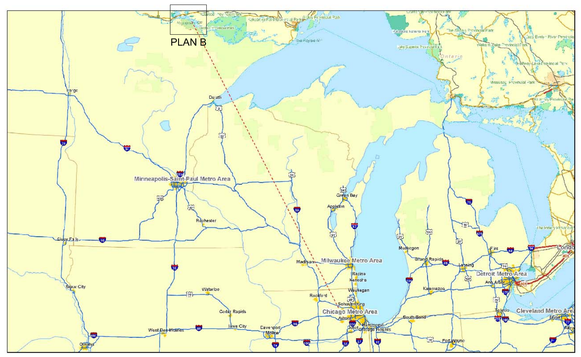
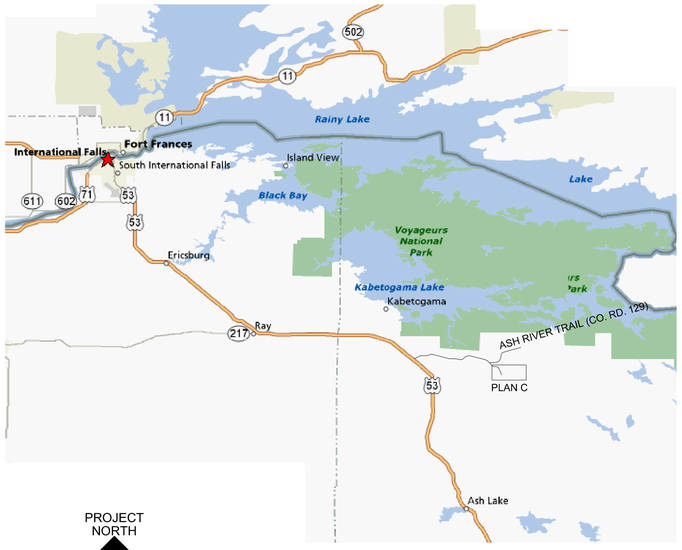
NOvA FAR DETECTOR BUILDING

FERMI LAB PROJECT 15-1-3B
UNIVERSITY OF MINNESOTA PROJECT 896-06-1711



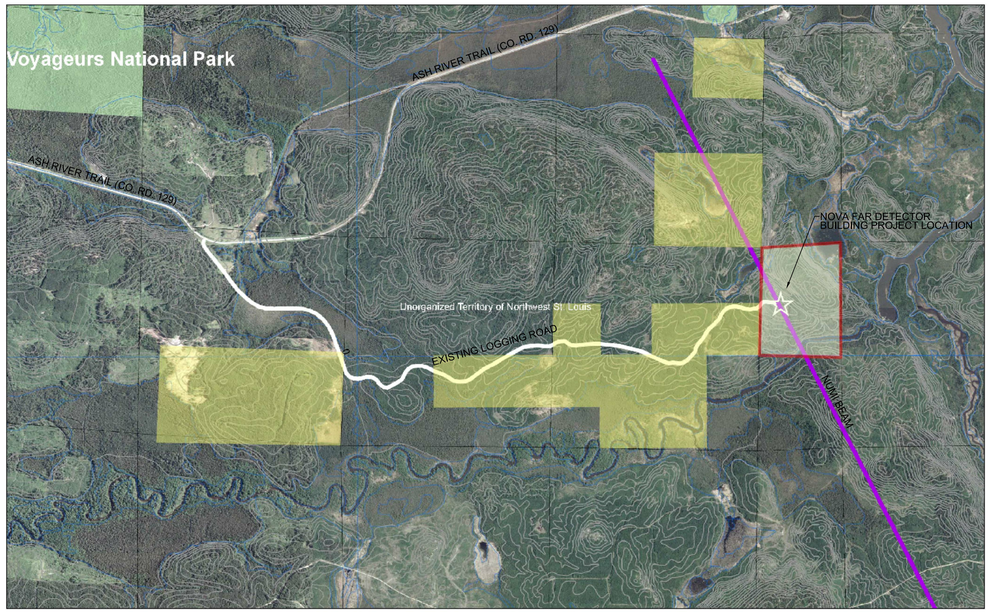
PROJECT NORTH
W E S

LOCATION PLAN A



PROJECT NORTH
W E S

LOCATION PLAN B
1"=20,000'



LOCATION PLAN C
1"=1500'

PROJECT NORTH
W E S

CODE SEARCH

BUILDING HEIGHT:

-ONE FLOOR ABOVE GROUND, 36 FEET
-UNDERGROUND 55 FEET

BUILDING AREAS IN SQUARE FEET:

ELEVATION 1236'-6": -MECHANICAL ROOM 430 SF
- OFFICE 700 SF
- SCINTILLATOR EQUIP. ROOM 400SF
- LOADING DOCK AREA 7300SF
- FIRE PROTECTION AREA 860 SF
- CONTROL RM/ COMPUTER RM 920 SF
- ENTRANCE/CORRIDOR/VIEWING AREA 1050 SF

ELEVATION 1224'-10": -TELEPHONE EQUIP/ELECTRICAL ROOM 920 SF
ELEVATION 1181'-8": -ASSEMBLY AREA 4900 SF

TOTAL 17500 SF

CHEMICALS: -IN DETECTOR ENCLOSURE -4.9 MILLION GALLONS OF LIQUID SCINTILLATOR (BICRON/SAINT-GOBAIN CRYSTALS AND DETECTORS BC-517L) IN 23,808 RIGID PVC CONTAINERS; FLASH POINT 208F; COMBUSTIBLE LIQUID CLASS IIIB (FLASH POINT ABOVE 200F)
- IN FIRE PROTECTION AREA - 660 GALLONS OF DIESEL FUEL FOR FIRE PUMP OPERATION (FLASH POINT 130F; COMBUSTIBLE LIQUID CLASS II (FLASH POINT ABOVE 100F AND BELOW 140F)

SUBJECT	REQUIREMENTS/RESTRICTIONS	IBC 2006 SECTION
BUILDING/AREA OCCUPANCY	LOADING DOCK, ASSEMBLY AREA, DETECTOR ENCLOSURE, MECHANICAL ROOM, SCINTILLATOR EQUIP. RM: F-1 FACTORY INDUSTRIAL MODERATE HAZARD OCCUPANCY OFFICE, COMPUTER RM, CONTROL RM: B BUSINESS ENTRANCE/CORRIDOR/VIEWING AREA 1060SF: B FOR OCC LOAD LESS THAN 50 FIRE PROTECTION AREA: F-1 FACTORY INDUSTRIAL MODERATE HAZARD OCCUPANCY GENERAL BUILDING OCCUPANCY: F-1 FACTORY INDUSTRIAL MODERATE HAZARD OCCUPANCY	306.1 304,1 303,1 307.1 EX 5 306,1 AND 307.1 EXP 1
OCCUPANT LOAD	PER CODE - MECHANICAL ROOM 430 SF/300=2 - OFFICE 700 SF/100=7 - SCINTILLATOR EQUIP. ROOM 400SF/300=2 - LOADING DOCK AREA 7300SF/100=73 - FIRE PROTECTION AREA 860 SF/300=3 - CONTROL RM/ COMPUTER RM 920 SF/100=10 - ENTRANCE/CORRIDOR/VIEWING AREA 1050 SF/100=11 TOTAL ON ELEVATION 1236'-6" - 108 - TELEPHONE EQUIP/ELECTRICAL ROOM 920 SF/300=10 TOTAL ON ELEVATION 1224'-10" - 10 -ASSEMBLY AREA 4900 SF/100=49 TOTAL ON ELEVATION 1181'-8" - 49 TOTAL PER CODE ON ALL FLOORS - 167 ACTUAL:10	TABLE 1004.1.1
MAX ALLOWABLE QUANTITY OF HAZARDOUS CHEMICAL PER CONTROL AREA	CLASS IIIB COMBUSTIBLE LIQUID UNLIMITED IN A BUILDING WITH AUTOMATIC SPRINKLER SYSTEM	TABLE 307.1(1) F

CODE SEARCH

SUBJECT	REQUIREMENTS/RESTRICTIONS	IBC 2006 SECTION
SPECIAL DETAILED REQUIREMENTS FOR UNDERGROUND BUILDING	-MIN CONSTRUCTION REQUIREMENT - TYPE IB -AUTOMATIC SPRINKLER SYSTEM REQUIRED -COMPARTMENTATION NOT REQUIRED -SMOKE CONTROL SYSTEM REQUIRED -MEANS OF EGRESS - NUMBER OF EXITS: TWO MIN -SMOKEPROOF STAIR ENCLOSURE REQUIRED -STANDBY POWER (WITHIN 60 SEC) REQUIRED FOR SMOKE CONTROL SYSTEM, VENTILATION, FIRE PUMPS, ELEVATOR -EMERGENCY POWER REQUIRED -STANDPIPE SYSTEM REQUIRED	405.1,405.2 405.3 405.4.1 405.5.1 405.8.1 405.8.2 AND 1020.1.7 405.9 405.10 405.11
ALLOWABLE HEIGHT AND BUILDING AREAS	FOR F-1 MIN VA CONSTRUCTION TYPE - ALLOWABLE AREA INCREASED 300% FOR BUILDING W/ SPRINKLERS , 14000SF X 4=56,000 SF MAX, 2 FLOORS MAX FOR UNDERGROUND STRUCTURE ACTUAL CONSTRUCTION TYPE IB FOR BUILDING ABOVE GROUND ACTUAL CONSTRUCTION TYPE IIB	506.3, TABLE 503
SEPARATION OF OCCUPANCIES (HOURS)	SEPARATIONS NOT REQUIRED FOR NONSEPARATED OCCUPANCIES 2 HR RATED FIRE PUMPS ENCLOSURE	508.3.2 NFPA 20- 5.12.1.1.2
MIN FIRE -RESISTANCE RATING	FOR CONSTRUCTION TYPE IB (UNDERGROUND STRUCTURE): -STRUCTURAL FRAME -2 HOURS -EXTERIOR BEARING WALLS - 2 HOURS -INTERIOR BEARING WALLS - 2 HOURS -FLOORS - 2 HOURS -ROOF CONSTRUCTION - 2 HOURS EXTERIOR WALLS - 0 HOURS SHAFT ENCLOSURES - 2 HOURS ELEVATOR LOBBY - UNRATED SMOKE PARTITION REQUIRED FOR BUILDING WITH SPRINKLERS CORRIDORS - 0 HOURS EXIT STAIR ENCLOSURES - 2 HOURS ELECTRICAL ROOM - 2 HOURS FOR CONSTRUCTION TYPE IIB (BUILDING ABOVE GROUND): -STRUCTURAL FRAME -0 HOUR -EXTERIOR BEARING WALLS - 0 HOURS -INTERIOR BERAING WALLS - 0 HOUR -FLOORS - 0 HOURS -ROOF CONSTRUCTION - 0 HOUR	TABLE 601 TABLE 602 707.4 707.14.1 EXP 5. TABLE 1017.1 1020.1 NEC 110.26(C)(3)
AUTOMATIC SPRINKLER SYSTEM	REQUIRED	903.2.3
STANDPIPE SYSTEM	REQUIRED, CLASS I	905.3.1 AND 905.3.5
FIRE ALARM AND DETECTION SYSTEM	NOT REQUIRED	907.2.19 AND 907.2.4
MEANS OF EGRESS	MAXIMUM TRAVEL DISTANCE - 250 FT MAXIMUM COMMON PATH OF TRAVEL - 100 FT DEAD END - 50FT MIN CORRIDOR/AISLE WIDTH - 36 INCHES EGRESS WIDTH 0.2" PER PERSON - 0.2"X167=33.4"MIN	TABLE 1016.1 1014.3 EXCEPTION 1. 1017.3 EXCEPTION 2. 1017.2 TABLE 1005.1

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: JOHN R. STEENKEN
SIGNATURE:
DATE: 03/11/2009 LICENSE #45669

Hines

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3535 VADNAIS CENTER DR
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REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

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DESIGNED	P. WAIT	03-11-09
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APPROVED	J. STEENKEN	03-11-09

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
COVER SHEET

DRAWING NO. 15-1-3B G-1 REV.

11 MAR, 2009

PLOT-DATE

DRAWING LIST

GENERAL DRAWINGS

DWG NO.	TITLE
G-1	COVER SHEET
G-2	INDEX SHEET
G-3	SET BACK EXHIBIT

GENERAL ARRANGEMENT DRAWINGS

DWG NO.	TITLE
GA-1	GENERAL ARRANGEMENT PLAN
GA-2	BUILDING SECTION A
GA-3	BUILDING SECTION B
GA-4	BUILDING SECTION C
GA-5	BUILDING SECTION D
GA-6	BUILDING SECTION E
GA-7	BUILDING SECTION F

CIVIL DRAWINGS

DWG NO.	TITLE
C-1	GEN NOTES, ABBREVIATIONS & LEGEND
C-2	CIVIL GRADING PLAN
C-3	CIVIL GRADING & GEOMETRY PLAN - ENLARGED VIEWS
C-4	CIVIL UTILITY PLAN
C-5	CIVIL UTILITY PLAN - ENLARGED VIEW
C-6	CIVIL UNDERDRAIN SECTIONS
C-7	CIVIL GEOMETRY, PAVING & FENCING PLAN
C-8	CIVIL DETAILS - 1
C-9	CIVIL DETAILS - 2
C-10	CIVIL DETAILS - 3
C-11	CIVIL DETAILS - 4
C-12	CIVIL DETAILS - 5
C-13	CIVIL DETAILS - 6

EROSION CONTROL DRAWINGS

DWG NO.	TITLE
EC-1	EROSION CONTROL PLAN
EC-2	EROSION CONTROL DETAILS

CROSS SECTIONS

DWG NO.	TITLE
X-1	INDEX TO CROSS SECTIONS
X-2	BUILDING BACKFILL CROSS SECTIONS - 1
X-3	BUILDING BACKFILL CROSS SECTIONS - 2
X-4	BUILDING BACKFILL CROSS SECTIONS - 3
X-5	BUILDING BACKFILL CROSS SECTIONS - 4
X-6	BUILDING BACKFILL CROSS SECTIONS - 5
X-7	BUILDING BACKFILL CROSS SECTIONS - 6
X-8	BUILDING BACKFILL CROSS SECTIONS - 7

ARCHITECTURAL DRAWINGS

DWG NO.	TITLE
A-1	GENERAL NOTES
A-2	COMPLIANCE PLANS 1 OF 2
A-3	COMPLIANCE PLANS 2 OF 2
A-4	ROOF PLAN 1 OF 2
A-5	ROOF PLAN 2 OF 2
A-6	FLOOR PLAN EL 1236'-6" 1 OF 2
A-7	FLOOR PLAN EL 1236'-6" 2 OF 2
A-8	FLOOR PLAN EL 1224'-10" 1 OF 2
A-9	FLOOR PLAN EL 1224'-10" 2 OF 2
A-10	FLOOR PLAN EL 1212'-0" 1 OF 2
A-11	FLOOR PLAN EL 1212'-0" 2 OF 2
A-12	FLOOR PLAN EL 1196'-0" 1 OF 2
A-13	FLOOR PLAN EL 1196'-0" 2 OF 2
A-14	FLOOR PLAN EL 1181'-8" 1 OF 2
A-15	FLOOR PLAN EL 1181'-8" 2 OF 2
A-16	BUILDING ELEVATIONS AND SECTIONS
A-17	MAIN ENTRANCE PLAN & SECTIONS
A-18	CEILING PLAN, TOILET & KITCHEN DETAILS
A-19	EXIT STAIRS 1 & 5
A-20	EXIT STAIR 3 & ELEVATOR
A-21	EXIT STAIRS 2, 6, 7 & 8
A-22	ROOM FINISHES SCHED & HANDRAIL DETAILS
A-23	STAIR DETAILS
A-24	DOOR SCHEDULE & DETAILS
A-25	SIGNAGE SCHEDULE & DETAILS
A-26	BUILDING DETAILS - 1
A-27	BUILDING DETAILS - 2
A-28	WALL TYPES & DETAILS
A-29	BUILDING DETAILS

STRUCTURAL CONCRETE DRAWINGS

DWG NO.	TITLE
SC-1	GENERAL NOTES & ABBREVIATIONS
SC-2	ROOF PLAN
SC-3	SLAB PLAN EL 1236'-6" 1 OF 2
SC-4	SLAB PLAN EL 1236'-6" 2 OF 2
SC-5	SLAB PLAN EL 1224'-10" 1 OF 2
SC-6	SLAB PLAN EL 1224'-10" 2 OF 2
SC-7	SLAB PLAN EL 1206'-10"
SC-8	SLAB PLAN EL 1212'-0"
SC-9	SLAB PLAN EL 1196'-10" 1 OF 2
SC-10	SLAB PLAN EL 1196'-10" 2 OF 2

STRUCTURAL CONCRETE DRAWINGS (CONT.)

DWG NO.	TITLE
SC-11	SLAB PLAN EL 1181'-8" 1 OF 2
SC-12	SLAB PLAN EL 1181'-8" 2 OF 2
SC-13	FOUNDATION PLAN 1 OF 2
SC-14	FOUNDATION PLAN 2 OF 2
SC-15	ENLARGED ROOF PLANS
SC-16	ENLARGED SLAB PLANS - 1
SC-17	ENLARGED SLAB PLANS - 2
SC-18	BUILDING SECTION G
SC-19	BUILDING SECTION H
SC-20	BUILDING SECTION J
SC-21	BUILDING SECTION K
SC-22	BUILDING SECTION L
SC-23	BUILDING SECTION M
SC-24	BUILDING SECTION N
SC-25	WALL ELEVATIONS A, B, & C
SC-26	WALL ELEVATIONS D & E
SC-27	EAST EXIT PLAN, SECTION & DETAILS
SC-28	SOUTH EXIT PLAN, SECTION & DETAILS
SC-29	SITE RETAINING WALLS & SECTION
SC-30	WALL SECTIONS
SC-31	ROOF SECTIONS & DETAILS
SC-32	SLAB SECTIONS & DETAILS - 1
SC-33	SLAB SECTIONS & DETAILS - 2
SC-34	FOUNDATION SECTIONS & DETAILS
SC-35	STANDARD DETAILS - 1
SC-36	STANDARD DETAILS - 2

STRUCTURAL STEEL DRAWINGS

DWG NO.	TITLE
SS-1	GENERAL NOTES & ABBREVIATIONS
SS-2	HIGH ROOF PLAN
SS-3	LOW ROOF PLAN
SS-4	INTERMEDIATE STEEL PLAN
SS-5	GRATING PLAN EL 1236'-6"
SS-6	GRATING PLAN EL 1224'-10"
SS-7	GRATING PLAN EL 1212'-0"
SS-8	GRATING PLAN EL 1206'-10"
SS-9	GRATING PLAN EL 1196'-10"
SS-10	ENLARGED GRATING PLANS EL 1236'-6"
SS-11	ENLARGED GRATING PLANS
SS-12	ELEVATION @ COLUMN LINES 1 & 5
SS-13	ELEVATION @ COLUMN LINE 9
SS-14	ELEVATION @ COLUMN LINE A
SS-15	ELEVATION @ COLUMN LINE B
SS-16	ELEVATION @ COLUMN LINE C
SS-17	ELEVATION @ COLUMN LINES D & E
SS-18	SCHEDULE
SS-19	SECTIONS
SS-20	DETAILS - 1
SS-21	DETAILS - 2
SS-22	DETAILS - 3
SS-23	STANDARD DETAILS - 1
SS-24	STANDARD DETAILS - 2
SS-25	STANDARD DETAILS - 3
SS-26	STANDARD DETAILS - 4

MECHANICAL DRAWINGS

DWG NO.	TITLE
M-1	HVAC LEGEND & ABBREVIATIONS
M-2	HVAC ROOF PLAN 1 OF 2
M-3	HVAC ROOF PLAN 2 OF 2
M-4	HVAC FLOOR PLAN EL 1236'-6" 1 OF 2
M-5	HVAC FLOOR PLAN EL 1236'-6" 2 OF 2
M-6	HVAC FLOOR PLAN EL 1224'-10"
M-7	HVAC FLOOR PLAN EL 1212'-0"
M-8	HVAC FLOOR PLAN EL 1196'-10"
M-9	HVAC FLOOR PLAN EL 1181'-8" 1 OF 2
M-10	HVAC FLOOR PLAN EL 1181'-8" 2 OF 2
M-11	MECHANICAL SECTIONS
M-12	HVAC DETAILS - 1
M-13	HVAC DETAILS - 2
M-14	HVAC SCHEDULES - 1
M-15	HVAC SCHEDULES - 2
M-16	HVAC CONTROL DIAGRAMS - 1
M-17	HVAC CONTROL DIAGRAMS - 2

PLUMBING DRAWINGS

DWG NO.	TITLE
P-1	PLUMBING LEGEND & ABBREVIATIONS
P-2	PLUMBING ROOF PLAN
P-3	PLUMBING FLOOR PLAN EL 1236'-6" 1 OF 2
P-4	PLUMBING FLOOR PLAN EL 1236'-6" 2 OF 2
P-5	PLUMBING FLOOR PLAN EL 1224'-10"
P-6	PLUMBING FLOOR PLAN EL 1212'-0"
P-7	PLUMBING FLOOR PLAN EL 1196'-10"
P-8	PLUMBING FLOOR PLAN EL 1181'-8"
P-9	PLUMBING SECTIONS
P-10	PLUMBING DETAILS
P-11	PLUMBING RISERS
P-12	PUMP STATION ELEVATION & SECTIONS
P-13	PLUMBING SCHEDULES

FIRE PROTECTION DRAWINGS

DWG NO.	TITLE
FA-1	GENERAL NOTES & SYSTEMS OPERATION MATRIX
FA-2	AIR SAMPLING SMOKE DETECTION SYSTEM PLAN EL 1236'-6"
FA-3	AIR SAMPLING SMOKE DETECTION SYSTEM PLAN EL 1236'-6"
FA-4	LINEAR HEAT DETECTION SYSTEM PLAN
FA-5	LINEAR HEAT DETECTION SYSTEM PLAN
FA-6	FIRE ALARM PLAN EL 1236'-6"
FA-7	FIRE ALARM PLAN EL 1236'-6"
FA-8	FIRE ALARM PLAN EL 1224'-10"
FA-9	FIRE ALARM PLAN EL 1206'-10"
FA-10	FIRE ALARM PLAN EL 1212'-0"
FA-11	FIRE ALARM PLAN EL 1196'-10"
FA-12	FIRE ALARM PLAN EL 1181'-8"
FA-13	FIRE ALARM PLAN EL 1181'-8"
FA-14	DETAILS
FP-1	GENERAL NOTES
FP-2	SYSTEM ZONING
FP-3	SYSTEM ZONING
FP-4	WATER MIST SYSTEM PLAN EL 1236'-6"
FP-5	WATER MIST SYSTEM PLAN EL 1236'-6"
FP-6	FIRE PROTECTION ROOM EL 1236'-6"
FP-7	WATER MIST SYSTEM PLAN EL 1224'-10"
FP-8	WATER MIST SYSTEM PLAN EL 1224'-10"
FP-9	WATER MIST SYSTEM PLAN EL 1212'-0"
FP-10	WATER MIST SYSTEM PLAN EL 1196'-10"
FP-11	WATER MIST SYSTEM PLAN EL 1181'-8"
FP-12	WATER MIST SYSTEM PLAN EL 1181'-8"
FP-13	DETAILS
FP-14	SECTION & DETAILS - 1
FP-15	SECTION & DETAILS - 2
FP-16	SECTION & DETAILS - 3
FP-17	VALVE MANIFOLD DETAIL
FP-18	DETAILS
FP-19	ISOMETRIC
FP-20	HYDRAULIC CALCULATION
FPS-1	DRY STANDPIPE PLAN EL 1236'-6"
FPS-2	DRY STANDPIPE PLAN EL 1236'-6"
FPS-3	DRY STANDPIPE PLAN EL 1224'-10"
FPS-4	DRY STANDPIPE PLAN EL 1224'-10"
FPS-5	DRY STANDPIPE PLAN EL 1212'-0"
FPS-6	DRY STANDPIPE PLAN EL 1206'-10"
FPS-7	DRY STANDPIPE PLAN EL 1196'-10"
FPS-8	DRY STANDPIPE PLAN EL 1196'-10"
FPS-9	DRY STANDPIPE PLAN EL 1181'-8"
FPS-10	DRY STANDPIPE PLAN EL 1181'-8"
FPS-11	SECTION & DETAILS

ELECTRICAL DRAWINGS

DWG NO.	TITLE
E-1	ELECTRICAL SYMBOLS & GENERAL NOTES
E-2	SINGLE-LINE DIAGRAM
E-3	ELECTRICAL SITE PLAN
E-4	POWER PLAN - ROOF 1 OF 2
E-5	POWER PLAN - ROOF 2 OF 2
E-6	POWER PLAN EL 1236'-6" 1 OF 2
E-7	POWER PLAN EL 1236'-6" 2 OF 2
E-8	POWER PLAN EL 1224'-10"
E-9	POWER PLAN EL 1206'-10"
E-10	POWER PLAN EL 1212'-0"
E-11	POWER PLAN EL 1196'-10"
E-12	POWER PLAN EL 1181'-8" 1 OF 2
E-13	POWER PLAN EL 1181'-8" 2 OF 2
E-14	LIGHTING PLAN EL 1236'-6" 1 OF 2
E-15	LIGHTING PLAN EL 1236'-6" 2 OF 2
E-16	LIGHTING PLAN EL 1224'-10" 1 OF 2
E-17	LIGHTING PLAN EL 1224'-10" 2 OF 2
E-18	LIGHTING PLAN EL 1206'-10"
E-19	LIGHTING PLAN EL 1212'-0"
E-20	LIGHTING PLAN EL 1196'-10" 1 OF 2
E-21	LIGHTING PLAN EL 1196'-10" 2 OF 2
E-22	LIGHTING PLAN EL 1181'-8" 1 OF 2
E-23	LIGHTING PLAN EL 1181'-8" 2 OF 2
E-24	ENLARGED POWER PLANS
E-25	ENLARGED POWER & LIGHTING PLAN
E-26	LIGHTING FIXTURE SCHEDULE & DETAILS
E-27	ELECTRICAL SECTIONS & DETAILS
E-28	PANELBOARD SCHEDULES - 1
E-29	PANELBOARD SCHEDULES - 2
E-30	PANELBOARD SCHEDULES - 3
E-31	PANELBOARD SCHEDULES - 4
E-32	STAIRWAY LIGHTING
E-33	LIGHTNING PROTECTION PLAN & DETAILS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: JOHN R. STEENKEN

SIGNATURE:

DATE: 03/11/2009 LICENSE #45689

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

PLOT - DATE

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	P. WAIT	03-11-09
DRAWN	J. HOLZINGER	03-11-09
CHECKED	B. QUINLAN	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

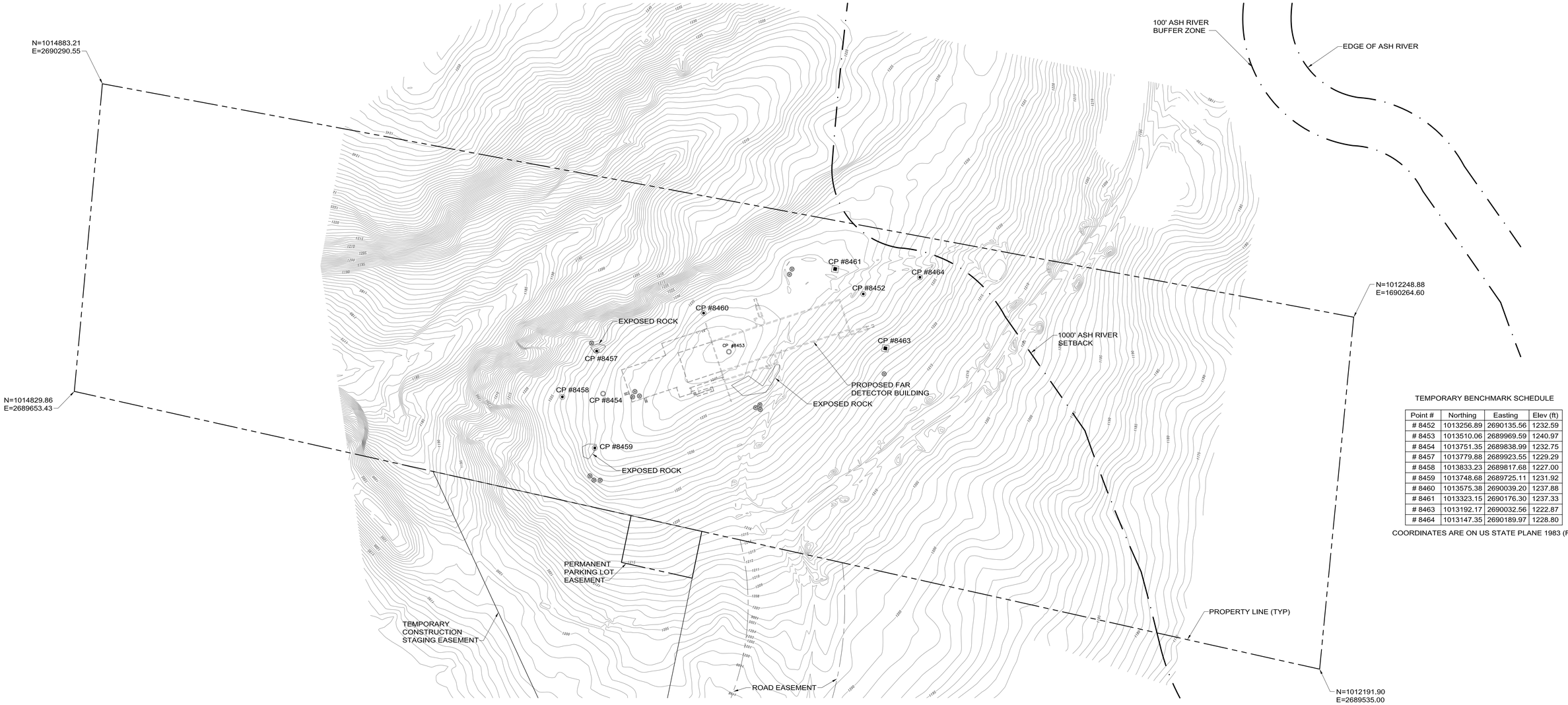
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

INDEX SHEET

DRAWING NO. 15-1-3B G-2 REV. 0

11 MAR, 2009



TEMPORARY BENCHMARK SCHEDULE

Point #	Northing	Easting	Elev (ft)
# 8452	1013256.89	2690135.56	1232.59
# 8453	1013510.06	2689969.59	1240.97
# 8454	1013751.35	2689838.99	1232.75
# 8457	1013779.88	2689923.55	1229.29
# 8458	1013833.23	2689817.68	1227.00
# 8459	1013748.68	2689725.11	1231.92
# 8460	1013575.38	2690039.20	1237.88
# 8461	1013323.15	2690176.30	1237.33
# 8463	1013192.17	2690032.56	1222.87
# 8464	1013147.35	2690189.97	1228.80

COORDINATES ARE ON US STATE PLANE 1983 (FT)

LEGEND

- BRASS DISK IN ROCK
- TEMPORARY CONTROL POINT
- WELL
- 4" ALUMINUM MONUMENT (MONUMENTS HAVE LOCATING MAGNETS MOUNTED WITHIN CAP)

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1" = 80'-0"

50 0 80 160

SCALE FEET

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

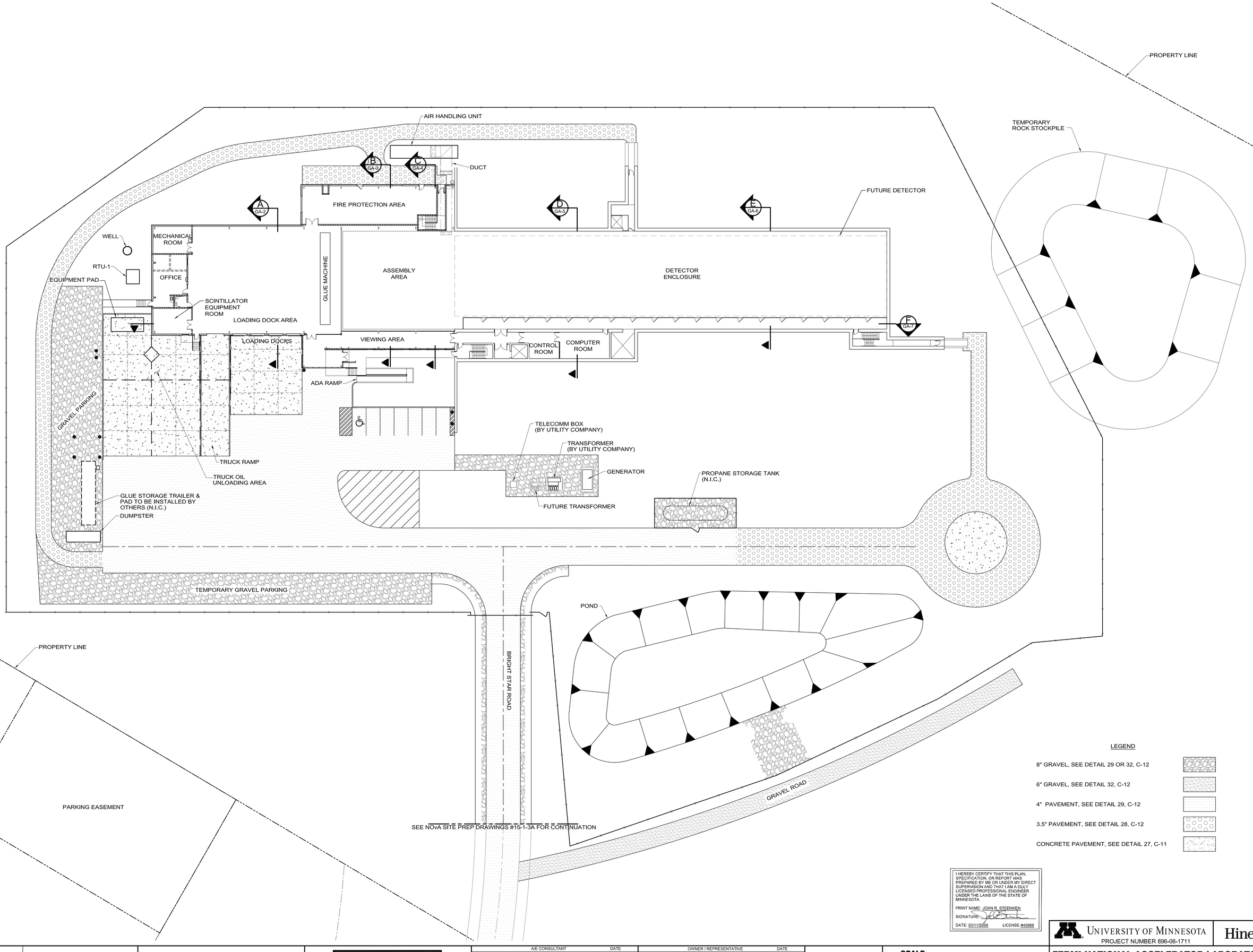
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

SET BACK EXHIBIT

DRAWING NO. 15-1-3B G-3 REV. 0

11 MAR, 2009



LEGEND

- 8" GRAVEL, SEE DETAIL 29 OR 32, C-12
- 6" GRAVEL, SEE DETAIL 32, C-12
- 4" PAVEMENT, SEE DETAIL 29, C-12
- 3.5" PAVEMENT, SEE DETAIL 28, C-12
- CONCRETE PAVEMENT, SEE DETAIL 27, C-11

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PRINT NAME: JOHN R. STEENKEN

SIGNATURE:

DATE: 03/11/2009 LICENSE #45669

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	P. WAIT	03-11-09
DRAWN	J. HOLZINGER	03-11-09
CHECKED	B. QUINLAN	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1" = 20'-0" (20 0 20 40 SCALE FEET)

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

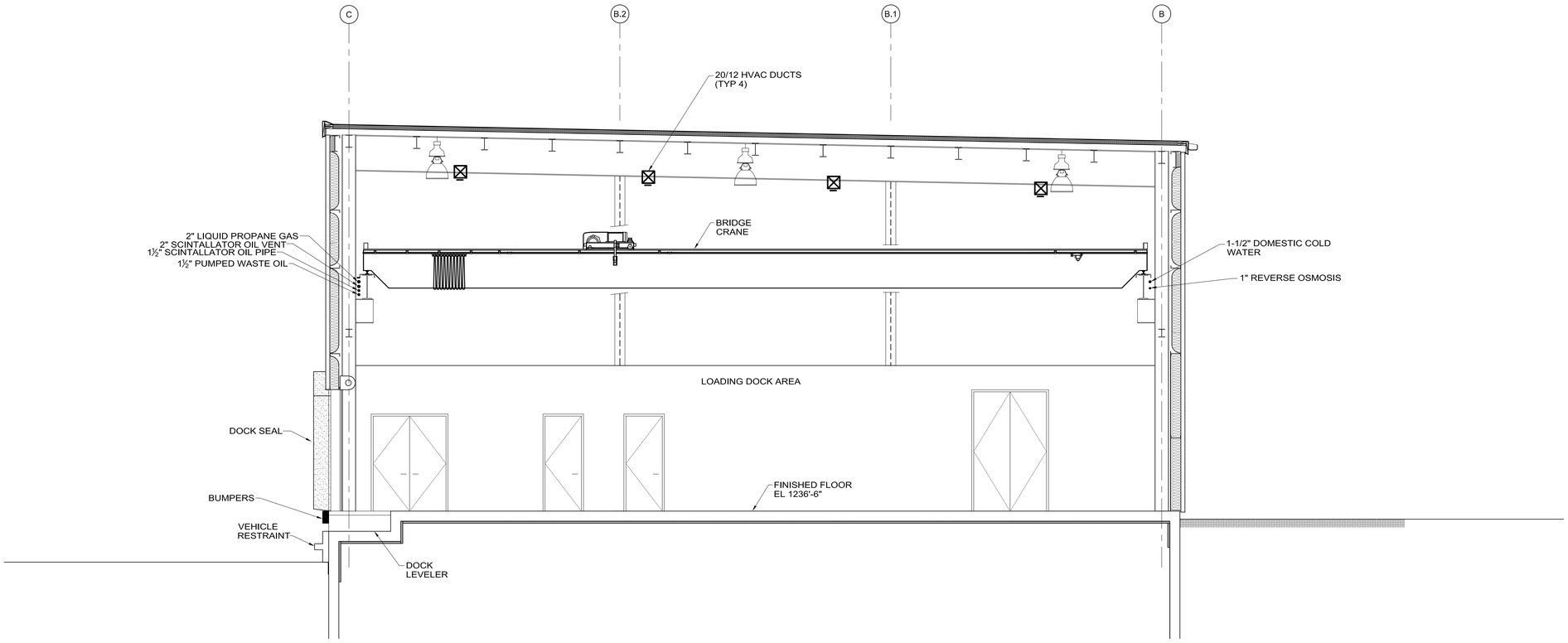
NOvA FAR DETECTOR BUILDING

GENERAL ARRANGEMENT

DRAWING NO. 15-1-3B GA-1 REV. 0

11 MAR, 2009

PLOT - DATE



SECTION

1/4"=1'-0"

A
GA-1
M-2
M-4
P-2
P-3

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

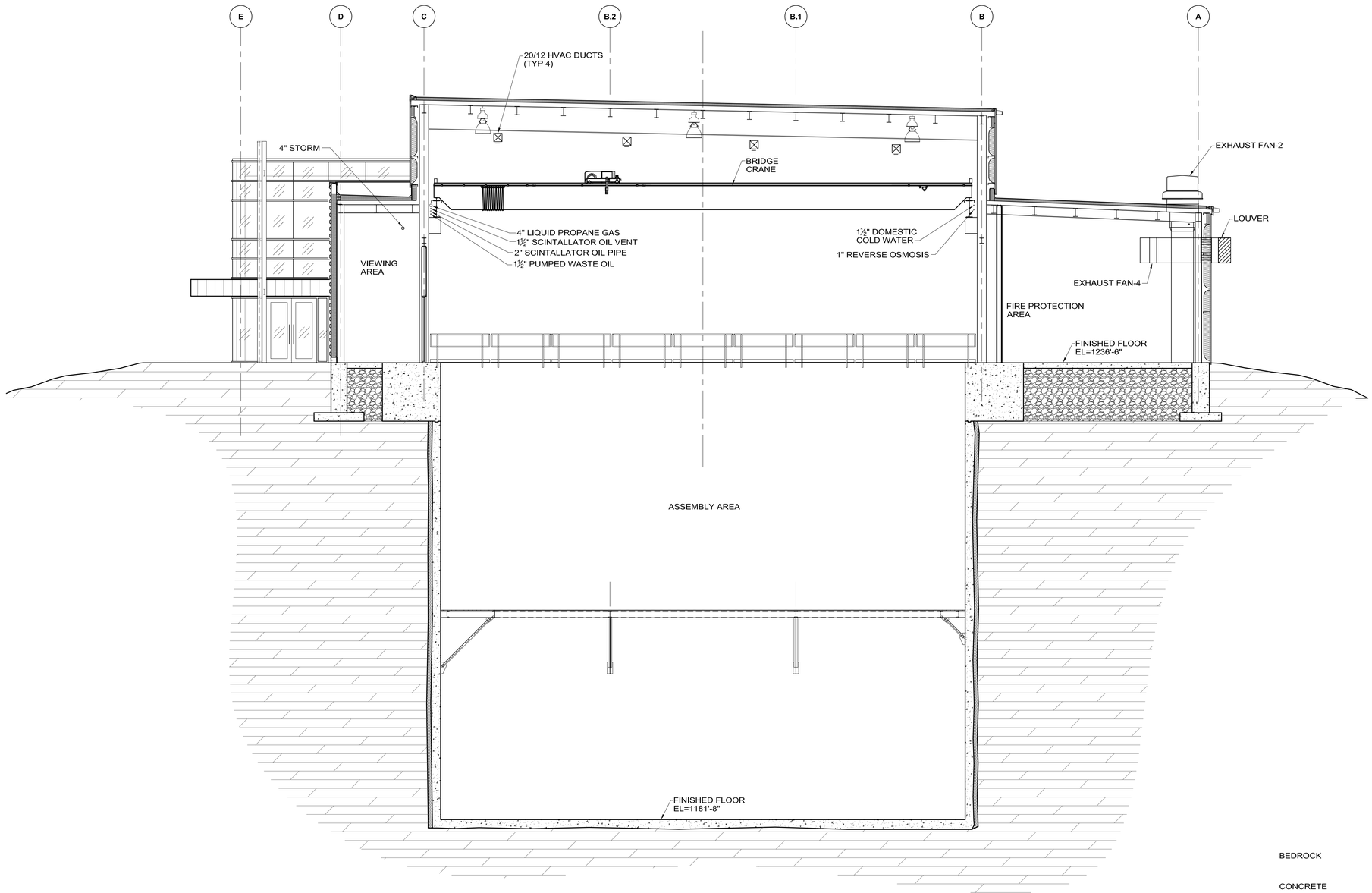
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

BUILDING SECTION A

DRAWING NO. **15-1-3B** **GA-2** REV. **0**

11 MAR, 2009



LEGEND

BEDROCK

CONCRETE

SECTION

3/16"=1'-0"

B
GA-1
M-2
M-4
M-9
P-2
P-3

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SINCE 1898

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0"

2 0 2 4 6 8 10 12 14
SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

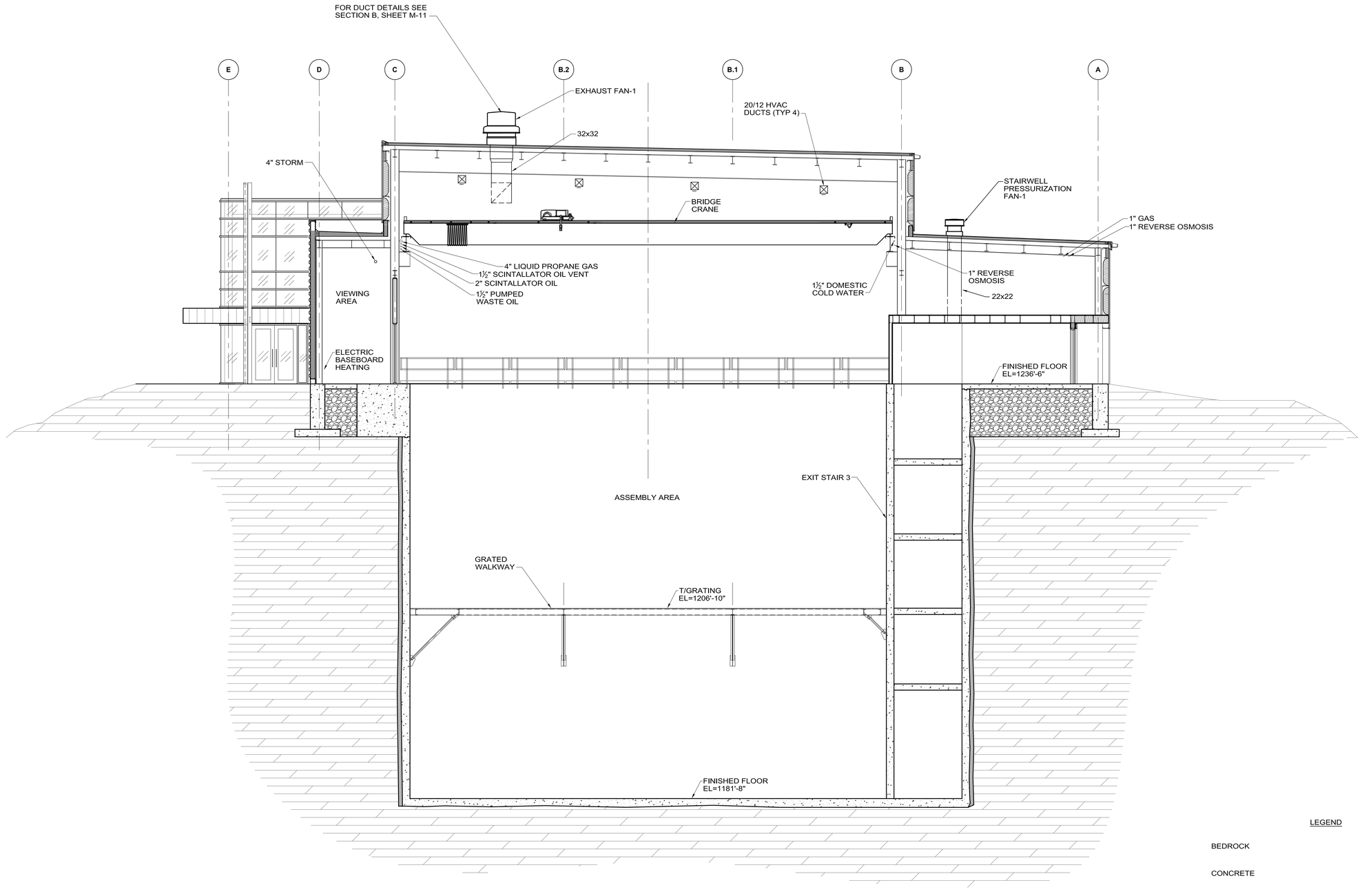
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

BUILDING SECTION B

DRAWING NO. **15-1-3B** **GA-3** REV. **0**

11 MAR, 2009



LEGEND

BEDROCK

CONCRETE

SECTION C

3/16"=1'-0"

GA-1
M-2
M-4
M-9
P-2
P-3

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0"

2 0 2 4 6 8 10 12 14

SCALE FEET

UNIVERSITY OF MINNESOTA

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FERMI NATIONAL ACCELERATOR LABORATORY

