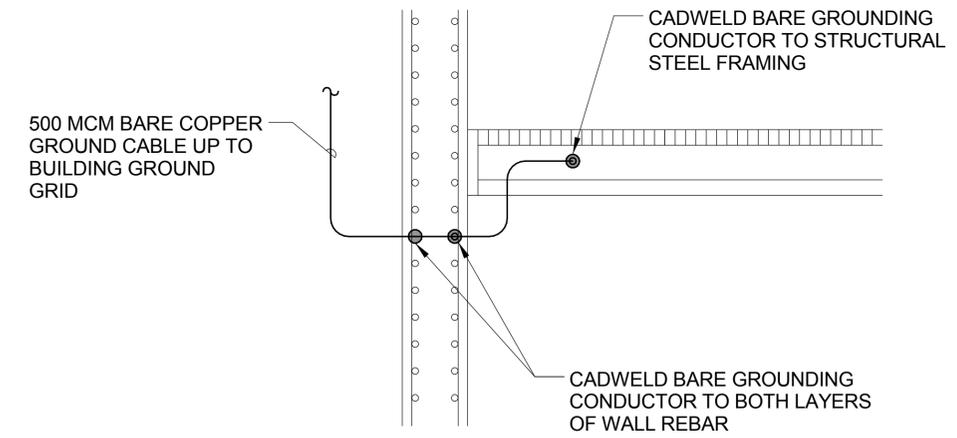
**DETAIL**  
NO SCALE  
3  
E-16



- 1- EACH BUS-BAR
- 2- EACH INSULATORS
- 2- EACH STANDOFF BRACKETS AND ASSEMBLY SCREWS



**GROUND BAR DETAIL**  
NO SCALE  
2  
E-16



**DETAIL**  
NO SCALE  
4  
E-16

NO.	REVISIONS

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**SBN FAR DETECTOR BUILDING**  
ELECTRICAL DETAILS

DRAWING NO. **6-7-93** **E-16** REV. **0**

30 MAR. 2015



PANEL NAME: EPP-SFDBA1-A1

CONNECTED 29.9 kVA

TYPE: BOLT-ON
MOUNTING: SURFACE
FED FROM: EDHP-SFDBA1-1
SCCR: 18,000
LOCATION: GRADE LEVEL

SOLID NEUTRAL
GROUND BUS

MAIN: 250 A/MLO
VOLTS: 120/208 Wye
PHASE: 3
WIRE: 4
DEMAND: 29.91 kVA

Panel Notes: UNLESS NOTED OTHERWISE, ALL NEW CIRCUITS SHALL HAVE 2#12 & 1#12 GND IN 3/4" C., USE #10 FOR CIRCUIT HOMERUN LENGTHS OVER 75 FEET.

Table with 12 columns: CKT NO., LOAD DESCRIPTION, AMP, POLES, A, B, C, POLES, AMP, LOAD DESCRIPTION, CKT NO. Lists various lighting and equipment loads.

Total Load: 8.08 kVA, 11.53 kVA, 10.5 kVA
Total Amps: 67.3, 99.17, 90.64

[Key\*]: \*O=REFER TO ONE LINE DIAGRAM FOR WIRE SIZE

PANEL NAME: PHP-SFDBA1-1

CONNECTED 195 kVA

TYPE: BOLT-ON
MOUNTING: SURFACE
FED FROM: DHP-SFDBA1
SCCR: 42,000
LOCATION: GRADE LEVEL

SOLID NEUTRAL
GROUND BUS

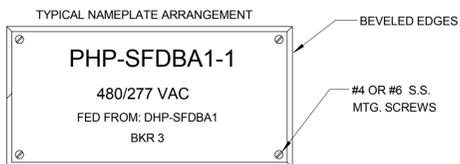
MAIN: 400 A/MLO
VOLTS: 480/277 Wye
PHASE: 3
WIRE: 4
DEMAND: 195 kVA

Panel Notes:

Table with 12 columns: CKT NO., LOAD DESCRIPTION, AMP, POLES, A, B, C, POLES, AMP, LOAD DESCRIPTION, CKT NO. Lists welding outlets, CAB units, and spares.

Total Load: 65 kVA, 65 kVA, 65 kVA
Total Amps: 234.66, 234.66, 234.66

[Key\*]:



FERMI LAB
PANELBOARD AND TRANSFORMER LABELING

PANELBOARDS AND TRANSFORMERS OF THE DISTRIBUTION SYSTEM SHALL BE UNIQUELY IDENTIFIED WITH LABELS MADE FROM ENGRAVED PLASTIC LAMOCOID MATERIAL...