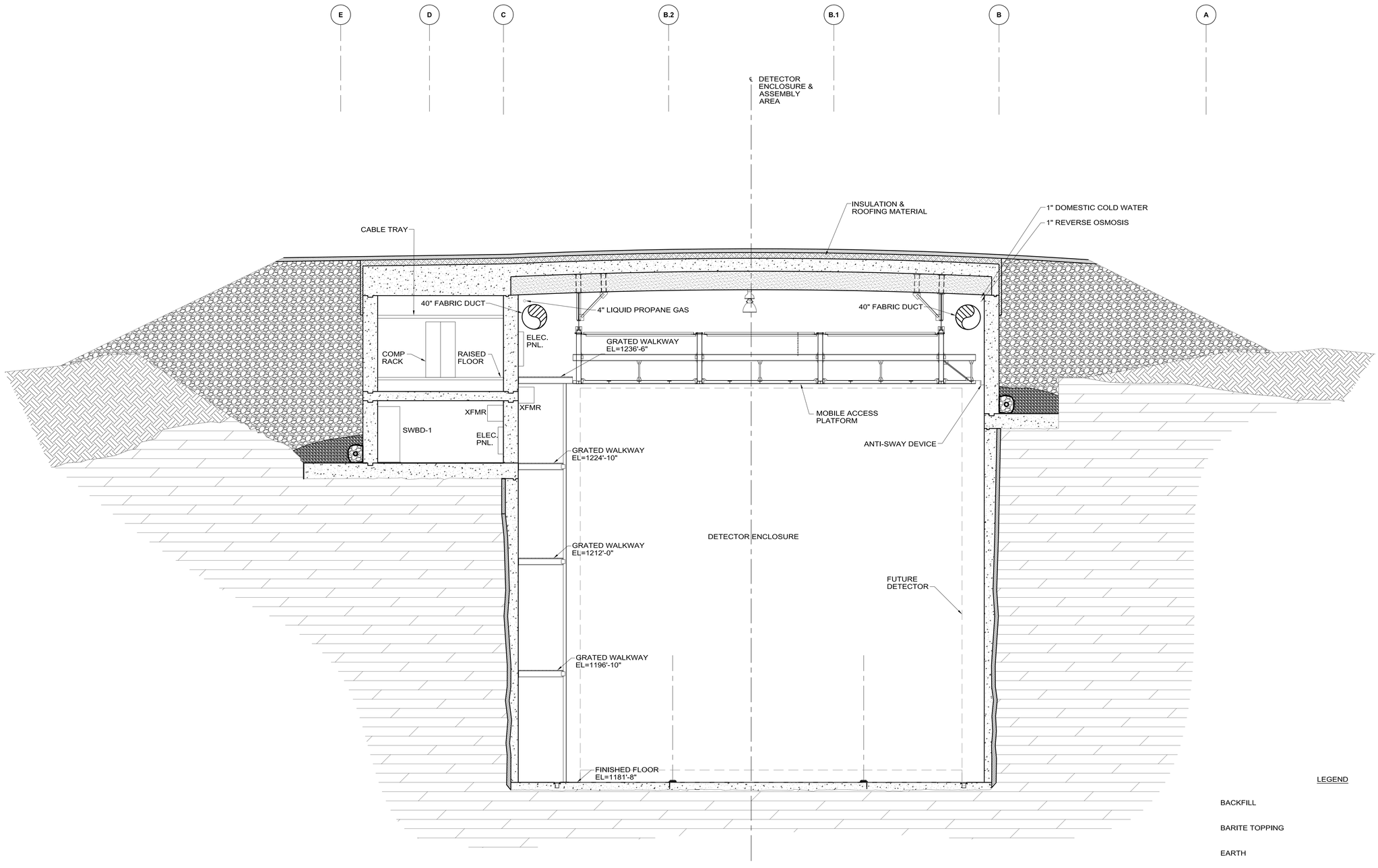
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

BUILDING SECTION C

DRAWING NO. 15-1-3B GA-4 REV. 0

11 MAR, 2009



SECTION
3/16"=1'-0"

D
GA-1
M-3 P-8
M-5
M-6
M-7
M-8
M-10
P-4
P-5
P-6
P-7

LEGEND

- BACKFILL
- BARITE TOPPING
- EARTH
- BEDROCK
- CONCRETE

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SCALE:
3/16"=1'-0"
2 0 2 4 6 8 10 12 14
SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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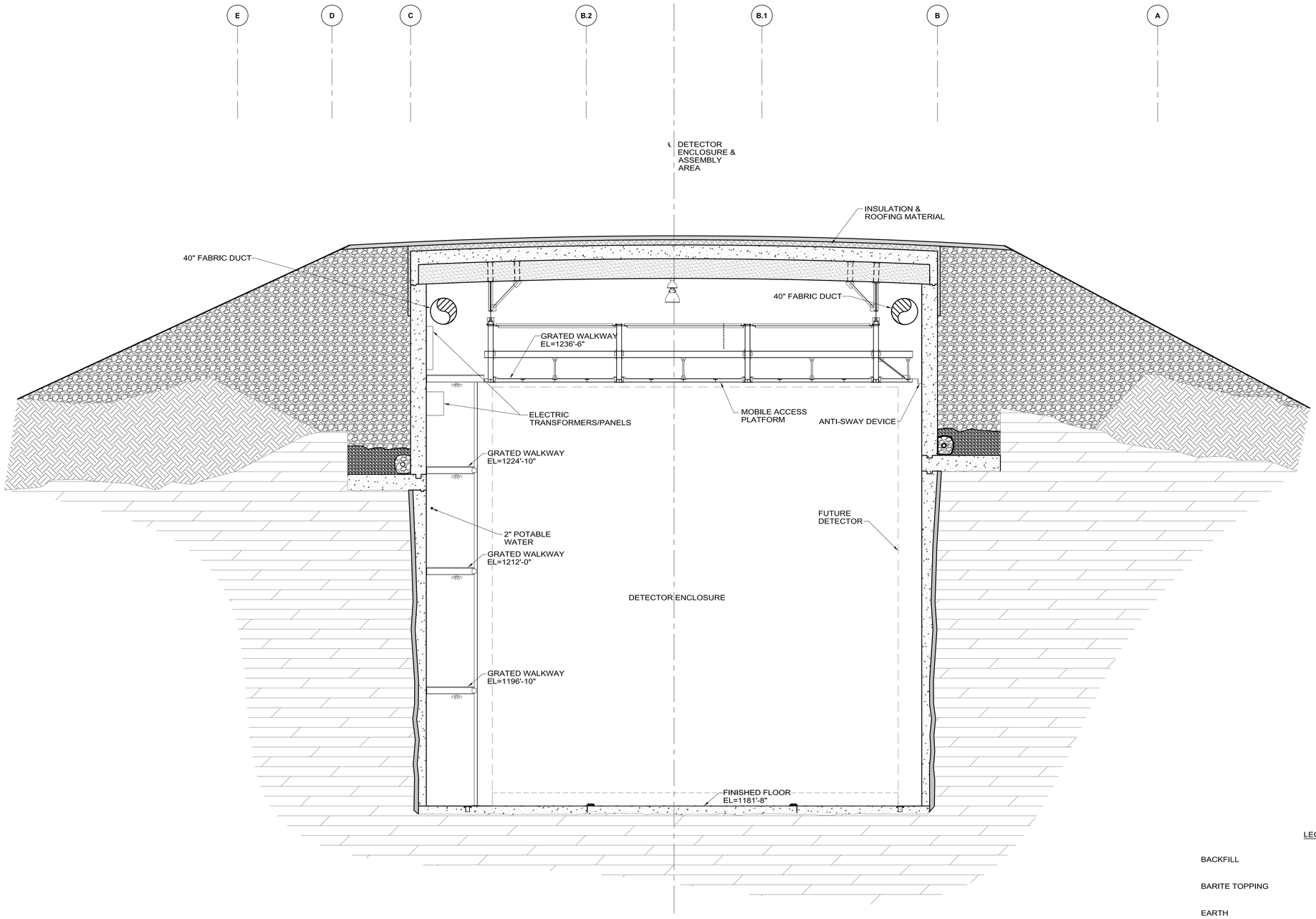
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
BUILDING SECTION D

DRAWING NO. 15-1-3B GA-5 REV. 0

11 MAR, 2009



LEGEND

- BACKFILL
- BARITE TOPPING
- EARTH
- BEDROCK
- CONCRETE

SECTION E
3/16"=1'-0"

GA-1
M-3
M-5
M-6
M-7
M-8
M-10
P-4
P-5
P-6
P-7
P-8

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SCALE:
3/16"=1'-0"
2 0 2 4 6 8 10 12 14
SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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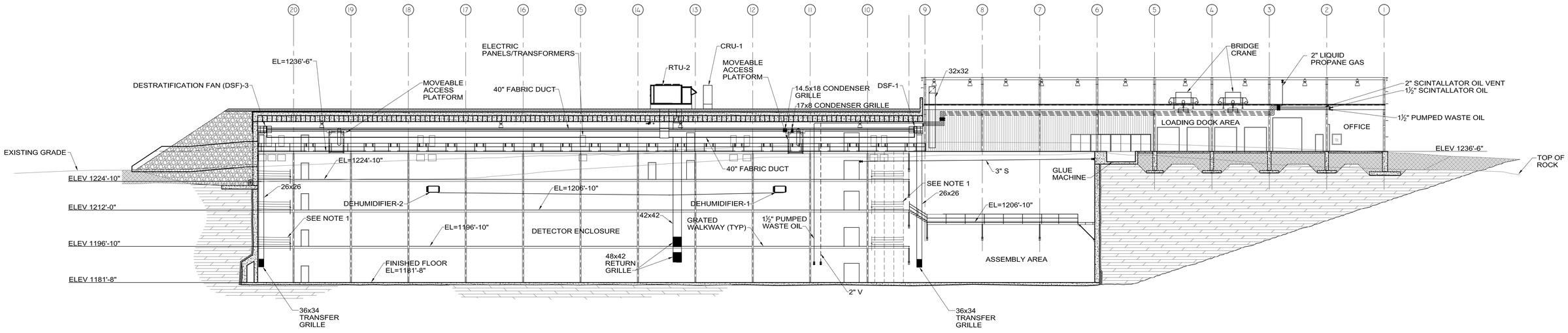
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

BUILDING SECTION E

DRAWING NO. 15-1-3B GA-6 REV. 0

11 MAR, 2009



SECTION F

1/16"=1'-0"

GA-1
M-2 P-2
M-3 P-3
M-4 P-4
M-5 P-5
M-6 P-6
M-7 P-7
M-8 P-8
M-9
M-10

NOTE:

1. REMOVABLE HANDRAIL TO EXTEND ENTIRE LENGTH OF CATWALK FOR ELEVATIONS 1196'-10", 1212'-0", AND 1224'10".

LEGEND

- BACKFILL
- BARITE TOPPING
- EARTH
- BEDROCK
- CONCRETE

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1/16"=1'-0" 8 0 8 16 24 32 40 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

BUILDING SECTION F

DRAWING NO. 15-1-3B GA-7 REV. 0

11 MAR, 2009

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE MINNESOTA DEPARTMENT OF TRANSPORTATION (MnDOT) "STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2005 EDITION".

2. ALL UTILITY OWNERS SHALL BE CONTACTED AND THEIR FACILITIES SHALL BE LOCATED PRIOR TO THE COMMENCEMENT OF ANY SUBSURFACE OR SUBGRADE PREPARATION WORK. UTILITY LOCATIONS SHOWN HEREIN ARE FOR GRAPHIC ILLUSTRATION ONLY AND ARE NOT TO BE RELIED UPON. THEY ARE SHOWN ON THE DRAWINGS ACCORDING TO AVAILABLE RECORDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION IN THE FIELD OF THESE UTILITY LINES AND THE PROTECTION OF THEM FROM DAMAGE DUE TO CONSTRUCTION OPERATIONS. IF EXISTING UTILITY LINES OF ANY NATURE ARE ENCOUNTERED WHICH CONFLICT WITH NEW CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE IMMEDIATELY SO THAT THE CONFLICT MAY BE RESOLVED.

3. THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR THE PROPER BRACING, SHORING AND OTHER REQUIRED PROTECTION OF ALL UTILITIES BEFORE CONSTRUCTION BEGINS. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE UTILITIES AND ASSOCIATED STRUCTURES AND SHALL MAKE REPAIRS AS NECESSARY TO THE SATISFACTION OF THE UTILITY OWNER.

4. CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ADEQUATE SIGNS, AND WARNING DEVICES TO INFORM AND PROTECT THE PUBLIC DURING ALL PHASES OF CONSTRUCTION. BARRICADES AND WARNING SIGNS SHALL BE PROVIDED IN ACCORDANCE WITH THE MnDOT "STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2005 EDITION".

5. THE STANDARD SPECIFICATIONS LISTED ON THESE CONSTRUCTION DRAWINGS AND SUBSEQUENT DETAILS ARE ALL TO BE CONSIDERED AS PART OF THE CONTRACT DOCUMENTS. INCIDENTAL ITEMS, ACCESSORIES, OR CONSTRUCTION NECESSARY TO COMPLETE THIS WORK MAY NOT BE SPECIFICALLY NOTED BUT ARE TO BE CONSIDERED A PART OF THE CONTRACT.

6. NO DRAWINGS SHALL BE USED FOR CONSTRUCTION UNLESS SPECIFICALLY MARKED 'FOR CONSTRUCTION'. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AFFECTING THEIR WORK WITH THE ACTUAL CONDITIONS AT THE JOB SITE. IF THERE ARE ANY DISCREPANCIES FROM WHAT IS SHOWN ON THE CONSTRUCTION DRAWINGS, CONTRACTOR MUST IMMEDIATELY REPORT SAME TO THE OWNER'S REPRESENTATIVE BEFORE DOING ANY WORK, OTHERWISE THE CONTRACTOR ASSUMES FULL RESPONSIBILITY. IN THE EVENT OF DISAGREEMENT BETWEEN THE CONSTRUCTION DRAWINGS, STANDARD SPECIFICATIONS AND/OR SPECIAL DETAILS, THE CONTRACTOR SHALL SECURE WRITTEN INSTRUCTIONS FROM THE OWNER'S REPRESENTATIVE PRIOR TO PROCEEDING WITH ANY PART OF THE WORK AFFECTED BY OMISSIONS OR DISCREPANCIES. FAILING TO SECURE SUCH INSTRUCTION, THE CONTRACTOR WILL BE CONSIDERED TO HAVE PROCEEDED AT ITS OWN RISK AND EXPENSE.

7. EROSION/SEDIMENTATION CONTROL MEASURES, AS INDICATED IN THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP), AND AS REQUIRED BY LOCAL AUTHORITIES, SHALL BE FUNCTIONAL BEFORE LAND IS OTHERWISE DISTURBED ON THE SITE AND BE EMPLOYED CONTINUOUSLY DURING THE COURSE OF CONSTRUCTION OPERATIONS UNTIL SUITABLE GROUND COVERS ARE ESTABLISHED ON ALL CONSTRUCTION SITE AREAS.

8. CONSTRUCTION ACCESS SHALL BE CONFINED TO DEFINED CONNECTIONS TO ADJACENT DRIVEWAYS, UTILITY EASEMENTS AND PUBLIC ROADWAYS. CONSTRUCTION EXITS SHALL BE CLEANED DAILY AS NEEDED TO PREVENT THE SPREAD OF MUD OR DEBRIS ON THE ADJACENT ROADWAYS. MUD AND DEBRIS SHALL BE CLEARED FROM THE PAVEMENTS WHENEVER IT OCCURS AND AS REQUIRED BY THE LOCAL AUTHORITIES.

9. CONTRACTOR TO PROVIDE DUST CONTROL MEASURES TO PREVENT TRAFFIC HAZARDS OR THE DISCOMFORT OF PERSONS DOWN WIND.

10. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REMOVE FROM THE SITE ANY AND ALL MATERIALS, DEBRIS, REFUSE, AND EQUIPMENT WHICH RESULT FROM CONSTRUCTION OPERATIONS IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REQUIREMENTS AND AT NO ADDITIONAL EXPENSE TO THE OWNER. EXCESS SOIL WILL BE STOCKPILED ON SITE.

11. THE OWNER'S REPRESENTATIVE AND OWNER ARE NOT RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES, TIME OF PERFORMANCE, PROGRAMS OR FOR ANY SAFETY PRECAUTIONS USED BY THE CONTRACTOR. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR EXECUTION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND SPECIFICATIONS.

12. THE CONTRACTOR SHALL KEEP A SET OF "APPROVED" CONSTRUCTION DRAWINGS ON THE JOB SITE, AND SHALL MAINTAIN (AS INDICATED HEREIN AND ELSEWHERE WITHIN THESE CONSTRUCTION NOTES, SPECIFICATIONS, AND DRAWINGS) A LEGIBLE RECORD ON SAID DRAWINGS OF ANY UNANTICIPATED UTILITIES ENCOUNTERED, ANY MODIFICATIONS/ALTERATIONS TO ALIGNMENT OR GRADE AND/OR TO DRAWINGS AND SPECIFICATIONS OF PROPOSED IMPROVEMENTS, ETC. UPON COMPLETION OF THE CONTRACTORS' WORK, SAID DRAWINGS AND INFORMATION SHALL BE PROVIDED TO OWNER'S REPRESENTATIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION SURVEY AND STAKEOUT.

13. ANY UNFILLED EXCAVATION OR OTHER HAZARD LEFT UNATTENDED OVERNIGHT OR DURING PERIODS OF INACTIVITY SHALL BE PROPERLY FENCED OR PROTECTED BY THE CONTRACTOR.

EARTHWORK

1. SOIL STOCKPILES
   A. SOILS OF DIFFERENT TYPES SHALL BE SEGREGATED INTO SEPARATE STOCKPILES.
   B. TEMPORARY SOIL STOCKPILES SHALL BE LOCATED AND PROTECTED SO AS TO PREVENT SEDIMENT RUNOFF INTO WATER COURSES AND DRAINAGE SYSTEMS OR ONTO ADJACENT ROADWAYS AND PROPERTIES.
   C. TOPSOIL SHALL BE STOCKPILED FOR FUTURE RESPREAD (BY OTHERS).

2. TOPSOIL PLACEMENT AND VEGETATIVE COVER
   A. IMMEDIATELY UPON COMPLETION OF THE PAVEMENT WEATHER CONDITIONS PERMITTING, TOPSOIL SHALL BE PLACED AND GRADED WHEREVER AREAS HAVE BEEN DISTURBED.
   B. SEEDING TO ESTABLISH PERMANENT VEGETATIVE GROUND COVER SHALL BE PERFORMED WITHIN 5 DAYS AFTER TOPSOIL PLACEMENT, WHENEVER WEATHER CONDITIONS ARE ADEQUATE FOR SUCH WORK.

3. SITE RESTORATION MEASURES
   A. AREAS NOT OTHERWISE SUBJECT TO DISTURBANCE THAT ARE DAMAGED BY MOVEMENT OR STORAGE OF CONSTRUCTION VEHICLES, EQUIPMENT OR MATERIALS OR DISCHARGE OF WATER FROM THE CONSTRUCTION SITE SHALL BE RESTORED TO ORIGINAL CONDITIONS.

SOIL EROSION/SEDIMENT CONTROL

1. SOIL EROSION AND SEDIMENT CONTROL SHALL BE PER PROJECT STORM WATER POLLUTION PREVENT PLAN (SWPPP).

CONCRETE CURBING & SIDEWALK NOTES

1. CURBING CONTROL JOINTS SHALL BE 3" DEEP SAW CUT MADE WITHIN 48 HOURS OF PLACING CONCRETE.

2. ALL CURBING SHALL CONTAIN CONTINUOUS REINFORCING BARS (2-#4 BARS UNLESS OTHERWISE INDICATED). BARS SHALL BE OVERLAPPED 12" AT SPLICES. BARS SHALL NOT RUN THROUGH EXPANSION JOINTS.

3. SIDEWALKS SHALL HAVE ⅜" WIDE EXPANSION JOINTS AT 60' SPACING AND ¼" WIDE EXPANSION JOINTS AT CURBS AND STRUCTURES. (ASTM-D1751)

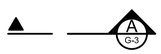
4. SIDEWALKS SHALL HAVE 1" DEEP CONTROL JOINTS SPACED SO AS TO OBTAIN APPROXIMATELY SQUARE SECTIONS.

5. CROSS SLOPE OF SIDEWALKS SHALL NOT EXCEED 2%.

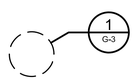
LEGEND

	EXISTING	PROPOSED
FENCE		X
STORM SEWER		ST
MANHOLE STRUCTURE		
CATCH BASIN		
INLET STRUCTURE		
WATER		W
FIBER OPTIC		FO
ELECTRIC		E
GRAVEL LINED SWALE		
SILT FENCE		
GROUND CONTOUR (ONE FOOT)		14
GROUND CONTOUR (FIVE FOOT)	15	15
SPOT ELEVATION		+1216.60
CULVERT (W/FES AND INLET AND OUTLET PROTECTION)		
LIGHT POLES AND OVERHEAD WIRE		
ITEM TO BE REMOVED OR DEMOLISHED		
INLET PROTECTION		
FIRE PROTECTION		FP
SANITARY SEWER		
EXPANSION JOINT		
CONTROL JOINT		
BOLLARD		
UTILITY STRUCTURE		
NATURAL GAS		GAS
UNDERDRAIN		
EROSION BLANKET		
PROPERTY LINE		
CURVE		1
POINT		PT-1
PIPE OUT / UP		
PIPE IN / DOWN		
8" GRAVEL		
4" GRAVEL SHOULDER		
24" BITUMINOUS PAVEMENT OVER 4" BASE		
9" BITUMINOUS PAVEMENT OVER 3.5" BASE		
CONCRETE		
STUB		
6" BARITE		

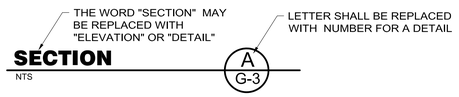
SECTION, DETAIL, AND ELEVATION IDENTIFICATION SYSTEM



SECTION CALLOUT EXAMPLE



DETAIL CALLOUT EXAMPLE



SECTION, DETAIL, OR ELEVATION TITLE EXAMPLE

ABBREVIATIONS

ADA	AMERICAN DISABILITIES ACT
APPROX	APPROXIMATELY
CO	CLEAN OUT
CLR	CLEARANCE
CONC	CONCRETE
CU YD	CUBIC YARDS
Ø	DIAMETER
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
EW	EACH WAY
E	EASTING
EL	ELEVATION
ELEV	ELEVATION
EJ	EXPANSION JOINT
FT	FEET
FES	FLARED END SECTION
GA	GAUGE
GEN	GENERAL
HDPE	HIGH DENSITY POLY ETHYLENE
HORIZ	HORIZONTAL
INCH	INCH
ID	INNER DIAMETER
INV	INVERT
LF	LINEAR FEET
LG	LONG
MAX	MAXIMUM
MIN	MINIMUM
MNDOT	MINNESOTA DEPARTMENT OF TRANSPORTATION
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
NOM	NOMINAL
N	NORTHING
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
NO.	NUMBER
OC	ON CENTER
OD	OUTER DIAMETER
PT	POINT
PE	POLYETHYLENE
PVC	POLY VINYL CHLORIDE
PIV	POST INDICATOR VALVE
PSI	POUNDS PER SQUARE INCH
R	RADIUS
REQ'D	REQUIRED
SCH	SCHEDULE
SDR	STANDARD DIMENSION RATIO
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
T/	TOP OF
T.O.R.	TOP OF ROCK
T & B	TOP AND BOTTOM
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
WWM	WELDED WIRE MESH
W/	WITH

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: JOHN R. STEENKEN

SIGNATURE:

DATE: 03/11/2009 LICENSE #45669

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

PLOT - DATE

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	P. WAIT	03-11-09
DRAWN	J. HOLZINGER	03-11-09
CHECKED	B. QUINLAN	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

GEN NOTES, ABBREVIATIONS & LEGEND

DRAWING NO. **15-1-3B** **C-1** REV. **0**

11 MAR, 2009

LEGEND

- 8" GRAVEL, SEE DETAIL 29 OR 32, C-12
- 6" GRAVEL, SEE DETAIL 32, C-12
- 4" PAVEMENT, SEE DETAIL 29, C-12
- 3.5" PAVEMENT, SEE DETAIL 28, C-12
- CONCRETE PAVEMENT, SEE DETAIL 27, C-11
- 6" BARITE GRAVEL

EQUIPMENT PAD

EQUIPMENT PAD

ADA RAMP

LOADING DOCKS

TRUCK RAMP

TRUCK OIL UNLOADING AREA

GLUE STORAGE TRAILER & PAD TO BE INSTALLED BY OTHERS (N.I.C.)

DUMPSTER

TEMPORARY GRAVEL PARKING

FAR DETECTOR BUILDING

FF=1236.5'

165 LF GRAVEL LINED SWALE @ 2.5%

80 LF GRAVEL LINED SWALE @ 1.0%

32 LF GRAVEL LINED SWALE @ 2.5%

SEE NOTE 1

BRIGHT STAR ROAD

GRAVEL ROAD

PROPERTY LINE

SEE NOVA SITE PREP DRAWINGS #15-1-3A FOR CONTINUATION

NOTE:
1. PIPING AND STRUCTURES INSTALLED IN SITE PREP PHASE #15-1-3A.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1" = 20'-0"
20 0 20 40
SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

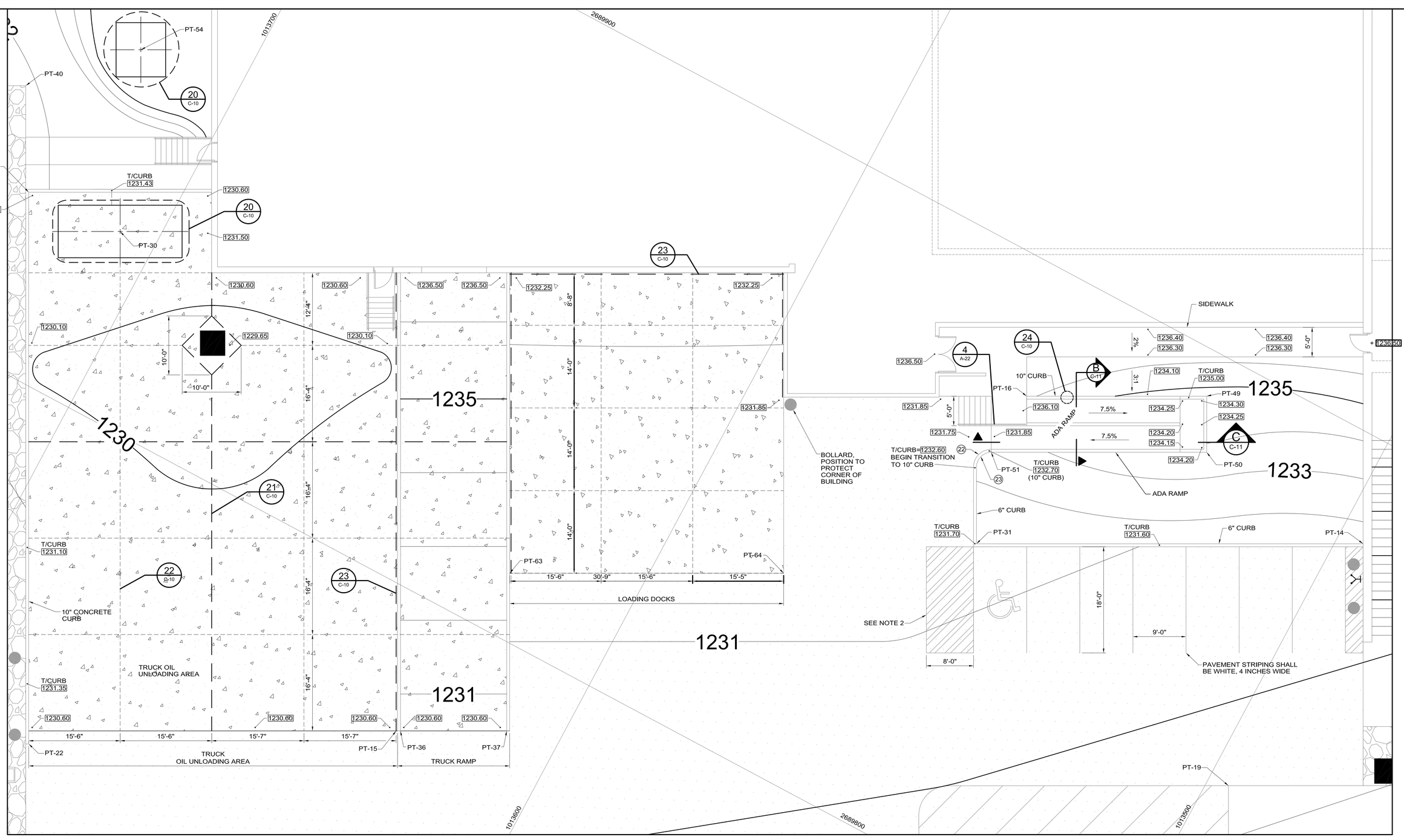
NOvA FAR DETECTOR BUILDING

CIVIL GRADING PLAN

DRAWING NO. 15-1-3B C-2 REV. 0

11 MAR, 2009

PLOT - DATE



ENLARGED PLAN

SCALE: 1" = 6'-0"

1 C-2 C-7

NOTES:
1. FOR COORDINATES SEE SHEET C-7.
2. STRIPING & MARKING SHALL BE IN ACCORDANCE WITH MINNESOTA ADA STANDARDS.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

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SIGNATURE:

DATE: 03/11/2009 LICENSE #45569

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

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REVISIONS

Burns & McDonnell
SINCE 1898
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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1" = 6'-0"
6 0 6 12
SCALE FEET

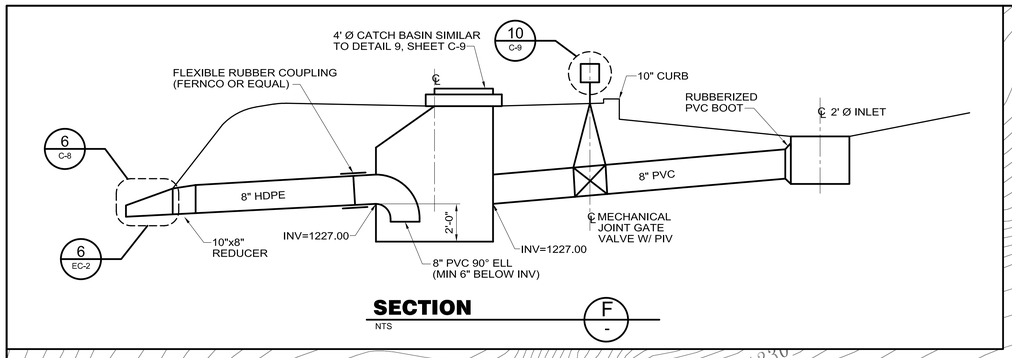
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
CIVIL GRADING & GEOMETRY PLAN - ENLARGED VIEWS

DRAWING NO. 15-1-3B C-3 REV. 0

11 MAR, 2009

PLOT - DATE



SECTION F

NTS

FAR DETECTOR BUILDING

SLEEVE

6" UNDERDRAIN

13 LF 2" COPPER PIPE

N=1013715.07
E=2689879.66
INV=1227.25
SEE NOTE 5

WELL
N=1013733.33
E=2689833.72

N=1013700.97
E=2689853.28
INV=1231.63

38 LF 4" CLASS 52 DIP @ 4.00%

45° ELBOW

2'Ø INLET
N=1013683.58
E=2689821.13
RIM=1229.65
INV=1228.00

WYE
N=1013731.21
E=2689829.75
INV=1230.11

LIGHT POLE
N=1013554.93
E=2689861.43

LIGHT POLE
N=1013550.83
E=2689863.58
SEE NOTE 4

10" HPDE FES
N=1013793.69
E=2689762.26
INV=1226.00

84 LF 8" HDPE @1.20%

41 LF 8" SCH 80 PVC @ 2.45%

83 LF 4" CLASS 52 DIP @ 2.50%

DROP CLEANOUT
E INV=1228.04
W INV=1222.21

5 LF 4" CLASS 52 DIP @ 2.00%

4'Ø CATCH BASIN
N=1013719.79
E=2689801.77
RIM=1230.50
SEE SECTION F FOR INVERT

SANITARY HOLDING TANK 7'-0" DEEP TO T/TANK

2'Ø INLET
N=1013211.36
E=2689957.15
RIM=1220.65
INV=1216.00-6"-NE
INV=1216.00-12"-W

105 LF 6" HDPE @ 0.50%

79 LF 12" HDPE @ 1.25%

POND

12" HPDE FES
N=1013215.80
E=2689880.30
INV=1215.00

118 LF 12" HDPE @ 6.35%

12" HPDE FES
N=1013323.10
E=2689813.80
INV=1216.00

104 LF 12" HDPE @ 3.85%

12" HPDE FES
N=1013339.82
E=2689782.43
INV=1216.00

SEE NOTE 1

SEE NOTE 2

SEE NOTE 3

2'Ø INLET
N=1013443.70
E=2689773.02
RIM=1225.50
INV=1220.00-12"

BRIGHT STAR ROAD

PROJECT NORTH

NOTES:

1. INSTALLATION OF TELEPHONE PULL BOX AND CONDUIT WEST OF TELEPHONE PULL BOX SHOWN SHALL BE INSTALLED BY TELECOMM COMPANY.
2. INSTALLATION OF TRANSFORMER AND ELECTRICAL LINES WEST OF TRANSFORMER SHALL BE INSTALLED BY ELECTRIC COMPANY.
3. LOCATION OF TELECOM AND POWER WEST OF PULL BOX/TRANSFORMER IS APPROXIMATE AND IS SHOWN FOR COORDINATION PURPOSES ONLY.
4. SEE FPS-1 FOR DETAILS OF FIRE PROTECTION SYSTEM.
5. CONTRACTOR TO REMOVE ROCK AS NEEDED.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: JOHN R. STEENKEN

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UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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Burns & McDonnell SINCE 1898

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1" = 20'-0"

20 0 20 40

SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

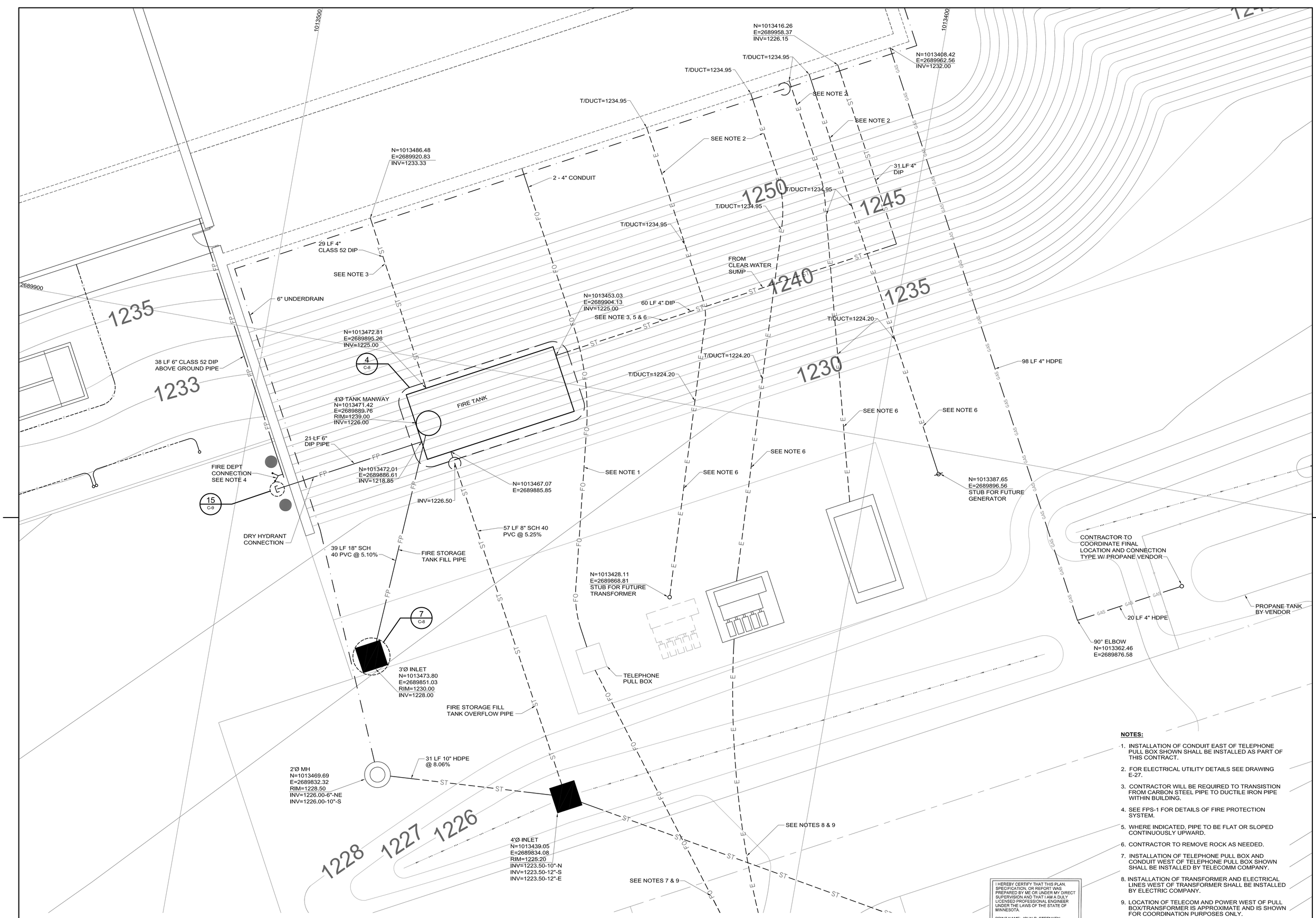
NOνA FAR DETECTOR BUILDING

CIVIL UTILITY PLAN

DRAWING NO. 15-1-3B C-4 REV. 0

11 MAR, 2009

PLOT-DATE



ENLARGED PLAN

SCALE = 1" = 5'-0"

3 / C-4

NOTES:

1. INSTALLATION OF CONDUIT EAST OF TELEPHONE PULL BOX SHOWN SHALL BE INSTALLED AS PART OF THIS CONTRACT.
2. FOR ELECTRICAL UTILITY DETAILS SEE DRAWING E-27.
3. CONTRACTOR WILL BE REQUIRED TO TRANSISTION FROM CARBON STEEL PIPE TO DUCTILE IRON PIPE WITHIN BUILDING.
4. SEE FPS-1 FOR DETAILS OF FIRE PROTECTION SYSTEM.
5. WHERE INDICATED, PIPE TO BE FLAT OR SLOPED CONTINUOUSLY UPWARD.
6. CONTRACTOR TO REMOVE ROCK AS NEEDED.
7. INSTALLATION OF TELEPHONE PULL BOX AND CONDUIT WEST OF TELEPHONE PULL BOX SHOWN SHALL BE INSTALLED BY TELECOMM COMPANY.
8. INSTALLATION OF TRANSFORMER AND ELECTRICAL LINES WEST OF TRANSFORMER SHALL BE INSTALLED BY ELECTRIC COMPANY.
9. LOCATION OF TELECOM AND POWER WEST OF PULL BOX/TRANSFORMER IS APPROXIMATE AND IS SHOWN FOR COORDINATION PURPOSES ONLY.

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UNIVERSITY OF MINNESOTA | Hines

PROJECT NUMBER 896-06-1711

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1" = 5'-0" (5 0 5 10 SCALE FEET)

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

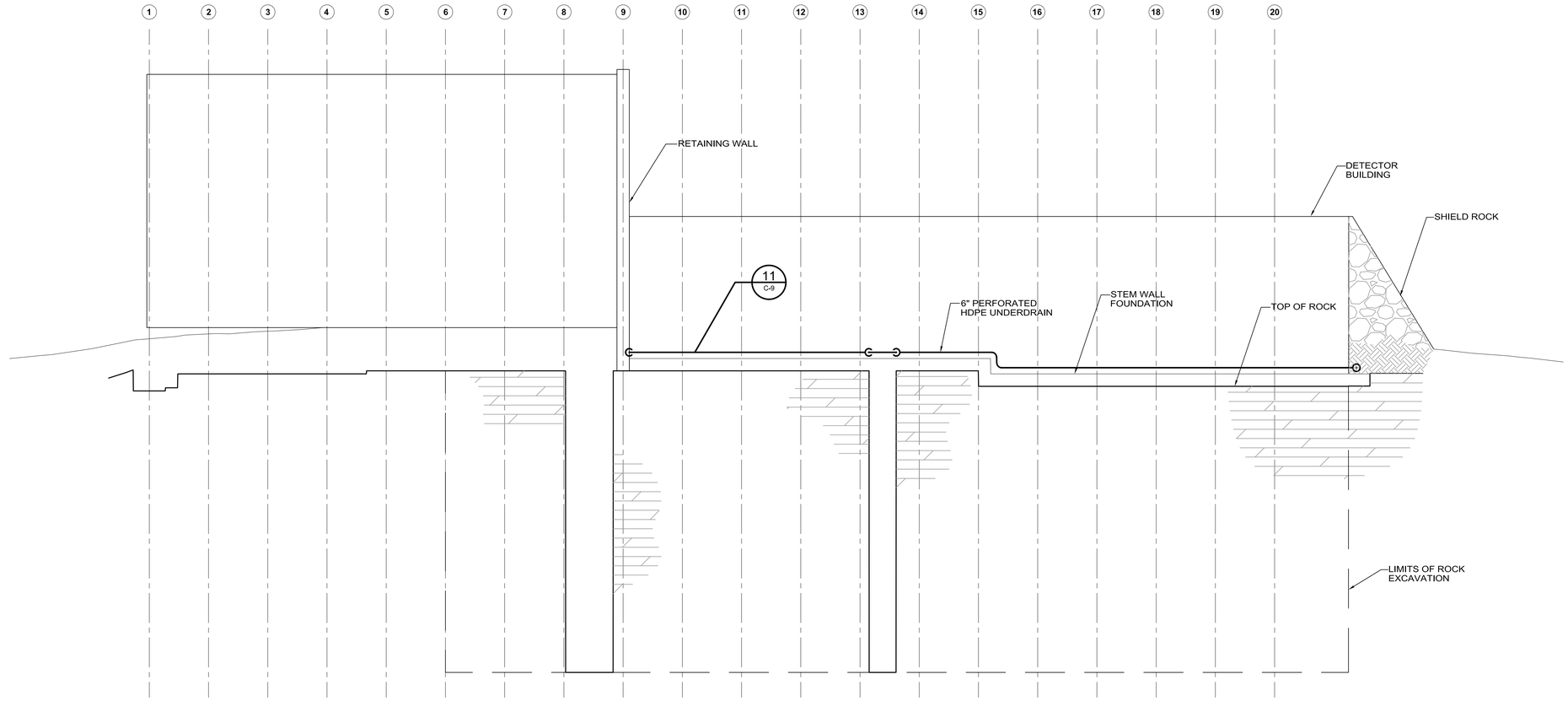
NOvA FAR DETECTOR BUILDING

CIVIL UTILITY PLAN - ENLARGED VIEW

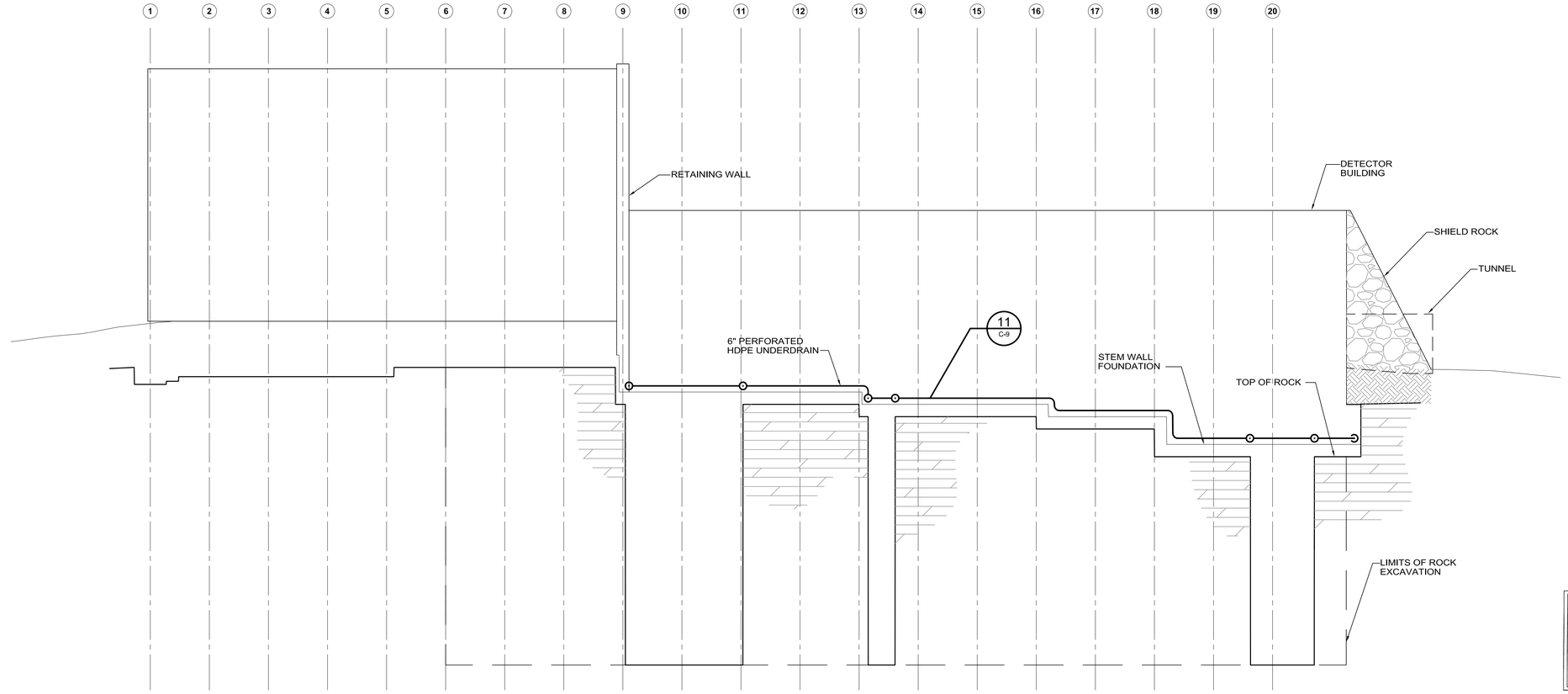
DRAWING NO. 15-1-3B C-5 REV. 0

11 MAR, 2009

PLOT--DATE



UNDERDRAIN SECTION ALONG EAST FACE OF BUILDING G C-4



UNDERDRAIN SECTION ALONG WEST FACE OF BUILDING H C-4

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

H: 1" = 20'-0" — 20 0 20 40 SCALE FEET

V: 1" = 5'-0" — 5 0 5 10 SCALE FEET

UNIVERSITY OF MINNESOTA Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

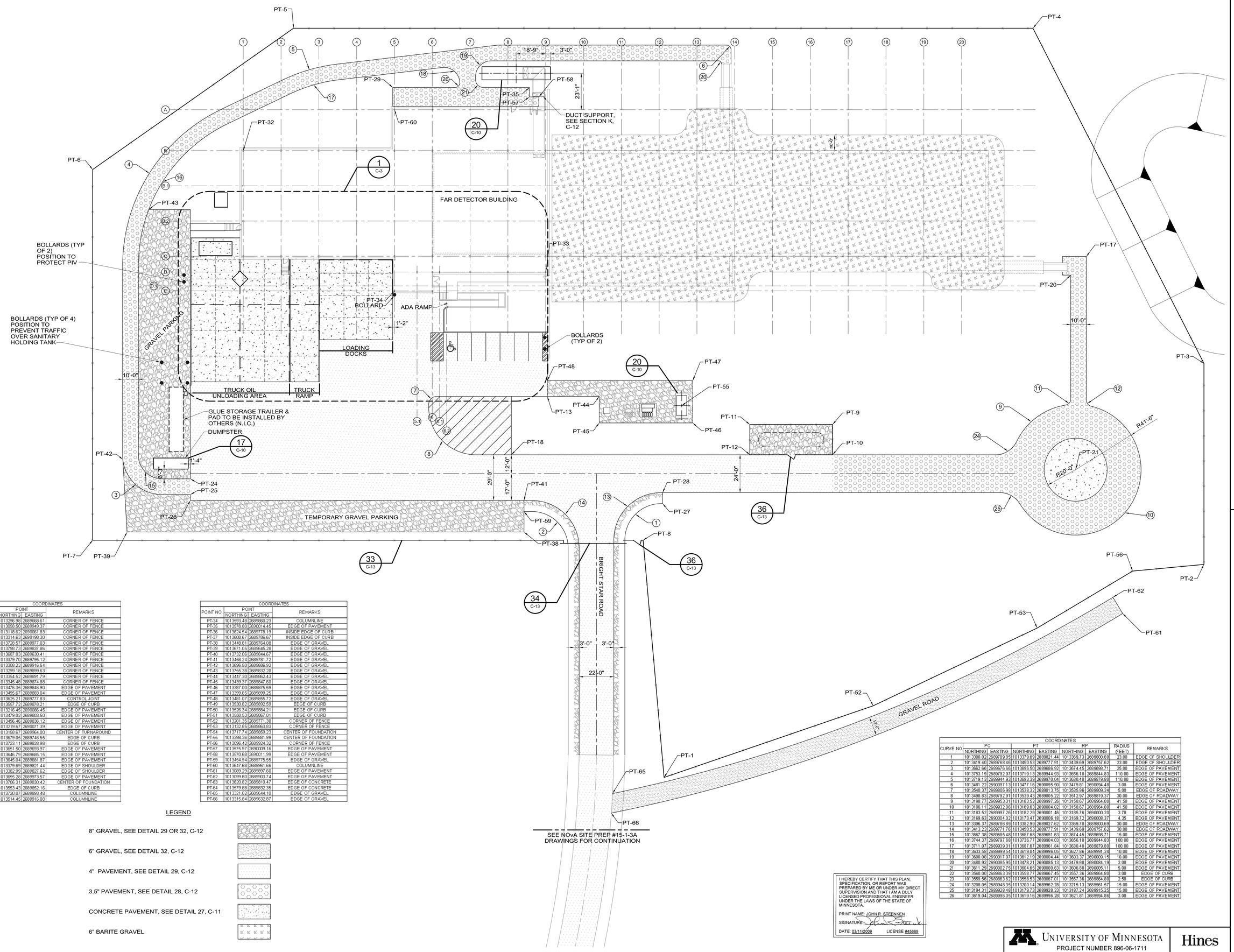
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