THESE LABELS GENERALLY HAVE TWO LINES OF TEXT. THE FIRST LINE WOULD BE THE PANELBOARD OR TRANSFORMER NAME (E.G. PHP-M60A-3, TR-M60A-3-A)...

FIRST LINE CHARACTERS ARE TO BE 0.85 TO 1.0 INCH HIGH WITH A 1/8 INCH LINE WIDTH. SECOND LINE CHARACTERS ARE 0.5 INCHES HIGH WITH A 1/16 INCH LINE WIDTH...

RED LABELS WITH WHITE CHARACTERS SHALL BE USED FOR EQUIPMENT OPERATING AT 480Y/277 OR 480 VAC OR HIGHER. A 480 TO 208Y/120 VAC TRANSFORMER WOULD BE OUTFITTED WITH A LABEL HAVING THESE COLORS...

BLACK LABELS WITH WHITE CHARACTERS SHALL BE USED FOR EQUIPMENT OPERATING AT 120, 208Y/120, OR 240/120 VAC. WHEN SUCH EQUIPMENT IS CAPABLE OF BEING POWERED BY A DEDICATED EMERGENCY OR STANDBY POWER SOURCE...

EQUIPMENT LABELS ARE PREFERABLY ATTACHED WITH A HIGH QUALITY, DOUBLE-SIDED ADHESIVE TAPE RATHER THAN SCREWS. FOR INDOOR APPLICATIONS TO SMOOTH SURFACES, 3M TAPE 9500PC IS A PREFERRED CHOICE...

PANELBOARD NOTES

- 1. PHASE ROTATION SHALL BE: INCOMING A-B-C LEFT-TO-RIGHT. LEFT SIDE BREAKERS SHALL BE A-B-C, TOP-TO-BOTTOM. RIGHT SIDE BREAKERS SHALL BE C-B-A, TOP-TO-BOTTOM.
2. PANELBOARDS SHALL USE PLATED COPPER BUS. NEUTRAL AND GROUNDING BLOCKS SHALL BE PLATED COPPER ONLY. ALUMINUM IS PROHIBITED.
3. ALL ELECTRICAL PANELBOARDS SHALL USE HINGED TRIM AND HAVE A HINGED DOOR OVER THE BREAKER COMPARTMENT FOR EASY ACCESS.
4. ALL CIRCUIT BREAKER SPACES SHALL BE NUMBERED. THE PANELBOARD DIRECTORY SHALL BE NEATLY TYPED TO CORRESPOND TO THE BREAKER NUMBERS AND FUNCTION.
5. ALL PANELBOARDS TRIMS SHALL BE ARRANGED TO OPEN TO THE RIGHT-HAND SIDE UNLESS NOTED OTHERWISE.
6. PANELBOARD NAMEPLATES SHALL BE PLASTIC ENGRAVED LAMOCOID MATERIAL WITH S.S. MOUNTING SCREWS.
7. ALL CIRCUIT BREAKERS SHALL HAVE FACTORY INSTALLED PERMANENTLY MOUNTED LOCKS.

PANEL NAME: EPP-UPS-SFDBA1-A1-1

CONNECTED 0 kVA

TYPE: BOLT-ON
MOUNTING: SURFACE
FED FROM: PANEL 'EPP-SFDBA1-A1' VIA UPS
SCCR: 18,000
LOCATION: ENCLOSURE LEVEL

SOLID NEUTRAL
GROUND BUS

MAIN: 100 A/MLO
VOLTS: 120/208 Wye
PHASE: 3
WIRE: 4
DEMAND: 0 kVA

Panel Notes: UNLESS NOTED OTHERWISE, ALL NEW CIRCUITS SHALL HAVE 2#12 & 1#12 GND IN 3/4" C., USE #10 FOR CIRCUIT HOMERUN LENGTHS OVER 75 FEET.

Table with 12 columns: CKT NO., LOAD DESCRIPTION, AMP, POLES, A, B, C, POLES, AMP, LOAD DESCRIPTION, CKT NO. Lists spare loads.

Total Load: 0 kVA, 0 kVA, 0 kVA
Total Amps: 0, 0, 0

[Key\*]:

NOTE : BRANCH CONNECTIONS FROM THIS PANEL WILL BE DONE BY FERMI LAB

Logo for KU Engineering Consultants, 623 26TH AVENUE QUAD CITIES, ILLINOIS 61201. Includes contact information and a reference scale in inches.

Table with columns: FERMILAB, DATE, DESIGNED (T. BALA, 3/30/2015), DRAWN (M. WELLS, 3/30/2015), CHECKED (J. LEESMAN, 3/30/2015), APPROVED, SUBMITTED.