CIVIL UNDERDRAIN SECTIONS

DRAWING NO. 15-1-3B C-6 REV. 0

11 MAR, 2009



COORDINATES			
POINT NO.	POINT NORTHING	POINT EASTING	REMARKS
PT-1	1013296.98	2689668.61	CORNER OF FENCE
PT-2	1013058.60	2689949.37	CORNER OF FENCE
PT-3	1013118.62	2690361.83	CORNER OF FENCE
PT-4	1013314.63	2690198.30	CORNER OF FENCE
PT-5	1013728.57	2689977.03	CORNER OF FENCE
PT-6	1013798.73	2689837.86	CORNER OF FENCE
PT-7	1013687.83	2689630.41	CORNER OF FENCE
PT-8	1013379.70	2689795.12	CORNER OF FENCE
PT-9	1013308.22	2689916.54	CORNER OF FENCE
PT-10	1013299.18	2689899.63	CORNER OF FENCE
PT-11	1013354.52	2689891.79	CORNER OF FENCE
PT-12	1013345.48	2689874.88	CORNER OF FENCE
PT-13	1013476.35	2689846.90	EDGE OF PAVEMENT
PT-14	1013495.67	2689863.04	EDGE OF PAVEMENT
PT-15	1013625.21	2689777.83	CONTROL JOINT
PT-16	1013557.72	2689878.21	EDGE OF CURB
PT-17	1013216.45	2690086.45	EDGE OF PAVEMENT
PT-18	1013479.02	2689803.50	EDGE OF PAVEMENT
PT-19	1013496.46	2689836.12	EDGE OF PAVEMENT
PT-20	1013219.67	2690071.39	EDGE OF PAVEMENT
PT-21	1013158.67	2689964.00	CENTER OF TURNAROUND
PT-22	1013679.05	2689746.55	EDGE OF CURB
PT-23	1013723.11	2689826.98	EDGE OF CURB
PT-24	1013651.50	2689693.97	EDGE OF PAVEMENT
PT-25	1013646.79	2689685.15	EDGE OF PAVEMENT
PT-26	1013645.04	2689681.87	EDGE OF PAVEMENT
PT-27	1013379.69	2689621.44	EDGE OF SHOULDER
PT-28	1013382.99	2689827.62	EDGE OF SHOULDER
PT-29	1013655.28	2689973.67	EDGE OF PAVEMENT
PT-30	1013706.31	2689830.42	CENTER OF FOUNDATION
PT-31	1013653.43	2689852.16	EDGE OF CURB
PT-32	1013720.07	2689683.48	COLUMNLINE
PT-33	1013514.45	2689916.08	COLUMNLINE

COORDINATES			
POINT NO.	POINT NORTHING	POINT EASTING	REMARKS
PT-34	1013693.48	2689860.23	COLUMNLINE
PT-35	1013578.80	2690014.45	EDGE OF PAVEMENT
PT-36	1013624.54	2689778.19	INSIDE EDGE OF CURB
PT-37	1013608.67	2689786.67	INSIDE EDGE OF CURB
PT-38	1013448.81	2689764.08	EDGE OF GRAVEL
PT-39	1013671.05	2689645.28	EDGE OF GRAVEL
PT-40	1013732.06	2689644.67	EDGE OF GRAVEL
PT-41	1013458.24	2689781.72	EDGE OF GRAVEL
PT-42	1013696.50	2689686.92	EDGE OF GRAVEL
PT-43	1013755.38	2689632.20	EDGE OF GRAVEL
PT-44	1013447.30	2689862.43	EDGE OF GRAVEL
PT-45	1013439.37	2689847.60	EDGE OF GRAVEL
PT-46	1013387.00	2689875.59	EDGE OF GRAVEL
PT-47	1013399.65	2689899.25	EDGE OF GRAVEL
PT-48	1013481.07	2689855.72	EDGE OF GRAVEL
PT-49	1013530.82	2689892.59	EDGE OF GRAVEL
PT-50	1013526.34	2689884.21	EDGE OF CURB
PT-51	1013558.53	2689967.01	EDGE OF CURB
PT-52	1013201.35	2689771.30	CORNER OF FENCE
PT-53	1013132.85	2689663.83	CORNER OF FENCE
PT-54	1013717.74	2689669.23	CENTER OF FOUNDATION
PT-55	1013398.36	2689881.99	CENTER OF FOUNDATION
PT-56	1013096.42	2689924.32	CORNER OF FENCE
PT-57	1013575.97	2690009.16	EDGE OF PAVEMENT
PT-58	1013570.68	2690011.99	EDGE OF PAVEMENT
PT-59	1013454.94	2689775.55	EDGE OF GRAVEL
PT-60	1013647.68	2689961.66	COLUMNLINE
PT-61	1013089.29	2689897.60	EDGE OF PAVEMENT
PT-62	1013099.60	2689903.74	EDGE OF PAVEMENT
PT-63	1013620.82	2689810.47	EDGE OF CONCRETE
PT-64	1013579.88	2689632.35	EDGE OF CONCRETE
PT-65	1013321.02	2689644.18	EDGE OF GRAVEL
PT-66	1013315.84	2689632.87	EDGE OF GRAVEL

LEGEND

- 8" GRAVEL, SEE DETAIL 29 OR 32, C-12
- 6" GRAVEL, SEE DETAIL 32, C-12
- 4" PAVEMENT, SEE DETAIL 29, C-12
- 3.5" PAVEMENT, SEE DETAIL 28, C-12
- CONCRETE PAVEMENT, SEE DETAIL 27, C-11
- 6" BARITE GRAVEL

COORDINATES								
CURVE NO.	PC NORTHING	PC EASTING	PT NORTHING	PT EASTING	RP NORTHING	RP EASTING	RADIUS (FEET)	REMARKS
1	1013390.02	2689789.85	1013379.69	2689821.44	1013369.73	2689800.69	23.00	EDGE OF SHOULDER
2	1013419.40	2689768.46	1013450.53	2689777.91	1013439.69	2689757.62	23.00	EDGE OF SHOULDER
3	1013662.66	2689676.66	1013696.50	2689686.92	1013674.45	2689688.71	25.00	EDGE OF PAVEMENT
4	1013753.19	2689792.97	1013719.13	2689944.93	1013656.18	2689844.83	110.00	EDGE OF PAVEMENT
5	1013719.13	2689944.93	1013693.39	2689970.04	1013630.48	2689879.80	110.00	EDGE OF PAVEMENT
6	1013481.22	2690097.13	1013477.16	2690095.90	1013479.81	2690094.48	3.00	EDGE OF PAVEMENT
7	1013540.37	2689806.98	1013539.32	2689813.75	1013535.98	2689809.34	5.00	EDGE OF ROADWAY
8	1013498.83	2689792.91	1013539.43	2689805.22	1013512.97	2689819.37	30.00	EDGE OF ROADWAY
9	1013198.77	2689953.31	1013183.52	2689997.26	1013158.67	2689964.00	41.50	EDGE OF PAVEMENT
10	1013186.11	2689932.86	1013169.63	2690004.02	1013158.67	2689964.00	41.50	EDGE OF PAVEMENT
11	1013183.52	2689997.26	1013182.29	2690001.46	1013185.76	2690000.20	3.70	EDGE OF PAVEMENT
12	1013169.63	2690004.02	1013173.47	2690006.18	1013169.72	2690008.37	4.35	EDGE OF PAVEMENT
13	1013396.37	2689786.89	1013382.99	2689827.62	1013369.70	2689800.69	30.00	EDGE OF ROADWAY
14	1013413.23	2689771.76	1013450.53	2689777.91	1013439.69	2689757.62	30.00	EDGE OF ROADWAY
15	1013667.38	2689685.48	1013697.68	2689691.63	1013674.45	2689688.71	15.00	EDGE OF PAVEMENT
16	1013744.37	2689797.68	1013736.77	2689804.03	1013656.18	2689844.83	100.00	EDGE OF PAVEMENT
17	1013711.07	2689939.01	1013687.67	2689961.84	1013630.48	2689879.80	100.00	EDGE OF PAVEMENT
18	1013633.58	2689993.54	1013619.04	2689996.05	1013627.86	2689991.34	10.00	EDGE OF PAVEMENT
19	1013608.08	2690017.97	1013612.19	2690004.44	1013603.37	2690009.15	10.00	EDGE OF PAVEMENT
20	1013480.92	2690085.95	1013478.21	2690085.13	1013479.99	2690084.19	2.00	EDGE OF PAVEMENT
21	1013611.29	2690002.75	1013604.65	2690000.63	1013606.88	2690005.11	5.00	EDGE OF PAVEMENT
22	1013560.00	2689863.39	1013558.77	2689867.45	1013557.36	2689864.80	3.00	EDGE OF CURB
23	1013559.56	2689863.62	1013558.53	2689867.01	1013557.36	2689864.80	2.50	EDGE OF CURB
24	1013208.05	2689948.35	1013200.14	2689962.28	1013215.13	2689961.57	15.00	EDGE OF PAVEMENT
25	1013194.31	2689928.48	1013179.73	2689928.23	1013187.24	2689915.25	15.00	EDGE OF PAVEMENT
26	1013619.04	2689996.05	1013619.16	2689996.28	1013621.81	2689994.86	3.00	EDGE OF PAVEMENT

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SIGNATURE:

DATE: 03/11/2009 LICENSE #45569

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Burns & McDonnell SINCE 1898

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1" = 20'-0"

20 0 20 40 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

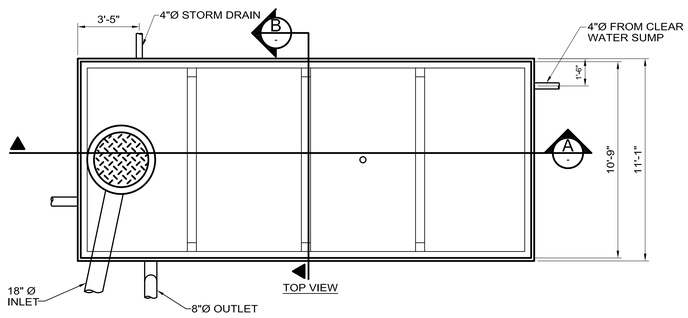
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

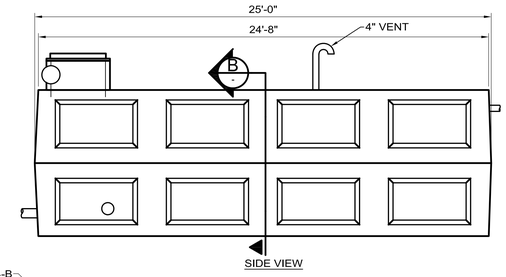
NOvA FAR DETECTOR BUILDING

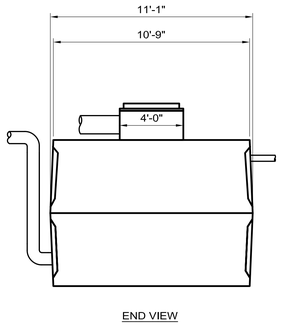
CIVIL GEOMETRY, PAVING & FENCING PLAN

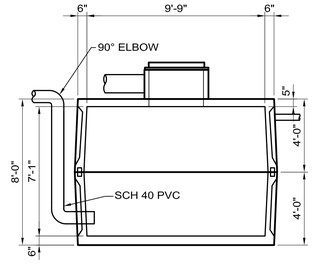
DRAWING NO. 15-1-3B C-7 REV. 0

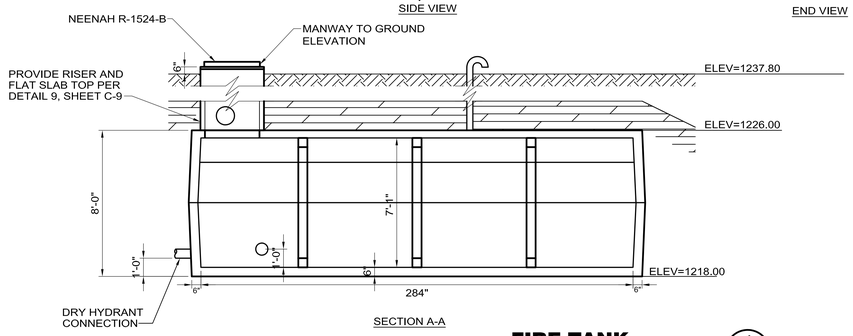
11 MAR, 2009

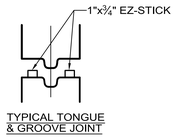








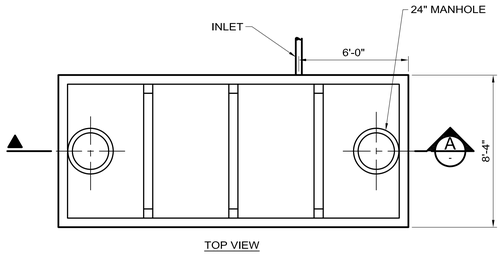


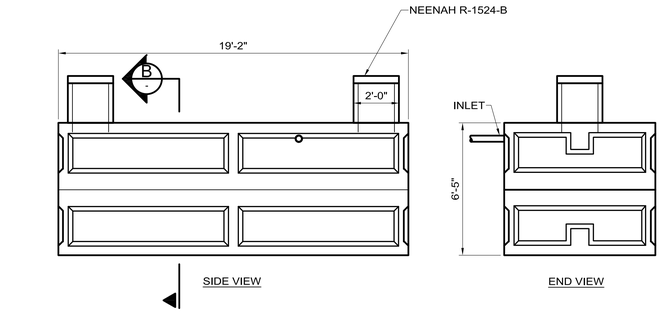


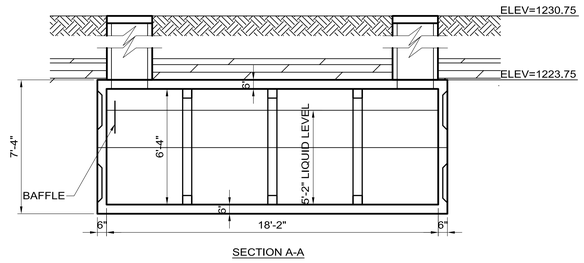
FIRE TANK

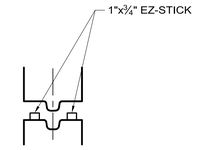
NTS

4 C-5





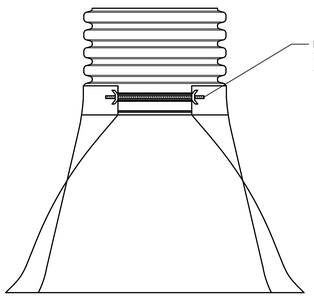




SANITARY HOLDING TANK

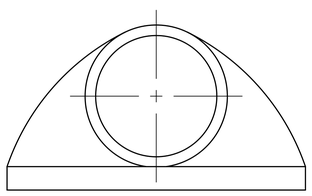
NTS

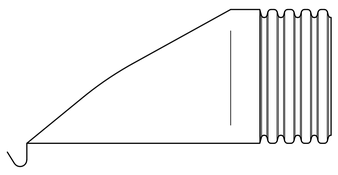
5 C-4



NOTES:

1. PE THREADED ROD W/WING NUTS PROVIDED FOR END SECTIONS 10"-24", 30" & 36" END SECTIONS REQUIRE TWO (2) THREADED RODS FOR ASSEMBLE.
2. ALL DIMENSIONS ARE NOMINAL.

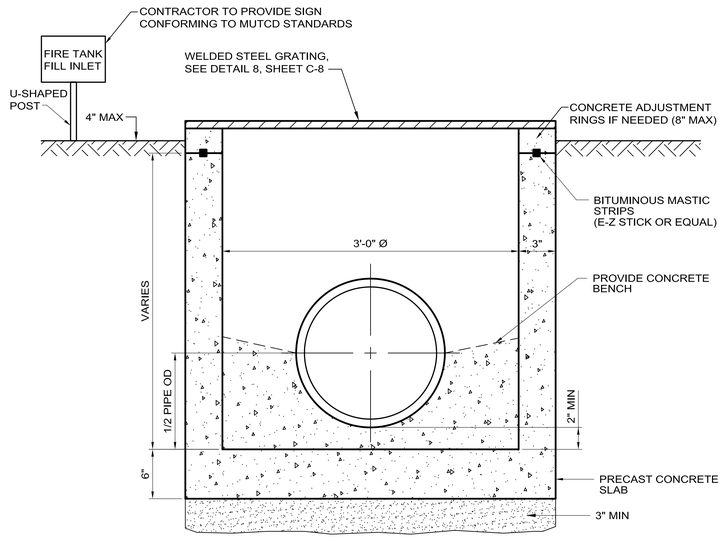




HDPE CULVERT APRON

NTS

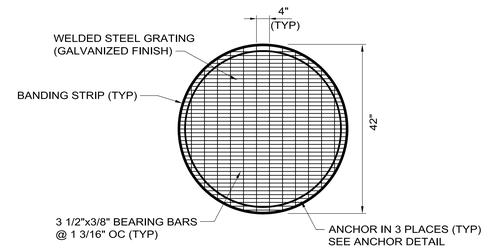
6 EC-2 C-4

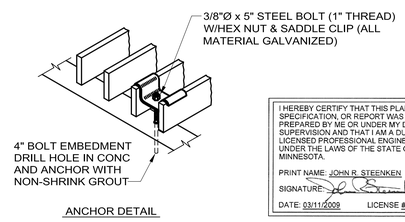


36" INLET (PRE-CAST)

NTS

7 C-5





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SIGNATURE:

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GRATING AND ANCHOR DETAIL

NTS

8 -

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SCALE:

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

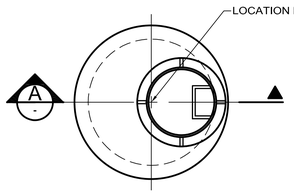
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

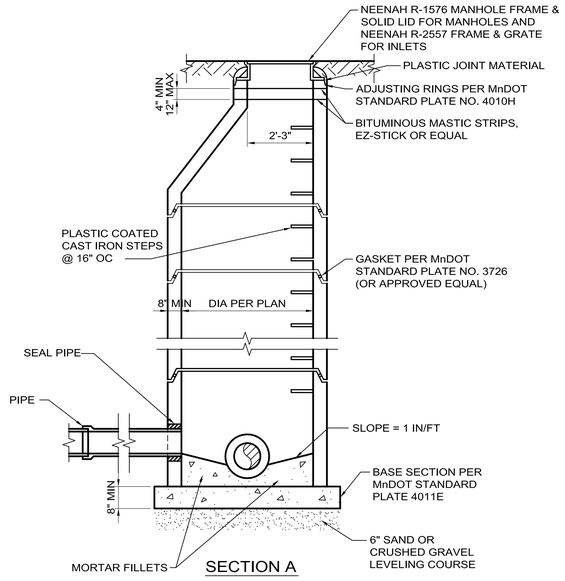
CIVIL DETAILS - 1

DRAWING NO. 15-1-3B C-8 REV. 0

11 MAR, 2009



PLAN

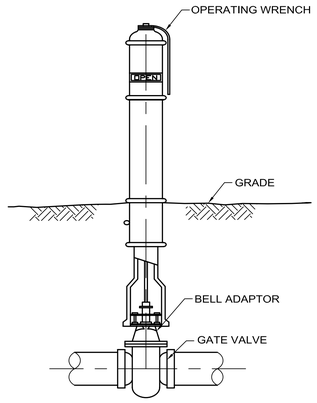


SECTION A

NOTE:
PROVIDE FLAT SLAB TOPS WHERE LACK OF SUFFICIENT DEPTH PRECLUDES THE USE OF CONE SECTIONS. FLAT SLAB TOP SHALL CONFORM TO MnDOT STANDARD PLATE NO. 4020J.

TYP MANHOLE/LARGE DIA INLET DETAIL

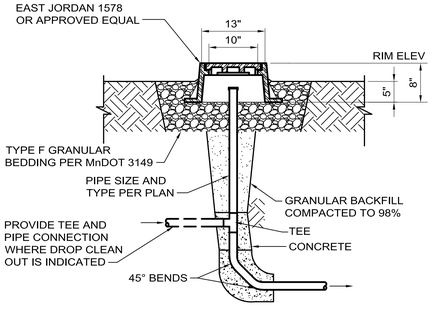
NTS — 9 / -



TYP POST INDICATOR VALVE AND GATE VALVE

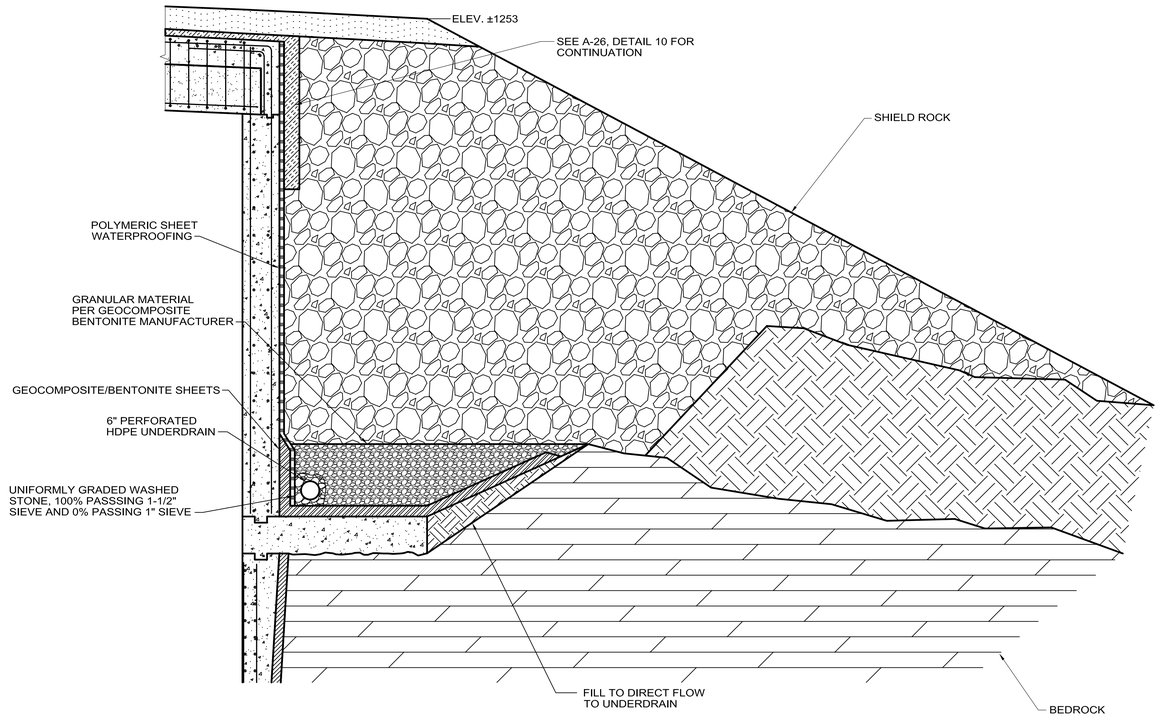
NTS — 10 / C-4

NOTE:
PIV TO BE SUPPLIED FIRE ENGINE RED IN COLOR.



TYPICAL CLEANOUT DETAIL

NTS — 12 / -



UNDERDRAIN DETAIL

NTS — 11 / C-4 C-6

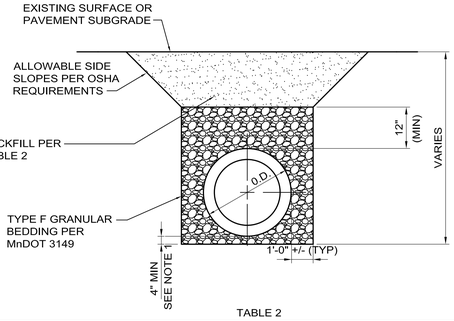


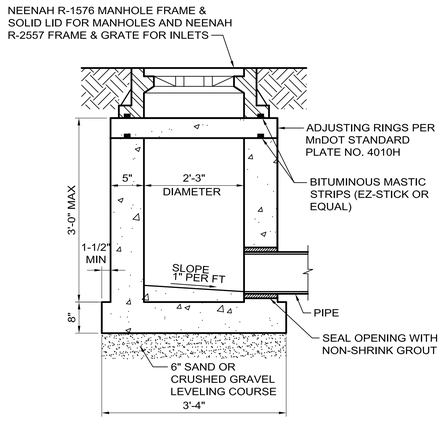
TABLE 2

PIPE LOCATION	BACKFILL MATERIAL	LIFT THICKNESS LOOSE MEASURE	COMPACTION REQUIREMENTS
PAVED AREAS	GRANULAR BACKFILL	6"	95% MODIFIED PROCTOR (ASTM D1557)
UNPAVED AREAS	JOB EXCAVATED	10"	90% MODIFIED PROCTOR (ASTM D1557)

NOTE:
1. GRANULAR MATERIAL BENEATH PIPE SHALL EXTEND DOWN TO UNDISTURBED SOIL SIMILAR TO SECTION J SHEET C-12.

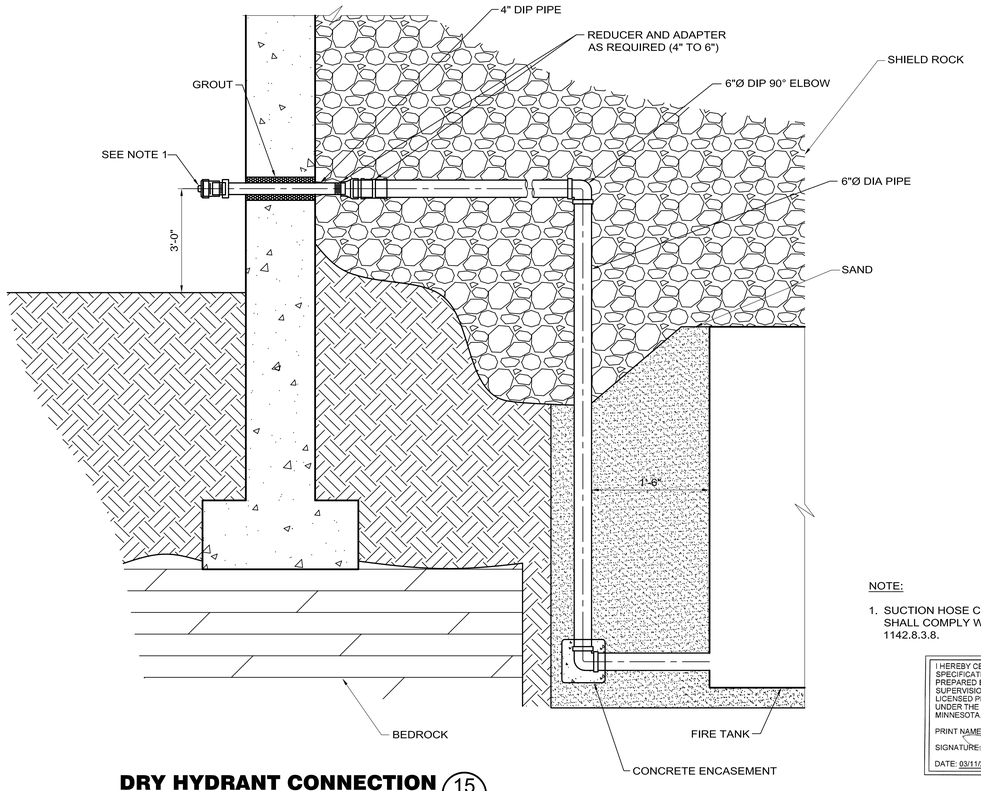
PIPE EMBEDMENT DETAIL

NTS — 13 / -



TYPICAL 2'Ø INLET/MH DETAIL

NTS — 14 / -



NOTE:
1. SUCTION HOSE CONNECTION SHALL COMPLY WITH NFPA 1142.8.3.8.

DRY HYDRANT CONNECTION

NTS — 15 / C-5

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UNITED STATES DEPARTMENT OF ENERGY

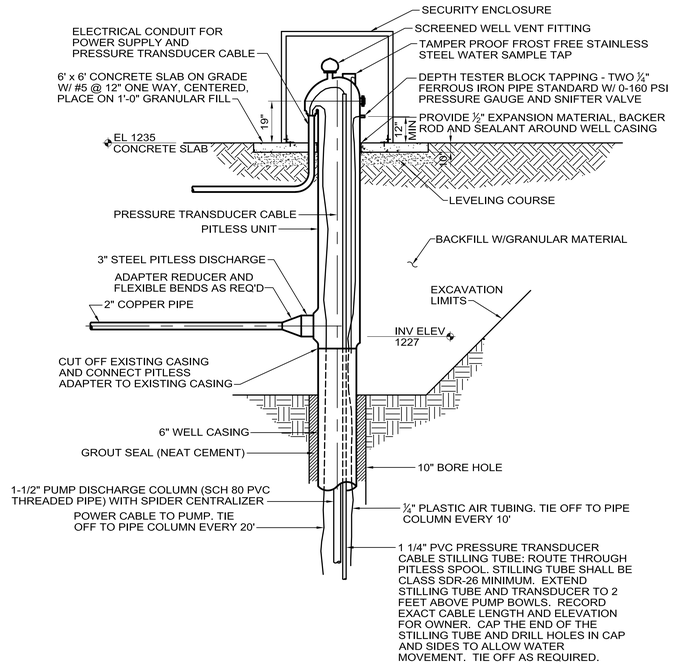
NOνA FAR DETECTOR BUILDING

CIVIL DETAILS - 2

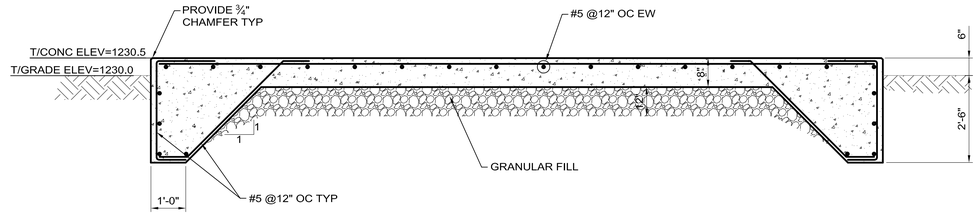
DRAWING NO. 15-1-3B C-9 REV. 0

11 MAR, 2009

PLOT - DATE

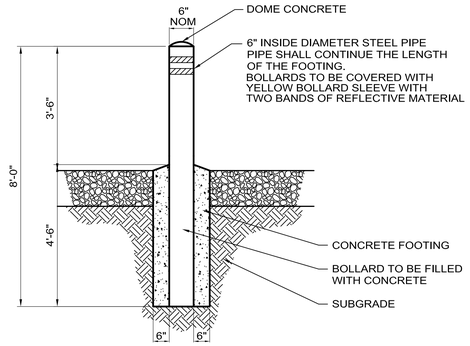


WATER WELL PITLESS UNIT DETAIL
NTS — 16 / C-4

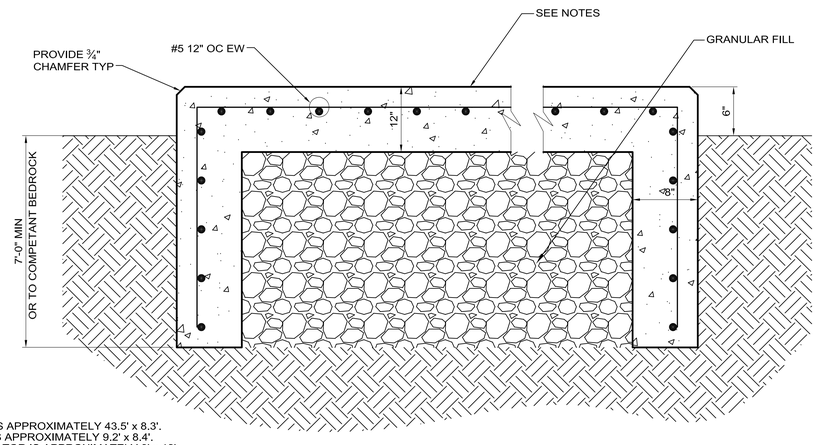


DUMPSTER SLAB PLAN
SCALE 3/8" = 1'-0" — 17 / C-7

NOTE:
1. DUMPSTER PAD IS APPROX. 7' x 22'.



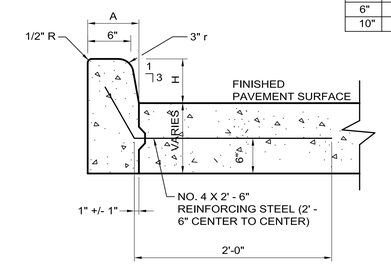
TYPICAL BOLLARD
NTS — 18 / C-7



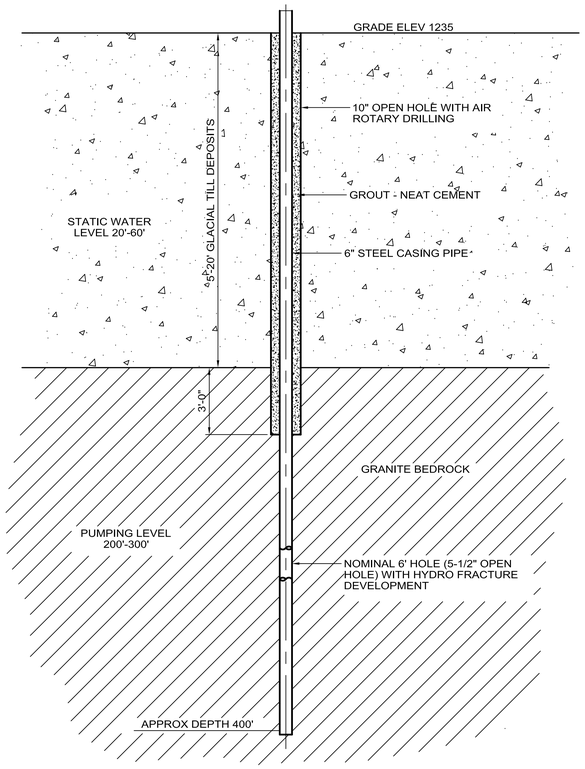
NOTES:
1. MAU-1 IS APPROXIMATELY 43.5' x 8.3'.
2. RTU-1 IS APPROXIMATELY 9.2' x 8.4'.
3. GENERATOR IS APPROXIMATELY 8' x 12'.
4. CONTRACTOR SHALL COORDINATE DIMENSIONS WITH ACTUAL EQUIPMENT PURCHASED. ALL EQUIPMENT SHALL BE INSTALLED PER MANUFACTURER'S INSTALLATION PROCEDURES.

MAU-1, RTU-1, & GENERATOR FOUNDATION
NTS — 20 / C-3 C-7

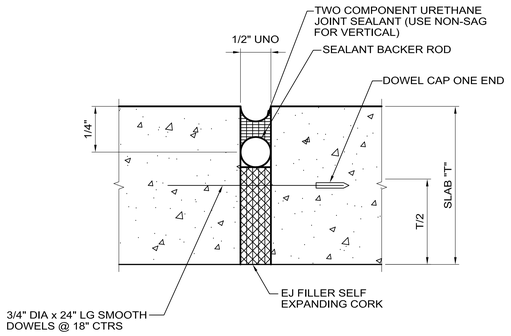
DIMENSION	
H	A
6"	8.0"
10"	9.3"



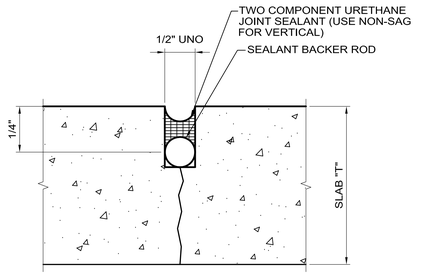
TYP CONCRETE CURB DETAIL
NTS — 24 / C-3



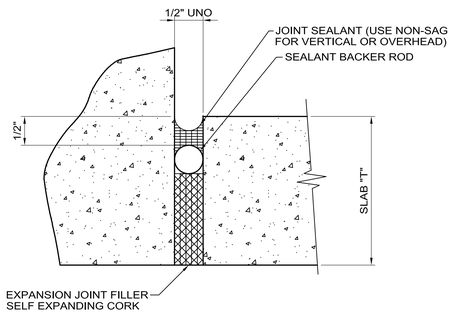
WELL LOG
NTS — 19 / –



EXPANSION JOINT DETAIL
NTS — 21 / C-3



CONTROL JOINT DETAIL
NTS — 22 / C-3



EXPANSION JOINT FOR SLAB AGAINST WALL
NTS — 23 / C-3

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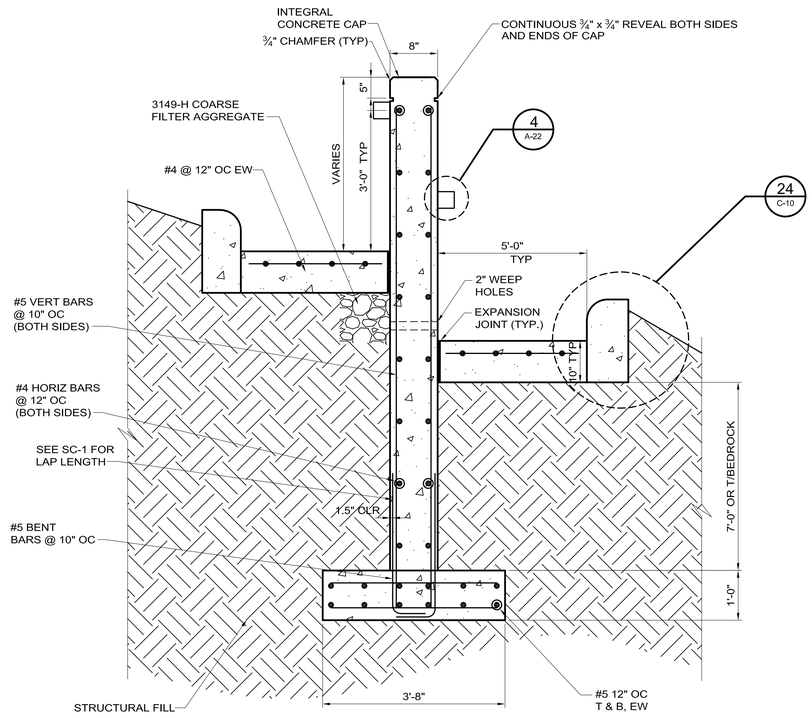
UNITED STATES DEPARTMENT OF ENERGY

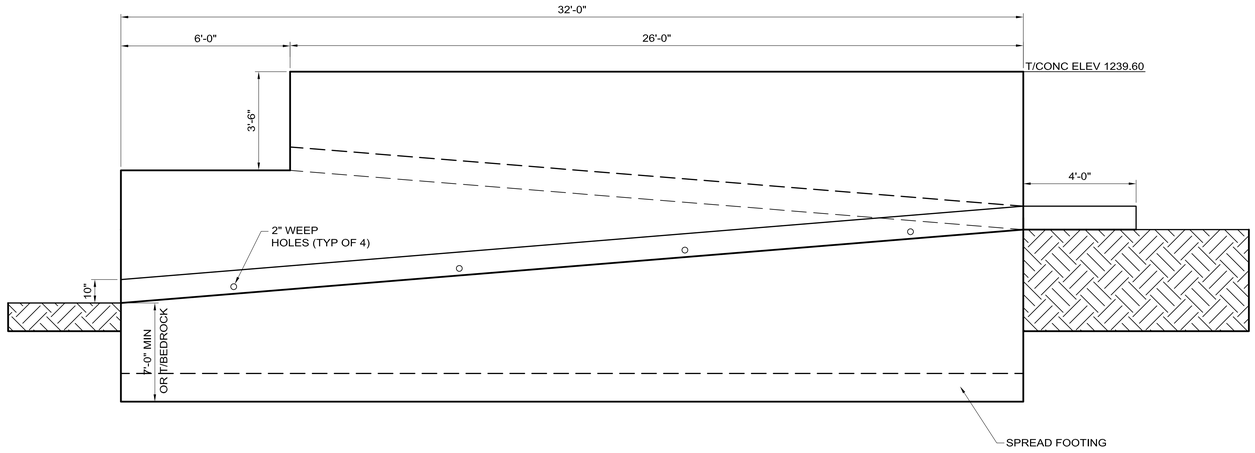
NOνA FAR DETECTOR BUILDING
CIVIL DETAILS - 3

DRAWING NO. 15-1-3B C-10 REV. 0

11 MAR, 2009

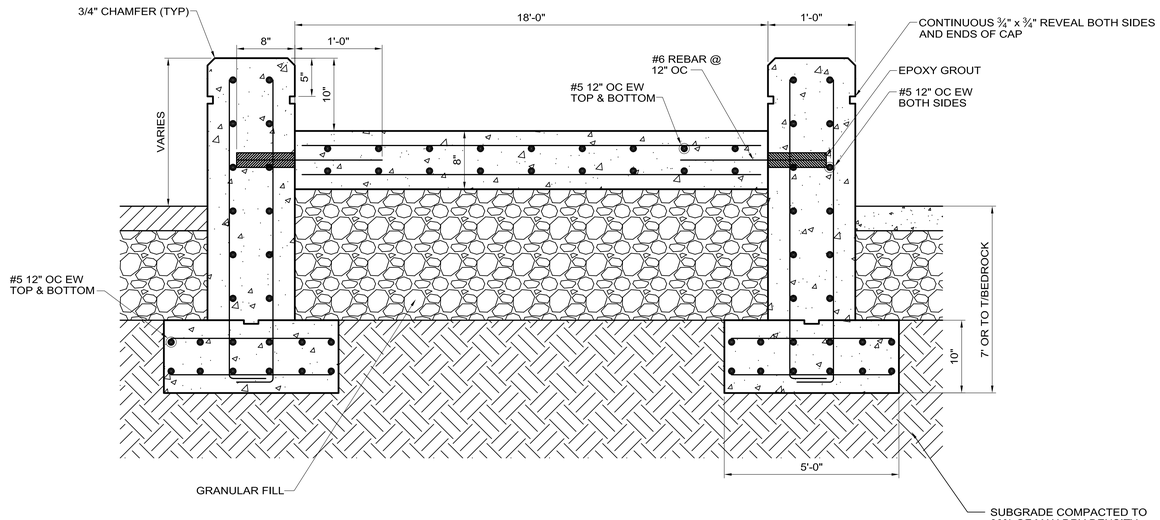


ADA RAMP SECTION B / C-3
NTS

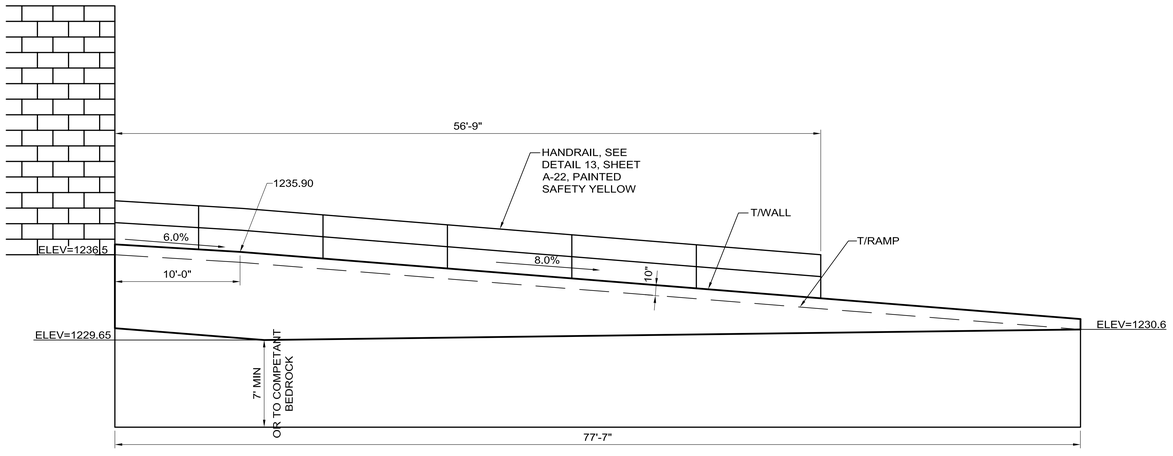


ADA RAMP SECTION C / C-3
NTS

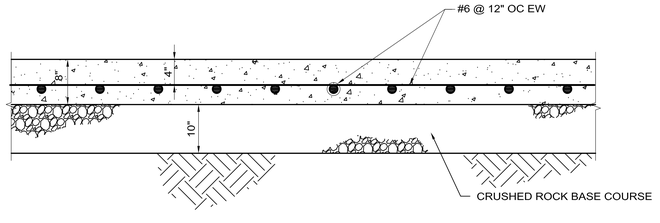
NOTE:
1. FOR HANDRAIL INFORMATION, SEE A-12 & A-22.
2. ADA RAMP SHALL BE IN ACCORDANCE WITH MINNESOTA ADA STANDARDS.



TRUCK RAMP SECTION D / C-2
NTS



TRUCK RAMP SECTION E / C-2
NTS



CONCRETE PAVEMENT DETAIL 27 / -
NTS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: JOHN R. STEENKEN

SIGNATURE:

DATE: 03/11/2009 LICENSE #45669

REV.	DATE	DESCRIPTIONS
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REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	P. WAIT	03-11-09
DRAWN	J. HOLZINGER	03-11-09
CHECKED	B. QUINLAN	03-11-09
APPROVED	J. STEENKEN	03-11-09

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

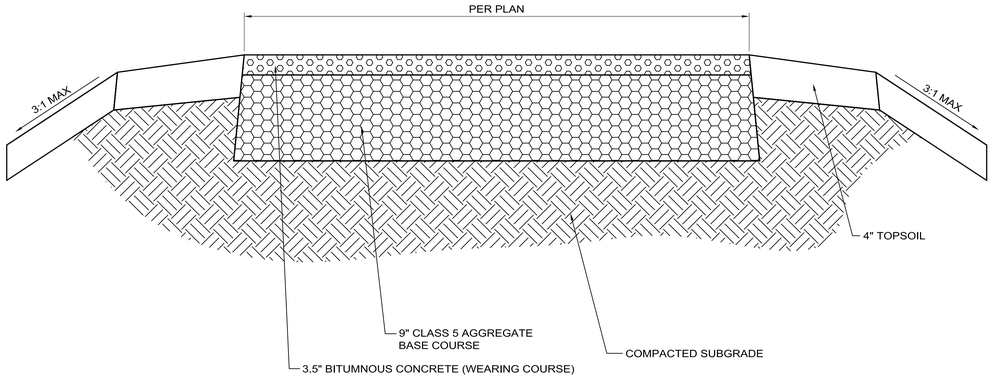
UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

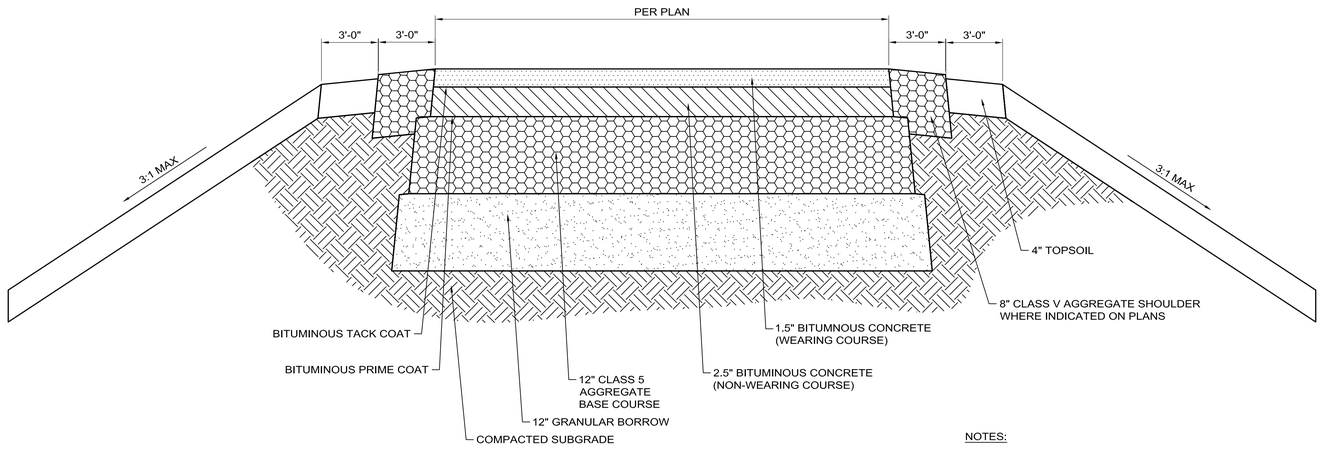
NOνA FAR DETECTOR BUILDING
CIVIL DETAILS - 4

DRAWING NO. 15-1-3B C-11 REV. 0

11 MAR, 2009



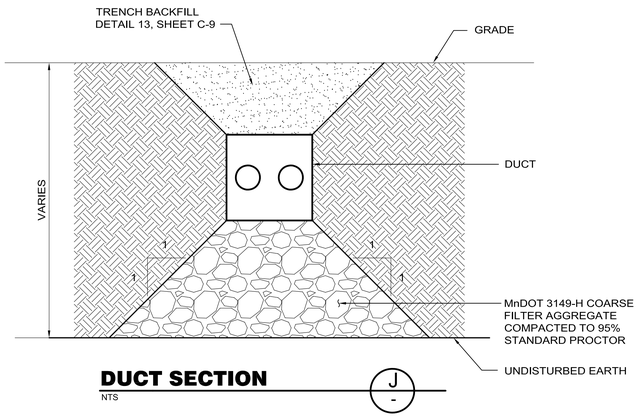
PAVEMENT SECTION 28 C-7
NTS



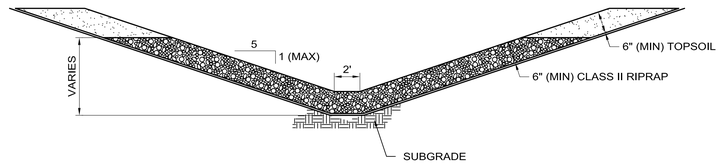
PAVEMENT SECTION 29 C-7
NTS

NOTES:

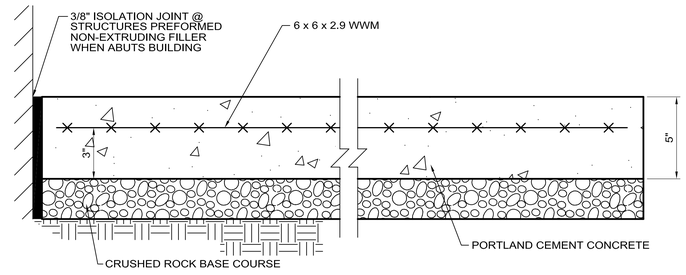
1. WHERE ROCK ENCOUNTERED, GRANULAR BORROW AND AGGREGATE BASE COURSE CAN BE REDUCED.
2. SHOULDERS TO BE PROVIDED AS SHOWN ON PLANS.



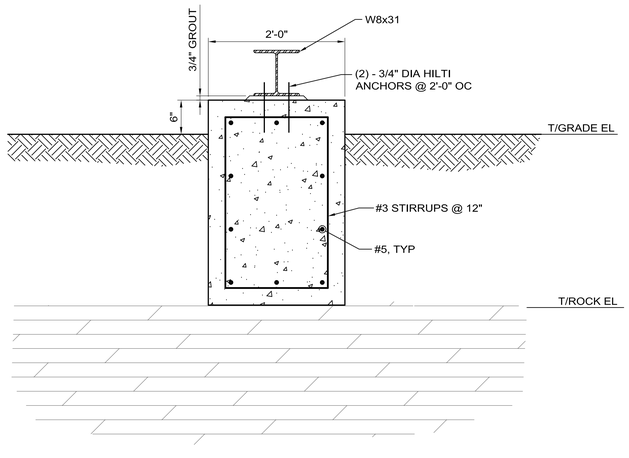
DUCT SECTION J -
NTS



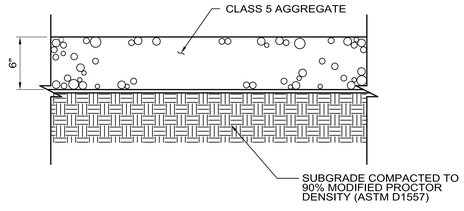
GRAVEL LINED SWALE 30 -
NTS



TYPICAL SIDEWALK 31 -
NTS



MAU-1 DUCT SUPPORT ELBOW SECTION K M-11
NTS



GRAVEL PAVEMENT SECTION 32 C-7
NTS

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

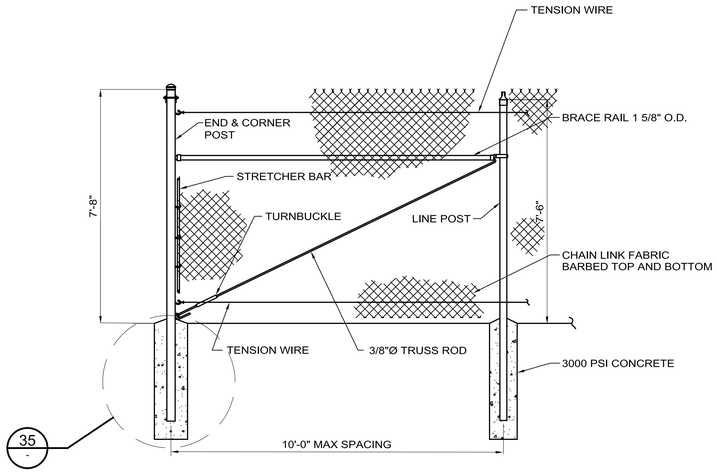
NOνA FAR DETECTOR BUILDING

CIVIL DETAILS - 5

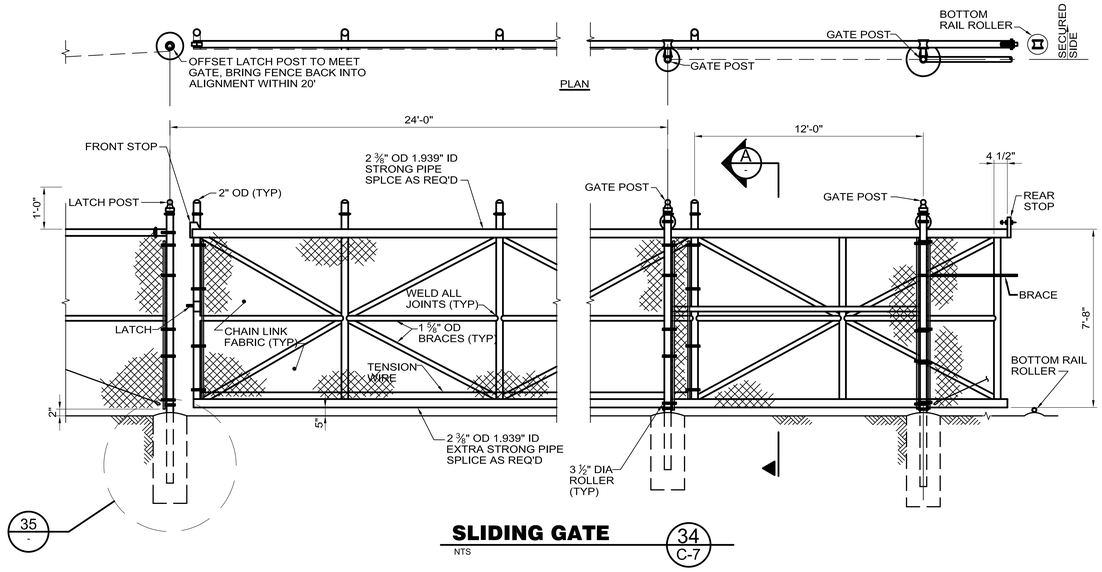
DRAWING NO. **15-1-3B** **C-12** REV. **0**

11 MAR, 2009

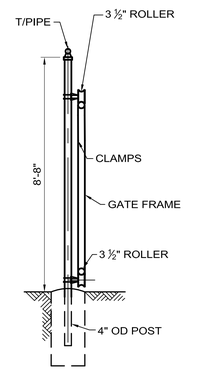
PLOT—DATE



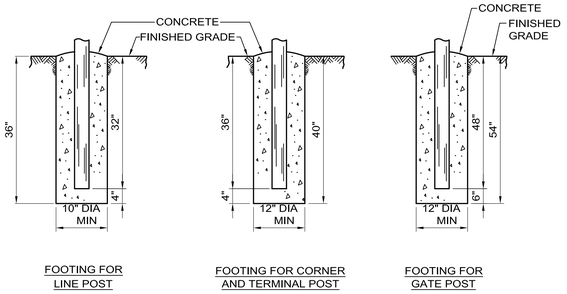
FENCE DETAIL 33 C-7
NTS



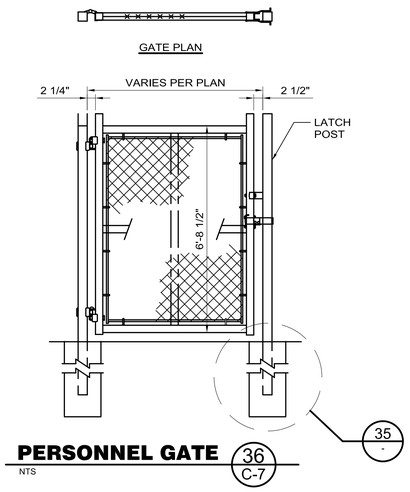
SLIDING GATE 34 C-7
NTS



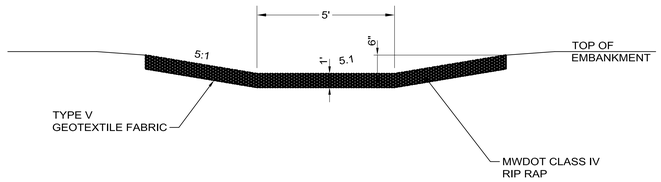
SECTION A -
NTS



FENCE FOOTING DETAILS 35 -
NTS



PERSONNEL GATE 36 C-7
NTS



EMERGENCY SPILLWAY CROSS-SECTION L C-2
NTS

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

CIVIL DETAILS - 6

DRAWING NO. 15-1-3B C-13 REV. 0

11 MAR, 2009

PLOT=DATE

LEGEND

8" GRAVEL, SEE DETAIL 29 OR 32, C-12

6" GRAVEL, SEE DETAIL 32, C-12

4" PAVEMENT, SEE DETAIL 29, C-12

3.5" PAVEMENT, SEE DETAIL 28, C-12

CONCRETE PAVEMENT, SEE DETAIL 27, C-11

6" BARITE GRAVEL

TEMPORARY STOCK PILE AREA
LIMITS AS SHOWN ARE APPROX.

FAR DETECTOR BUILDING

ADA RAMP

LOADING DOCKS

TRUCK RAMP

TRUCK OIL UNLOADING AREA

TEMPORARY GRAVEL PARKING

BRIGHT STAR ROAD

POND

GRAVEL ROAD

5
EC-2

NOTE:
1. SILT FENCE INSTALLED AS PART OF SITE PREP PACKAGE.
2. BUILDING CONTRACTOR FOR THIS PROJECT WILL BE REQUIRED TO MAINTAIN, REPAIR, AND INSTALL NEW SILT FENCE PER PROJECT SWPPP THROUGH DURATION OF PROJECT UNTIL STABILIZATION OF ALL AREAS IS COMPLETE.
3. UNLESS INDICATED OTHERWISE, ALL DISTURBED AREAS SHALL BE SEEDED, IN ACCORDANCE WITH THE PROJECT SWPPP.
4. SEE C-1 FOR SYMBOLS AND ADDITIONAL NOTES.

SEE NOvA SITE PREP DRAWINGS #15-1-3A FOR CONTINUATION

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1" = 20'-0"
20 0 20 40
SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

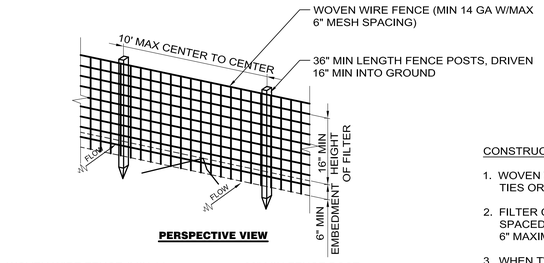
NOvA FAR DETECTOR BUILDING

EROSION CONTROL PLAN

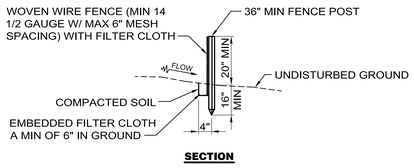
DRAWING NO. 15-1-3B EC-1 REV. 0

11 MAR, 2009

PLOT - DATE



PERSPECTIVE VIEW



SECTION

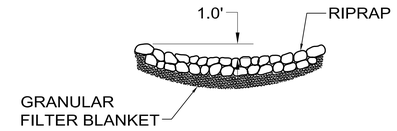
CONSTRUCTION SPECIFICATIONS:

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

EROSION CONTROL FABRIC FENCE DETAIL

NTS

4 EC-1



SECTION

NTS

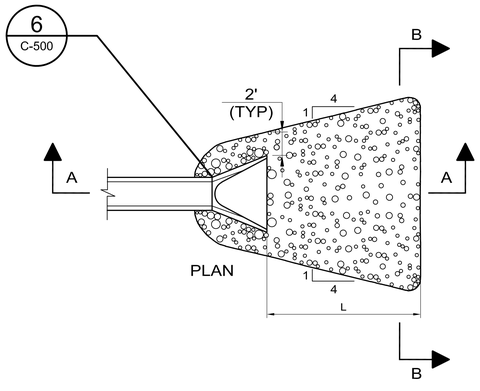
B

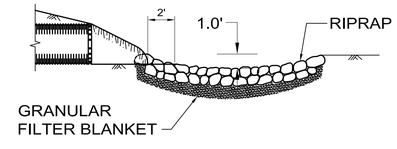
DIA. OF ROUND PIPE (IN.)	L (FT.)	CLASS II d_{50} = 6" 12" DEPTH RIPRAP (CU. YD.)	CLASS II d_{50} = 6" 6" DEPTH GRANULAR FILTER (CU. YD.)	CLASS III D_{50} = 9" 18" DEPTH RIPRAP (CU. YD.)	CLASS III D_{50} = 9" 9" DEPTH GRANULAR FILTER (CU. YD.)	CLASS VI D_{50} = 12" 24" DEPTH RIPRAP (CU. YD.)	CLASS VI D_{50} = 12" 12" DEPTH GRANULAR FILTER (CU. YD.)
12	8	3.2	1.6	4.7	2.4	6.3	3.2
15	8	3.5	1.8	5.2	2.6	6.9	3.5
18	10	4.7	2.4	7.0	3.5	9.4	4.7
21	10	5.5	2.8	8.2	4.1	10.9	5.5
24	12	6.5	3.3	9.8	4.9	13.0	6.5
30	14	8.6	4.3	12.8	6.4	17.1	8.6
36	16	10.9	5.5	16.3	8.2	21.8	10.9
42	18	13.5	6.8	20.3	10.2	27.0	13.5
48	20	16.0	8.0	24.0	12.0	32.0	16.0

NOTES:

1. CLASS II RIPRAP TO BE UTILIZED WHEN CULVERT SLOPE IS 1.0% OR LESS.
2. CLASS III RIPRAP TO BE UTILIZED WHEN CULVERT SLOPE IS GREATER THAN 1.0% BUT LESS THAN OR EQUAL TO 2.0%.
3. CLASS IV RIPRAP TO BE UTILIZED WHEN CULVERT SLOPE EXCEEDS 2.0%.

6 C-500





SECTION

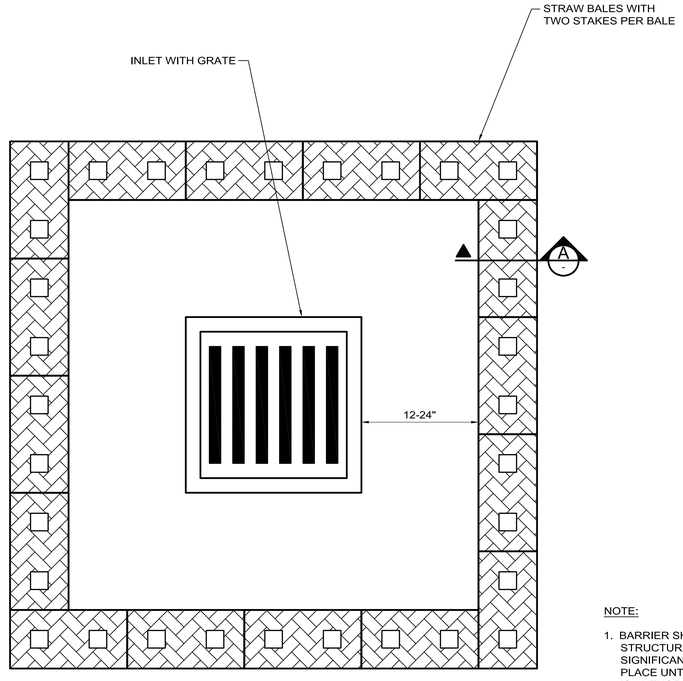
NTS

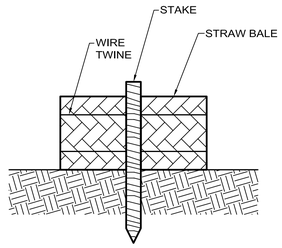
A

OUTLET PROTECTION DETAIL

NTS

6 C-4





SECTION

NTS

A -

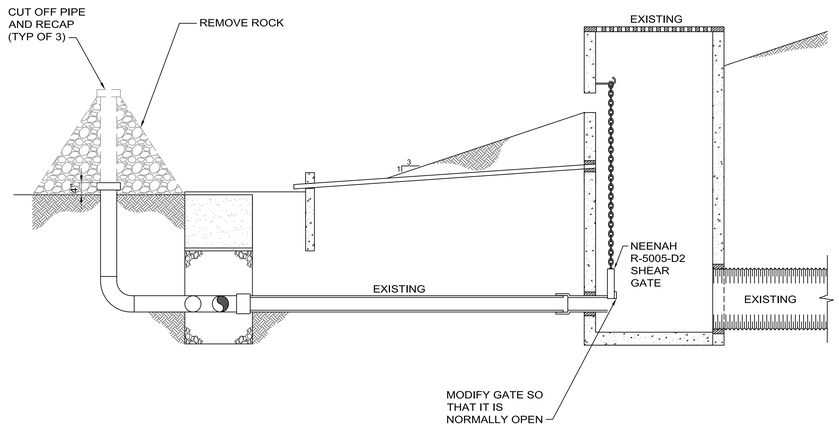
NOTE:

1. BARRIER SHALL BE PLACED IMMEDIATELY UPON INSTALLATION OF SEWER STRUCTURE. BALES SHALL BE REPLACED AS NECESSARY WHEN SIGNIFICANT CLOGGING OCCURS. BARRIER SHALL BE MAINTAINED IN PLACE UNTIL GRASS COVER HAS BEEN ESTABLISHED AND UNTIL REMOVAL IS AUTHORIZED BY THE ENGINEER. SEDIMENT TRAPPED BY THE BARRIER SHALL BE REMOVED (AND PROPERLY DISPOSED OF) WHENEVER THE BALES ARE REPLACED OR REMOVED.

INLET PROTECTION

NTS

5 EC-1



SEDIMENTATION BASIN OUTLET STRUCTURE

NTS

G C-4

NOTE:

1. POND DRAINAGE SYSTEM ORIGINALLY INSTALLED AS PART OF SITE PREP PACKAGE TO BE MODIFIED PER THIS DETAIL AFTER SOIL STABILIZATION IS ACHIEVED.

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UNIVERSITY OF MINNESOTA

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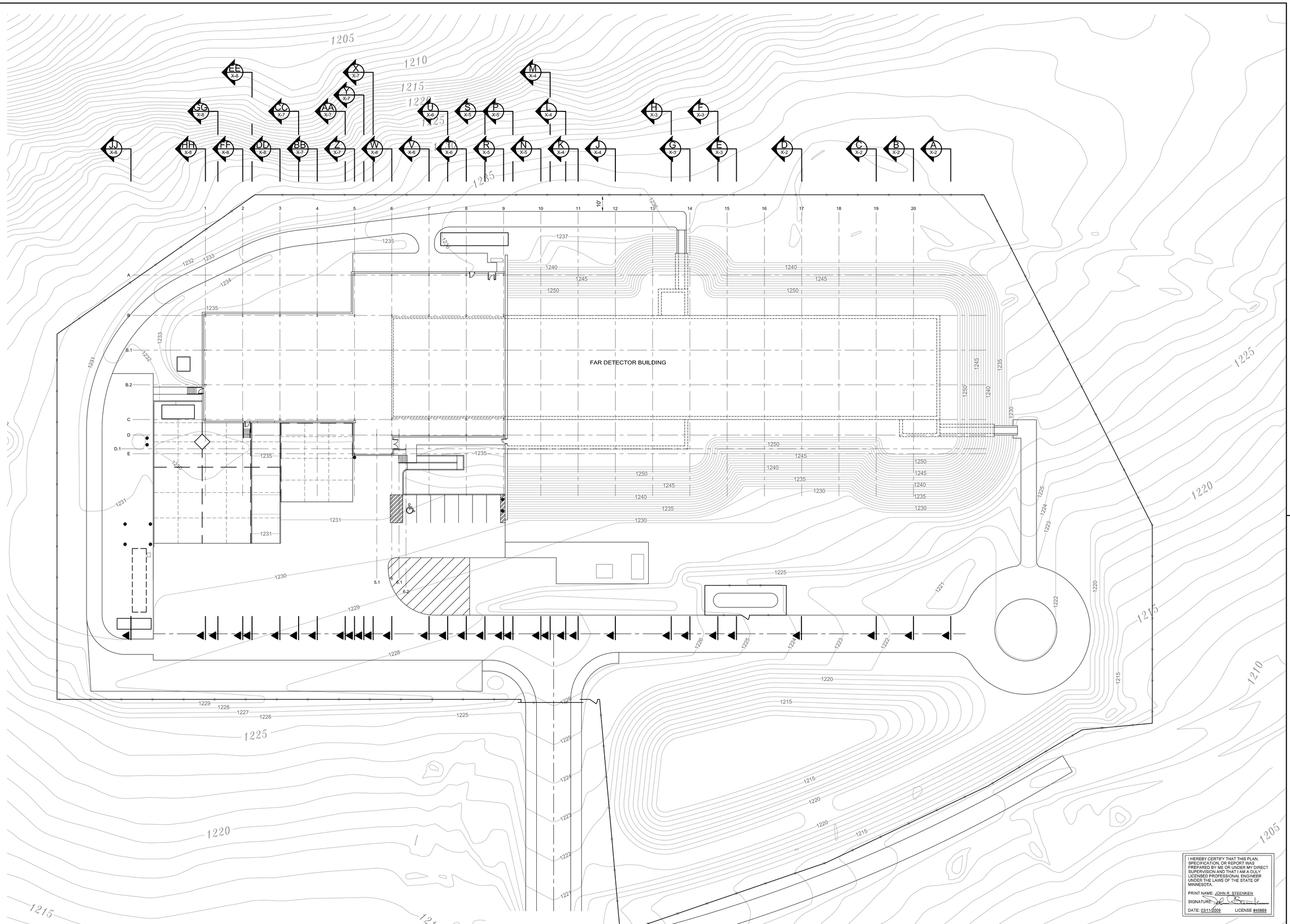
NOνA FAR DETECTOR BUILDING

EROSION CONTROL DETAILS

DRAWING NO. 15-1-3B EC-2 REV. 0

11 MAR, 2009



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1" = 20'-0"

20 0 20 40

SCALE FEET

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

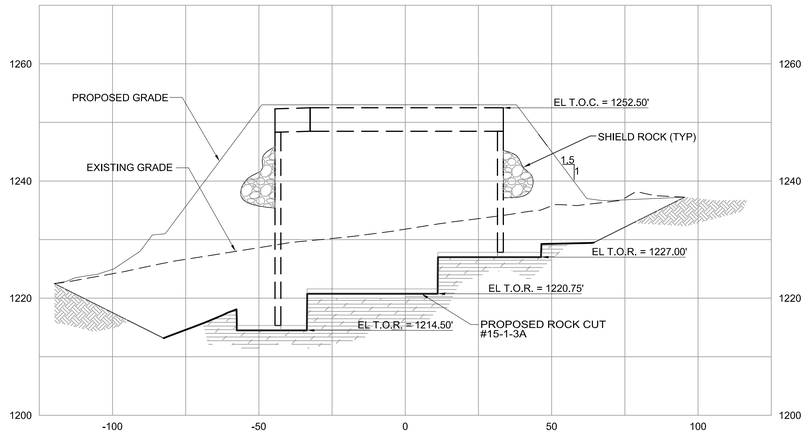
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

INDEX TO CROSS SECTIONS

DRAWING NO. 15-1-3A X-1 REV. 0

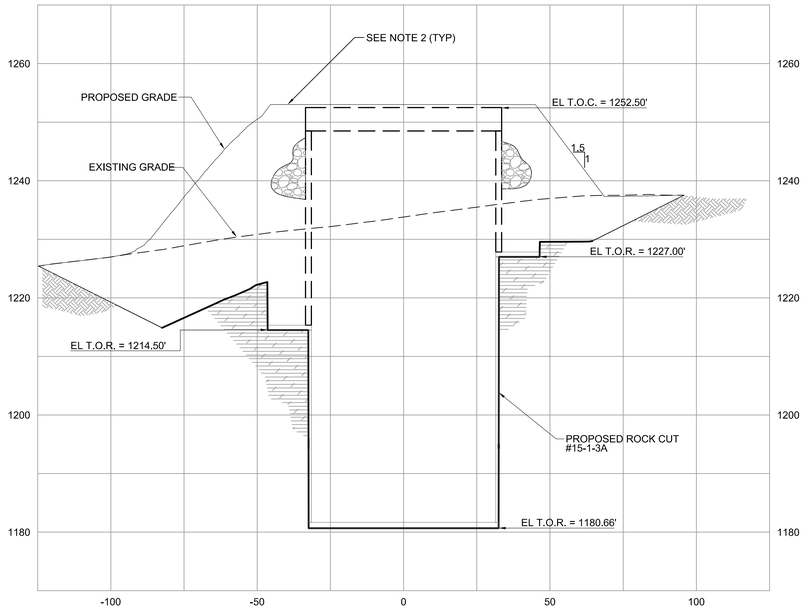
11 MAR, 2009



SECTION 24' SOUTH OF CL-20

SCALE : 1"=10' V 1"=20' H

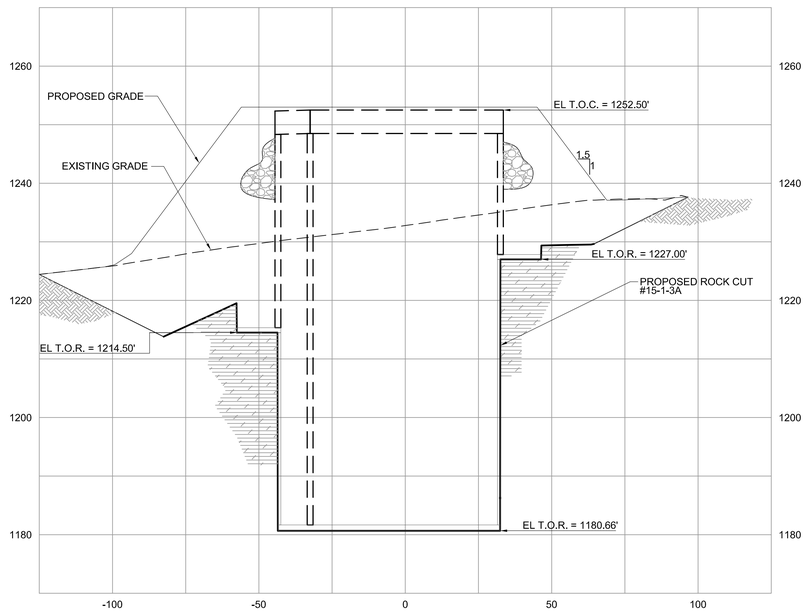
A
X-1



SECTION CL-19

SCALE : 1"=10' V 1"=20' H

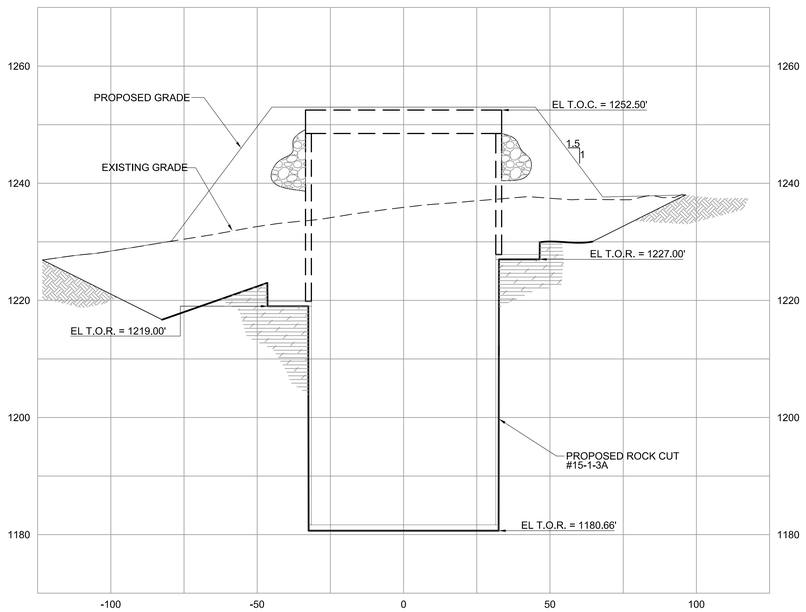
C
X-1



SECTION CL-20

SCALE : 1"=10' V 1"=20' H

B
X-1



SECTION CL-17

SCALE : 1"=10' V 1"=20' H

D
X-1

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1. SHIELD ROCK BACKFILL LIMITED TO 10'-0" VERTICAL UNTIL CAST-IN-PLACE ROOF SLAB HAS BEEN PLACED AND CURED FOR 14 DAYS.
2. SOUTH OF COLUMN LINE 9, SHIELD ROCK TO EXTEND A MINIMUM OF 10' BEYOND THE OUTER PERIMETER OF DETECTOR ENCLOSURE.

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

PLOT--DATE

Burns & McDonnell
SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE
DESIGNED	P. WAIT	03-11-09
DRAWN	J. HOLZINGER	03-11-09
CHECKED	B. QUINLAN	03-11-09
APPROVED	J. STEENKEN	03-11-09

	OWNER / REPRESENTATIVE	DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1" = 20'-0" 20 0 20 40 SCALE FEET HORIZONTAL

1" = 10'-0" 10 0 10 20 SCALE FEET VERTICAL

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

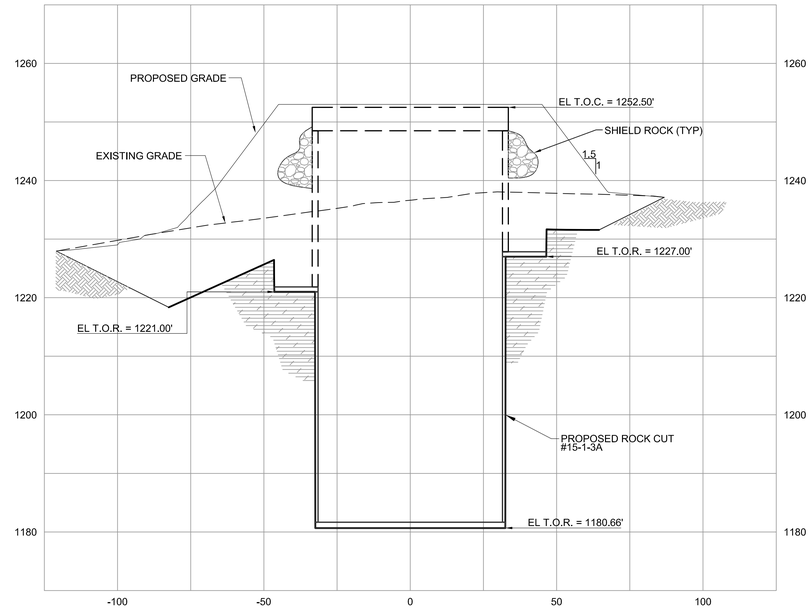
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

BUILDING BACKFILL CROSS SECTIONS - 1

DRAWING NO. **15-1-3A** **X-2** REV. **0**

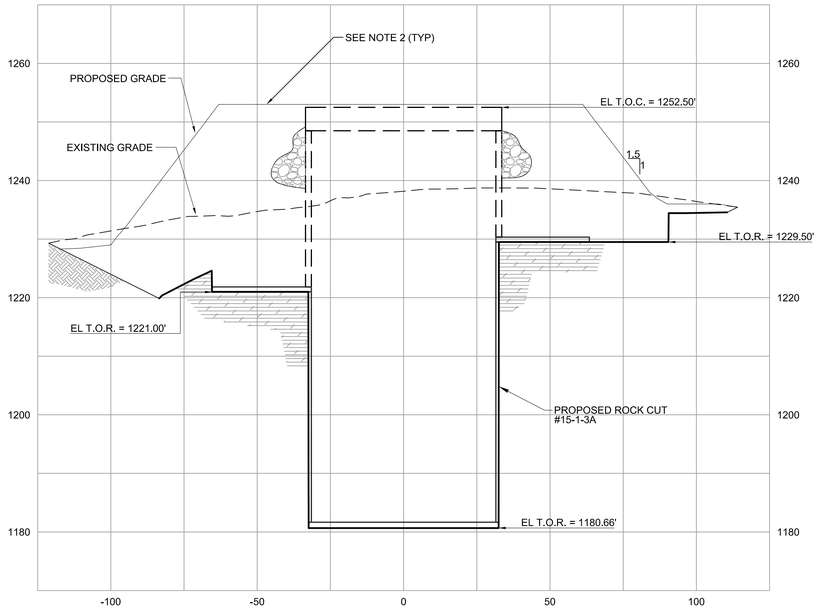
11 MAR, 2009



SECTION 6' SOUTH OF CL-15

SCALE : 1"=10' V 1"=20' H

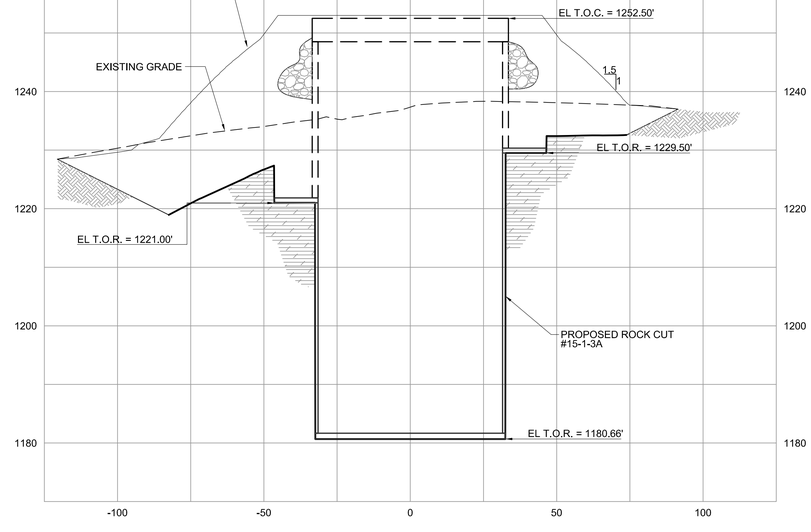
E
X-1



SECTION CL-14

SCALE : 1"=10' V 1"=20' H

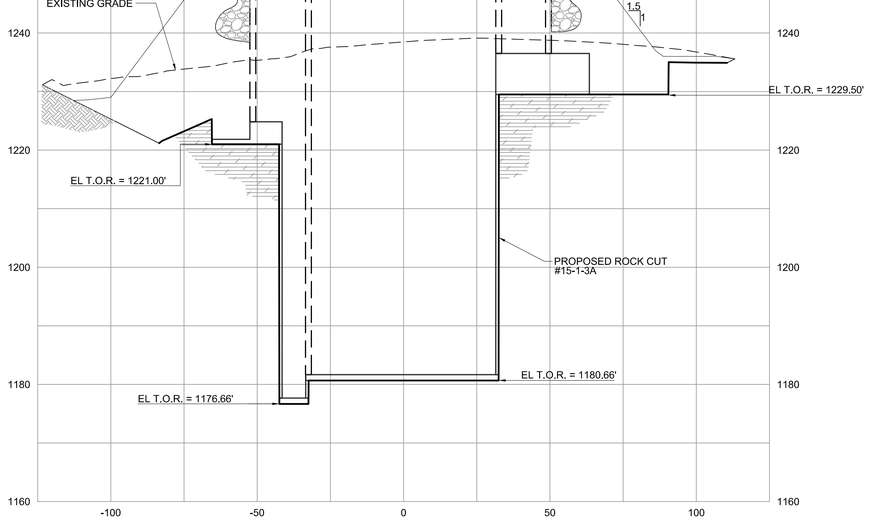
G
X-1



SECTION 6' NORTH OF CL-15

SCALE : 1"=10' V 1"=20' H

F
X-1



SECTION 12' NORTH OF CL-14

SCALE : 1"=10' V 1"=20' H

H
X-1

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: JOHN R. STEENKEN

SIGNATURE:

DATE: 03/11/2009 LICENSE #45669

NOTE:
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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1" = 20'-0" — 20 0 20 40 — SCALE — HORIZONTAL — FEET

1" = 10'-0" — 10 0 10 20 — SCALE — VERTICAL — FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

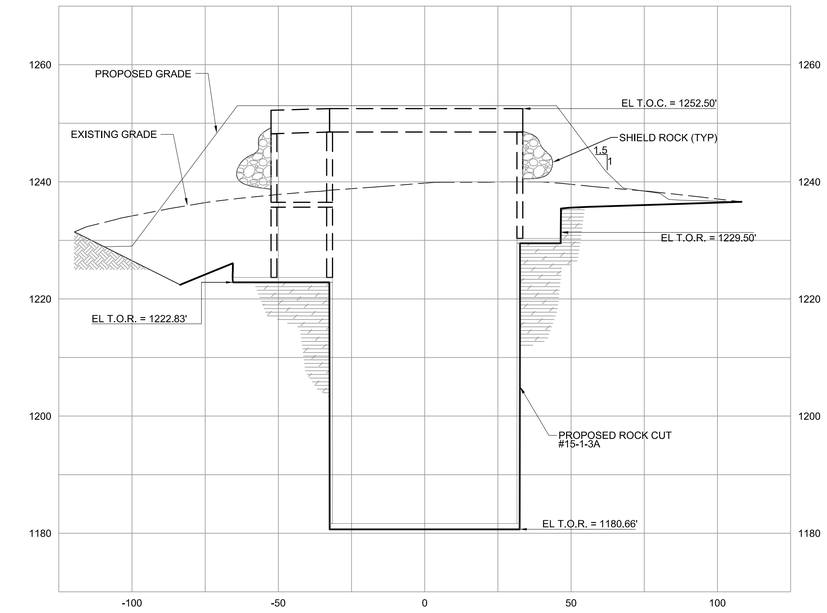
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

BUILDING BACKFILL CROSS SECTIONS - 2

DRAWING NO. **15-1-3A** **X-3** REV. **0**

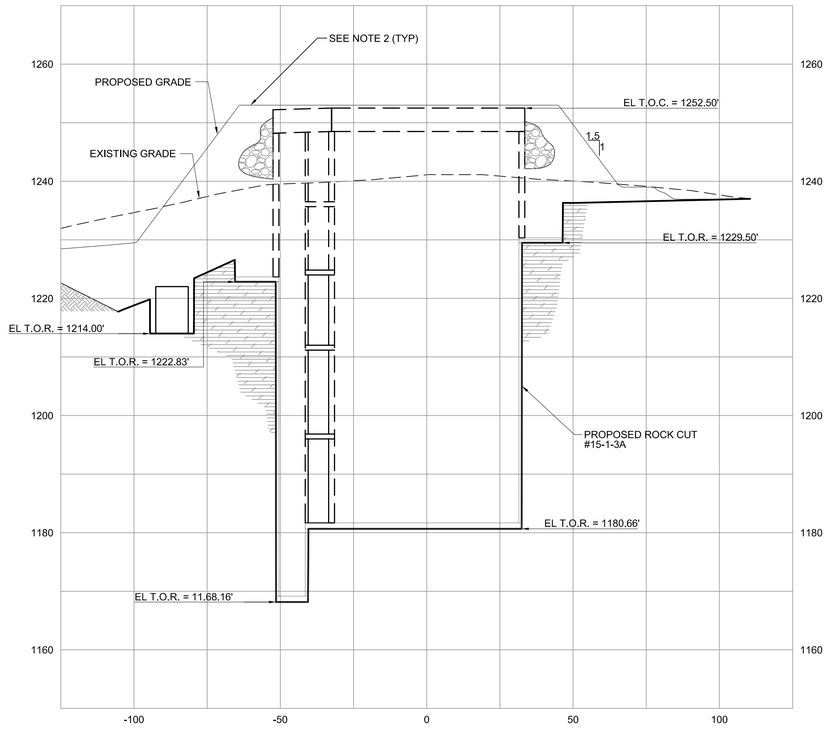
11 MAR, 2009



SECTION CL-12

SCALE : 1"=10' V 1"=20' H

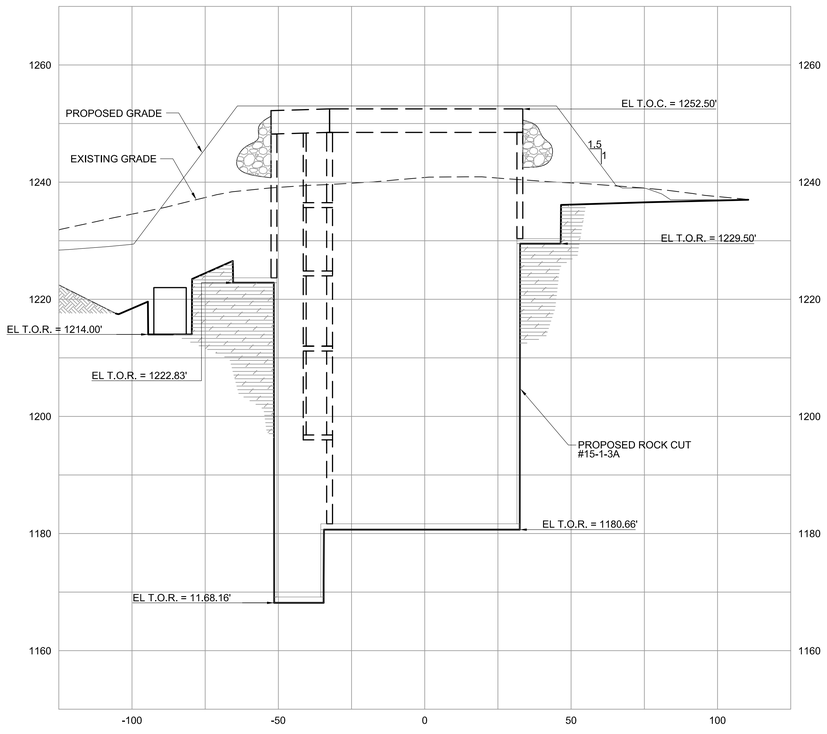
J
X-1



SECTION 8' NORTH OF CL-11

SCALE : 1"=10' V 1"=20' H

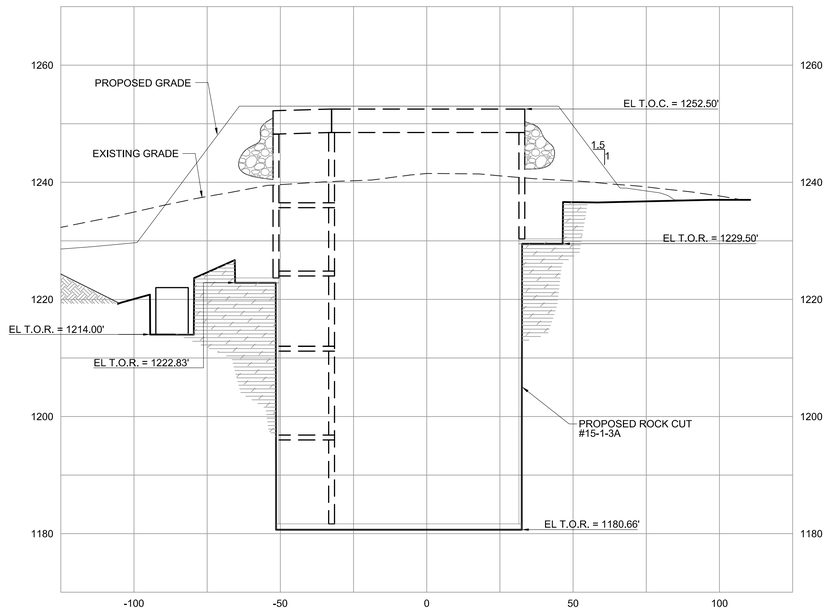
L
X-1



SECTION CL-11

SCALE : 1"=10' V 1"=20' H

K
X-1



SECTION 6' SOUTH OF CL-10

SCALE : 1"=10' V 1"=20' H

M
X-1

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SIGNATURE:

DATE: 03/11/2009 LICENSE #45669

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SINCE 1898

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1" = 20'-0" — 20 0 20 40 — SCALE — HORIZONTAL — FEET

1" = 10'-0" — 10 0 10 20 — SCALE — VERTICAL — FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

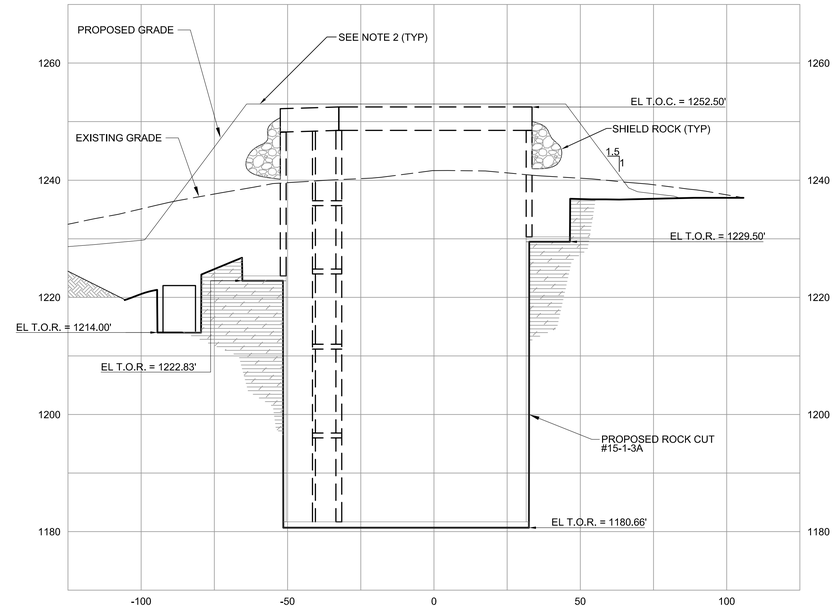
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

BUILDING BACKFILL CROSS SECTIONS - 3

DRAWING NO. **15-1-3A** **X-4** REV. **0**

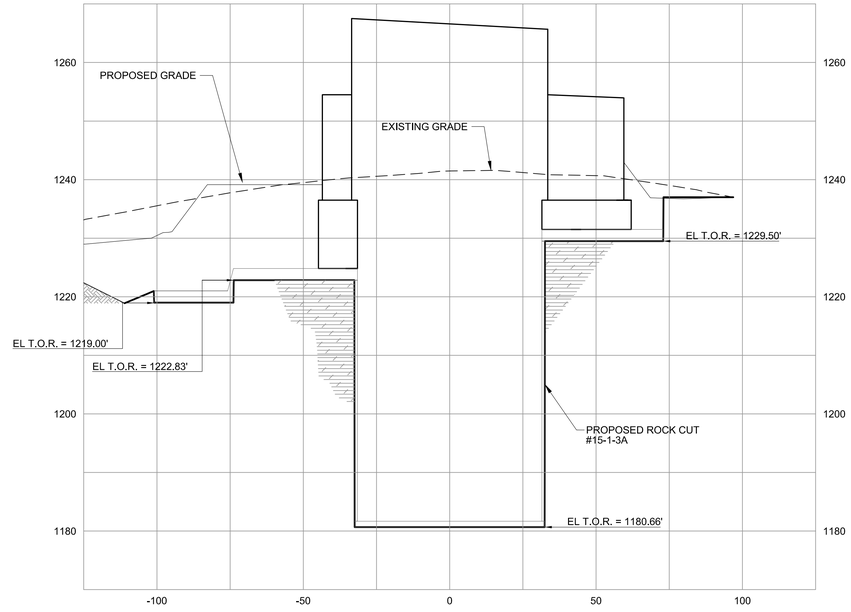
11 MAR, 2009



SECTION CL-10

SCALE : 1"=10' V 1"=20' H

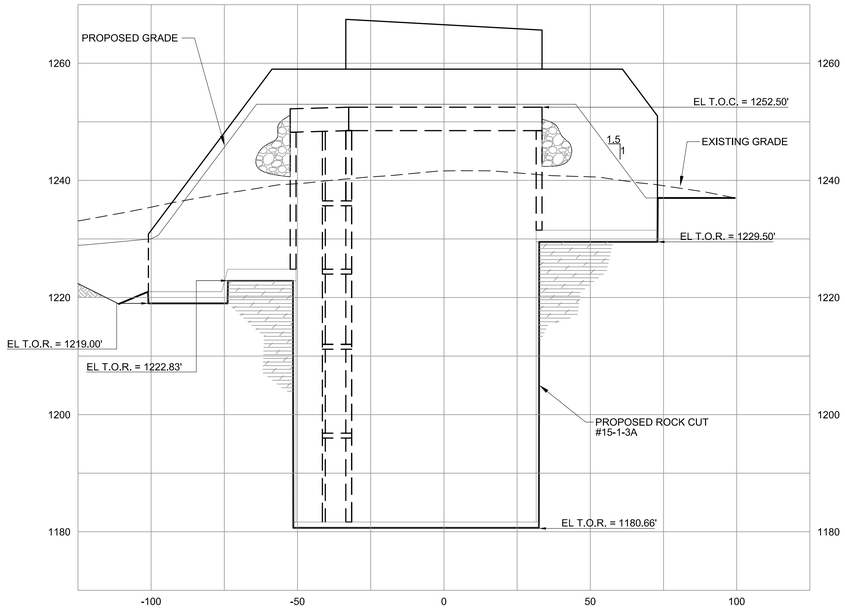
N
X-1



SECTION CL-9

SCALE : 1"=10' V 1"=20' H

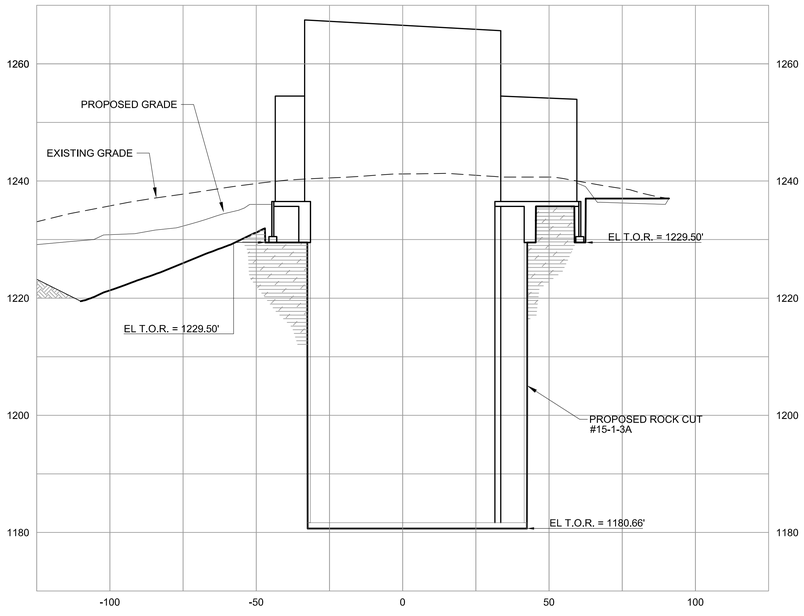
R
X-1



SECTION 6' SOUTH OF CL-9

SCALE : 1"=10' V 1"=20' H

P
X-1



SECTION 12' SOUTH OF CL-8

SCALE : 1"=10' V 1"=20' H

S
X-1

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PRINT NAME: JOHN R. STEENKEN

SIGNATURE

DATE: 03/11/2009 LICENSE #45689

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Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1" = 20'-0" — 20 0 20 40 — SCALE — HORIZONTAL — FEET

1" = 10'-0" — 10 0 10 20 — SCALE — VERTICAL — FEET

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

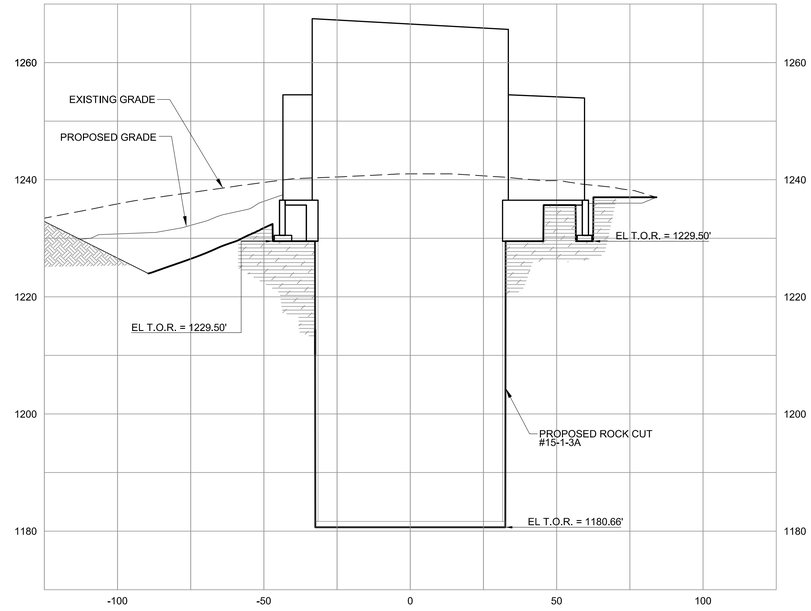
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

BUILDING BACKFILL CROSS SECTIONS - 4

DRAWING NO. 15-1-3A X-5 REV.