SCALE:

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



SBN FAR DETECTOR BUILDING
PANEL SCHEDULES

DRAWING NO. 6-7-93

E-18

REV. 0

PANEL NAME: PP-SFDBA1-A1

CONNECTED 0 kVA

TYPE: BOLT-ON
MOUNTING: SURFACE
FED FROM: DHP-SFDBA1 VIA TR-SFDBA1-A
SCCR: 18,000
LOCATION: GRADE LEVEL
MAIN: 400 A/MLO
VOLTS: 120/208 Wye
PHASE: 3
WIRE: 4

Panel Notes: UNLESS NOTED OTHERWISE, ALL NEW CIRCUITS SHALL HAVE 2#12 & 1#12 GND IN 3/4" C., USE #10 FOR CIRCUIT HOMERUN LENGTHS OVER 75 FEET.

Table with columns: CKT NO., LOAD DESCRIPTION, AMP, POLES, A, B, C, POLES, AMP, LOAD DESCRIPTION, CKT NO. Includes rows for BUILDING RACK #1 through #11, SPARE, and SPACE.

Total Load: 0 kVA, 0 kVA, 0 kVA
Total Amps: 0, 0, 0

[Key\*:]

NOTE : BRANCH CONNECTIONS FROM THIS PANEL TO BUILDING RACKS WILL BE DONE BY FERMILAB

PANEL NAME: PP-SFDBA1-C1

CONNECTED 0 kVA

TYPE: BOLT-ON
MOUNTING: SURFACE
FED FROM: DHP-SFDBA1 VIA TR-SFDBA1-C
SCCR: 18,000
LOCATION: ENCLOSURE LEVEL
MAIN: 400 A/MLO
VOLTS: 120/208 Wye
PHASE: 3
WIRE: 4

Panel Notes: UNLESS NOTED OTHERWISE, ALL NEW CIRCUITS SHALL HAVE 2#12 & 1#12 GND IN 3/4" C., USE #10 FOR CIRCUIT HOMERUN LENGTHS OVER 75 FEET.

Table with columns: CKT NO., LOAD DESCRIPTION, AMP, POLES, A, B, C, POLES, AMP, LOAD DESCRIPTION, CKT NO. Includes rows for CR40 HEATER, FILTER HEATER, TURBO PUMP, GAS ANALYZER, SPARE, and SPACE.

Total Load: 0 kVA, 0 kVA, 0 kVA
Total Amps: 0, 0, 0

[Key\*:]

NOTE : BRANCH CONNECTIONS FROM THIS PANEL WILL BE DONE BY FERMILAB

PANEL NAME: PP-SFDBA1-B1

CONNECTED 36.4 kVA

TYPE: BOLT-ON
MOUNTING: SURFACE
FED FROM: DHP-SFDBA1 VIA TR-SFDBA1-B
SCCR: 18,000
LOCATION: GRADE LEVEL
MAIN: 400 A/MLO
VOLTS: 120/208 Wye
PHASE: 3
WIRE: 4
DEMAND: 36.4 kVA

Panel Notes: UNLESS NOTED OTHERWISE, ALL NEW CIRCUITS SHALL HAVE 2#12 & 1#12 GND IN 3/4" C., USE #10 FOR CIRCUIT HOMERUN LENGTHS OVER 75 FEET.

Table with columns: CKT NO., LOAD DESCRIPTION, AMP, POLES, A, B, C, POLES, AMP, LOAD DESCRIPTION, CKT NO. Includes rows for Receptacles, TRANS. HEATER, SPARE, WH-1, UH-3, UH-4, UH-5, and various heaters.

Total Load: 12.05 kVA, 14.5 kVA, 10.25 kVA
Total Amps: 102.72, 123.14, 85.42

[Key\*:]

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Table with columns: NO., REVISIONS

KJW ENGINEERING CONSULTANTS logo and contact information including address, phone, fax, website, and registration details.

Table with columns: FERMILAB, DATE. Rows for DESIGNED (T. BALA, 3/30/2015), DRAWN (M. WELLS, 3/30/2015), CHECKED (J. LEESMAN, 3/30/2015), APPROVED, and SUBMITTED.

SCALE:

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



SBN FAR DETECTOR BUILDING
PANEL SCHEDULES

DRAWING NO. 6-7-93

E-19 REV. 0

30 MAR. 2015



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## LUMINAIRE SCHEDULE

<b>(MTG) MOUNTING:</b> RE - RECESSED SP - SUSPENDED CL - CEILING SURFACE WL - WALL UC - UNDER CABINET CV - COVE PL - POLE FR - FLANGED RECESSED O - OTHER (SEE DESCRIPTION) <b>DOOR:</b> FA - FLAT ALUMINUM FS - FLAT STEEL RA - REGRESSED ALUMINUM RS - REGRESSED STEEL <b>FINISH:</b> PAF - PAINT AFTER FABRICATION CSA - FINISH SELECTION BY ARCHITECT	<b>(Type) LAMP TECHNOLOGY:</b> FL - FLUORESCENT CF - COMPACT FLUORESCENT HL - HALOGEN IN - INCANDESCENT LED - LIGHT EMITTING DIODE HS - HIGH PRESSURE SODIUM MH - METAL HALIDE SMH - SUPER METAL HALIDE PSMH - PULSE START METAL HALIDE CMH - CERAMIC METAL HALIDE O - OTHER (SEE DESCRIPTION) XL - EXTENDED LIFE XLP - EXTENDED LIFE & OUTPUT  <b>(TYPE) BALLAST:</b> DIM07- LINE DIMMING BALLAST DIM10- 0-10V DIMMING BALLAST HL- HIGH / LOW LEVEL BALLAST ML- MULTI-LEVEL SWITCHING HP- HIGH PERFORMANCE / LBF  <b>(TYPE) BALLAST:</b> EB- ELECTRONIC BALLAST EM- EMERGENCY BATTERY/BALLAST DALI- DIGITAL DIMMING BALLAST MV- MULTI-VOLTAGE ELECTRONIC 120V-277V #BF- BALLAST FACTOR	<b>(L/L) LENS/LOUVER:</b> A- .125" ACRYLIC B- BLACK BAFFLE C- CLEAR ALZAK D- PARABOLIC F- FRESNEL G- TEMPERED GLASS H- WALL WASHER P- POLY CARBONATE K- KSH12 .125" ACRYLIC K19- KSH19 .156" ACRYLIC L- LOW IRIDESCENT SPECULAR ALUM. N- NONE R- HIGH IMPACT DR ACRYLIC O- OTHER (SEE DESCRIPTION)
--	--	--

CATALOG NUMBER SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND CATALOG NUMBER ONLY. THE COMPLETE DESCRIPTION AND THE SPECIFICATION SHALL BE COORDINATED WITH THE CATALOG NUMBER TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE FIRST MANUFACTURER LISTED IS THE BASIS FOR DESIGN.

REFER TO SPECIFICATION SECTIONS LIGHTING 16510 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

ALL LAMPS FOR THIS PROJECT SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED. LED LAMP COLOR RENDERING INDEX (CRI) AT OR ABOVE 85 FOR INTERIOR APPLICATIONS.