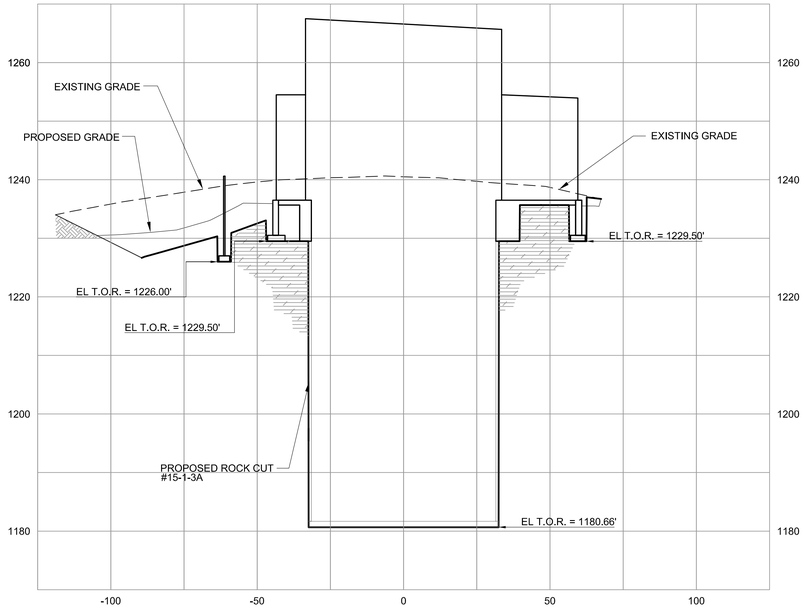
11 MAR, 2009



SECTION CL-8

SCALE : 1"=10' V 1"=20' H

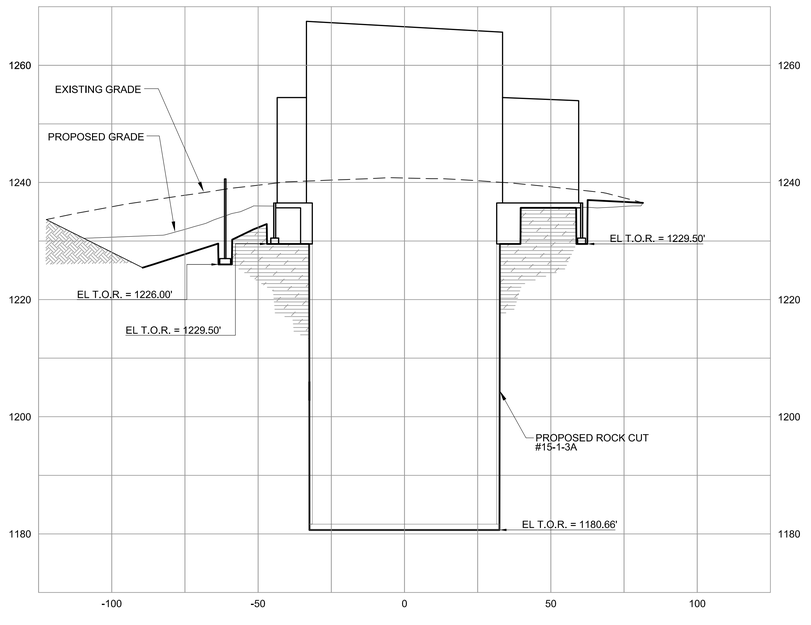
T / X-1



SECTION CL-7

SCALE : 1"=10' V 1"=20' H

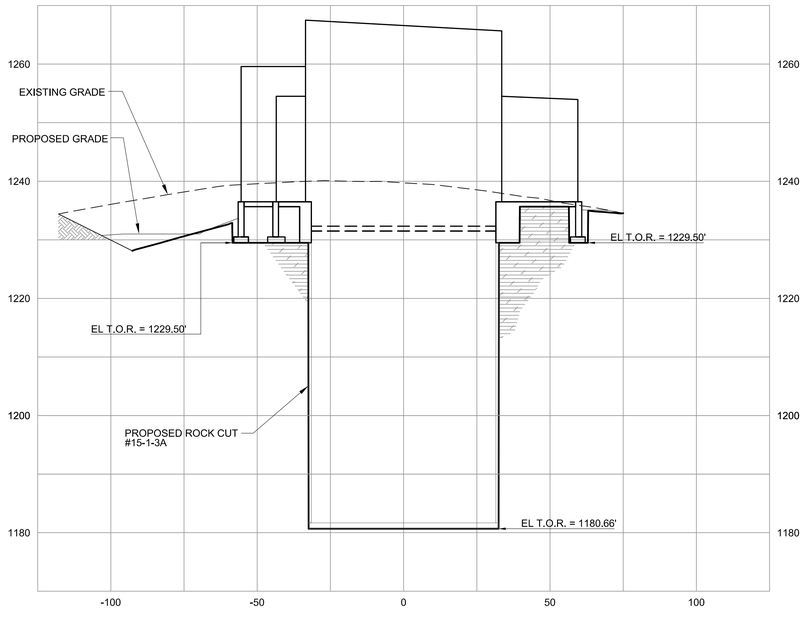
V / X-1



SECTION 12' SOUTH OF CL-7

SCALE : 1"=10' V 1"=20' H

U / X-1



SECTION CL-6

SCALE : 1"=10' V 1"=20' H

W / X-1

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SIGNATURE:

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1" = 20'-0" — 20 0 20 40 — SCALE — HORIZONTAL — FEET

1" = 10'-0" — 10 0 10 20 — SCALE — VERTICAL — FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

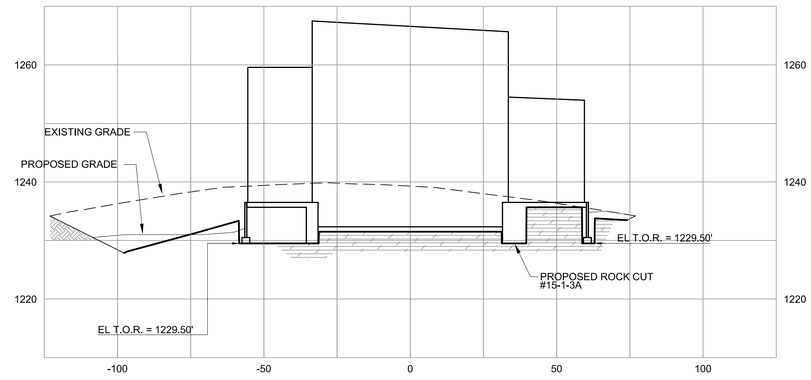
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

BUILDING BACKFILL CROSS SECTIONS - 5

DRAWING NO. 15-1-3A X-6 REV. 0

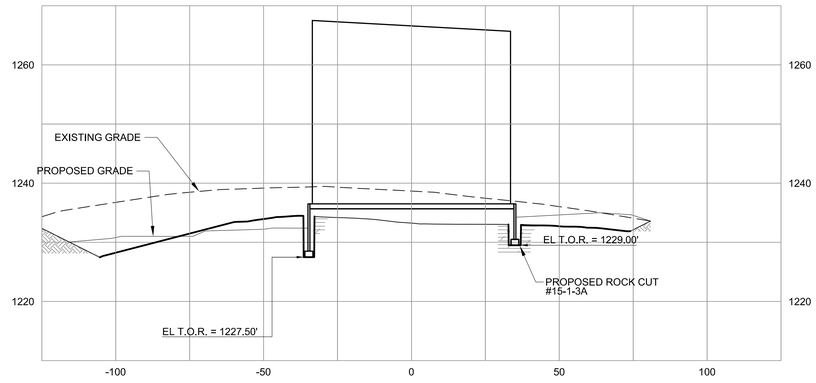
11 MAR, 2009



SECTION 12' SOUTH OF CL-5

SCALE : 1"=10' V 1"=20' H

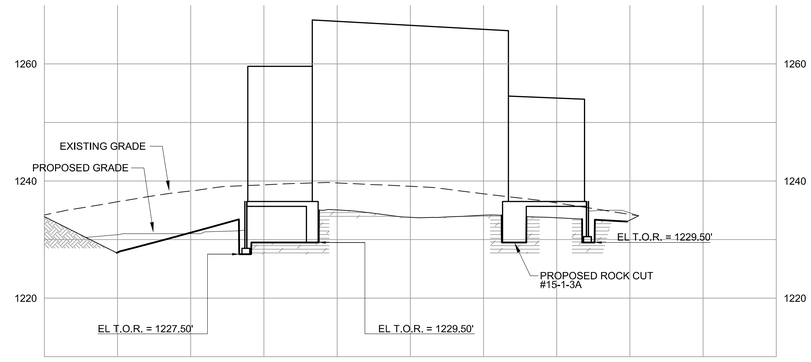
X / X-1



SECTION 6' NORTH OF CL-5

SCALE : 1"=10' V 1"=20' H

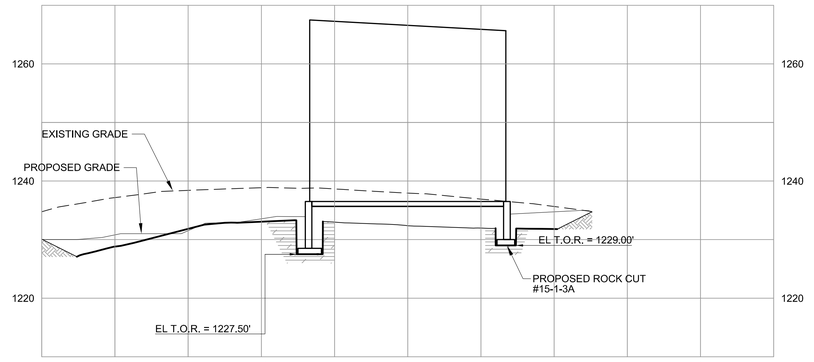
AA / X-1



SECTION 6' SOUTH OF CL-5

SCALE : 1"=10' V 1"=20' H

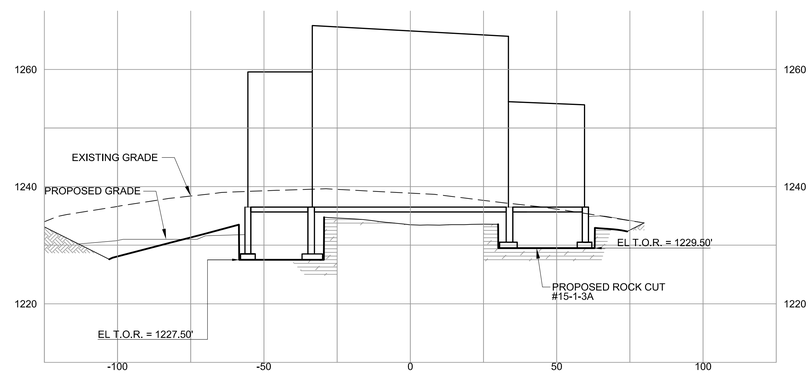
Y / X-1



SECTION CL-4

SCALE : 1"=10' V 1"=20' H

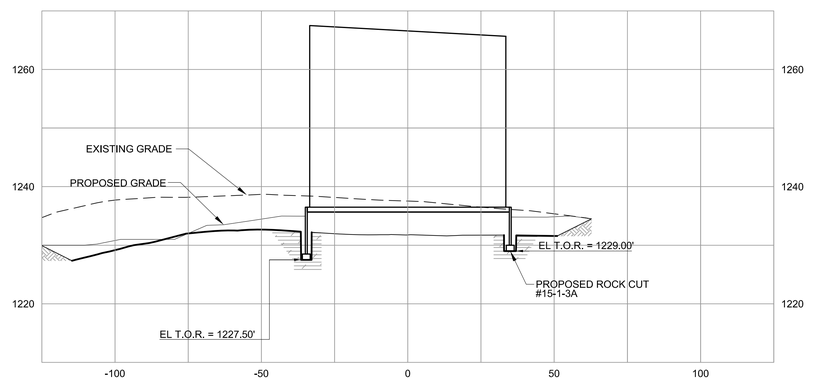
BB / X-1



SECTION CL-5

SCALE : 1"=10' V 1"=20' H

Z / X-1



SECTION 12' SOUTH OF CL-3

SCALE : 1"=10' V 1"=20' H

CC / X-1

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Burns & McDonnell SINCE 1898

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SCALE:

1" = 20'-0" — 20 0 20 40 — SCALE — FEET — HORIZONTAL

1" = 10'-0" — 10 0 10 20 — SCALE — FEET — VERTICAL

UNIVERSITY OF MINNESOTA | Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

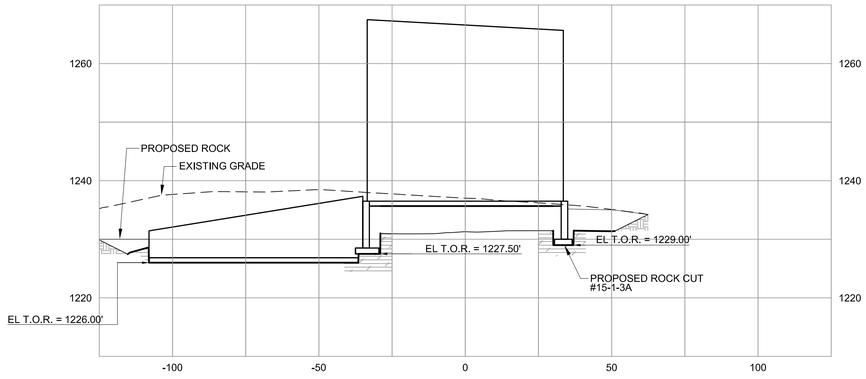
NOνA FAR DETECTOR BUILDING

BUILDING BACKFILL CROSS SECTIONS - 6

DRAWING NO. 15-1-3A X-7 REV. 0

11 MAR, 2009

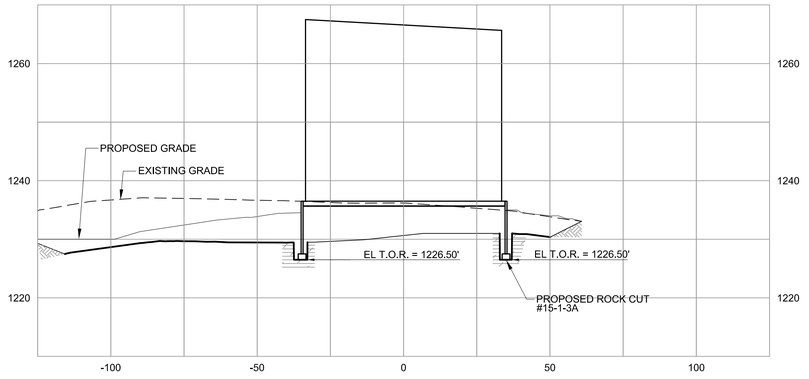
PLOT - DATE



SECTION CL-3

SCALE : 1"=10' V 1"=20' H

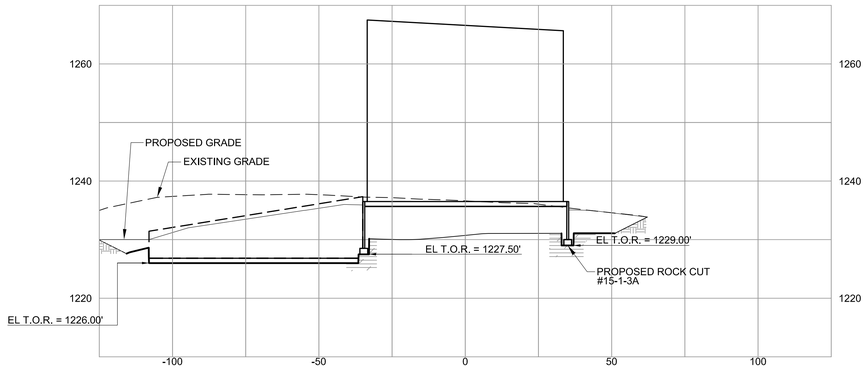
DD / X-1



SECTION 8' SOUTH OF CL-1

SCALE : 1"=10' V 1"=20' H

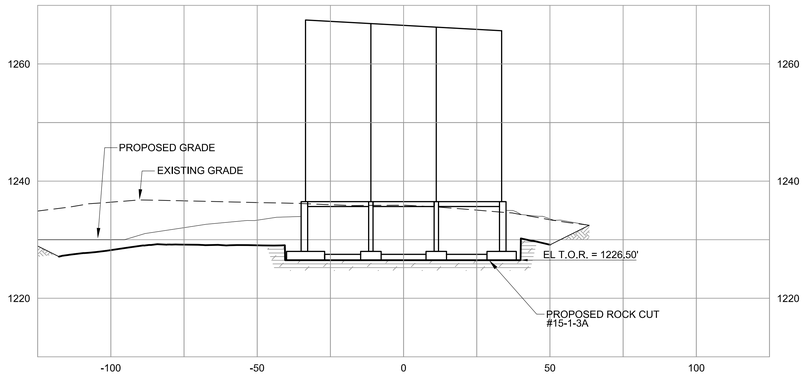
GG / X-1



SECTION 6' SOUTH OF CL-2

SCALE : 1"=10' V 1"=20' H

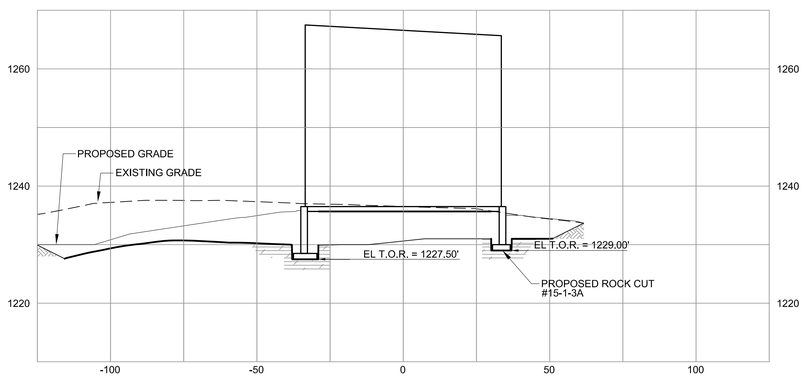
EE / X-1



SECTION CL-1

SCALE : 1"=10' V 1"=20' H

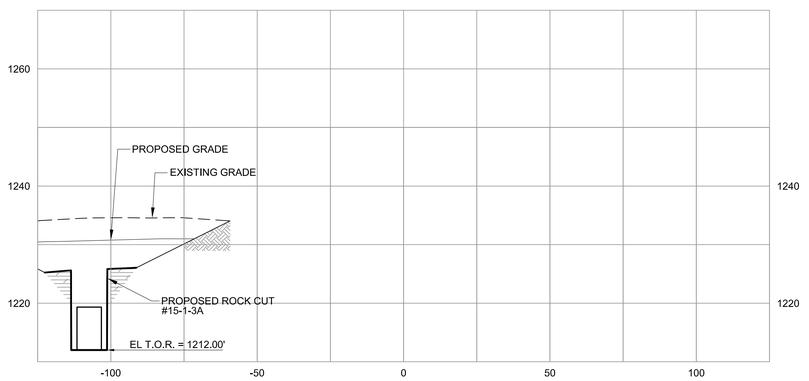
HH / X-1



SECTION CL-2

SCALE : 1"=10' V 1"=20' H

FF / X-1



SECTION 48' NORTH OF CL-1

SCALE : 1"=10' V 1"=20' H

JJ / X-1

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SIGNATURE:

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Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE
DESIGNED	P. WAIT	03-11-09
DRAWN	J. HOLZINGER	03-11-09
CHECKED	B. QUINLAN	03-11-09
APPROVED	J. STEENKEN	03-11-09

	OWNER / REPRESENTATIVE	DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1" = 20'-0" — 20 0 20 40 — SCALE FEET

1" = 10'-0" — 10 0 10 20 — SCALE VERTICAL FEET

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

BUILDING BACKFILL CROSS SECTIONS - 7

DRAWING NO. 15-1-3A X-8 REV. 0

11 MAR, 2009

PLOT--DATE

ABBREVIATIONS

ABBREVIATIONS:

ABV	above
AFF	above finished floor
ASC	above suspended ceiling
ACC	access
ACFL	access floor
AP	access panel
ACP	acoustical ceiling panel
ACT	acoustical ceiling tile
ADD	addendum
ADH	adhesive
ADJC	adjacent
ADJ	adjustable
AGG	aggregate
A/C	air conditioning
ALT	alternate
ALUM	aluminum
ANC	anchor, anchorage
AB	anchor bolt
ANOD	anodized
APPROX	approximate
ARCH	architect (ural)
BLW	below
BTWN	between
BVL	beveled
BLK	block
BLKG	blocking
BO	board
BS	both sides
BOT	bottom
BLDG	building
CAB	cabinet
CPT	carpet (ed)
CIPC	cast-in-place concrete
CLG	ceiling
CHT	ceiling height
CER	ceramic
CT	ceramic tile
CMT	ceramic mosaic (tile)
CIR	circle
CLR	clear (ance)
CLS	closure
CRC	cold rolled channel
COL	column
COMB	combination
COMP	compress (ed), (ion), (ible)
CONC	concrete
CONST	construction
CONT	continuous or continue
CONTR	contract (or)
CJT	control joint
CTR	center
CUFT	cubic foot
CYD	cubic yard
CW	curtain wall
DL	dead load
DEM	demolish, demolition
DET	detail
DIA	diameter
DIM	dimension
DR	door
DS	downspout
D	drain
DWG	drawing
EJ	expansion joint
EL	elevation/elevator
ELEV	elevation
EMERG	emergency
EQ	equal
EXT	exterior
F. BATT	fiberglass batt insulation
FIN	finish (ed)
FFE	finished floor elevation
FA	fire alarm
FE	fire extinguisher
FEC	fire extinguisher cabinet
FH	fire hose station
FRC	fire-resistant coating
FRT	fire-retardant
FLASH	flashing
FLR	floor (ing)
FD	floor drain
FPL	floor plate
FNDT	foundation
FS	full size
FURR	furred (ing)
GA	gage, gauge
GALV	galvanized
GC	general contract (or)
GL	glass, glazing
GB	grab bar
GR	grade, grading
GVL	gravel
GF	ground face
GT	grout
GPDW	gypsum dry wall
GPL	gypsum lath
H	high
HDW	hardware
HWD	hardwood
HJT	head joint
HDR	header
HVAC	heating/ventilation/air conditioning
HPT	high point
HT	height
HORZ	horizontal
HR	hour
INCL	include (d), (ing)
INSUL	insulate (d), (ion)
INT	interior
JC	janitor's closet
JT	joint
JF	joint filler
LBL	label
LAD	ladder
LG	length
LVR	louver
LPT	low point
MO	masonry opening
MBR	member
MEMB	membrane
MET/MTL	metal
MFD	metal floor decking
MTFR	metal furring
MRD	metal roof decking
MTHR	metal threshold
MS	metal stud
MP	metal panels
MLP	metal liner panels
MIN	minimum
MIR	mirror
MISC	miscellaneous
MOD	modular
MTD	mount (ed), (ing)
MOV	moveable
MULL	mullion
NAT	natural
NOM	nominal
N	north
NTS	not to scale
OC	on center (s)
OPNG	opening
OPP	opposite
OPH	opposite hand
OD	outside diameter
OH	overhead
PNT	paint (ed)
PNL	panel
PB	panic bar
PTD	paper towel dispenser
PTR	paper towel receptor
PAR	parallel
PLW	plywood
PT	point
PFN	prefinished
PRF	preformed
PJF	preformed joint filler
R	radius
RL	rail (ing)
RWC	rainwater conductor
REF	reference
RFL	reflect (ed), (ive), (or)
REFR	refrigerator
REINF	reinforce (d), (ing)
REV	revision (s), revised
R	riser
RD	roof drain
RFH	roof hatch
RFG	roofing
RM	room
RO	rough opening
SCH	schedule
SCN	screen
SLNT	sealant
SHT	sheet
SM	sheet metal
SIM	similar
SL	sleeve
SD	soap dispenser / storm drain
SB	splash block
SPL	special
SPEC	specification (s)
SQ	square
SST	stainless steel
STL	steel
STR/STRUCT	structural
SUSP	suspended
SYS	system
THK	thick (ness)
THR	threshold
TLT	toilet
TPH	toilet paper holder
TF	top of footing
TOC	top of concrete
TST	top of steel
TW	top of wall
TB	towel bar
TYP	typical
UC	undercut
UNF	unfinished
UOM	University of Minnesota
VB	vapor barrier & vinyl base
VNR	veneer
VERT	veritcal
VIN	vinyl
VCT	vinyl composition tile
VB	vinyl base & vapor barrier
VT	vinyl tile
WTW	wall to wall
WP	waterproofing
WR	water repellent
WS	waterstop
W	width, wide
WDW	window
WG	wired glass
WM	wire mesh
W/	with
WO	without
WD	wood
WB	wood base
WPT	working point

MATERIAL DESIGNATIONS and DETAIL SYMBOLS

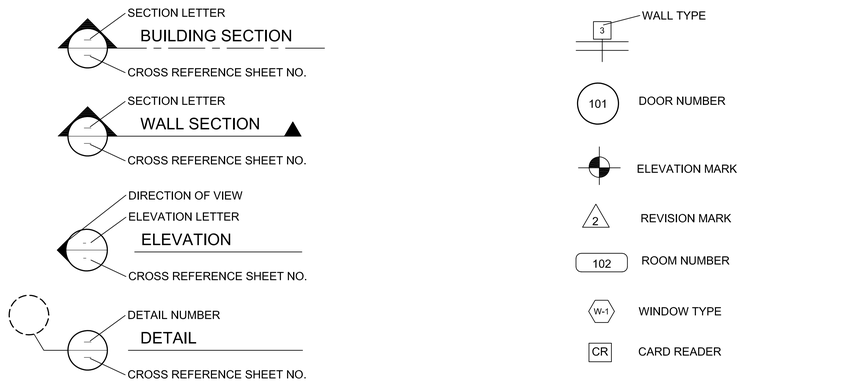
Plan Section

- EARTH
- POROUS FILL (stone or gravel, etc,)
- LIGHTWEIGHT CONCRETE (or concrete fill)
- STRUCTURAL CONCRETE (cast-in-place, precast, cast stone)
- ALUMINUM
- METAL, STEEL (large scale)
- PLYWOOD (large scale)
- WOOD ROUGH
- WOOD BLOCKING
- INSULATION (loose or batt)
- INSULATION (rigid)

Elevation

- CONCRETE, PLASTER
- CERAMIC TILE
- GLAZING

Detail Symbols



I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE: Dubravka Sretenovic

DATE: 03/11/2009 LICENSE #46160

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
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CHECKED	M. HANSON	03-11-09
APPROVED	J. STEENKEN	03-11-09

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

GENERAL NOTES

DRAWING NO. 15-1-3B A-1 REV. 0

11 MAR, 2009

CODE SEARCH

BUILDING HEIGHT:

-ONE FLOOR ABOVE GROUND, 36 FEET
-UNDERGROUND 55 FEET

BUILDING AREAS IN SQUARE FEET:

ELEVATION 1236'-6": -MECHANICAL ROOM 430 SF
- OFFICE 700 SF
- SCINTILLATOR EQUIP. ROOM 400SF
- LOADING DOCK AREA 7300SF
- FIRE PROTECTION AREA 860 SF
- CONTROL RM/ COMPUTER RM 920 SF
- ENTRANCE/CORRIDOR/VIEWING AREA 1050 SF

ELEVATION 1224'-10": -TELEPHONE EQUIP/ELECTRICAL ROOM 920 SF
ELEVATION 1181'-8": -ASSEMBLY AREA 4900 SF

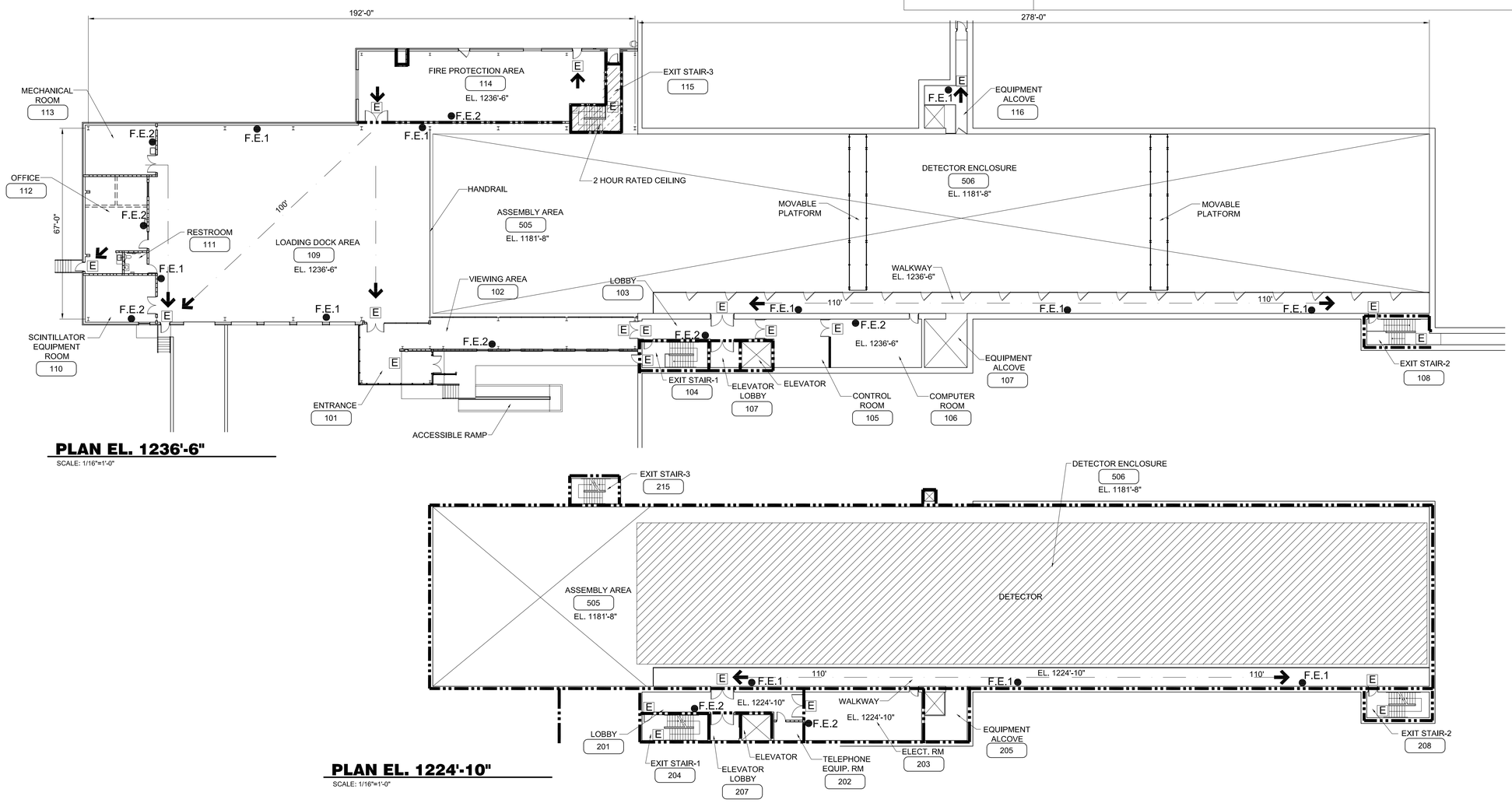
TOTAL 17500 SF

CHEMICALS: -IN DETECTOR ENCLOSURE -4.9 MILLION GALLONS OF LIQUID SCINTILLATOR (BICRON/SAINT-GOBAIN CRYSTALS AND DETECTORS BC-517L) IN 23,808 RIGID PVC CONTAINERS; FLASH POINT 208F; COMBUSTIBLE LIQUID CLASS IIIB (FLASH POINT ABOVE 200F)
- IN FIRE PROTECTION AREA - 660 GALLONS OF DIESEL FUEL FOR FIRE PUMP OPERATION (FLASH POINT 130F; COMBUSTIBLE LIQUID CLASS II (FLASH POINT ABOVE 100F AND BELOW 140F)

SUBJECT	REQUIREMENTS/RESTRICTIONS	IBC 2006 SECTION
BUILDING/AREA OCCUPANCY	LOADING DOCK, ASSEMBLY AREA, DETECTOR ENCLOSURE, MECHANICAL ROOM, SCINTILLATOR EQUIP. RM: F-1 FACTORY INDUSTRIAL MODERATE HAZARD OCCUPANCY OFFICE, COMPUTER RM, CONTROL RM: B BUSINESS ENTRANCE/CORRIDOR/VIEWING AREA 1060SF: B FOR OCC LOAD LESS THAN 50 FIRE PROTECTION AREA: F-1 FACTORY INDUSTRIAL MODERATE HAZARD OCCUPANCY GENERAL BUILDING OCCUPANCY: F-1 FACTORY INDUSTRIAL MODERATE HAZARD OCCUPANCY	306.1 304.1 303.1 307.1 EX 5 306.1 AND 307.1 EXP 1
OCCUPANT LOAD	PER CODE - MECHANICAL ROOM 430 SF/300=2 - OFFICE 700 SF/100=7 - SCINTILLATOR EQUIP. ROOM 400SF/300=2 - LOADING DOCK AREA 7300SF/100=73 - FIRE PROTECTION AREA 860 SF/300=3 - CONTROL RM/ COMPUTER RM 920 SF/100=10 - ENTRANCE/CORRIDOR/VIEWING AREA 1050 SF/100=11 TOTAL ON ELEVATION 1236'-6" - 108 - TELEPHONE EQUIP/ELECTRICAL ROOM 920 SF/300=10 TOTAL ON ELEVATION 1224'-10" - 10 -ASSEMBLY AREA 4900 SF/100=49 TOTAL ON ELEVATION 1181'-8" - 49 TOTAL PER CODE ON ALL FLOORS - 167 ACTUAL:10	TABLE 1004.1.1
MAX ALLOWABLE QUANTITY OF HAZARDOUS CHEMICAL PER CONTROL AREA	CLASS IIIB COMBUSTIBLE LIQUID UNLIMITED IN A BUILDING WITH AUTOMATIC SPRINKLER SYSTEM	TABLE 307.1(1) F

CODE SEARCH

SUBJECT	REQUIREMENTS/RESTRICTIONS	IBC 2006 SECTION
SPECIAL DETAILED REQUIREMENTS FOR UNDERGROUND BUILDING	-MIN CONSTRUCTION REQUIREMENT - TYPE IB -AUTOMATIC SPRINKLER SYSTEM REQUIRED -COMPARTMENTATION NOT REQUIRED -SMOKE CONTROL SYSTEM REQUIRED -MEANS OF EGRESS - NUMBER OF EXITS: TWO MIN -SMOKEPROOF STAIR ENCLOSURE REQUIRED -STANDBY POWER (WITHIN 60 SEC) REQUIRED FOR SMOKE CONTROL SYSTEM, VENTILATION, FIRE PUMPS, ELEVATOR -EMERGENCY POWER REQUIRED -STANDPIPE SYSTEM REQUIRED	405.1,405.2 405.3 405.4.1 405.5.1 405.8.1 405.8.2 AND 1020.1.7 405.9 405,10 405.11
ALLOWABLE HEIGHT AND BUILDING AREAS	FOR F-1 MIN VA CONSTRUCTION TYPE - ALLOWABLE AREA INCREASED 300% FOR BUILDING W/ SPRINKLERS , 14000SF X 4=56,000 SF MAX, 2 FLOORS MAX FOR UNDERGROUND STRUCTURE ACTUAL CONSTRUCTION TYPE IB FOR BUILDING ABOVE GROUND ACTUAL CONSTRUCTION TYPE IIB	506.3, TABLE 503
SEPARATION OF OCCUPANCIES (HOURS)	SEPARATIONS NOT REQUIRED FOR NONSEPARATED OCCUPANCIES 2 HR RATED FIRE PUMPS ENCLOSURE	508.3.2 NFPA 20- 5.12.1.1.2
MIN FIRE -RESISTANCE RATING	FOR CONSTRUCTION TYPE IB (UNDERGROUND STRUCTURE): -STRUCTURAL FRAME -2 HOURS -EXTERIOR BEARING WALLS - 2 HOURS -INTERIOR BEARING WALLS - 2 HOURS -FLOORS - 2 HOURS -ROOF CONSTRUCTION - 2 HOURS EXTERIOR WALLS - 0 HOURS SHAFT ENCLOSURES - 2 HOURS ELEVATOR LOBBY - UNRATED SMOKE PARTITION REQUIRED FOR BUILDING WITH SPRINKLERS CORRIDORS - 0 HOURS EXIT STAIR ENCLOSURES - 2 HOURS ELECTRICAL ROOM - 2 HOURS FOR CONSTRUCTION TYPE IIB (BUILDING ABOVE GROUND): -STRUCTURAL FRAME -0 HOUR -EXTERIOR BEARING WALLS - 0 HOURS -INTERIOR BERAING WALLS - 0 HOUR -FLOORS - 0 HOURS -ROOF CONSTRUCTION - 0 HOUR	TABLE 601 TABLE 602 707.4 707.14.1 EXP 5. TABLE 1017.1 1020.1 NEC 110.26(C)(3)
AUTOMATIC SPRINKLER SYSTEM	REQUIRED	903.2.3
STANDPIPE SYSTEM	REQUIRED, CLASS I	905.3.1 AND 905.3.5
FIRE ALARM AND DETECTION SYSTEM	NOT REQUIRED	907.2.19 AND 907.2.4
MEANS OF EGRESS	MAXIMUM TRAVEL DISTANCE - 250 FT MAXIMUM COMMON PATH OF TRAVEL - 100 FT DEAD END - 50FT MIN CORRIDOR/AISLE WIDTH - 36 INCHES EGRESS WIDTH 0.2" PER PERSON - 0.2"X167=33.4"MIN	TABLE 1016.1 1014.3 EXCEPTION 1. 1017.3 EXCEPTION 2. 1017.2 TABLE 1005.1



PLAN EL. 1236'-6"
SCALE: 1/16"=1'-0"

PLAN EL. 1224'-10"
SCALE: 1/16"=1'-0"

EXIT EGRESS
2-HR WALL
E ILLUMINATED EXIT SIGN
F.E.1 AFFF FIRE EXTINGUISHERS
F.E.2 DRY CHEMICAL/ MULTIPURPOSE FIRE EXTINGUISHERS

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/16"=1'-0" 8 0 8 16 24 32 40 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

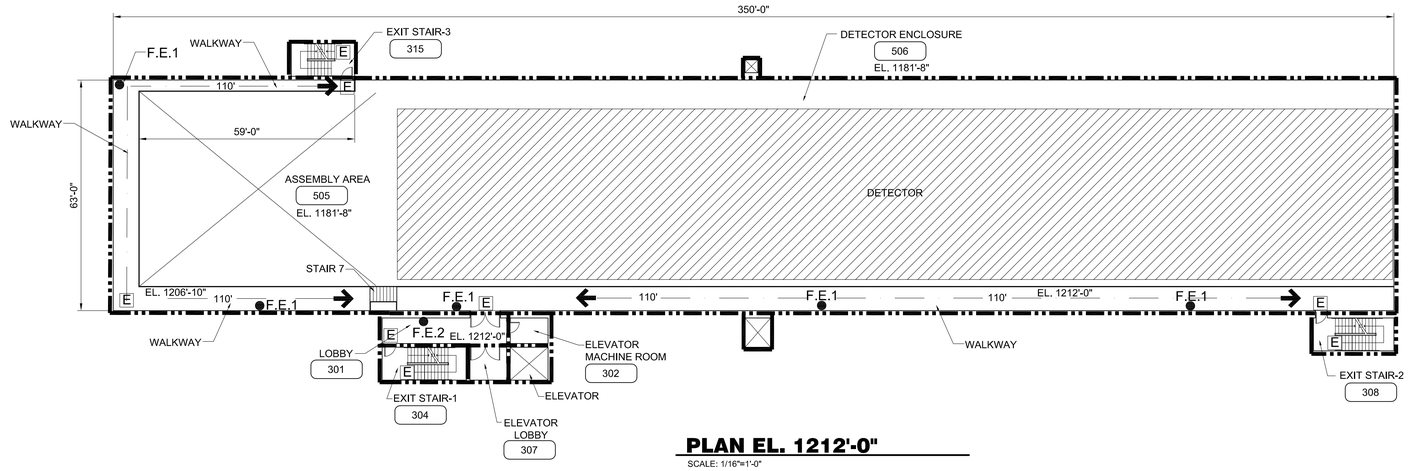
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

COMPLIANCE PLANS 1 OF 2

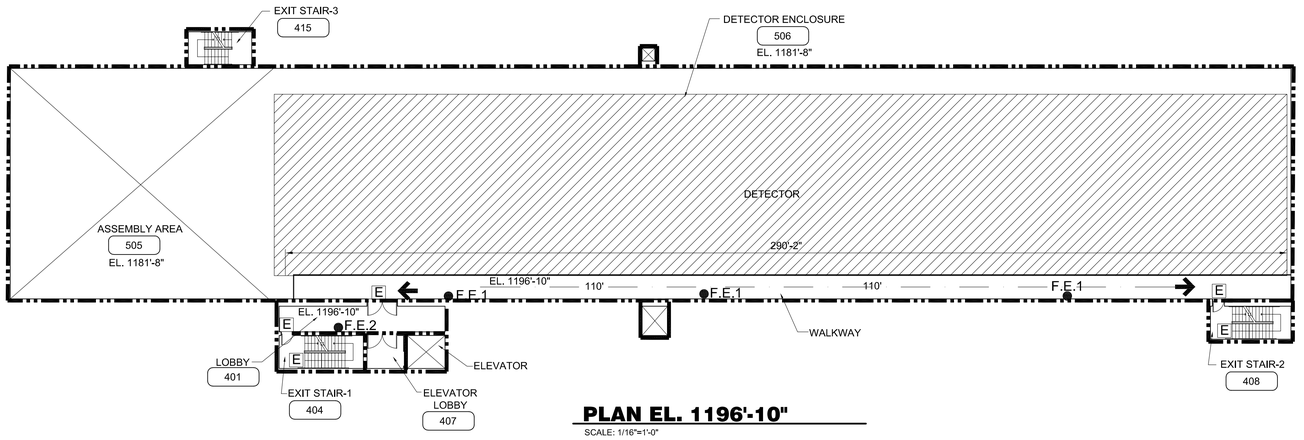
DRAWING NO. 15-1-3B A-2 REV. 0

11 MAR, 2009



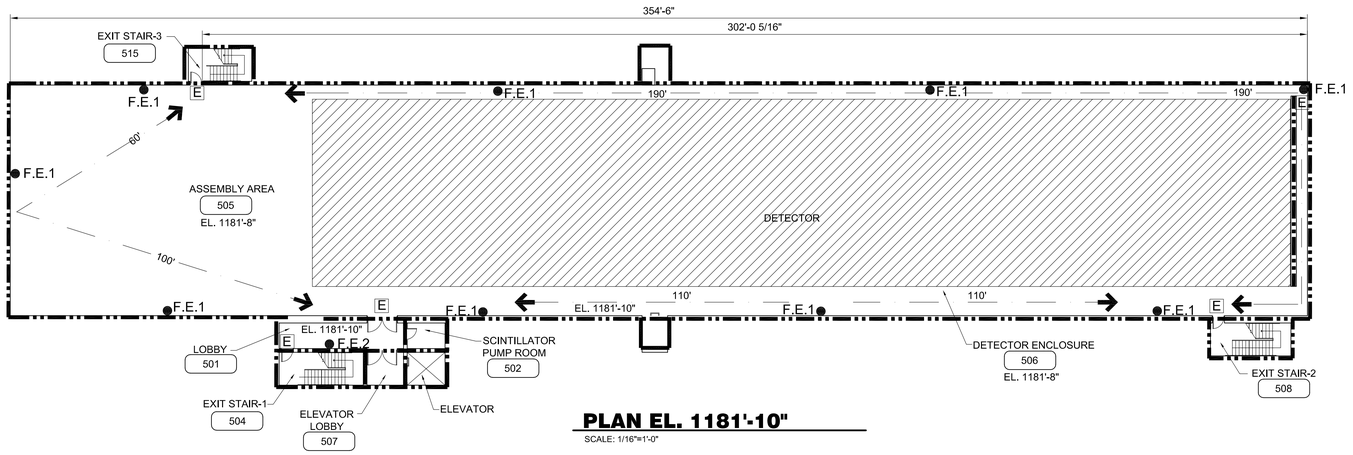
PLAN EL. 1212'-0"

SCALE: 1/16"=1'-0"



PLAN EL. 1196'-10"

SCALE: 1/16"=1'-0"



PLAN EL. 1181'-10"

SCALE: 1/16"=1'-0"

EXIT EGRESS

2-HR WALL

E ILLUMINATED EXIT SIGN

F.E.1 AFFF FIRE EXTINGUISHERS

F.E.2 DRY CHEMICAL/ MULTIPURPOSE FIRE EXTINGUISHERS

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PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE: Dubravka Sretenovic

DATE: 03/11/2009 LICENSE #46160

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PROJECT NORTH

SCALE: 1/16"=1'-0" 8 0 8 16 24 32 40 SCALE FEET

UNIVERSITY OF MINNESOTA

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FERMI NATIONAL ACCELERATOR LABORATORY

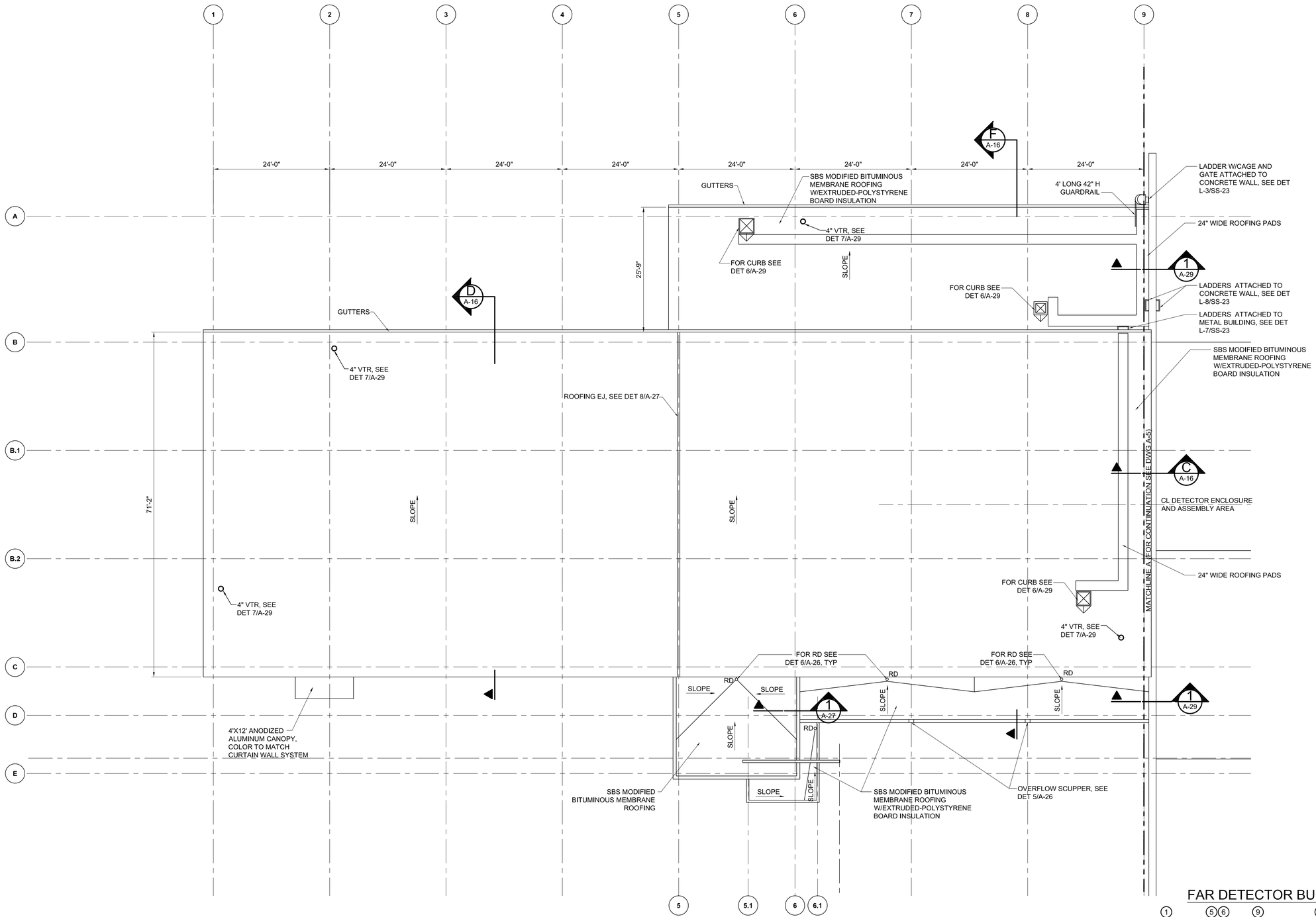
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

COMPLIANCE PLANS 2 OF 2

11 MAR, 2009

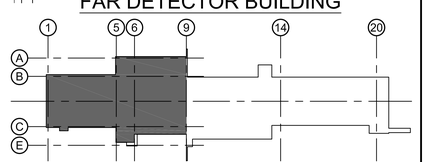
DRAWING NO. 15-1-3B A-3 REV. 0



ROOF PLAN

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

FAR DETECTOR BUILDING



KEY PLAN

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PROJECT NORTH

SCALE: 1/8"=1'-0" (8 0 8 16 SCALE FEET)

FERMI NATIONAL ACCELERATOR LABORATORY

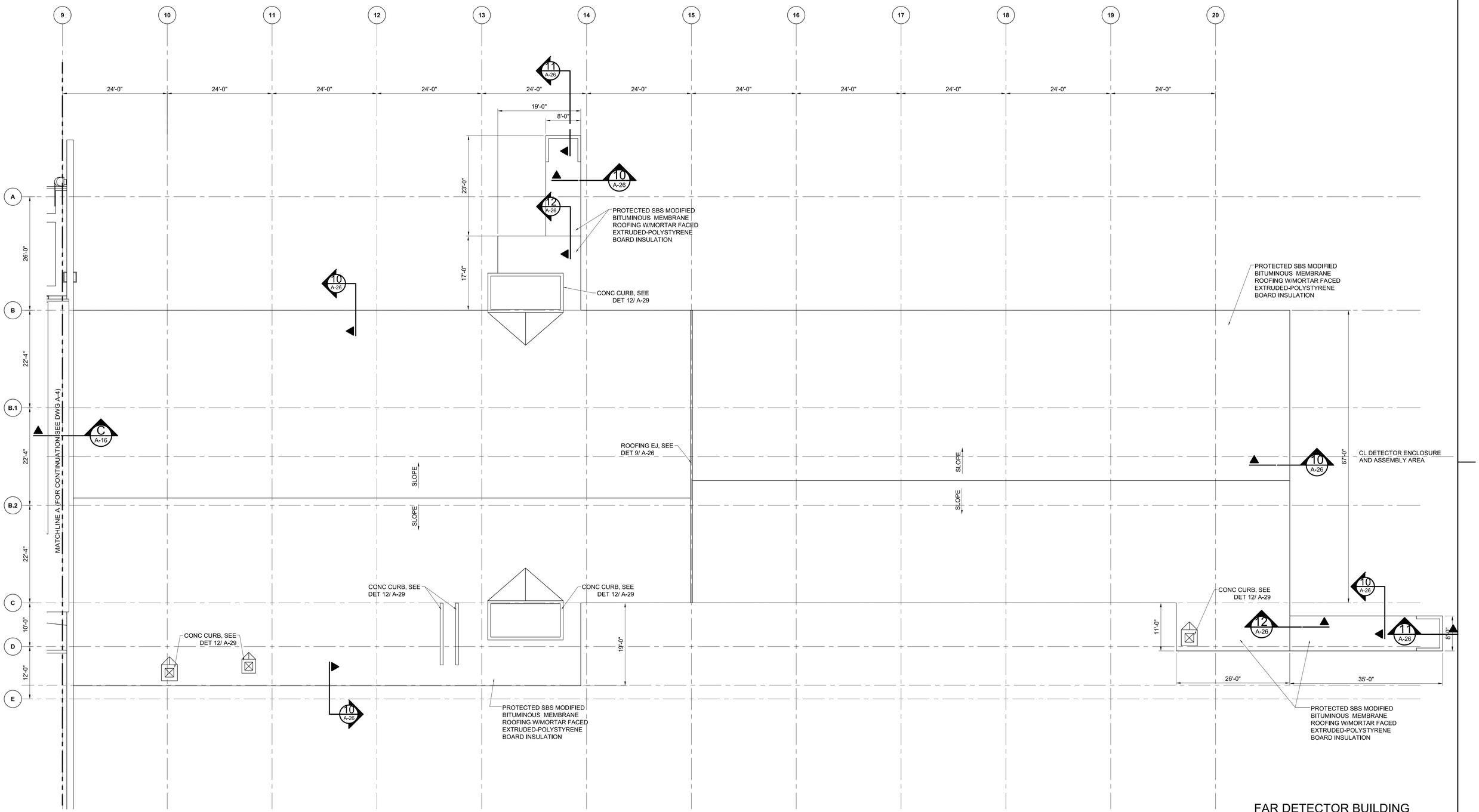
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ROOF PLAN 1 OF 2

DRAWING NO. 15-1-3B A-4 REV. 0

11 MAR, 2009



ROOF PLAN

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

FAR DETECTOR BUILDING

KEY PLAN

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FERMI NATIONAL ACCELERATOR LABORATORY

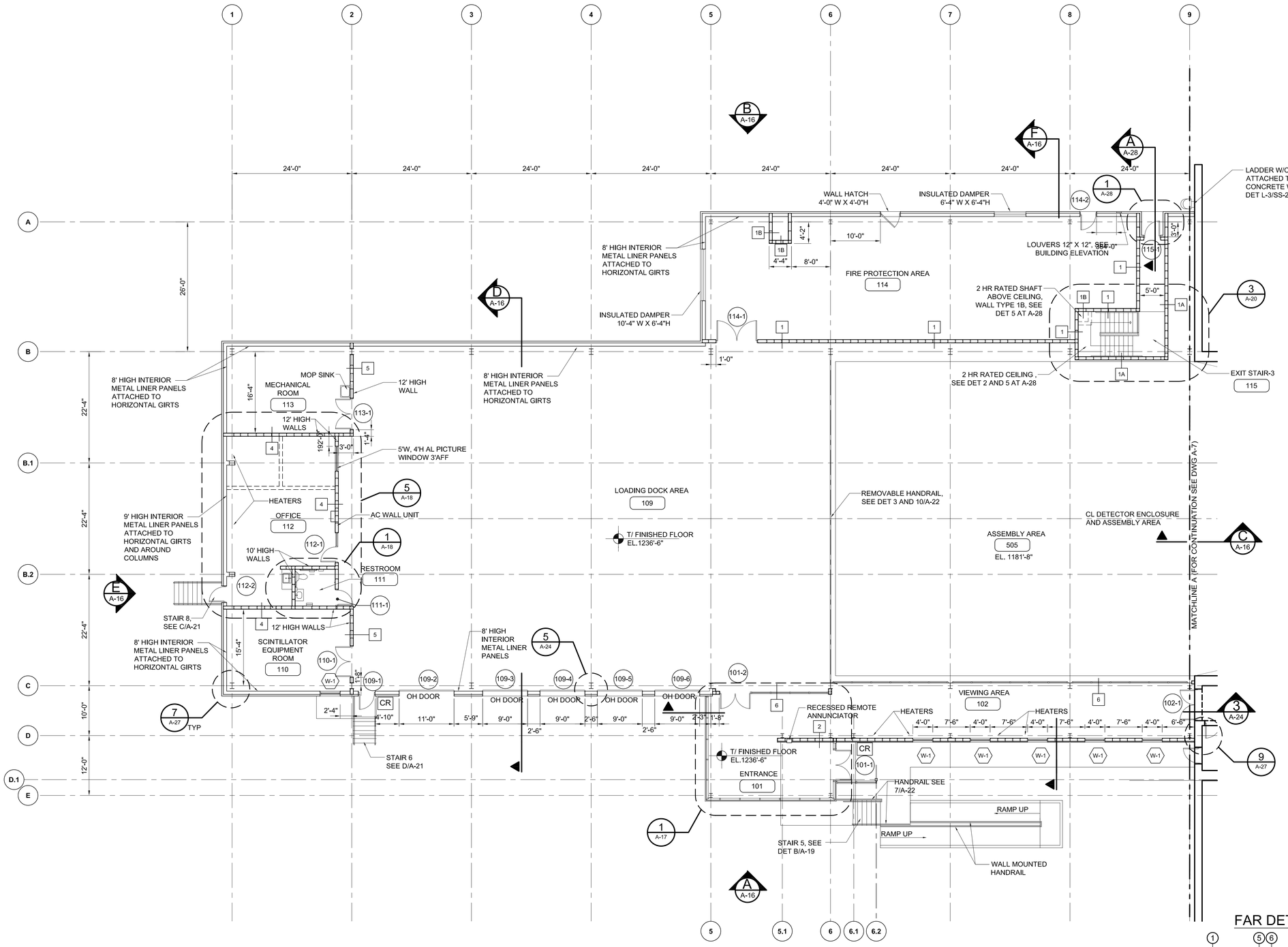
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ROOF PLAN 2 OF 2

DRAWING NO. 15-1-3B A-5 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1236'-6"

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

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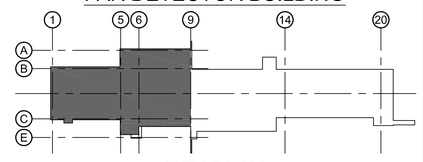

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

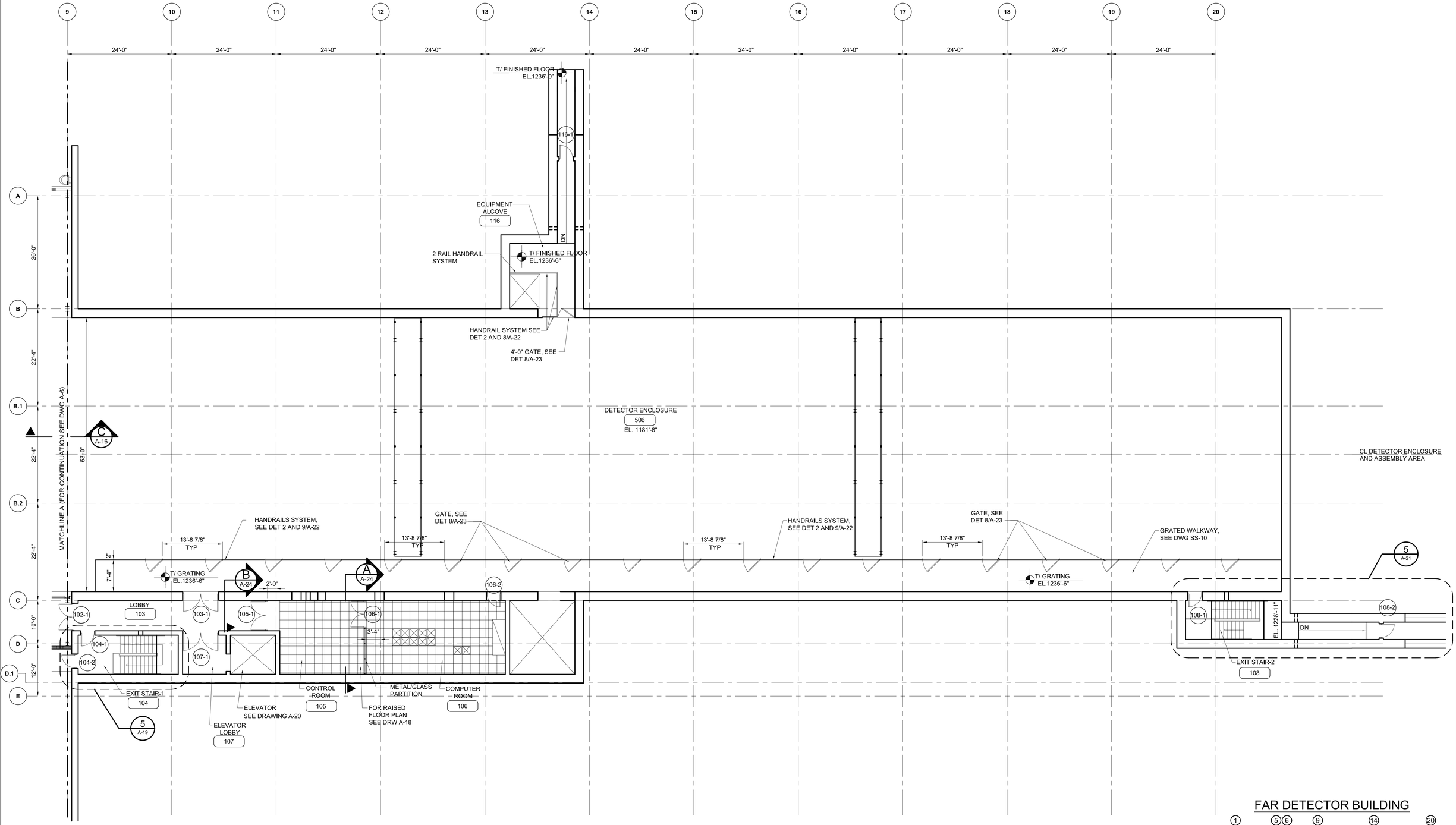
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

FLOOR PLAN EL 1236'-6" 1 OF 2

DRAWING NO. 15-1-3B A-6 REV. 0

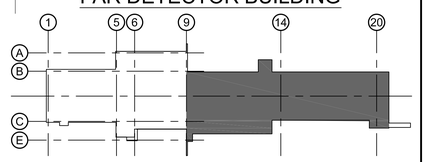
11 MAR, 2009



FLOOR PLAN EL 1236'-6"

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

FAR DETECTOR BUILDING



KEY PLAN

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE: Dubravka Sretenovic

DATE: 03/11/2009 LICENSE #46160

UNIVERSITY OF MINNESOTA | Hines

PROJECT NUMBER 896-06-1711

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	D. SRETENOVIC	03-11-09
DRAWN	D. SRETENOVIC	03-11-09
CHECKED	M. HANSON	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

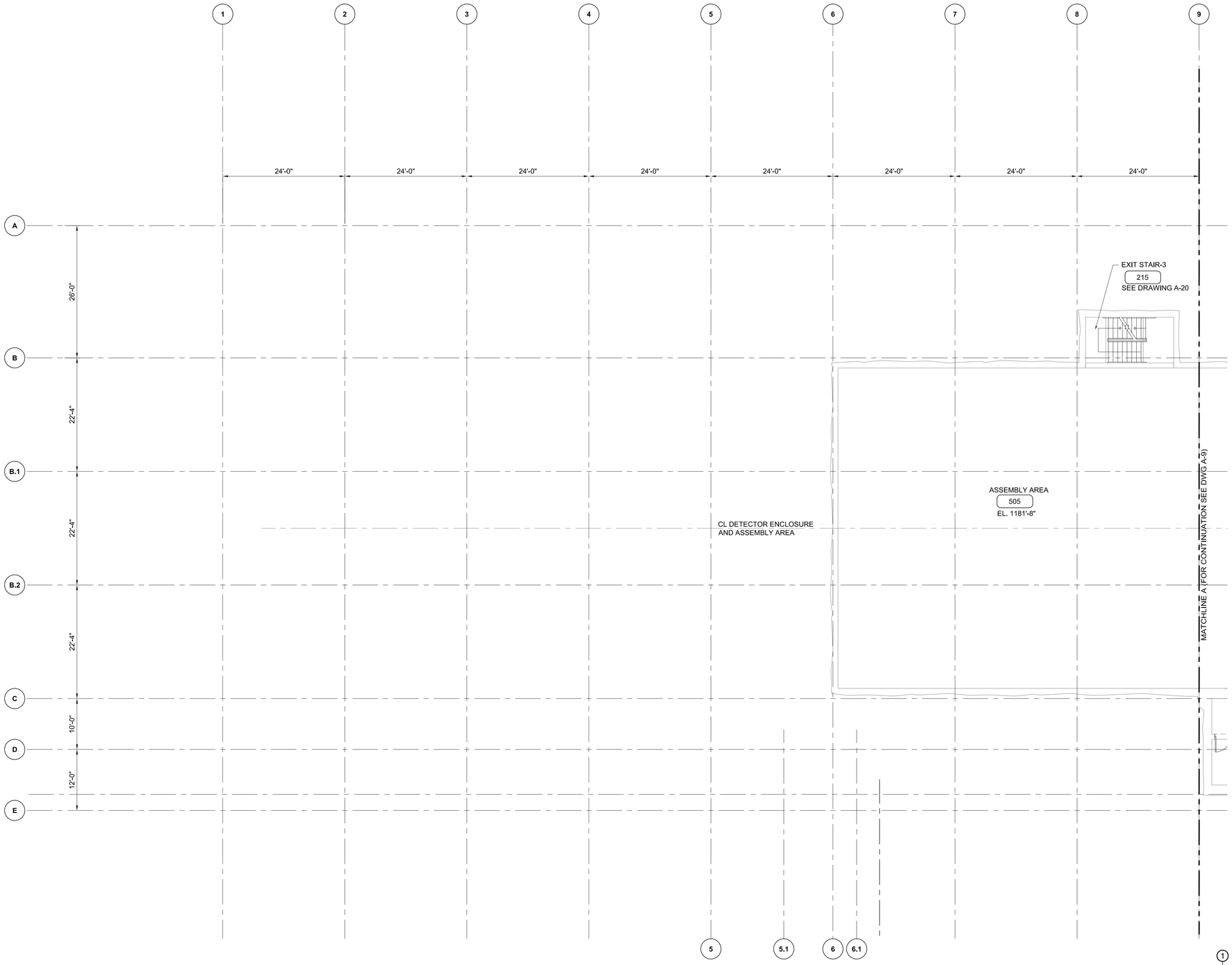
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

FLOOR PLAN EL 1236'-6" 2 OF 2

DRAWING NO. 15-1-3B A-7 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1224'-10"

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

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SIGNATURE:

DATE: 03/11/2009 LICENSE #46160

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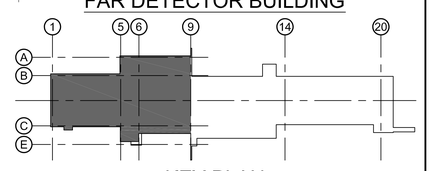

KEY PLAN

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

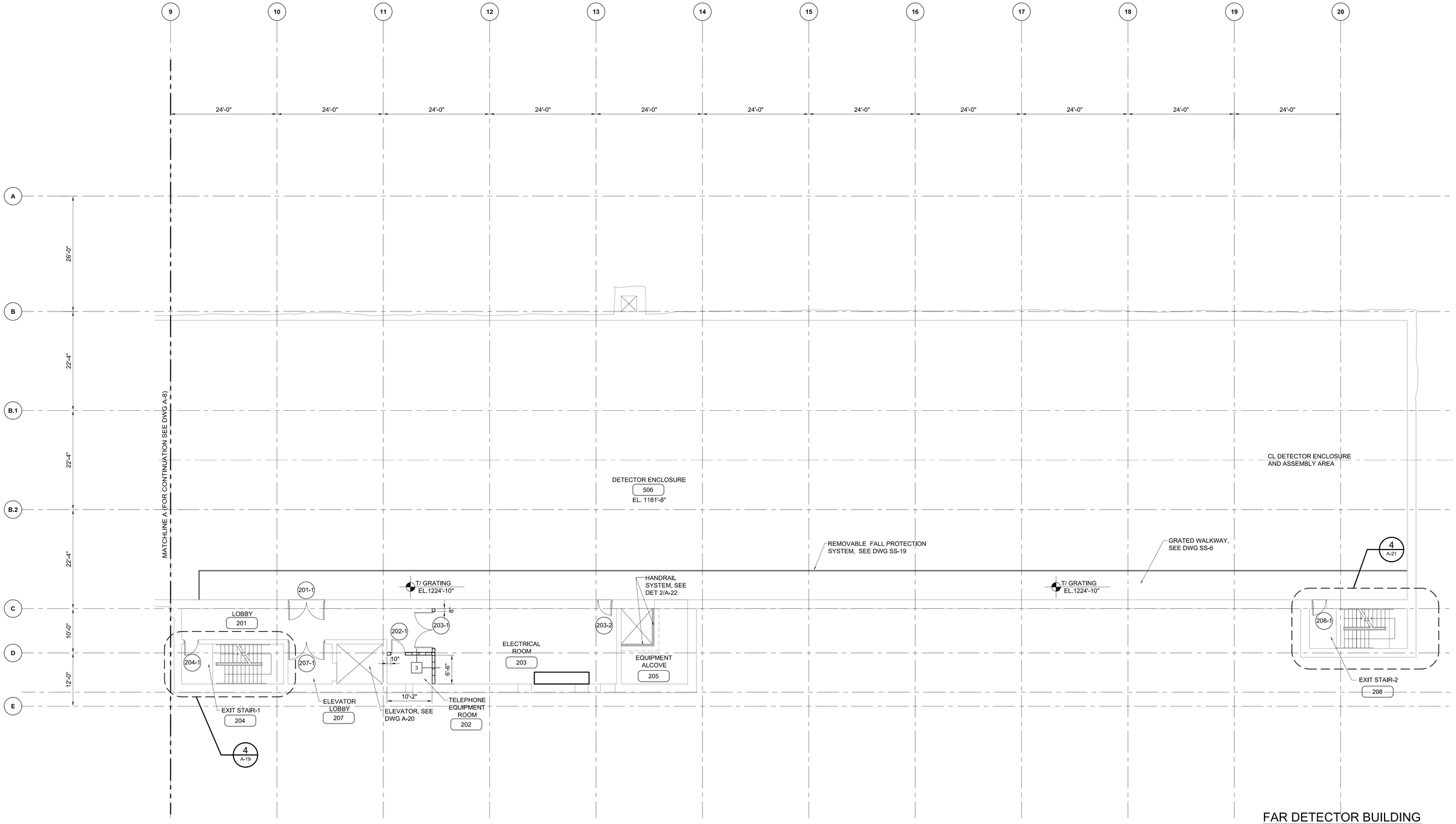
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

FLOOR PLAN EL 1224'-10" 1 OF 2

DRAWING NO. 15-1-3B A-8 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1224'-10"

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

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SIGNATURE: Dubravka Sretenovic

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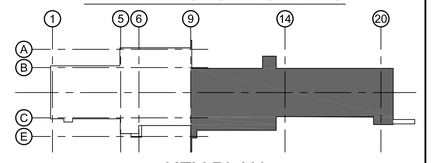

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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

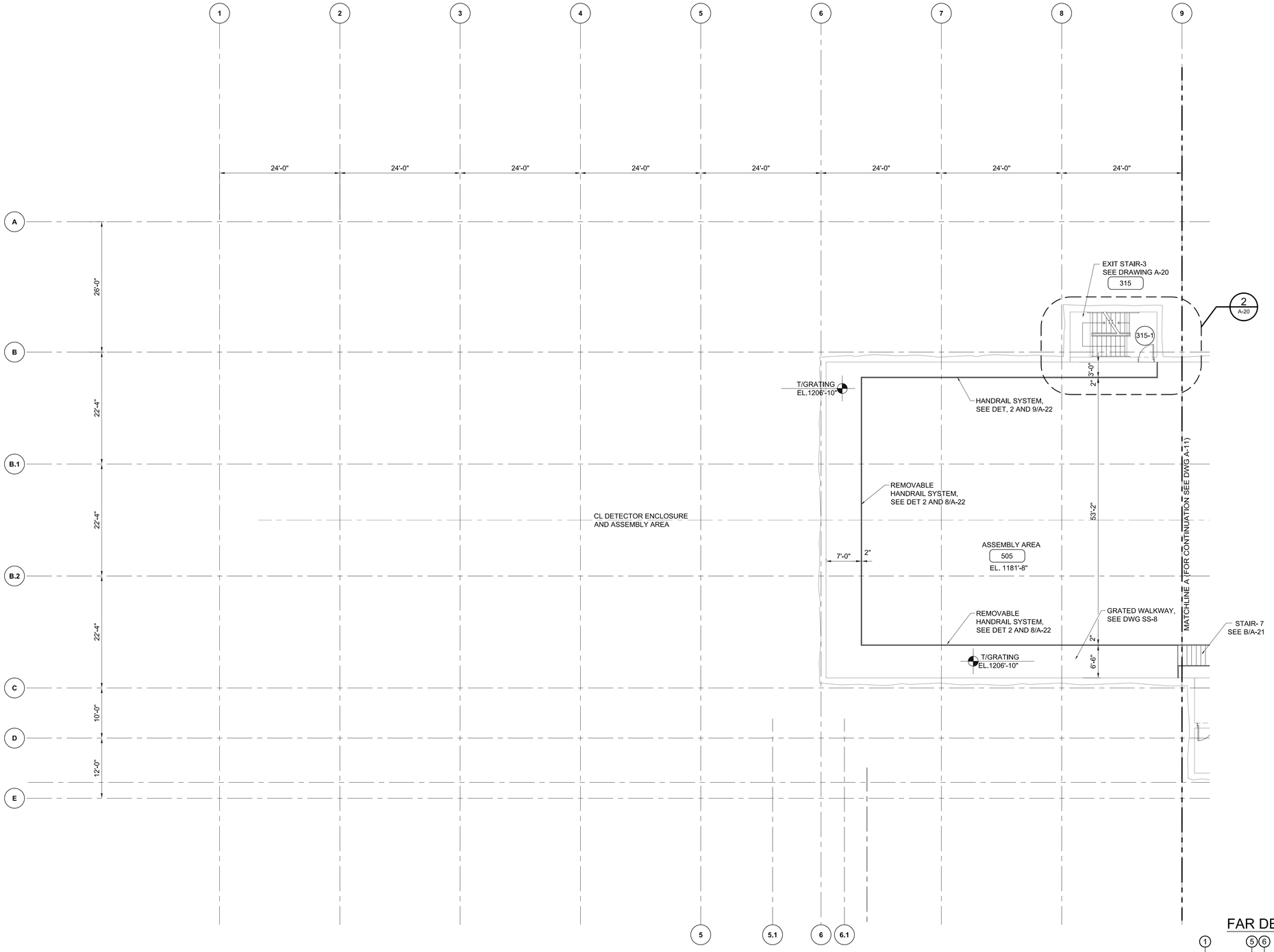
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

FLOOR PLAN EL 1224'-10 2 OF 2

DRAWING NO. 15-1-3B A-9 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1206'-10"

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

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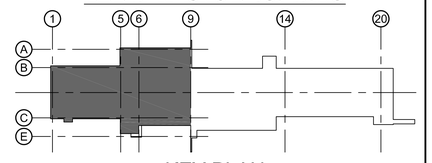
PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE: [signature]

DATE: 03/11/2009 LICENSE #46160

FAR DETECTOR BUILDING



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PROJECT NUMBER 896-06-1711

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PROJECT NORTH

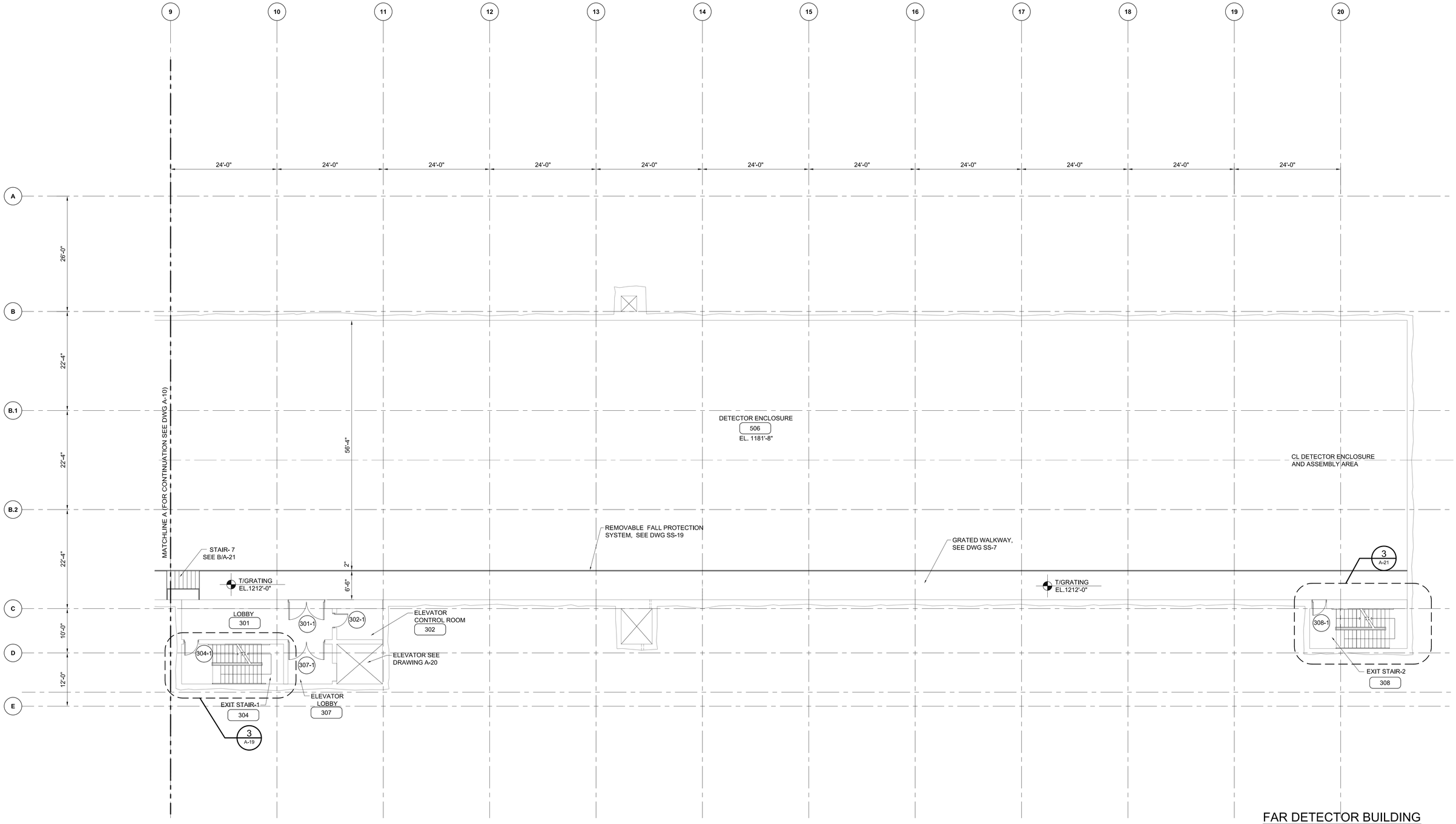
SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
FLOOR PLAN EL 1206'-10"

DRAWING NO. 15-1-3B A-10 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1212'-0"

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

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE

DATE: 03/11/2009 LICENSE #46160

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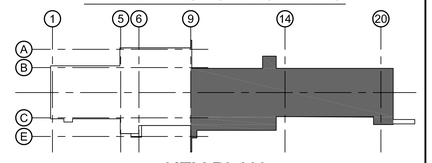

KEY PLAN

UNIVERSITY OF MINNESOTA
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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

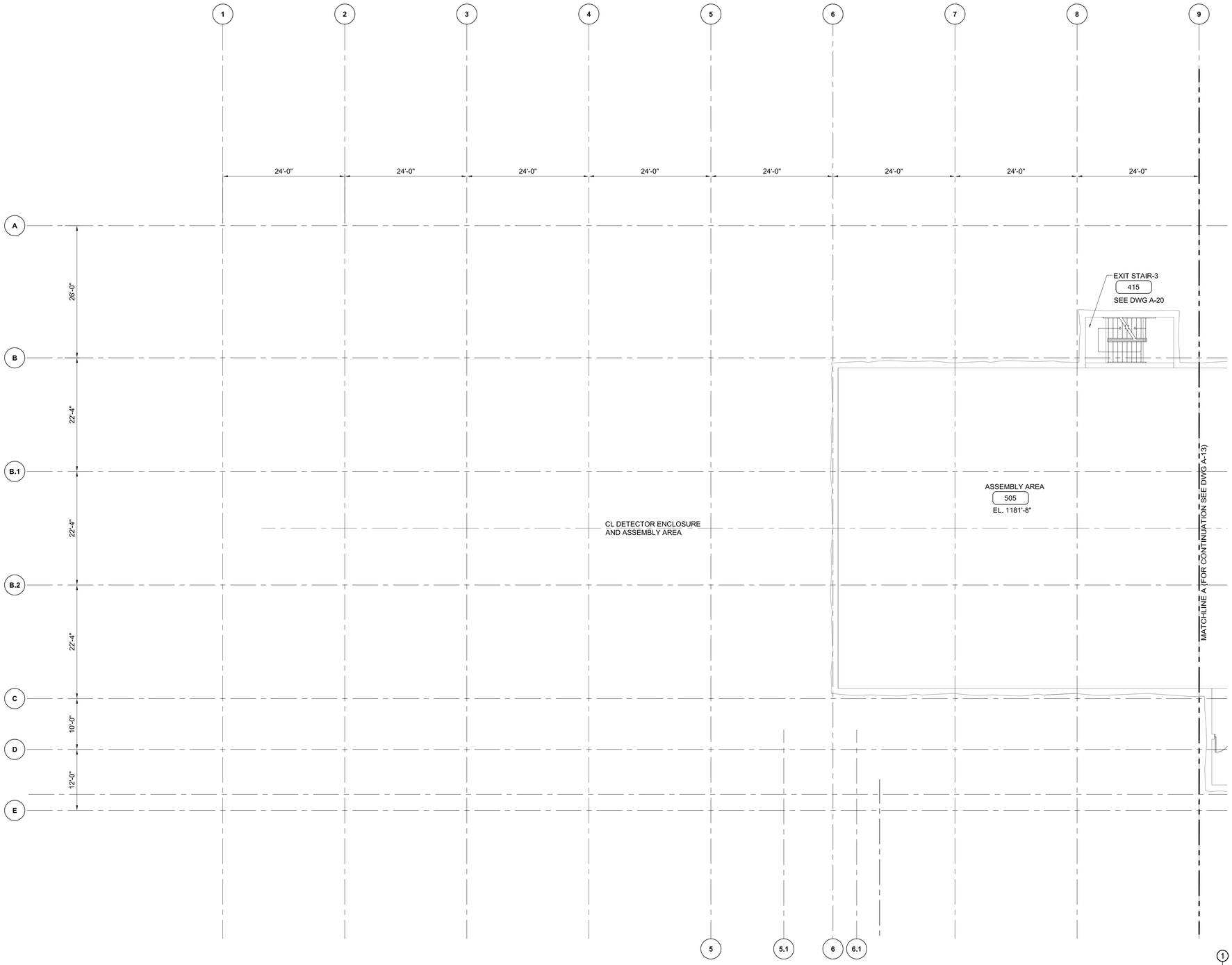
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

FLOOR PLAN EL 1212'-0"

DRAWING NO. 15-1-3B A-11 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1196'-10"

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

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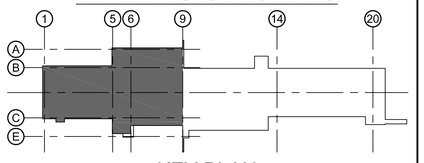
PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE:

DATE: 03/11/2009 LICENSE #46160

FAR DETECTOR BUILDING



KEY PLAN

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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

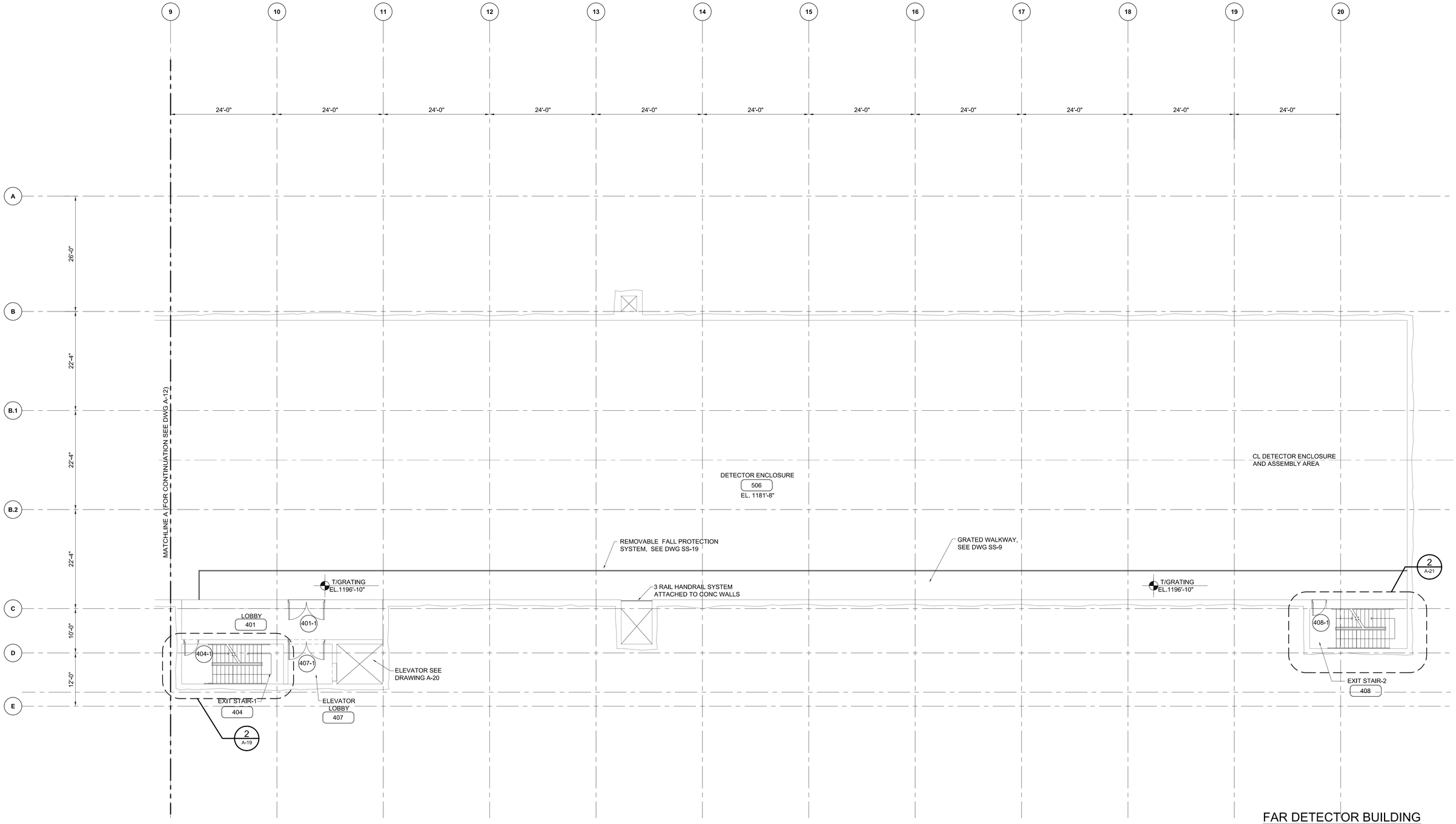
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

FLOOR PLAN EL 1196'-10" 1 OF 2

DRAWING NO. 15-1-3B A-12 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1196'-10"

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

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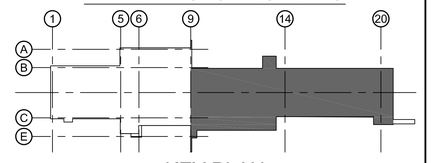
PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE:

DATE: 03/11/2009 LICENSE #46160

FAR DETECTOR BUILDING



KEY PLAN

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Burns & McDonnell SINCE 1898

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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

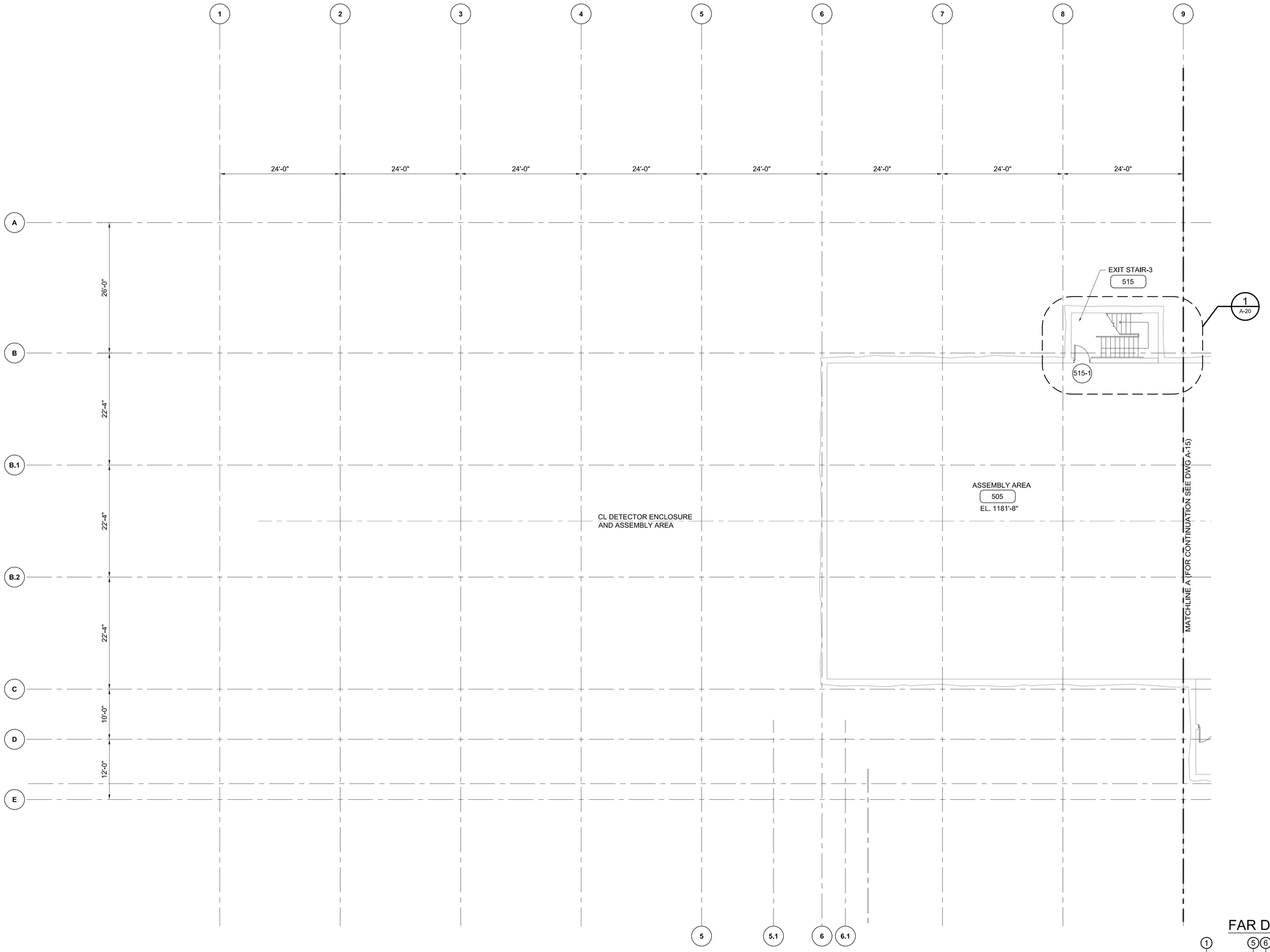
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

FLOOR PLAN EL 1196'-10" 2 OF 2

DRAWING NO. 15-1-3B A-13 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1181'-8"

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

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SIGNATURE: [signature]

DATE: 03/11/2009 LICENSE #46160

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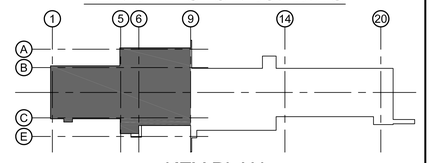

KEY PLAN

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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

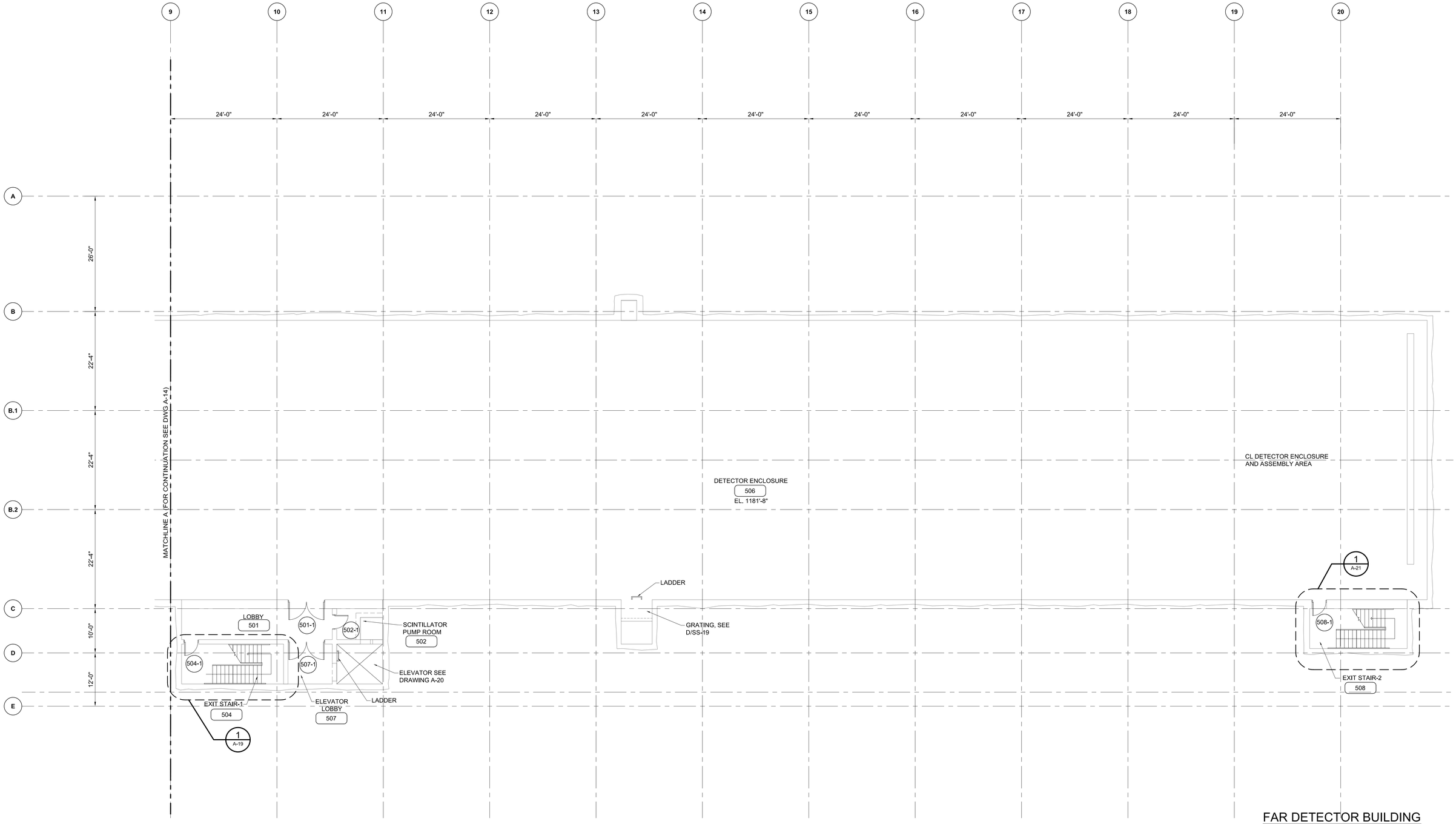
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

FLOOR PLAN EL 1181'-8" 1 OF 2

DRAWING NO. 15-1-3B A-14 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1181'-8"