ITEM	DESCRIPTION	DIMENSIONS				MTG	LAMPS				BALLAST			APPROVED MANUFACTURER
		L	W	H	DIA		TYPE	QTY	MODEL	VOLTS	TYPE	L/L		
F1	4' WALL BRACKET & SURFACE MOUNT LED LUMINAIRE. ROLL FORMED FROM CODE-GAUGE STEEL HOUSING. DECORATIVE DIE-CAST END CAPS. WHITE POLYESTER POWDER COAT FINISH. PROVIDE WITH INTEGRAL DUAL TECHNOLOGY (PASSIVE INFARED/ULTRASONIC) OCCUPANCY SENSOR. 30% LUMEN OUTPUT IN UNOCCUPIED MODE.	48"	4-3/4"	3-11/16"		WL/CL	LED	1	MIN. 4000 LUMENS MAX 40 WATT 3500K	120V		O	LITHONIA WL4-40L DAY-BRITE H.E. WILLIAMS COLUMBIA METALUX	
F2	LED HIGH BAY LUMINAIRE. STEEL HOUSING WITH END CAP. WIDE DISTRIBUTION. SEMI DIFFUSE ACRYLIC LENS.	45"	15-3/4"	3-1/4"		CL	LED	1	MIN. 18000 LUMENS MAX 192 WATT 3500K	120V		O	LITHONIA IBL-18L-WD-LP835 DAY-BRITE H.E. WILLIAMS COLUMBIA METALUX	
F2D	SIMILLAR TO F2. PROVIDE WITH 0-10V DIMMING DRIVER.	45"	15-3/4"	3-1/4"		CL	LED	1	MIN. 18000 LUMENS MAX 192 WATT 3500K	120V	DIM10	O	REFER TO F2	
F3	4' ENCLOSED AND GASKETED LED LUMINAIRE WITH ACRYLIC CLEAR DEEP LENS.	48"	7-3/8"	4-4/8"		CL	LED	1	MIN. 8000 LUMENS MAX 73 WATT 3500K	120V		O	H.E. WILLIAMS 96-4-L62/835-HIA LITHONIA FEM4LED-6L-35-IMACD COLUMBIA METALUX	
F4	LED HIGH BAY LUMINAIRE. STEEL HOUSING WITH END CAP. WIDE DISTRIBUTION. SEMI DIFFUSE ACRYLIC LENS.	45"	15-3/4"	3-1/4"		CL	LED	1	MIN. 24000 LUMENS MAX 241 WATT 3500K	120V		O	LITHONIA IBL-24L-WD-LP835 DAY-BRITE H.E. WILLIAMS COLUMBIA METALUX	
F5	EXTERIOR LED WALL PACK. PRISMATIC GLASS LENS. FORWARD THROW DISTRIBUTION. ALUMINIUM HOUSING. WET LOCATION LISTED. CUSTOM COLOR SELECTION BY ARCHITECT. REFER TO ARCHITECTURAL ELEVATION FOR EXACT MOUNTING HEIGHT.	16"	10.5"	7"		WL	LED	1	MIN. 3400 LUMENS MAX 54 WATT	120V		O	COOPER McGRW-EDITION IST PHILIPS GARDCO LITHONIA WST LED ACCU LITE DT	
F5E	SIMILLAR TO F5. PROVIDE WITH EMERGENCY BATTERY PACK. LOCATE BATTERY INSIDE BUILDING. CONNECT EM BATTERY TO UNSWITCHED PART OF CIRCUIT.	16"	10.5"	7"		WL	LED	1	MIN. 3400 LUMENS MAX 54 WATT	120V	EM	O	REFER TO F5	
F6	4' WALL BRACKET & SURFACE MOUNT LED LUMINAIRE. ROLL FORMED FROM CODE-GAUGE STEEL HOUSING. DECORATIVE DIE-CAST END CAPS. WHITE POLYESTER POWDER COAT FINISH.	48"	4-3/4"	3-11/16"		WL/CL	LED	1	MIN. 4000 LUMENS MAX 40 WATT 4000K	120V		O	LITHONIA WL4-40L DAY-BRITE H.E. WILLIAMS COLUMBIA METALUX	
F7E	4' SURFACE MOUNT LED LUMINAIRE. EXTRUDED ALUMINIUM HOUSING. DIE CAST ZINC END CAPS. FROSTED ACRYLIC LENS. WHITE POWDER COAT FINISH. WET LOCATION LISTED. PROVIDE WITH EMERGENCY BATTERY PACK. CONNECT EM BATTERY TO UNSWITCHED PART OF CIRCUIT.	48"	4"	4"		WL/CL	LED	1	MIN. 3000 LUMENS MAX 40 WATT	120V	EM	O	AXIS BEAM 4 WBSLED DAY-BRITE H.E. WILLIAMS LITHONIA METALUX	
EM1	EMERGENCY UNIT, TWO ADJUSTABLE LED HEADS. WHITE THERMOPLASTIC HOUSING. LITHIUM IRON PHOSPHATE (LiFePO) BATTERY. SELF TEST & DIAGNOSTICS OF INVERTER AND LAMPS.	11"	7.375"	3.25"		WL	LED	2	12 WATT 546 LUMENS	120V	EM	O	DUAL-LITE EVHC LITHONIA McPHILBEN	
EM2	EMERGENCY UNIT, TWO ADJUSTABLE LED HEADS. WHITE THERMOPLASTIC HOUSING. LITHIUM IRON PHOSPHATE (LiFePO) BATTERY. SELF TEST & DIAGNOSTICS OF INVERTER AND LAMPS.	11"	7.375"	3.25"		WL	LED	2	6 WATT 326 LUMENS	120V	EM	O	DUAL-LITE EVHC LITHONIA McPHILBEN	
EX1	SINGLE-FACE EXIT SIGN. WHITE THERMOPLASTIC BODY. RED LETTERS. EMERGENCY NI-CAD BATTERY INSIDE OF SIGN. UNIVERSAL ARROWS/MOUNTING. SELF TEST & DIAGNOSTICS OF INVERTER AND LAMPS	13"	2"	9"H [11"]		WL/CL	LED	1	3 WATT L.E.D.	120V	EM	O	LITHONIA LQMS 1 EL SD DUAL-LITE LXU [I] McPHILBEN CXXL	

NO.	REVISIONS	DATE

**KJW**  
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CONSULTANTS

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REFERENCE SCALE IN INCHES

FERMI LAB	DATE	SCALE:
DESIGNED	<b>T. BALA</b>	<b>3/30/2015</b>
DRAWN	<b>M. WELLS</b>	<b>3/30/2015</b>
CHECKED	<b>J. LEESMAN</b>	<b>3/30/2015</b>
APPROVED		
SUBMITTED		

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

**SBN FAR DETECTOR BUILDING**

**ELECTRICAL SCHEDULES**

DRAWING NO. **6-7-93**

**E-21** REV. **0**

30 MAR. 2015



### GENERAL ELECTRICAL EQUIPMENT SCHEDULE

THE SYMBOLS AND THE EQUIPMENT SCHEDULE ARE FOR THE CONVENIENCE OF THE SUB-CONTRACTOR. EACH SUB-CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF QUANTITIES AND SHALL FURNISH ALL MATERIAL REQUIRED, WHETHER SPECIFIED OR NOT, TO PRODUCE A SATISFACTORY WORKING SYSTEM.