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

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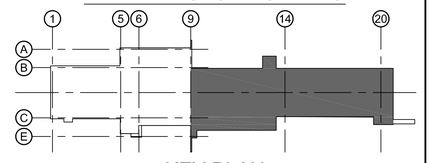
PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE

DATE: 03/11/2009 LICENSE #46150

FAR DETECTOR BUILDING



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PROJECT NORTH

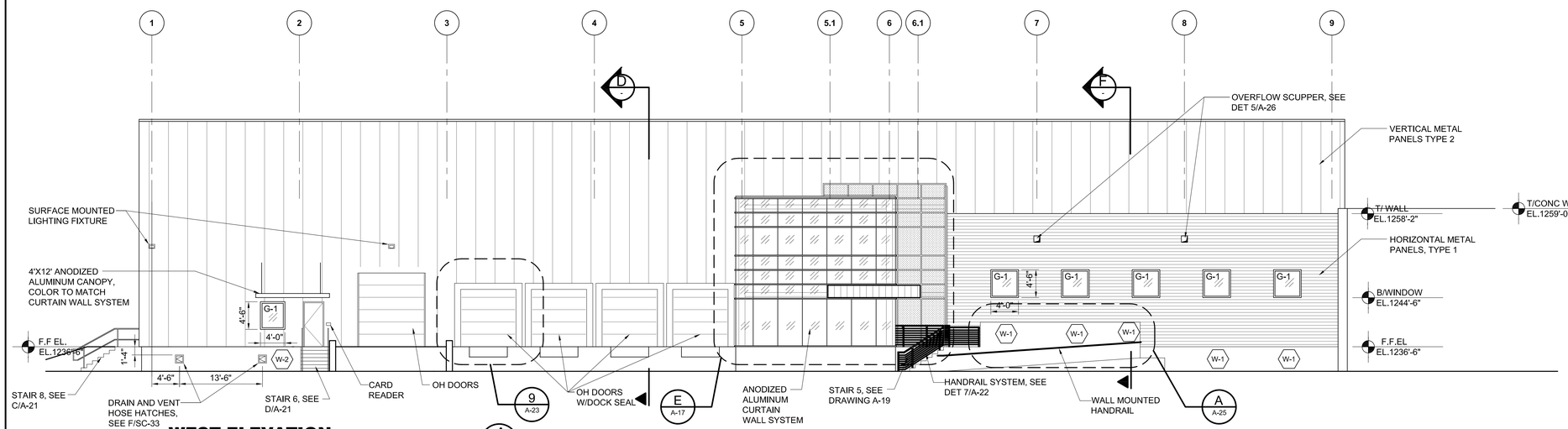
SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
FLOOR PLAN EL 1181'-8" 2 OF 2

DRAWING NO. 15-1-3B A-15 REV. 0

11 MAR, 2009

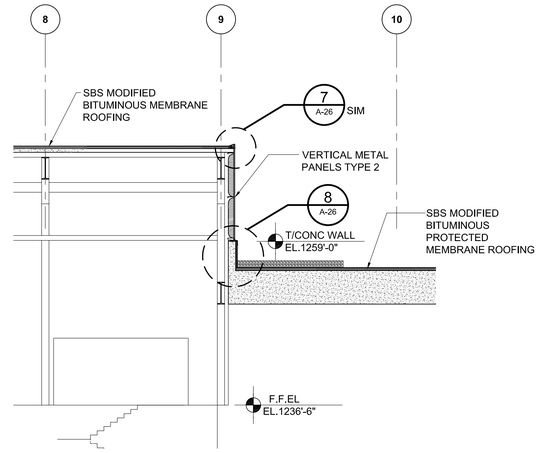


WEST ELEVATION

SCALE: 1/8"=1'0"

A A-6

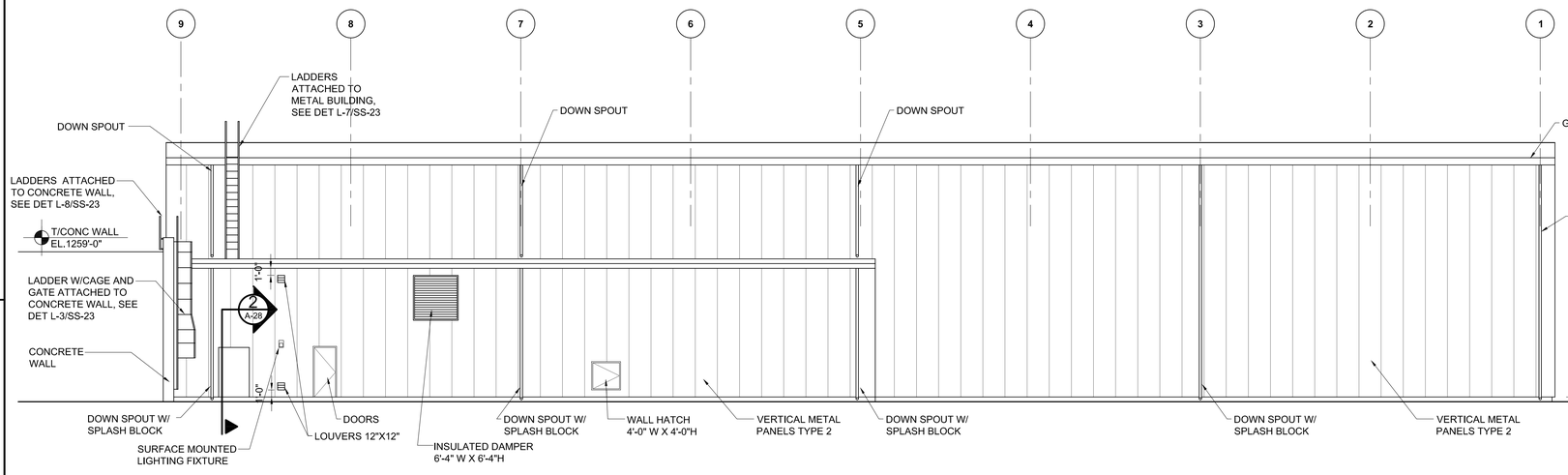
NOTE:-VERTICAL WALL PANELS TYPE 2 EQUIVALENT TO CENTRIA IW-10A
-HORIZONTAL WALL PANELS TYPE 1 EQUIVALENT TO CENTRIA CS-660
-GUTTERS AND DOWNSPOUTS COLOR TO MATCH METAL WALL COLOR
-FASCIA AND SOFFIT EQUIVALENT TO CENTRIA IW-10A



SECTION

SCALE: 1/8"=1'0"

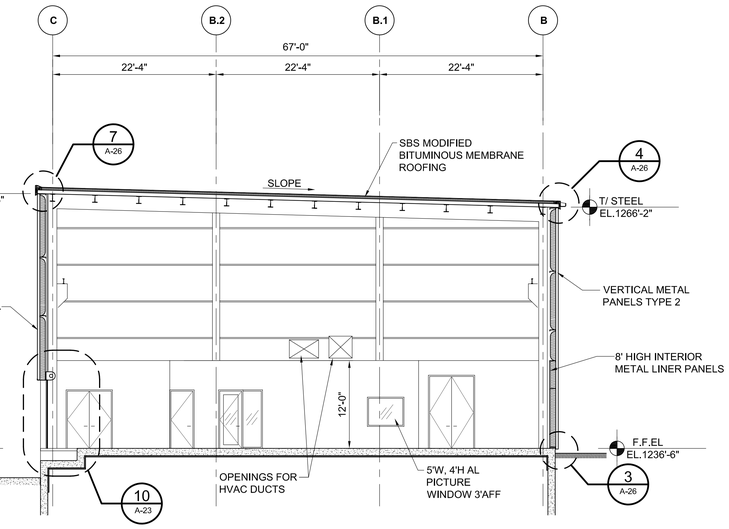
C A-4 A-6



EAST ELEVATION

SCALE: 1/8"=1'0"

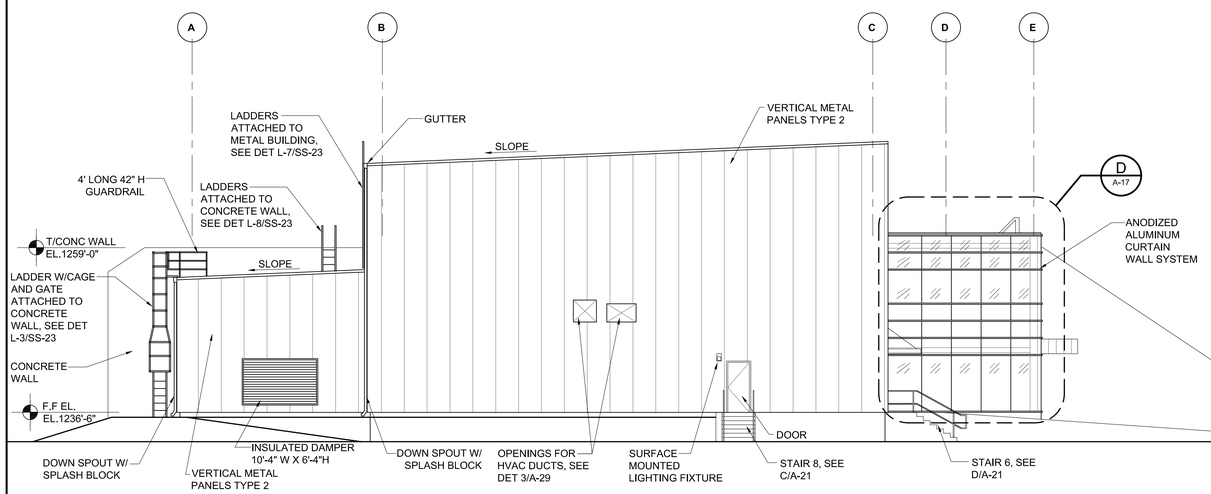
B A-6



BUILDING SECTION

SCALE: 1/8"=1'0"

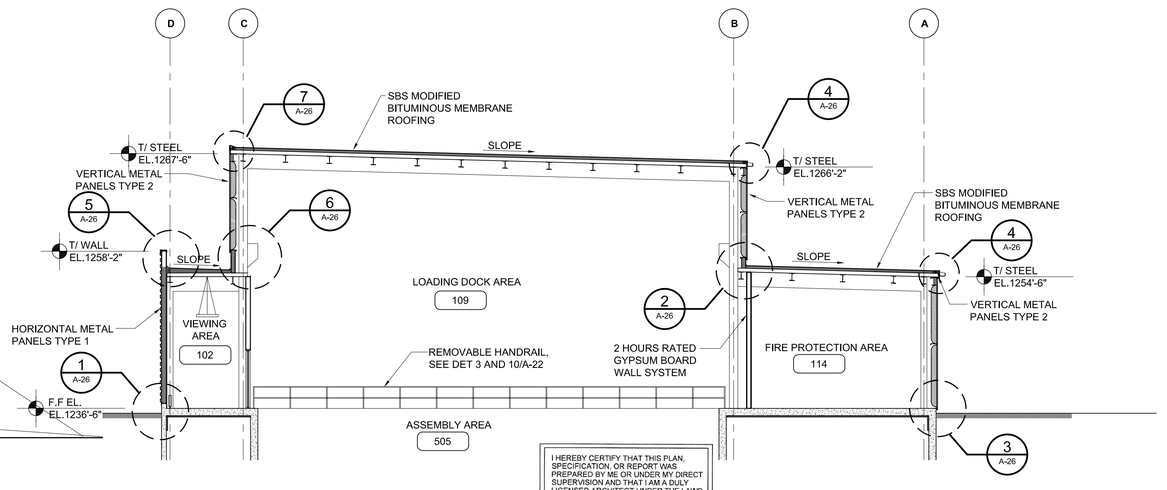
D A-4 A-6



NORTH ELEVATION

SCALE: 1/8"=1'0"

E A-6



BUILDING SECTION

SCALE: 1/8"=1'0"

F A-4 A-6

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE:

DATE: 03/11/2009 LICENSE #46160

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE
DESIGNED	D. SRETENOVIC	03-11-09
DRAWN	D. SRETENOVIC	03-11-09
CHECKED	M. HANSON	03-11-09
APPROVED	J. STEENKEN	03-11-09

	OWNER / REPRESENTATIVE	DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

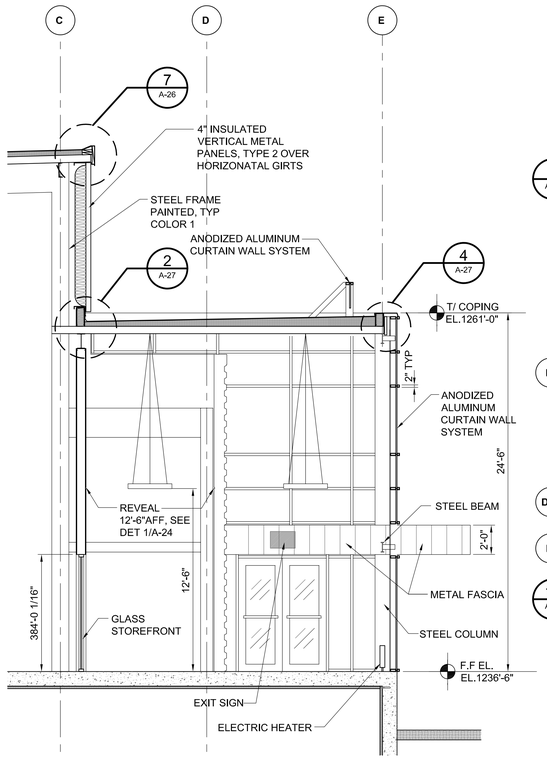
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

BUILDING ELEVATIONS AND SECTIONS

DRAWING NO. 15-1-3B A-16 REV. 0

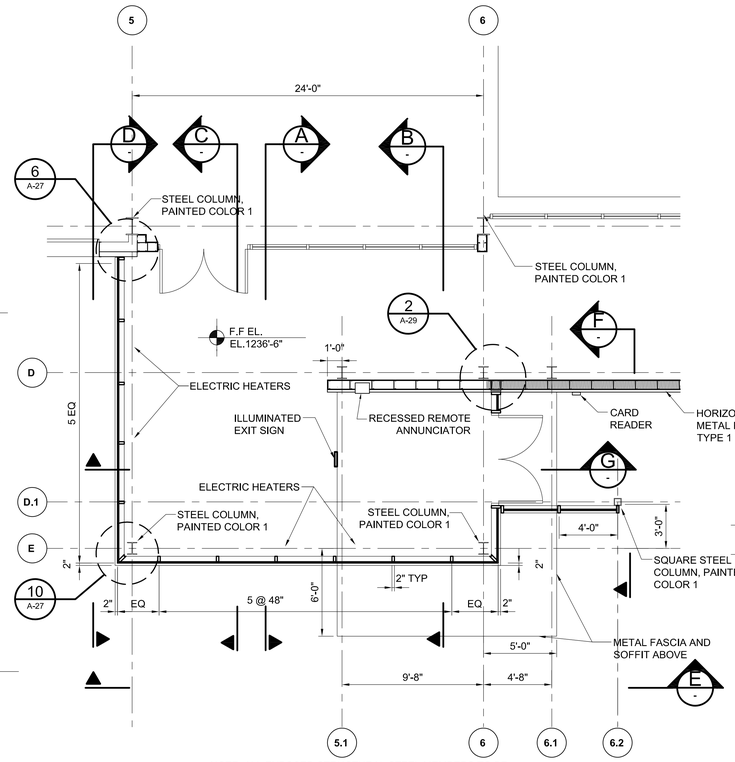
11 MAR, 2009



WALL SECTION

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

A / -

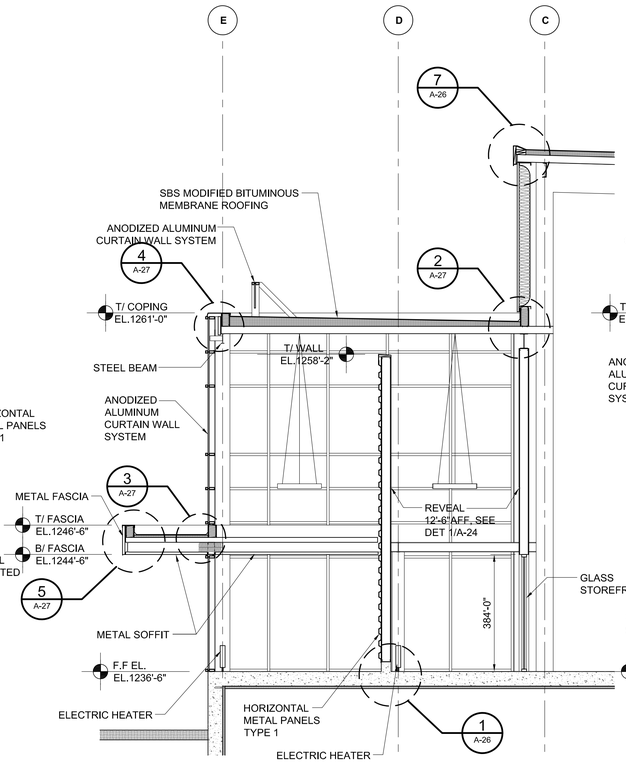


NOTE: ALL EXPOSED STRUCTURAL STEEL MEMBERS TO BE PAINTED COLOR 1

MAIN ENTRANCE PLAN

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

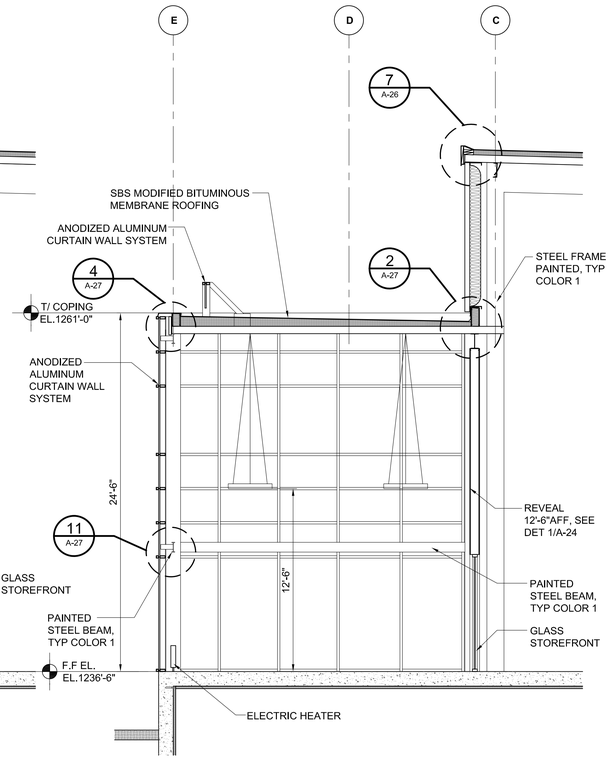
1 / A-6



WALL SECTION

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

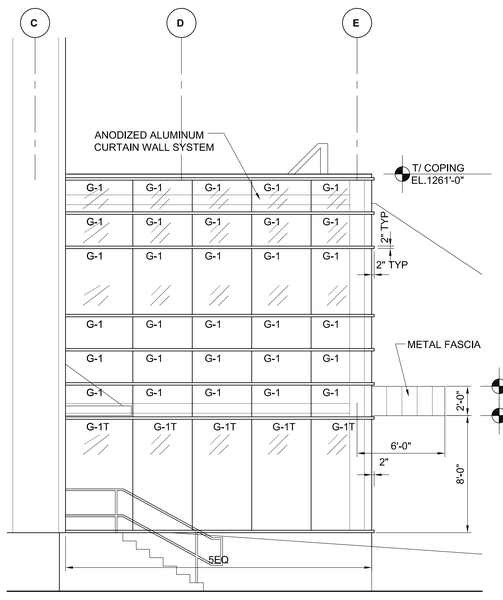
B / -



WALL SECTION

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

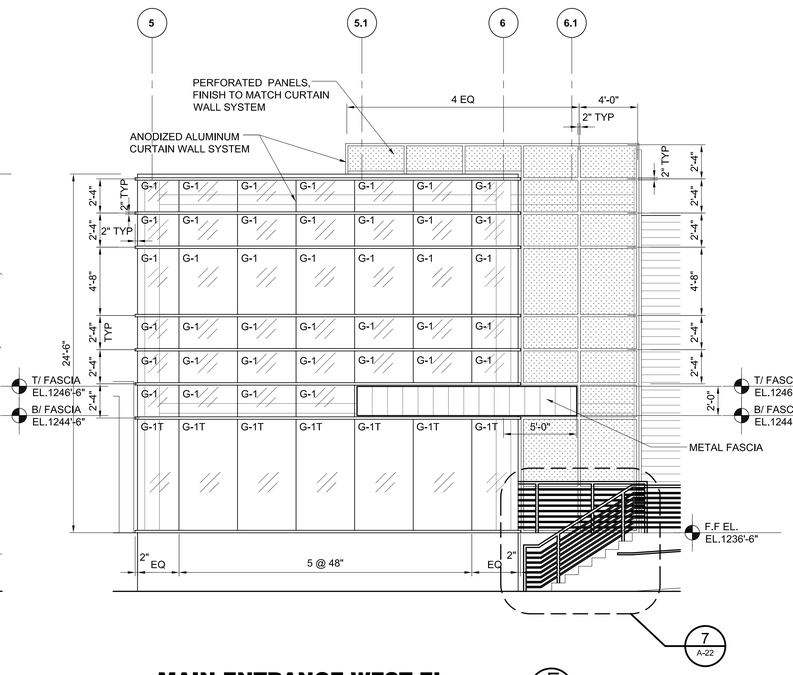
C / -



MAIN ENTRANCE NORTH EL.

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

D / - / A-16

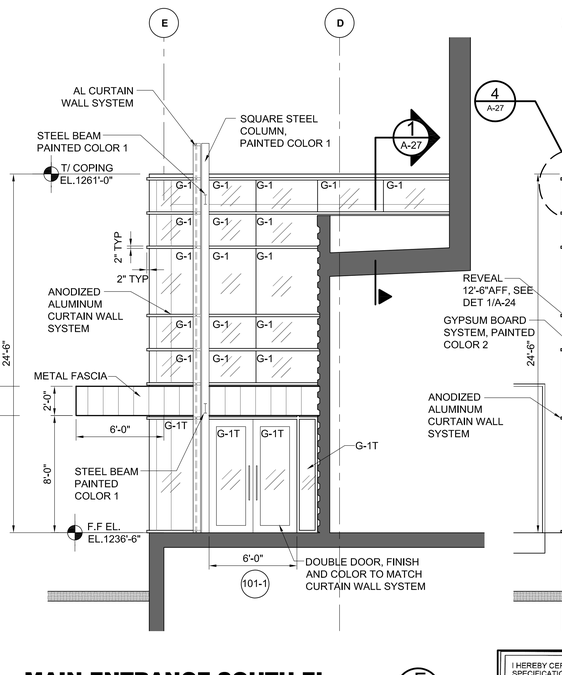


MAIN ENTRANCE WEST EL.

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

E / - / A-16

NOTE:-VERTICAL WALL PANELS TYPE 2 EQUIVALENT TO CENTRIA IW-10A
-HORIZONTAL WALL PANELS TYPE 1 EQUIVALENT TO CENTRIA CS-660
-GUTTERS AND DOWNSPOUTS COLOR TO MATCH METAL WALL COLOR
-FASCIA AND SOFFIT EQUIVALENT TO CENTRIA IW-10A

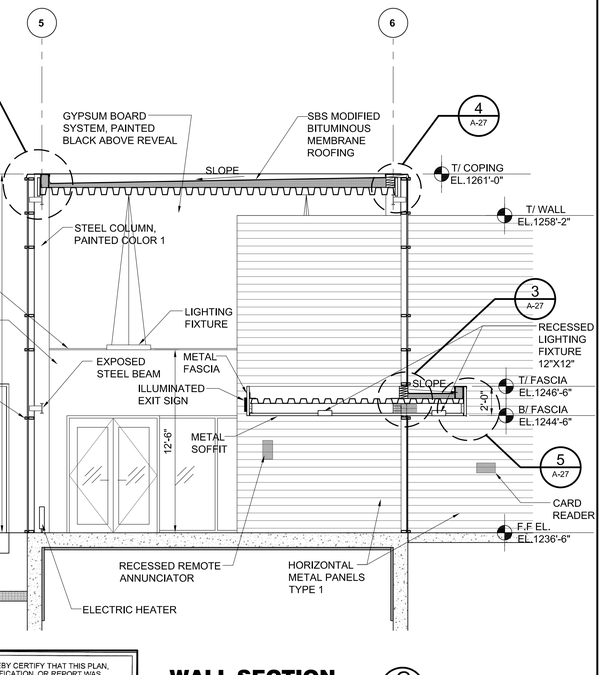


MAIN ENTRANCE SOUTH EL.

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

F / -

GLASS TYPES: G1 - CLEAR INSULATED
G1T - TEMPERED CLEAR INSULATED
G2 - CLEAR
G2T - TEMPERED CLEAR
G3 - WIREGLASS



WALL SECTION

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

G / -

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PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE: Dubravka Sretenovic

DATE: 03/11/2009 LICENSE #46160

UNIVERSITY OF MINNESOTA | Hines

PROJECT NUMBER 896-06-1711

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PROJECT NORTH

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

3/8"=1'-0" 1 0 1 2 3 4 5 6 7 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

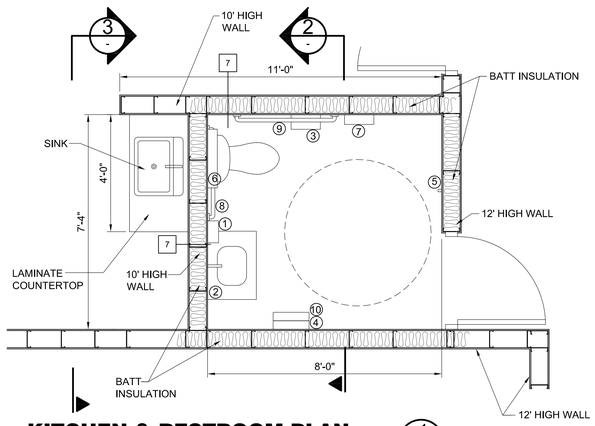
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

MAIN ENTRANCE PLAN & SECTIONS

DRAWING NO. 15-1-3B | A-17 | REV. 0

11 MAR, 2009



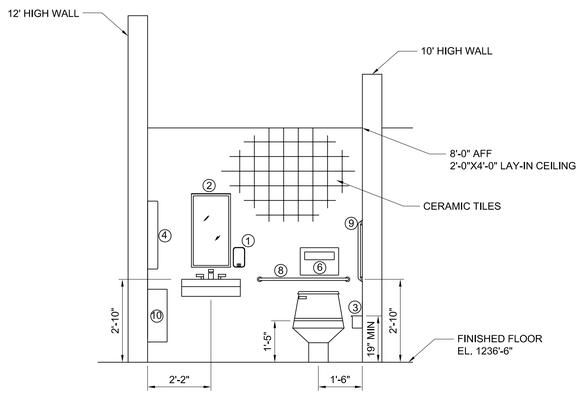
KITCHEN & RESTROOM PLAN

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

1 / A-6

EQUIP. NUMBER	DESCRIPTION	NOTES
①	SOAP DISPENSER	PUSH BUTTON TO BE 44" MAX ABOVE FINISHED FLOOR
②	TILTED MIRROR 30"X16"	TOP OF MIRROR TO BE MOUNTED 69-1/2" ABOVE FINISHED FLOOR.
③	TOILET TISSUE DISPENSER	TOP OF DISPENSER TO BE MOUNTED 28" TO 36" ABOVE FINISHED FLOOR.
④	PAPER TOWEL DISPENSER, SURFACE MOUNTED	
⑤	CLOTHES HOOK	
⑥	SEAT COVER DISPENSER	TOP TO BE MOUNTED 45" TO 59" ABOVE FINISHED FLOOR
⑦	WASTE RECEPTACLE, SURFACE MOUNTED	TOP TO BE MOUNTED 25" TO 30" ABOVE FINISHED FLOOR
⑧	GRAB BAR 24"	
⑨	L-SHAPE GRAB BAR 32"X16"	
⑩	WASTE RECEPTACLE, SURFACE MOUNTED	

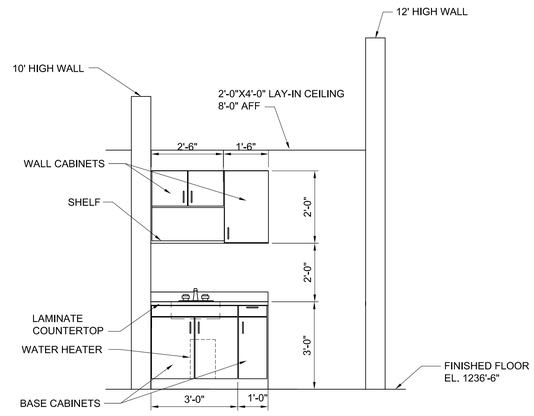
NOTE:
PROVIDE PLYWOOD BACKING BEHIND GYPSUM BOARD FOR MOUNTING OF TOILET FIXTURES AND ACCESSORIES



RESTROOM ELEVATION

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

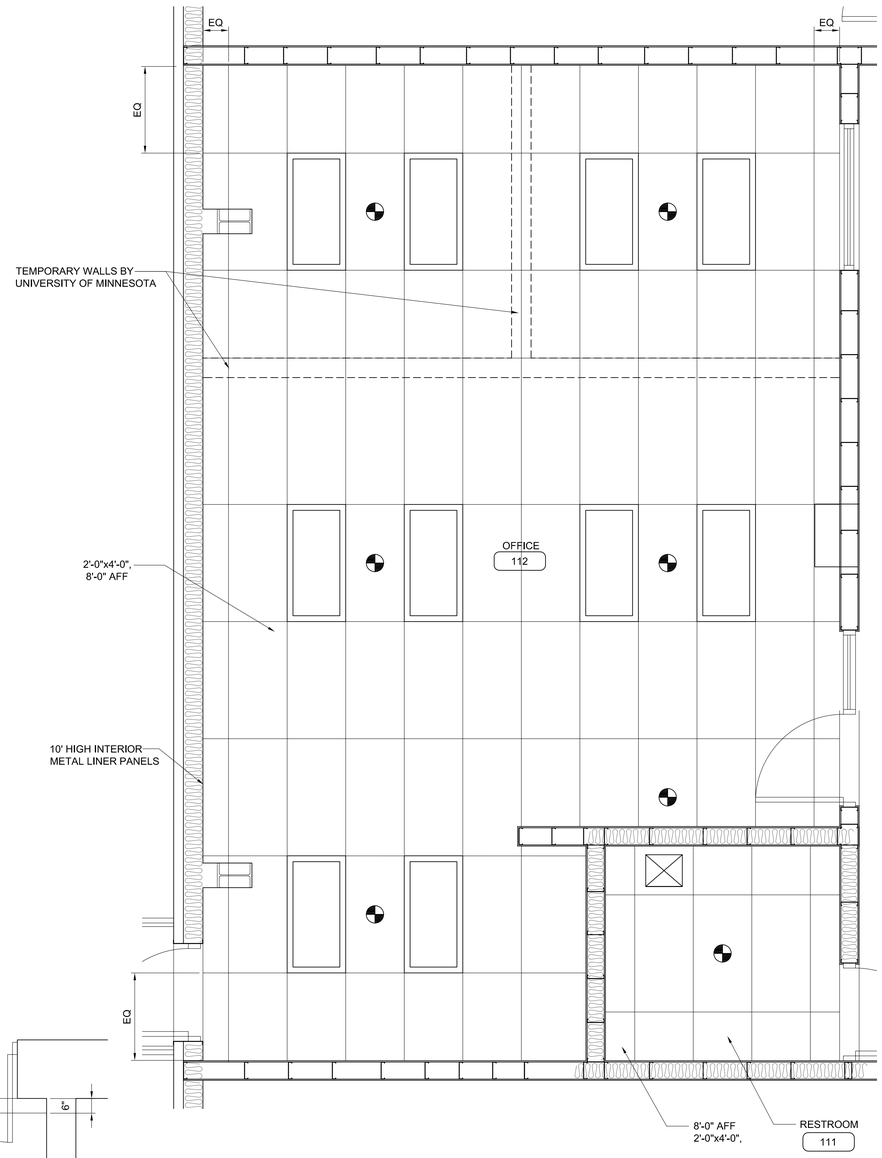
2 / -



KITCHEN ELEVATION

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

3 / -



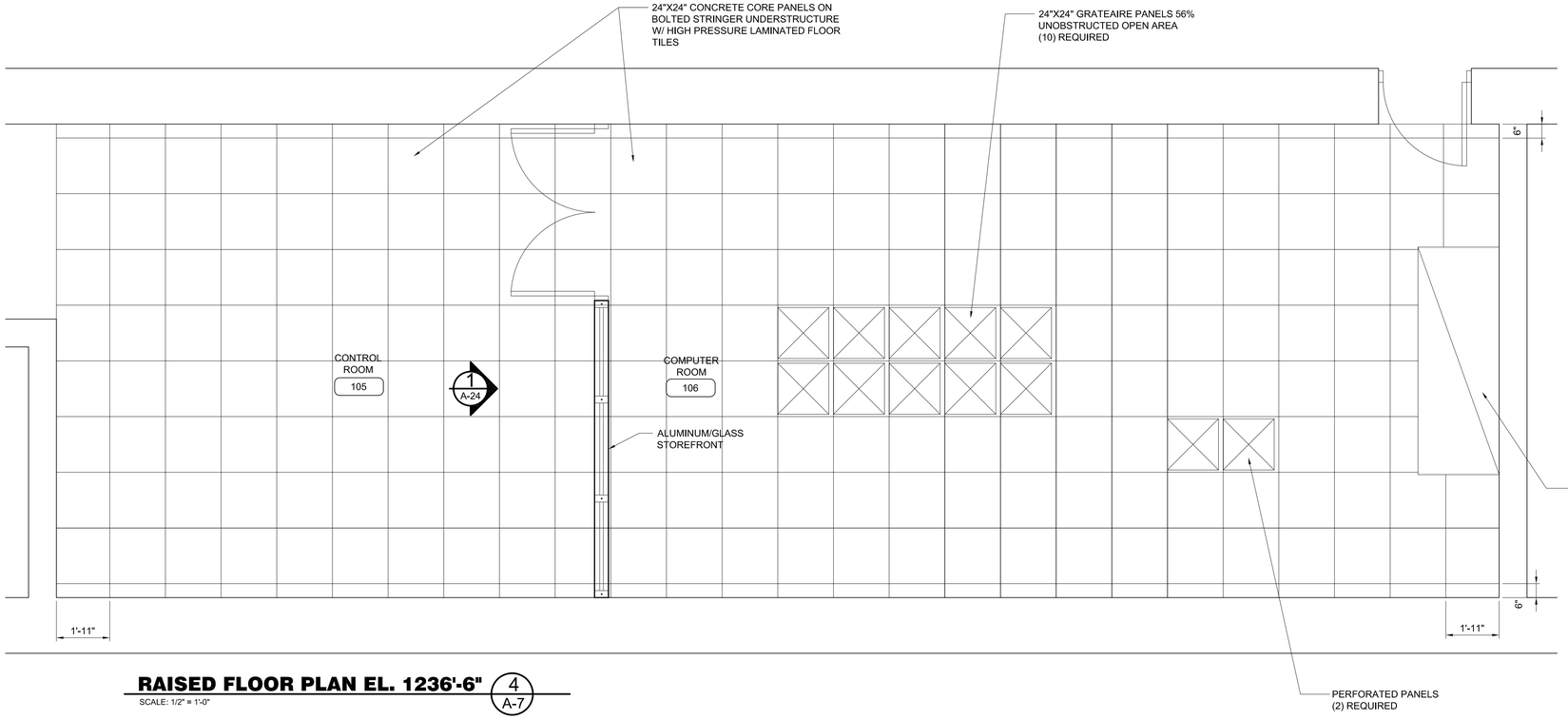
CEILING PLAN EL. 1236'-6"

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

5 / A-6

LEGEND

- SPRINKLER HEAD
- LIGHTING FIXTURE
- CEILING FAN AND GRILLE



RAISED FLOOR PLAN EL. 1236'-6"

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

4 / A-7

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SIGNATURE:

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH — E, S, W

SCALE:

1/2"=1'-0" 1 0 1 2 3 4 5 SCALE FEET

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

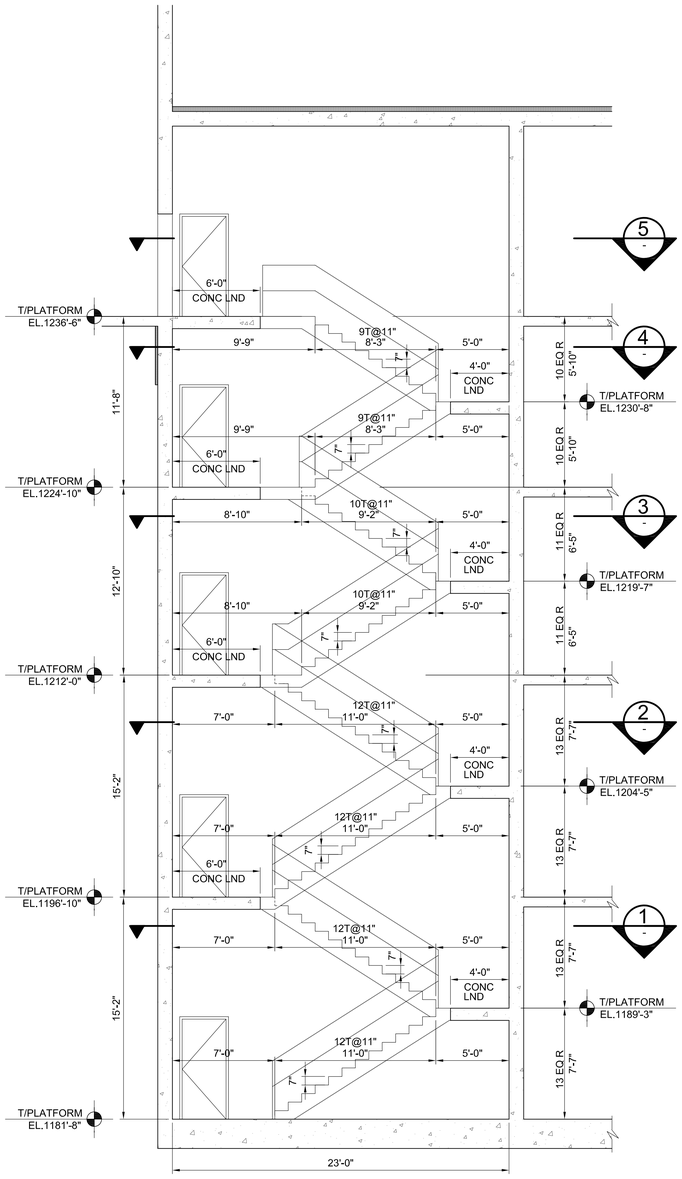
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

CEILING PLAN, TOILET & KITCHEN DETAILS

DRAWING NO. 15-1-3B A-18 REV. 0

11 MAR, 2009

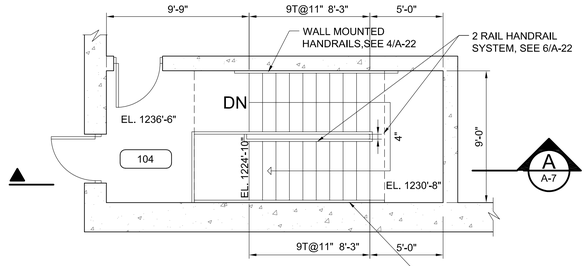


EXIT STAIR 1 SECTION

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

A
-

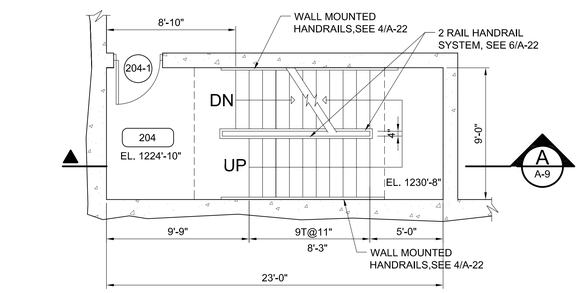
NOTES:
1. FOR STAIR-1 SEE STAIR DETAILS 1,2 DRAWING A-23



STAIR 1 PLAN EL. 1236'-6"

SCALE 1/4"=1'-0"

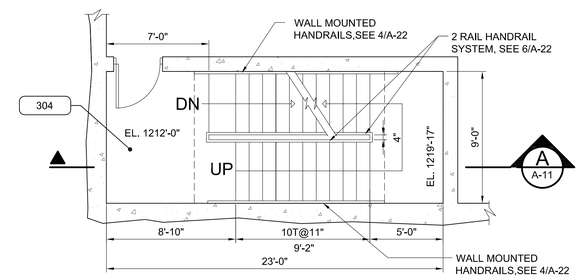
5
A-7



STAIR 1 PLAN 1224'-10"

SCALE 1/4"=1'-0"

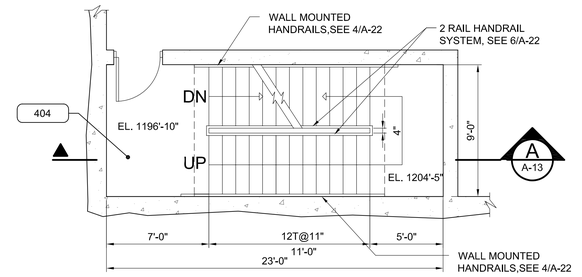
4
A-9



STAIR 1 PLAN EL. 1212'-0"

SCALE 1/4"=1'-0"

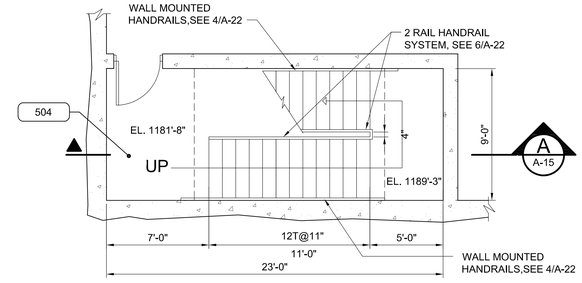
3
A-11



STAIR 1 PLAN EL 1196'-10"

SCALE 1/4"=1'-0"

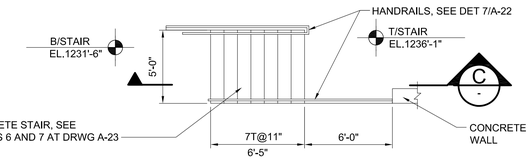
2
A-13



STAIR 1 PLAN EL. 1181'-8"

SCALE 1/4"=1'-0"

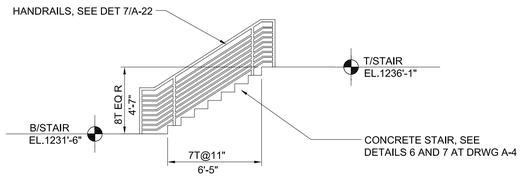
1
A-15



STAIR 5 PLAN

SCALE 1/4"=1'-0"

B
A-6



STAIR 5 SECTION

SCALE 1/4"=1'-0"

C
-

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PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE: Dubravka Sretenovic

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PROJECT NORTH

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

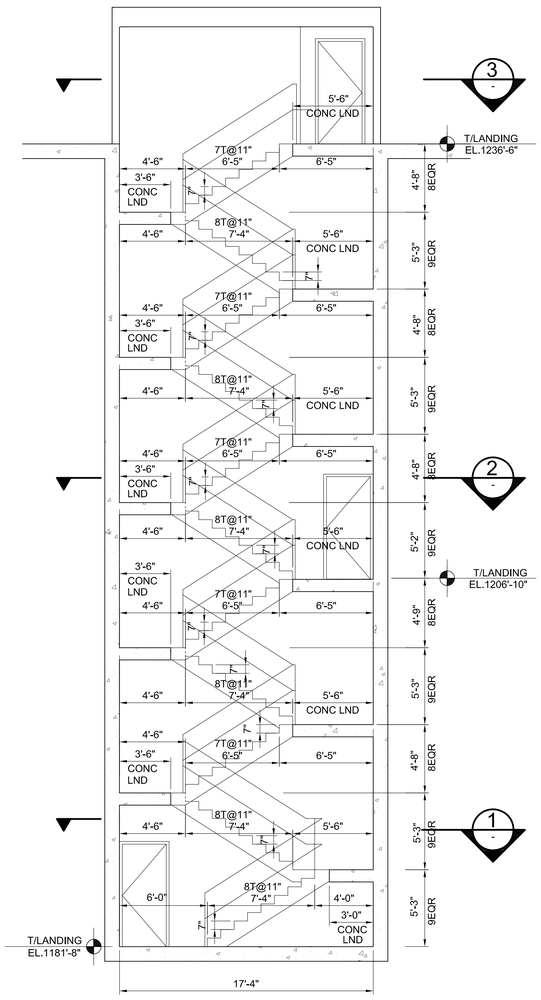
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

EXIT STAIRS 1 & 5

DRAWING NO. 15-1-3B A-19 REV. 0

11 MAR, 2009

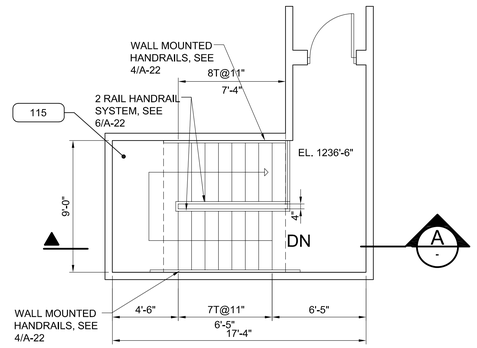


EXIT STAIR 3 SECTION

1/4"=1'-0"

A
-

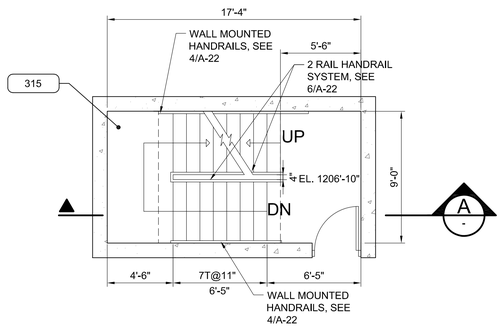
NOTES:
1. FOR STAIR-3 SEE STAIR DETAILS 1,2 DRAWING A-23



STAIR 3 PLAN EL. 1236'-6"

SCALE 1/4"=1'-0"

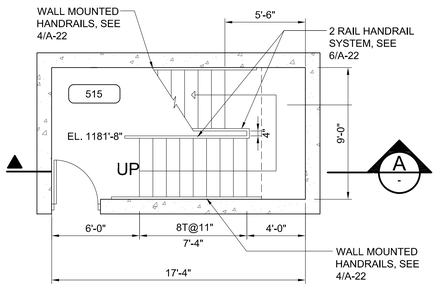
3
A-6



STAIR 3 PLAN EL. 1212'-0"

SCALE 1/4"=1'-0"

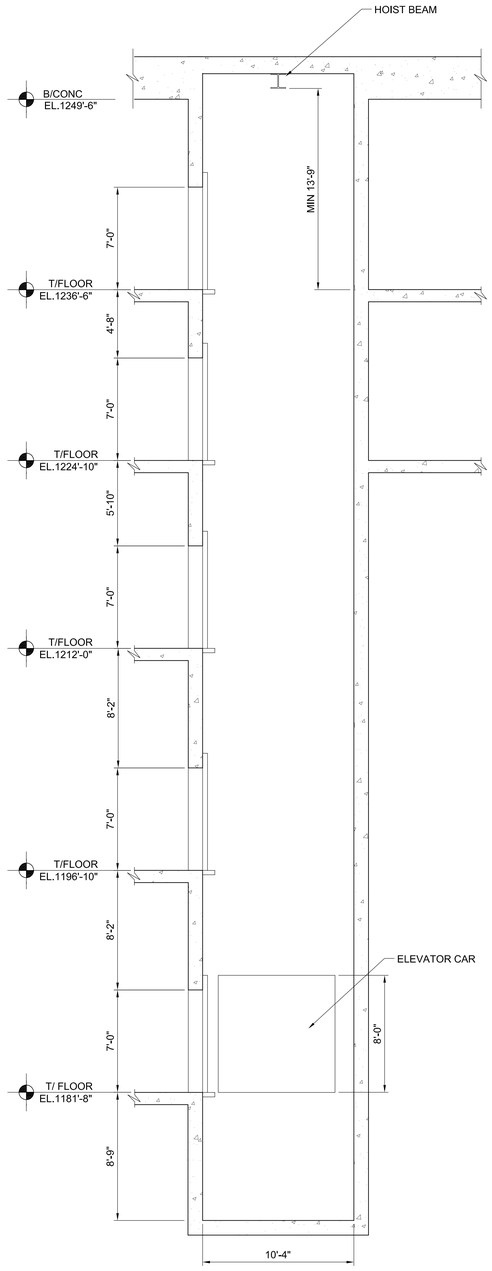
2
A-10



STAIR 3 PLAN EL. 1181'-8"

SCALE 1/4"=1'-0"

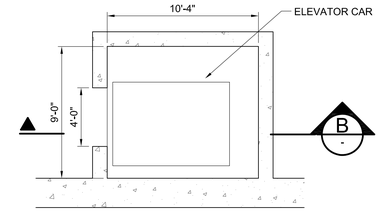
1
A-14



ELEVATOR SHAFT SECTION

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

B
-



ELEVATOR PLAN EL. 1236'-6"