CATALOG NUMBERS SHALL NOT BE CONSIDERED COMPLETE BUT ARE GIVEN ONLY TO AID THE SUB-CONTRACTOR IN THE SEARCH FOR MATERIAL. NO MATERIAL SHALL BE ORDERED BY MANUFACTURER AND CATALOG NUMBER ONLY. EACH SUB-CONTRACTOR SHALL FIRST READ THE COMPLETE DESCRIPTION OF THE MATERIAL ON THESE DRAWINGS AND SPECIFICATIONS. THE FIRST MANUFACTURER LISTED IS THE BASIS OF DESIGN. "STANDARD COLOR" INDICATES FACTORY FINISH AVAILABLE AT NO ADDITIONAL CHARGE.

ITEM NO.	SYMBOL	DESCRIPTION	APPROVED MANUFACTURERS
1	DEVICE COLOR	ALL SWITCH, RECEPTACLE, OUTLET, AND COVERPLATE COLORS SHALL BE VERIFIED WITH ARCHITECT UNLESS INDICATED OTHERWISE.	HUBBELL LEVITON PASS & SEYMOUR COOPER
2	COVER PLATES	ALL SWITCHES, RECEPTACLES, AND OUTLETS SHALL BE COMPLETE WITH #302 STAINLESS STEEL COVERPLATES, WHERE SEVERAL DEVICES ARE GANGED TOGETHER, THE COVER PLATE SHALL BE OF THE GANGED STYLE FOR THE NUMBER OF DEVICES USED.  INSTALL NAMEPLATE IDENTIFICATION WHERE INDICATED.	HUBBELL LEVITON PASS & SEYMOUR COOPER
3	 LCP-SFDB	LIGHTING CONTROL PANEL, 20A/1P, 16 RELAYS, 120V, SURFACE MOUNTED, NEMA 1 ENCLOSURE, BUILT IN ASTRONOMIC TIME CLOCK. REFER TO RELAY CONTROL PANEL CONTROL DIAGRAM DETAIL ON SHEET E-14 FOR ADDITIONAL INFORMATION. COORDINATE WITH MANUFACTURER FOR EXACT WIRING REQUIREMENTS.	LIGHTING CONTROLS GR2400
4	 LCS-#	LIGHTING CONTROL STATION. REFER TO RELAY CONTROL PANEL CONTROL DIAGRAM DETAIL ON SHEET E-14 FOR CONFIGURATION. INSTALL WIRING IN CONDUIT.	COMPATIBLE WITH LIGHTING CONTROL PANEL.
5	 S <sub>O</sub>	OCCUPANCY SENSOR WALL SWITCH, PASSIVE INFRARED, ZERO CROSSING CIRCUITRY, ADJUSTABLE SENSITIVITY AND TIME DELAY, NO MINIMUM LOAD REQUIREMENTS, MANUAL OR AUTO ON OPERATION, INITIAL SETTINGS: 10 MINUTES, AMBIENT SENSOR 40 FC.	WATT STOPPER PW-100 SERIES SENSOR SWITCH WSD HUBBELL INC. LHRS1 OR AP1277 LEVITON ODS15 GREENGATE OSW-P-0451
6		RECEPTACLE, DUPLEX, 125 VOLT, 20 AMP, 3 WIRE GROUNDING TYPE, N.E.M.A. 5-20R, IMPACT RESISTANT THERMOPLASTIC FACE, STEEL BACK STRAP.  DOUBLE DUPLEX, CONSIST OF TWO DUPLEX RECEPTACLES, DOUBLE GANG BOX, PLASTER RING AND FACEPLATE.	HUBBELL 5352A LEVITON 5362-S PASS & SEYMOUR 5362 COOPER 5352
7		RECEPTACLE, GROUND FAULT DUPLEX, 125 VOLT, 20 AMP, 3 WIRE GROUNDING TYPE, N.E.M.A. 5-20R, TEST AND RESET BUTTONS IN IMPACT RESISTANT THERMOPLASTIC FACE.  DOUBLE DUPLEX, CONSIST OF TWO DUPLEX RECEPTACLES, DOUBLE GANG BOX, PLASTER RING AND FACEPLATE.	HUBBELL GF20L LEVITON 7899 PASS & SEYMOUR 2095 COOPER VGF20
8	 W	RECEPTACLE, GROUND FAULT DUPLEX, WEATHER RESISTANT, WEATHERPROOF COVERPLATE, 125 VOLT, 20 AMP, 3 WIRE GROUNDING TYPE, N.E.M.A. 5-20R, TEST AND RESET BUTTONS IN IMPACT RESISTANT THERMOPLASTIC FACE, NEMA 3R RATED WHILE IN USE CAST ALUMINUM, NON-LOCKING, STANDARD DEPTH, VERTICAL MOUNT.	HUBBELL GFTR20 WP826 LEVITON W7899-TR M5979 PASS & SEYMOUR 2095TRWR WIUCAST1 COOPER TWRVGF20/ WIUMV-1
9	 J	JUNCTION BOX, SIZE PER N.E.C., REFER TO SPECIFICATIONS FOR GENERAL CONSTRUCTION, USE OF THIS SYMBOL DOES NOT INDICATE ALL JUNCTION BOXES REQUIRED FOR THIS CONTRACT ARE SHOWN.	REFER TO SPECIFICATIONS
10	 E	ELECTRICAL CONNECTION TO EQUIPMENT AND MOTORS, SIZE PER N.E.C. COORDINATE REQUIREMENTS WITH CONTRACTOR FURNISHING EQUIPMENT OR MOTOR. REFER TO SPECIFICATIONS AND GENERAL INSTALLATION NOTES FOR TERMINATIONS TO MOTORS.	REFER TO SPECIFICATIONS
11		PANELBOARD, SURFACE MOUNT, 208/120 VOLT, 3 PHASE, 4 WIRE, 200% S/N, GROUND BUS, COPPER BUS, BOLT-ON BREAKERS, NEMA 1 ENCLOSURE, REFER TO SCHEDULES FOR SIZE AND CONFIGURATION, REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.  PP-SFDBA1-A1    PP-SFDBB1-A1 PP-SFDBA1-C1    PP-SFDBB1-B1	BASE BID: SQUARE D NQ  ALTERNATE #2: SIEMENS, EATON
12	 PHP-SFDBA1-1	PANELBOARD, SURFACE MOUNT, 480/277 VOLT, 3 PHASE, 4 WIRE, S/N, GROUND BUS, COPPER BUS, BOLT-ON BREAKERS, NEMA 1 ENCLOSURE, REFER TO SCHEDULES FOR SIZE AND CONFIGURATION, REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.	BASE BID: SQUARE D NF  ALTERNATE #2: SIEMENS, EATON
13	 DHP-SFDBA1 DHP-SFDBB1	DISTRIBUTION PANEL, CIRCUIT BREAKER 480/277 VOLT, 3 PHASE, S/N, GROUND BUS, SURFACE MOUNTED NEMA 1 ENCLOSURE, SUITABLE FOR USE AS SERVICE ENTRANCE EQUIPMENT, REFER TO ONE LINE DIAGRAM AND SPECIFICATIONS.	BASE BID: SQUARE D I-LINE  ALTERNATE #2: SIEMENS, EATON
14	 SPD-DHP-SFDBA1 SPD-DHP-SFDBB1	SURGE PROTECTION DEVICE, NON-MODULAR SERVICE ENTRANCE TYPE, CATEGORY C3 RATING, EXTERNAL MOUNTED CABINET AND 480/277 VOLT, 3 PHASE, 4 WIRE, REFER TO SPECIFICATION SECTION 16.412 FOR ADDITIONAL INFORMATION.	CURRENT TECH. CURRENT GUARD PLUS LIEBERT ACV7 SERIES LEA INTERNATIONAL LSS SERIES
15	 SPD-EDHP-SFDBA1	SURGE PROTECTION DEVICE, NON-MODULAR SECONDARY DISTRIBUTION TYPE, CATEGORY B3/C1 RATING, EXTERNAL MOUNTED CABINET, 480/277 VOLT, 3 PHASE, 4 WIRE, REFER TO SPECIFICATION SECTION 16.412 FOR ADDITIONAL INFORMATION.	CURRENT TECH. CURRENT GAURD PLUS LIEBERT ACV SERIES LEA INTERNATIONAL SP SERIES
16		GROUND BUS, COPPER, REFER TO SPECIFICATION AND DETAIL 3/E-14 FOR ADDITIONAL INFORMATION.	.

### GENERAL ELECTRICAL EQUIPMENT SCHEDULE

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ITEM NO.	SYMBOL	DESCRIPTION	APPROVED MANUFACTURERS
17	 DPM #	DIGITAL POWER METER, MOUNTED IN DEDICATED ENCLOSURE, DIGITAL READOUT OF VOLTS, AMPS, KW, KWH, DEMAND KW, THD NETWORK COMMUNICATIONS CAPABLE, MOD BUS TOP/IP COMMUNICATIONS, 2 SPARE DIGITAL INPUTS, MOUNT IN DEDICATED ENCLOSURE P/N 9761E8858R1C3810, INCLUDE SHORTING BLOCK STATES MODEL 208-FU INSTEAD OF STANDARD BLOCK.	SCHNEIDER ELECTRIC POWERLOGIC PM 5320
18		PANELBOARD, SURFACE MOUNT, 208/120 VOLT, 3 PHASE, 4 WIRE, S/N, GROUND BUS, COPPER BUS, BOLT-ON BREAKERS, NEMA 1 ENCLOSURE, REFER TO SCHEDULES FOR SIZE AND CONFIGURATION, REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.  PP-SFDBA1-B1    EPP-UPS-SFDBA1-A1-1 EPP-SFDBA1-A1	BASE BID: SQUARE D NQ  ALTERNATE #2: SIEMENS, EATON
19		DISTRIBUTION PANEL, CIRCUIT BREAKER 480/277 VOLT, 3 PHASE, S/N, GROUND BUS, SURFACE MOUNTED NEMA 1 ENCLOSURE, REFER TO ONE LINE DIAGRAM AND SPECIFICATIONS.  DHP-SFDBA1-CRANE EDHP-SFDBA1-1	BASE BID: SQUARE D I-LINE  ALTERNATE #2: SIEMENS, EATON
20	 UPS-EPP-SFDBA1-A1	UNINTERRUPTIBLE POWER SUPPLY, TWO (2) 10 KVA / 9 KW MODULES (ONE MODULE FOR REDUNDANCY, EXPANDABLE TO (3) MODULES), 208/120 VOLT, 3 PHASE, 4 WIRE + GND INPUT AND OUTPUT, TRUE ON LINE, DOUBLE CONVERSION, IGBT INVERTER, LINE AND MATCH DESIGN, AUTOMATIC CONTINUOUS BYPASS SWITCH, INPUT HARMONIC FILTER AT OUTPUT FULL LOAD, PROGRAMMABLE RELAY BOARD SNMP INTERFACE, BATTERY CABINET, 10 MINUTES AT 10 KVA, EXPANDABLE TO 10 MIN AT 20 KVA LOAD.	mitsubishi 1100A
21	 UPS-BYPASS	WALL MOUNTED EXTERNAL MAINTENANCE CABINET, REFER TO ONE LINE AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.	MITSUBISHI
22	 SCLR-1	LADDER RACK, 12" WIDTH TUBULAR FIBER GLASS CONSTRUCTION WITH FULL LINE OF SECTIONS, FITTINGS, COVERS AND MOUNTING ACCESSORIES IN POLYESTER AND VINYLESTER FIBERGLASS.	LEGRAND 7400 SERIES  CHATSWORTH B-LINE
23	 SC-TTB	TELECOMMUNICATIONS TERMINAL BOARD, 4' X 8' X 3/4" A-C GRADE FIRE-RATED PLYWOOD, EXPOSED SIDE SHALL BE SMOOTH, MOUNT VERTICALLY WITH TOP OF PLYWOOD AT 86" A.F.F.	.
24	 LS	DAYLIGHT LEVEL SENSOR AND CONTROLLER FOR 1 DIMMING ZONE OF 0-10V, RANGE OF 10-200 FC, ADJUSTABLE DEADBAND PREVENTS CYCLING, ADJUSTABLE TIME DELAY, COORDINATE WITH DIMMING DRIVER PRIOR TO SUBMITTAL.  PROVIDE WITH POWER SUPPLY, USED IN CONJUNCTION WITH SENSORS, SELF CONTAINED RELAY/TRANSFORMER UNIT, 120 VAC, 20A BALLAST LOAD, MOUNT TO STANDARD 1/2" KNOCKOUT ON ELECTRICAL BOX, MOUNT ABOVE CEILING ADJACENT TO SENSOR, IN EXPOSED AREAS, MOUNT TO JUNCTION BOX.	WATT STOPPER LS-301 SENSOR SWITCH HUBBELL INC. LEVITON CRESTRON LUTRON

FERMI LAB DATE

DESIGNED	<b>T. BALA</b>	<b>3/30/2015</b>
DRAWN	<b>M. WELLS</b>	<b>3/30/2015</b>
CHECKED	<b>J. LEESMAN</b>	<b>3/30/2015</b>
APPROVED		
SUBMITTED		

SCALE:

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



**SBN FAR DETECTOR BUILDING**  
**ELECTRICAL SCHEDULES**

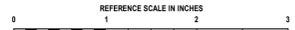
DRAWING NO. **6-7-93**

**E-23** REV. **0**

30 MAR. 2015

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