1/4"=1'-0"

ELEVATOR PLAN EL. 1224'-10"

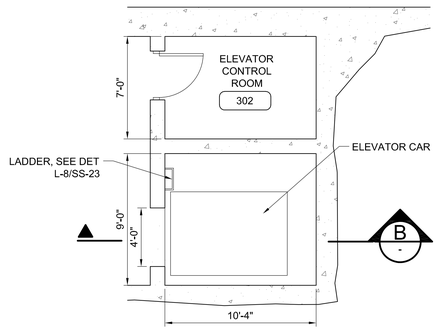
1/4"=1'-0"

ELEVATOR PLAN EL. 1196'-10"

1/4"=1'-0"

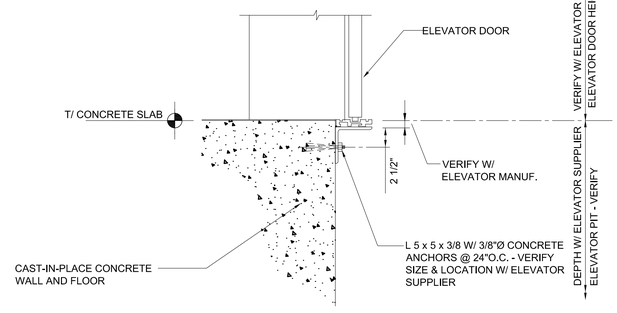
ELEVATOR PLAN EL. 1181'-8"

1/4"=1'-0"



ELEVATOR PLAN EL. 1212'-0"

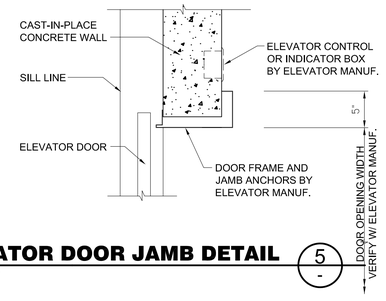
1/4"=1'-0"



ELEVATOR DOOR SILL DETAIL

NOT TO SCALE

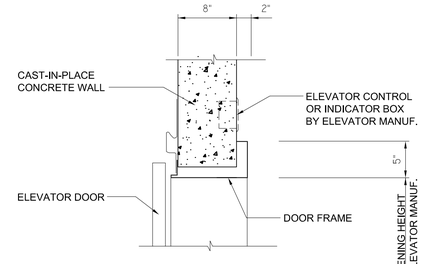
4
-



ELEVATOR DOOR JAMB DETAIL

NOT TO SCALE

5
-



ELEVATOR DOOR HEAD DETAIL

NOT TO SCALE

6
-

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PROJECT NORTH

SCALE:

1/4"=1'-0"

4 0 4 8

SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

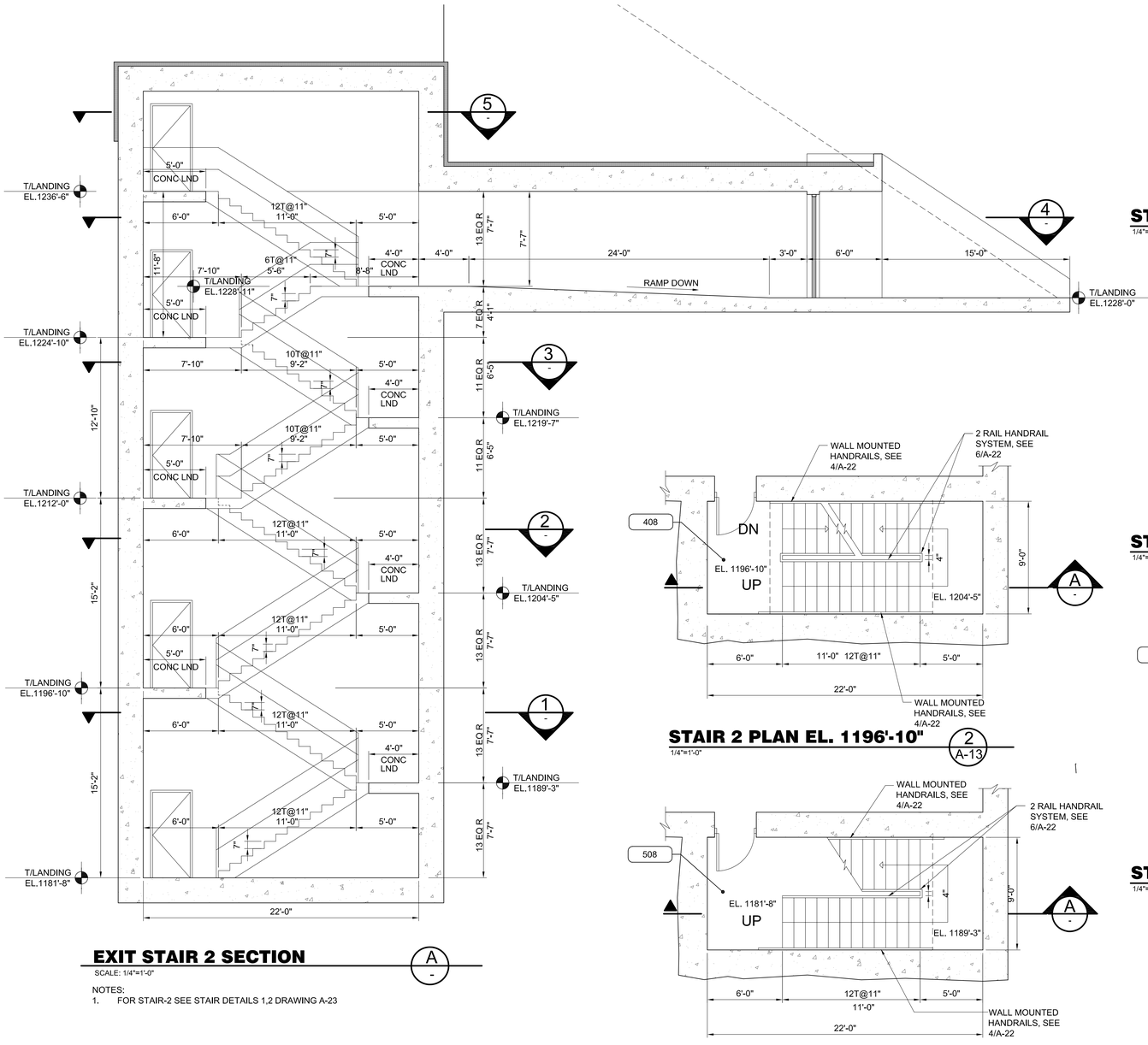
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

EXIT STAIR 3 & ELEVATOR

DRAWING NO. 15-1-3B A-20 REV. 0

11 MAR, 2009



EXIT STAIR 2 SECTION

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

A -

NOTES:
1. FOR STAIR-2 SEE STAIR DETAILS 1,2 DRAWING A-23

STAIR 2 PLAN EL. 1196'-10"

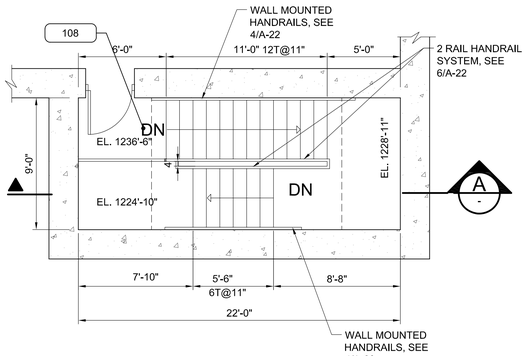
1/4"=1'-0"

2 A-13

STAIR 2 PLAN EL. 1181'-8"

1/4"=1'-0"

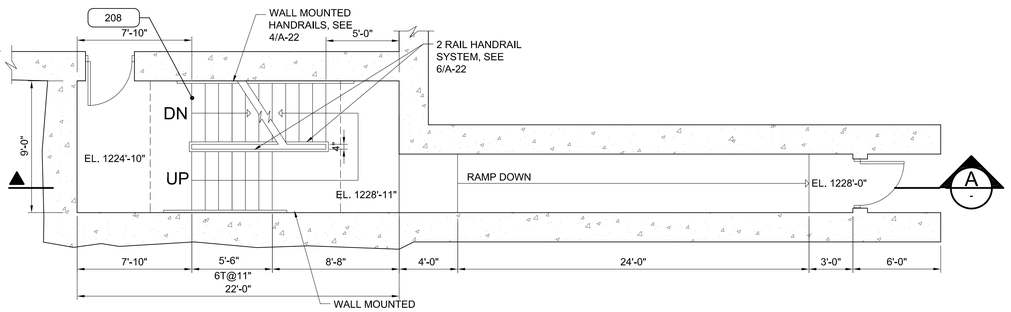
1 A-15



STAIR 2 PLAN EL. 1236'-6"

1/4"=1'-0"

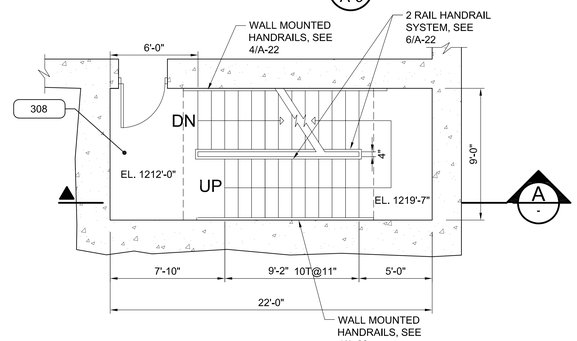
5 A-7



STAIR 2 PLAN EL. 1224'-10"

1/4"=1'-0"

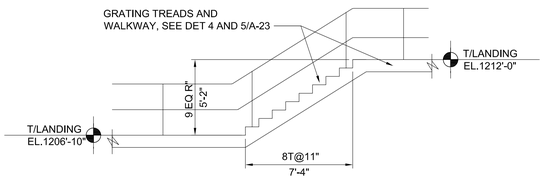
4 A-9



STAIR 2 PLAN EL. 1212'-0"

1/4"=1'-0"

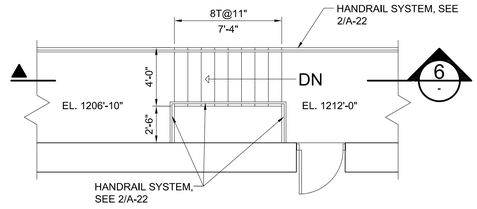
3 A-11



STAIR 7 SECTION

1/4"=1'-0"

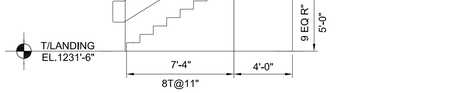
6 -



STAIR 7 PLAN

1/4"=1'-0"

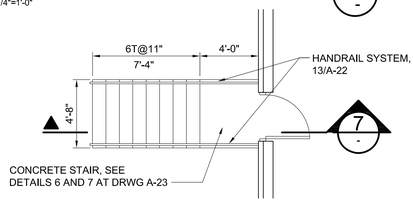
B A-11 A-10



STAIR 8 SECTION

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

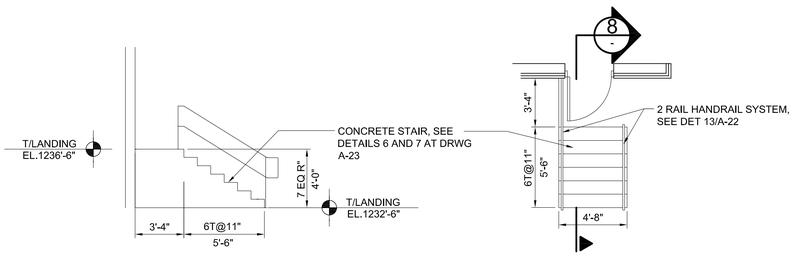
7 -



STAIR 8 PLAN

1/4"=1'-0"

C A-6



STAIR 6 SECTION

1/4"=1'-0"

8 -

STAIR 6 PLAN

1/4"=1'-0"

D A-6

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE: Dubravka Sretenovic

DATE: 03/11/2009 LICENSE #46160

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	D. SRETENOVIC	03-11-09
DRAWN	D. SRETENOVIC	03-11-09
CHECKED	M. HANSON	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

EXIT STAIRS 2, 6, 7 & 8

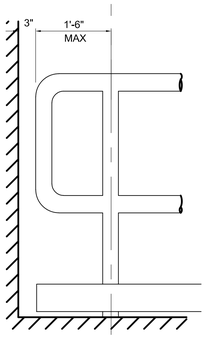
DRAWING NO. 15-1-3B A-21 REV. 0

11 MAR, 2009

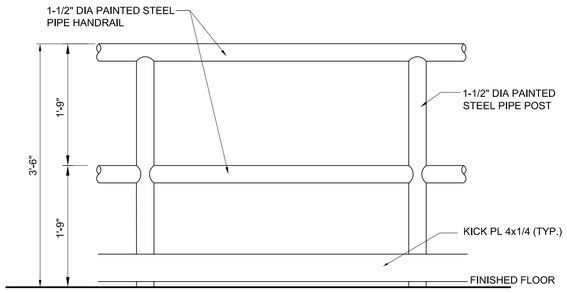
ROOM FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR	BASE	WALLS	CEILING		REMARKS
					MATERIAL	HEIGHT	
101	ENTRANCE	SEALED CONC	VCT	CW/GPDW/PNT	-	-	
102	VIEWING AREA	SEALED CONC	VCT	CONC/GPDW/PNT			NOTE 5
103	LOBBY	SEALED CONC	-	CONC/PNT			
104	EXIT STAIR 1	-	-	CONC/PNT	-	-	
105	CONTROL ROOM	ACFL 24"	-	CONC/PNT			NOTE 3
106	COMPUTER ROOM	ACFL 24"	-	CONC/PNT			NOTE 3
107	ELEVATOR LOBBY	SEALED CONC	-	CONC/PNT	-	-	
108	EXIT STAIR 2	-	-	CONC/PNT	-	-	
109	LOADING DOCK	SEALED CONC	VCT	GPDW/PNT/MLP	-	-	NOTE 1
110	SCINT EQUIP ROOM	SEALED CONC	VCT	GPDW/PNT/MLP 8'H		-	
111	RESTROOM	VCT	VCT	CT/GPDW/PNT			
112	OFFICE	VCT	VCT	GPDW/PNT/MLP	ACP	8'AFF	NOTES 2 AND 4
113	MECHANICAL ROOM	SEALED CONC	VCT	GPDW/PNT/CT/MLP 8'H			CT 6'HX6'W AT MOP SINK
114	FIRE PROT. AREA	SEALED CONC	VCT	GPDW/PNT/MLP 8'H	-		INTERIOR WALLS TO BE 2 HR RATED
115	EXIT STAIR 3	-	-	GPDW/PNT	GPDW	8' AFF	WALLS & CEILING TO BE 2 HR RATED
116	EQUIP ALCOVE	SEALED CONC	-	CONC/PNT	-	-	
201	LOBBY	SEALED CONC	-	CONC/PNT			
202	TELE. EQUIP ROOM	SEALED CONC	VCT	CONC/GPDW/PNT			
203	ELECTRICAL ROOM	SEALED CONC	VCT	CONC/GPDW/PNT			
204	EXIT STAIR 1	-	-	CONC/PNT	-	-	
205	EQUIP ALCOVE	SEALED CONC	-	CONC/PNT	-	-	
207	ELEVATOR LOBBY	SEALED CONC	-	CONC/PNT	-	-	
208	EXIT STAIR 2	-	-	CONC/PNT	-	-	
215	EXIT STAIR 3	-	-	CONC/PNT	-	-	
301	LOBBY	SEALED CONC	-	CONC/PNT			
302	ELEV CONTROL RM	SEALED CONC	-	CONC/PNT	-	-	
304	EXIT STAIR 1	-	-	CONC/PNT	-	-	
307	ELEVATOR LOBBY	SEALED CONC	-	CONC/PNT	-	-	
308	EXIT STAIR 2	-	-	CONC/PNT	-	-	
315	EXIT STAIR 3	-	-	CONC/PNT	-	-	
401	LOBBY	SEALED CONC	-	CONC/PNT			
404	EXIT STAIR 1	-	-	CONC/PNT	-	-	
407	ELEVATOR LOBBY	SEALED CONC	-	CONC/PNT	-	-	
408	EXIT STAIR 2	-	-	CONC/PNT	-	-	
415	EXIT STAIR 3	-	-	CONC/PNT	-	-	
501	LOBBY	SEALED CONC	-	CONC/PNT			
502	SCINT PUMP ROOM	SEALED CONC	-	CONC/PNT			
504	EXIT STAIR 1	-	-	CONC/PNT	-	-	
505	ASSEMBLY AREA	SEALED CONC	-	CONC/PNT	-	-	EPOXY COATING
506	DETECT. ENCLSRE.	SEALED CONC	-	CONC/PNT	-	-	EPOXY COATING
507	ELEVATOR LOBBY	SEALED CONC	-	CONC/PNT	-	-	
508	EXIT STAIR 2	-	-	CONC/PNT	-	-	
515	EXIT STAIR 3	-	-	CONC/PNT	-	-	

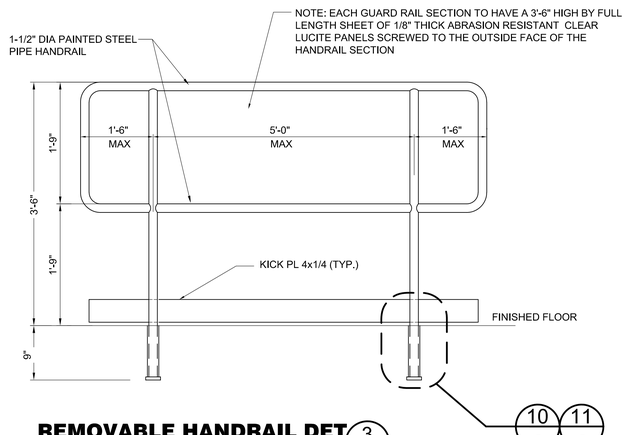
NOTES:
1. ALL EXPOSED STRUCTURAL STL MEMBERS TO BE PAINTED, COLOR 1
2. ACP IS SUSPENDED FORM STEEL JOISTS 2X12X97 @24"OC, W/ THIRD POINT BRACING SPACING
3. FOR RAISED FLOOR PLAN SEE DRAWING A-18
4. FOR SUSPENDED CEILING PLAN SEE DRAWING A-18
5. GPDW , ALL DUCTS, PIPES AND CONDUITS ABOVE EL.1249'-0" TO BE PAINTED BLACK



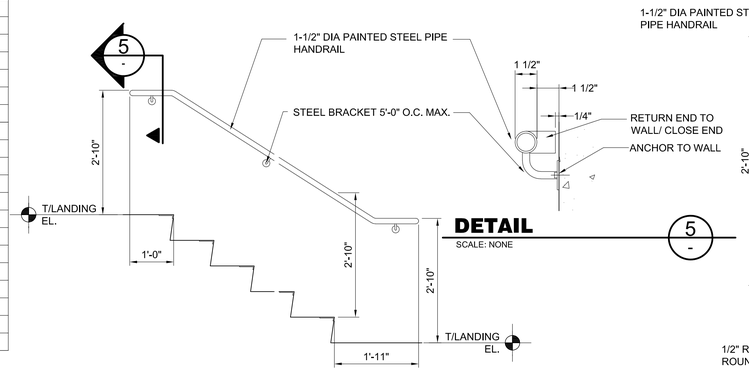
2 RAIL SYSTEM HANDRAIL END DETAIL 1/-
NOT TO SCALE



2 RAIL SYSTEM HANDRAIL DETAIL 2/-
NOT TO SCALE

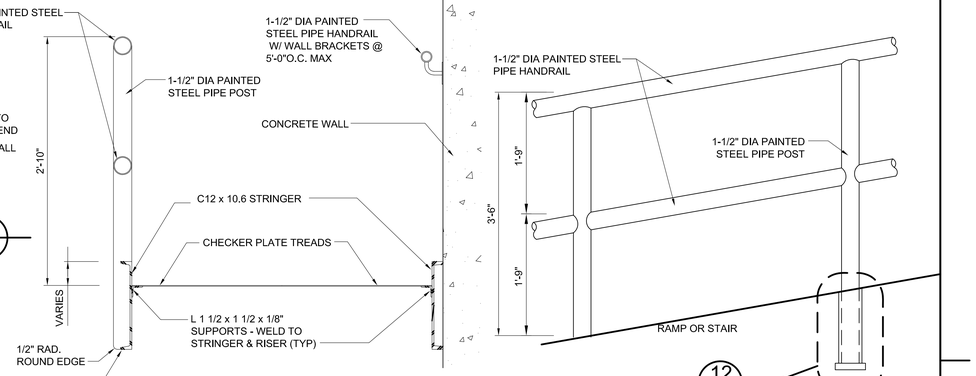


REMOVABLE HANDRAIL DET 3/A-6
NOT TO SCALE

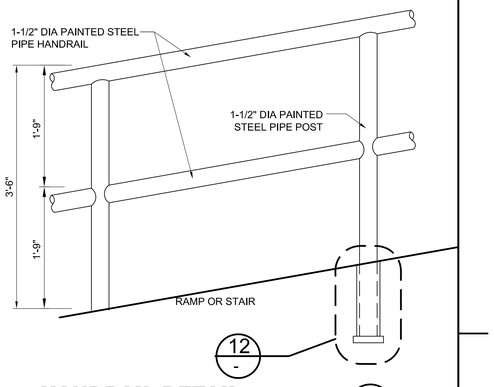


DETAIL 5/-
SCALE: NONE

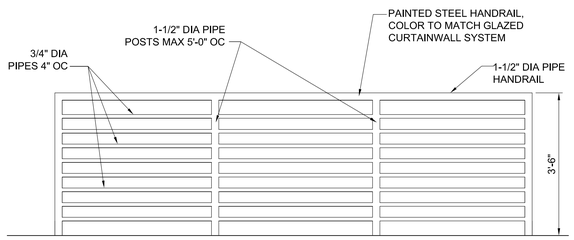
WALL MOUNTED HANDRAIL 4/-
NOT TO SCALE

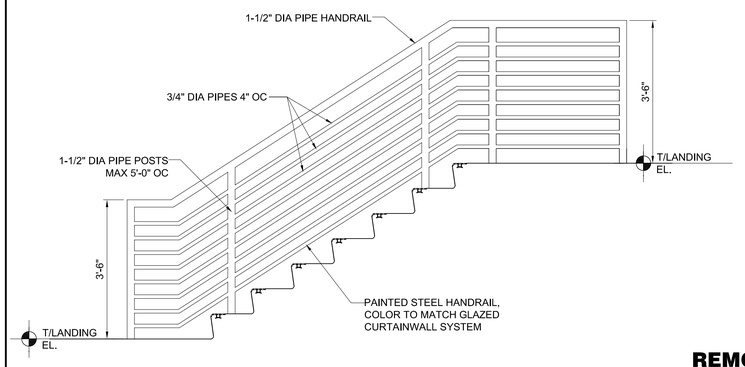


METAL STAIR DETAIL 6/-
NOT TO SCALE

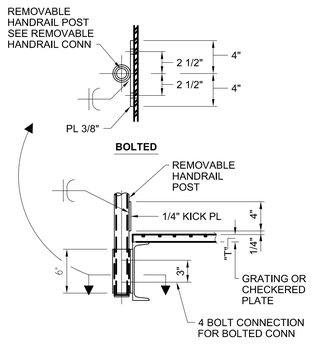


HANDRAIL DETAIL 13/-
NOT TO SCALE

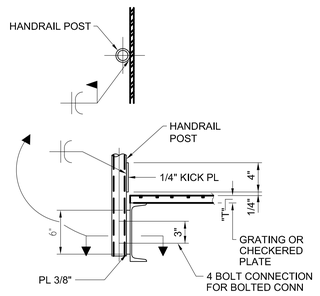




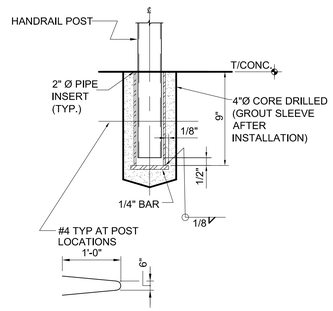
STAIR 5 HANDRAIL DETAILS 7/A-17
NOT TO SCALE



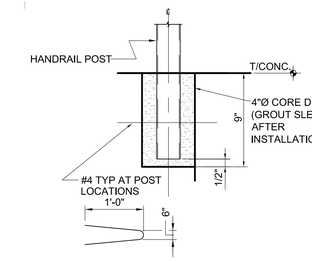
REMOVABLE HANDRAIL DETAIL 8/-
NOT TO SCALE



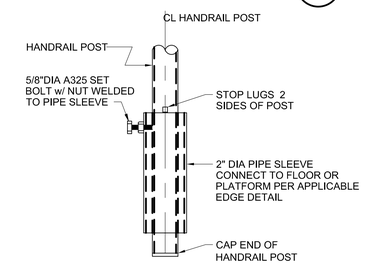
HANDRAIL DETAIL 9/-
NOT TO SCALE



REMOVABLE HANDRAIL CONNECTION DETAIL 10/-



HANDRAIL CONNECTION DETAIL 12/-



REMOVABLE HANDRAIL CONNECTION DETAIL 11/-
NOT TO SCALE

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: DUBRAVKA SRETENOVIC
SIGNATURE:
DATE: 03/11/2009 LICENSE #46160

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	D. SRETENOVIC	03-11-09
DRAWN	D. SRETENOVIC	03-11-09
CHECKED	M. HANSON	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

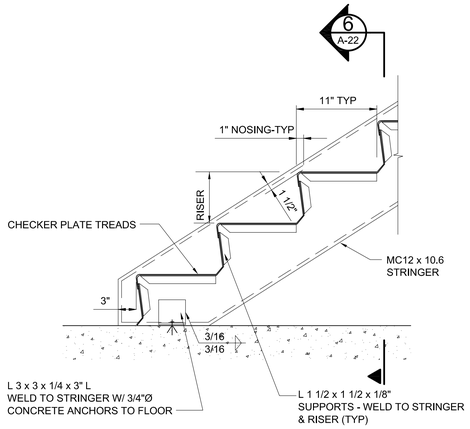
UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

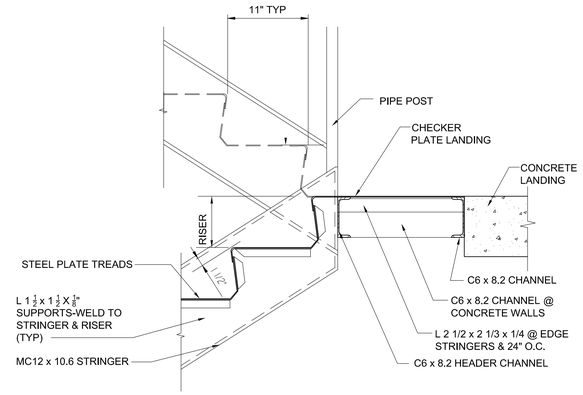
NOvA FAR DETECTOR BUILDING
ROOM FINISHES SCHED & HANDRAIL DETAILS

DRAWING NO. **15-1-3B** **A-22** REV. **0**

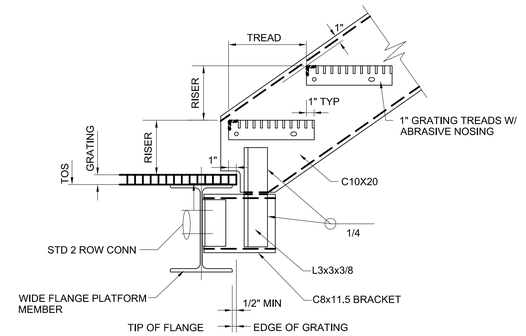
11 MAR, 2009



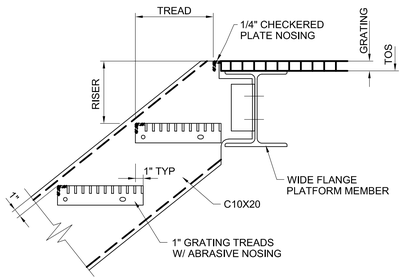
STEEL STAIR DET 1
NOT TO SCALE



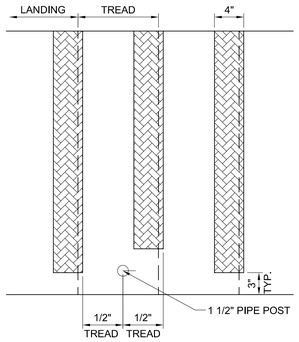
STEEL STAIR DET 2
NOT TO SCALE



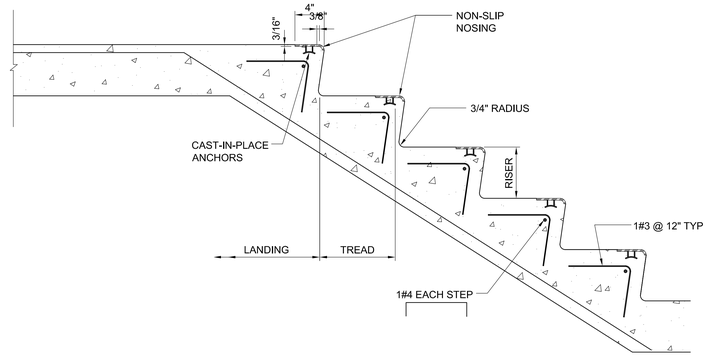
GRATING STAIR 7 DET 4
NOT TO SCALE



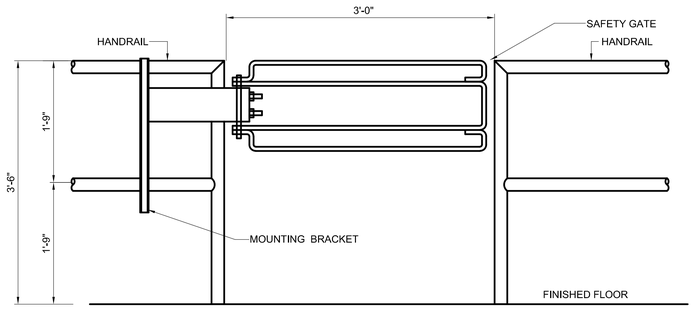
GRATING STAIR 7 DET 5
NOT TO SCALE



CONC STAIR PLAN, TYP 6
NOT TO SCALE



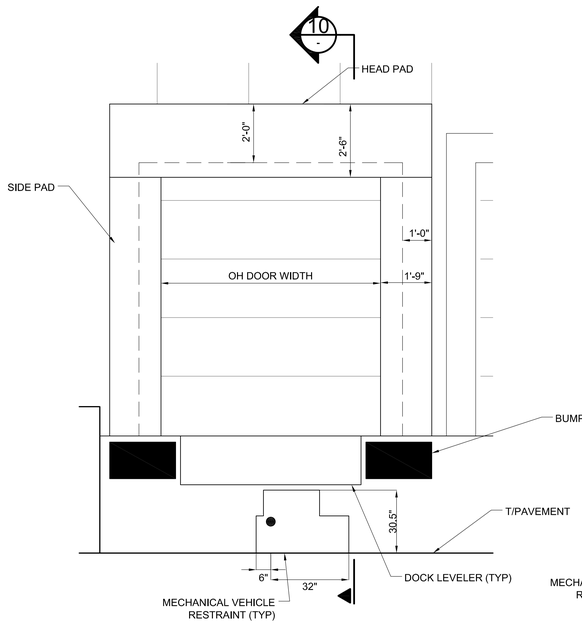
CONC STAIR DETAIL TYP 7
NOT TO SCALE



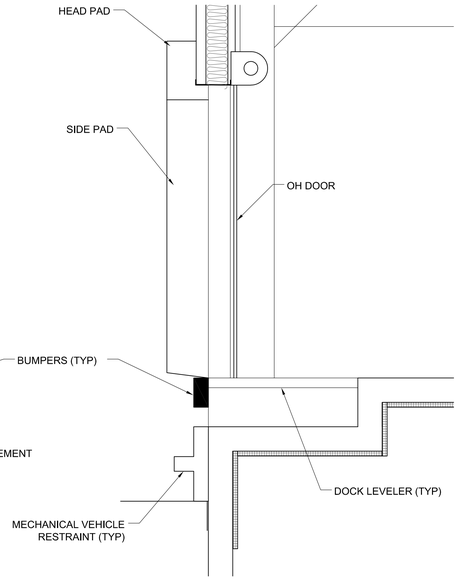
SAFETY GATE DETAIL 8
NOT TO SCALE

SAFETY GATE NOTES:

1. SAFETY GATE MODEL XL71-21PC A36 GALVANIZED STEEL AS MANUFACTURED BY FABENCO OF HOUSTON, TEXAS OR APPROVED EQUAL.
2. INSTALL USING MANUFACTURER'S MOUNTING BRACKET AND IN ACCORDANCE WITH THEIR INSTRUCTIONS.
3. PROVIDE KICKPLATE AT LOCATIONS INDICATED ON PLANS.



DOCK ELEVATION 9
NOT TO SCALE



DOCK SECTION 10
NOT TO SCALE

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE

DATE: 03/11/2009 LICENSE #46160

REV.	DATE	DESCRIPTIONS
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REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	D. SRETENOVIC	03-11-09
DRAWN	D. SRETENOVIC	03-11-09
CHECKED	M. HANSON	03-11-09
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OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

DETAILS

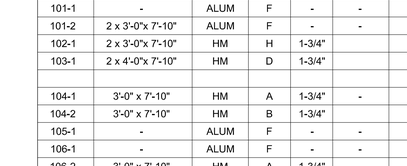
DRAWING NO. 15-1-3B A-23 REV. 0

11 MAR, 2009

DOOR AND FRAME SCHEDULE

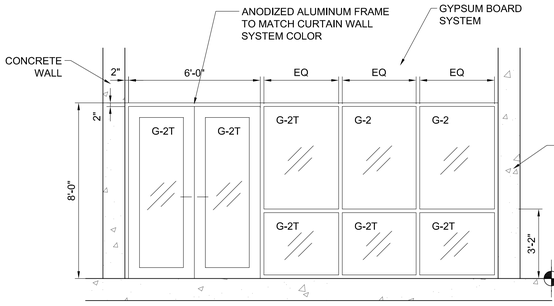
DOORS							FRAMES					UL FIRE - RESISTANCE RATING	HARDWARE SET	REMARKS
DOOR NO.	DOOR SIZE WIDTH x HEIGHT	MATERIAL	TYPE	THICK.	LOUVER	FINISH	MATERIAL	TYPE	DETAILS HEAD	DETAILS JAMB	DETAILS SILL			
101-1	-	ALUM	F	-	-	-	ALUM	-	-	-	-	-	-	F,1/A-17, NOTE 1
101-2	2 x 3'-0"x 7'-10"	ALUM	F	-	-	-	ALUM	-	-	-	-	-	HW-34	SEE 3/A-24
102-1	2 x 3'-0"x 7'-10"	HM	H	1-3/4"		PNT	HM	A	8	8	-	-	HW-36	
103-1	2 x 4'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	8	8	-	-	HW-36	
104-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-10	
104-2	3'-0" x 7'-10"	HM	B	1-3/4"		PNT	HM	A	8	8	-	-	HW-21	
105-1	-	ALUM	F	-	-	-	ALUM	-	-	-	-	-	HW-34	SEE 2/A-24
106-1	-	ALUM	F	-	-	-	ALUM	-	-	-	-	-	HW-34	SEE 1/A-24
106-2	3'-0" x 7'-10"	HM	A	1-3/4"		PNT	HM	A	8	8	-	-	HW-5	
107-1	2 x 4'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	8	8	-	1 1/2	HW-36	
108-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-10	
108-2	3'-0" x 7'-10"	HM	B	1-3/4"		PNT	HM	A	8	8	-	-	HW-21	
109-1	3'-0" x 7'-2"	HM	A	1-3/4"		PNT	HM	A	10	9	-	-	HW-25	NOTE 1
109-2	11'-0" x 14'-6"	STL	E	-	-	-	-	-	4	5	6	-		
109-3	9'-0" x 10'-0"	STL	E	-	-	-	-	-	4	5	6	-		
109-4	9'-0" x 10'-0"	STL	E	-	-	-	-	-	4	5	6	-		
109-5	9'-0" x 10'-0"	STL	E	-	-	-	-	-	4	5	6	-		
109-6	9'-0" x 10'-0"	STL	E	-	-	-	-	-	4	5	6	-		
110-1	2 x 3'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	7	7	-	-	HW-33	
111-1	3'-0" x 7'-10"	HM	B	1-3/4"		PNT	HM	A	7	7	-	-	HW-7	3/4"UNDERCUT
112-1	3'-0" x 7'-10"	AL	K	1-3/4"		-	AL	C	7	7	-	-	HW-5	
112-2	3'-0" x 7'-2"	HM	B	1-3/4"	-	PNT	HM	A	10	9	-	-	HW-21	
113-1	2 x 4'-0"x 9'-10"	HM	D	1-3/4"		PNT	HM	A	7	7	-	-	HW-33	
114-1	2 x 4'-0"x 9'-10"	HM	D	1-3/4"	-	PNT	HM	A	7	7	-	1 1/2	HW-36	
114-2	3'-0" x 7'-2"	HM	B	1-3/4"	-	PNT	HM	A	10	9	-	-	HW-21	
115-1	3'-0" x 7'-10"	HM	B	1-3/4"		PNT	HM	A	-	-	-	1 1/2	HW-21	SEE 1,2/A-28
116-1	3'-0" x 7'-10"	HM	B	1-3/4"		PNT	HM	A	8	8	-	-	HW-21	
201-1	2 x 4'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	8	8	-	-	HW-36	
202-1	3'-0" x 7'-10"	HM	A	1-3/4"		PNT	HM	A	7	7	-	-	HW-5	
203-1	2x3'-0" x 7'-10"	HM	D	1-3/4"		PNT	HM	A	7	7	-	-	HW-36	
203-2	3'-0" x 7'-10"	HM	A	1-3/4"		PNT	HM	A	8	8	-	-	HW-5	
204-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2		
207-1	2 x 4'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	8	8	-	1 1/2	HW-36	
208-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-10	
301-1	2 x 4'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	8	8	-	-	HW-36	
302-1	4'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-10	
304-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-10	
307-1	2 x 4'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	8	8	-	1 1/2	HW-36	
308-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-10	
315-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-10	
401-1	2 x 4'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	8	8	-	-	HW-36	
404-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-4	
407-1	2 x 4'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	8	8	-	1 1/2	HW-36	
408-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-10	
501-1	2 x 4'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	8	8	-	-	HW-36	
502-1	3'-0" x 7'-10"	HM	A	1-3/4"		PNT	HM	A	8	8	-	-	HW-5	
504-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-10	
507-1	2 x 4'-0"x 7'-10"	HM	D	1-3/4"		PNT	HM	A	8	8	-	1 1/2	HW-36	
508-1	3'-0" x 7'-10"	HM	A	1-3/4"	-	PNT	HM	A	8	8	-	1 1/2	HW-10	
515-1	3'-0" x 7'-10"	HM	A	1-3/4"		PNT	HM	A	8	8	-	1 1/2	HW-10	

NOTES:
1. PROVIDE CARD READER; FOR DOOR HARDWARE SEE SPECIFICATION 08440



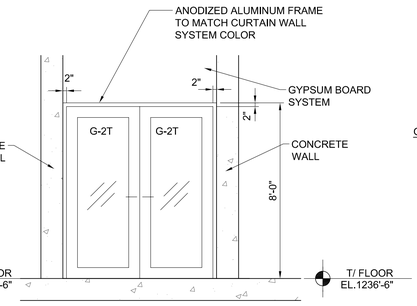
DOOR TYPES

FRAME TYPES



GLASS PARTITION ELEVATION (A / A-7)

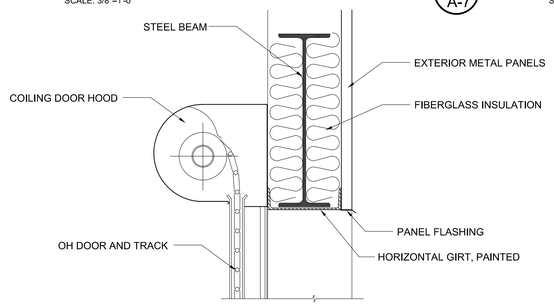
SCALE: 3/8"=1'-0"



GLASS TYPES:
G1 - CLEAR INSULATED
G1T - TEMPERED CLEAR INSULATED
G2 - CLEAR
G2T - TEMPERED CLEAR
G3 - WIREGLASS

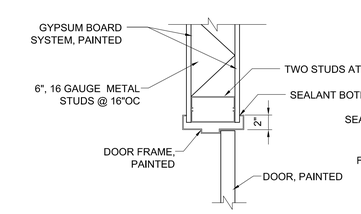
GLASS PARTITION ELEVATION (B / A-7)

SCALE: 3/8"=1'-0"



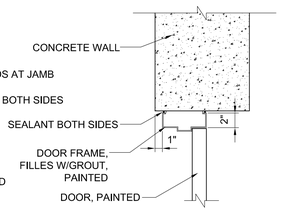
OH DOOR DETAIL (4 / -)

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



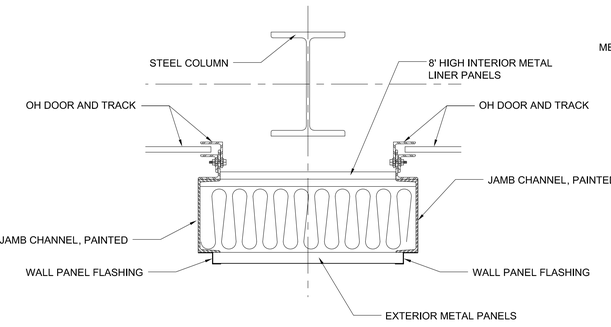
DOOR DETAIL (7 / -)

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



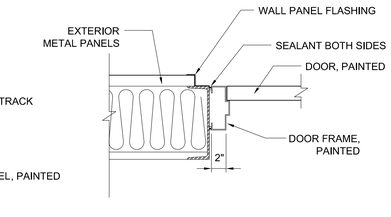
DOOR DETAIL (8 / -)

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



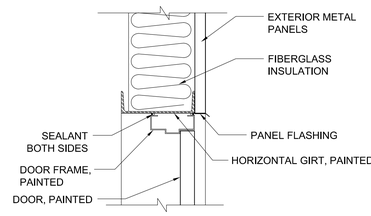
OH JAMB DETAIL (5 / A-6)

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



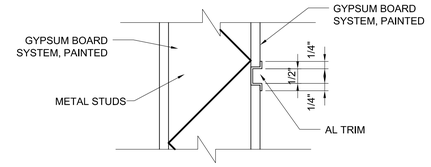
DOOR DETAIL (9 / -)

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



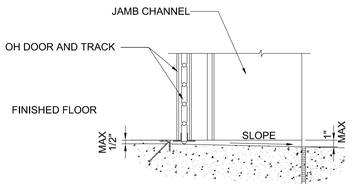
DOOR DETAIL (10 / -)

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



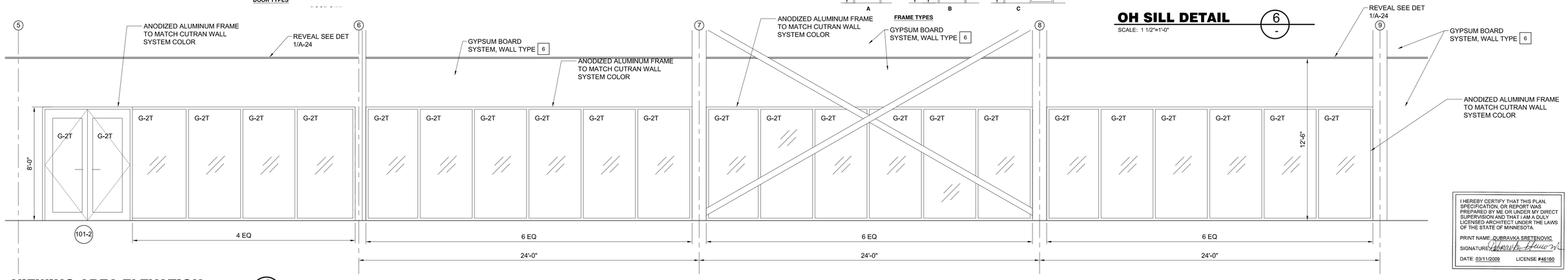
REVEAL DETAIL (1 / -)

SCALE: 3"=1'-0"



OH SILL DETAIL (6 / -)

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



VIEWING AREA ELEVATION (C / A-6)

SCALE: 3/8"=1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: DUBRAVKA SRETENOVIC
SIGNATURE:
DATE: 03/11/2009 LICENSE #46160

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	D. SRETENOVIC	03-11-09
DRAWN	D. SRETENOVIC	03-11-09
CHECKED	M. HANSON	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:
3/8"=1'-0" 1 0 1 2 3 4 5 6 7 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

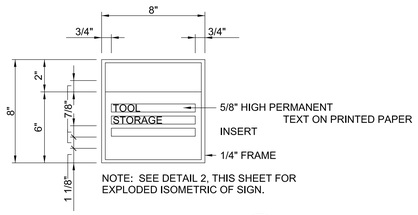
NOvA FAR DETECTOR BUILDING

DOOR SCHEDULE & DETAILS

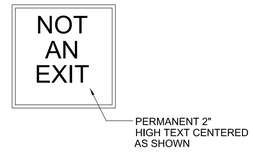
DRAWING NO. 15-1-3B | A-24 | REV. 0

11 MAR, 2009

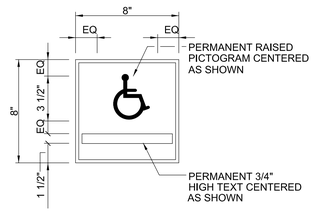
SIGN SCHEDULE					
LOCATION				MESSAGE	REMARKS
DOOR NO	ROOM NO	SIGN TYPE	NO		
EL. 1181'-8"				WORDING	
515-1	505	B5			
502-1	501	A1		SCINTILLATOR PUMP ROOM	
-	507	B7		ELEVATOR	
504-1	501	B5			
508-1	506	B5			
507-1	501	B6			
EL. 1196'-10"					
408-1	408	B1			
404-1	404	B1			
404-1	401	B5			
408-1	506	B5		STAIR	
-	407	B7		ELEVATOR	
407-1	401	B6			
EL. 1212'-0"					
308-1	308	B1			
304-1	304	B1			
315-1	315	B1			
308-1	506	B5			
304-1	301	B5			
315-1	505	B5			
-	307	B7			
302-1	301	A1		ELEVATOR CONTROL ROOM	
307-1	301	B6			
EL. 1224'-10"					
208-1	208	B1			
204-1	204	B1			
208-1	506	B5			
203-1	201	A1		ELECTRICAL ROOM	
202-1	201	A1		TELEPHONE EQUIP. ROOM	
-	207	B7			
204-1	201	B5			
207-1	201	B6			
EL. 1236'-6"					
108-1	108	B1			
104-1	104	B1			
108-1	506	B5			
108-2	108	C2			
116-1	116	C2			
115-1	115	C2			
114-2	114	C2			
114-1	109	A1		FIRE PROTECTION AREA	
113-1	109	A1		MECHANICAL ROOM	
112-1	109	A1		OFFICE	
112-2	112	C2			
111-1	109	B2			
110-1	109	A1		SCINILLATOR EQUIP. ROOM	
101-2	101	A1		LOADING DOCK AREA	
104-2	104	C2			
104-1	103	B5			
-	107	B7			
105-1	103	A1		COMPUTER ROOM	
105-1	103	A1		CONTROL ROOM	
106-2	506	A1		COMPUTER ROOM	
106-2	506	A1		CONTROL ROOM	
107-1	103	B6			



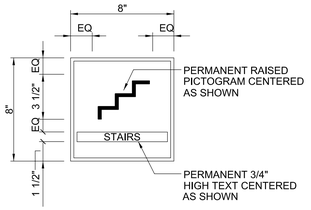
SIGN TYPE A1 — SCALE: NONE — 1 / -



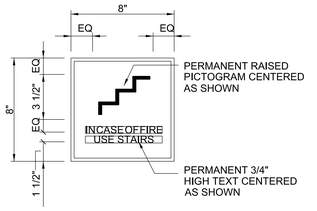
SIGN TYPE B1 — SCALE: NONE — 2 / -



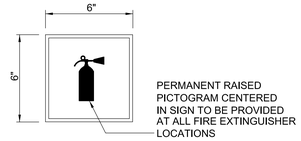
SIGN TYPE B2 — SCALE: NONE — 3 / -



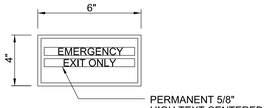
SIGN TYPE B5 — SCALE: NONE — 4 / -



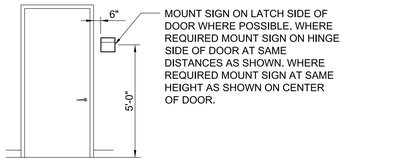
SIGN TYPE B6 — SCALE: NONE — 5 / -



SIGN TYPE C1 — SCALE: NONE — 6 / -

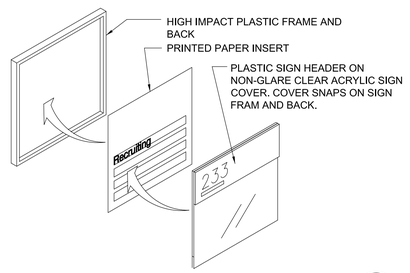


SIGN TYPE C2 — SCALE: NONE — 7 / -



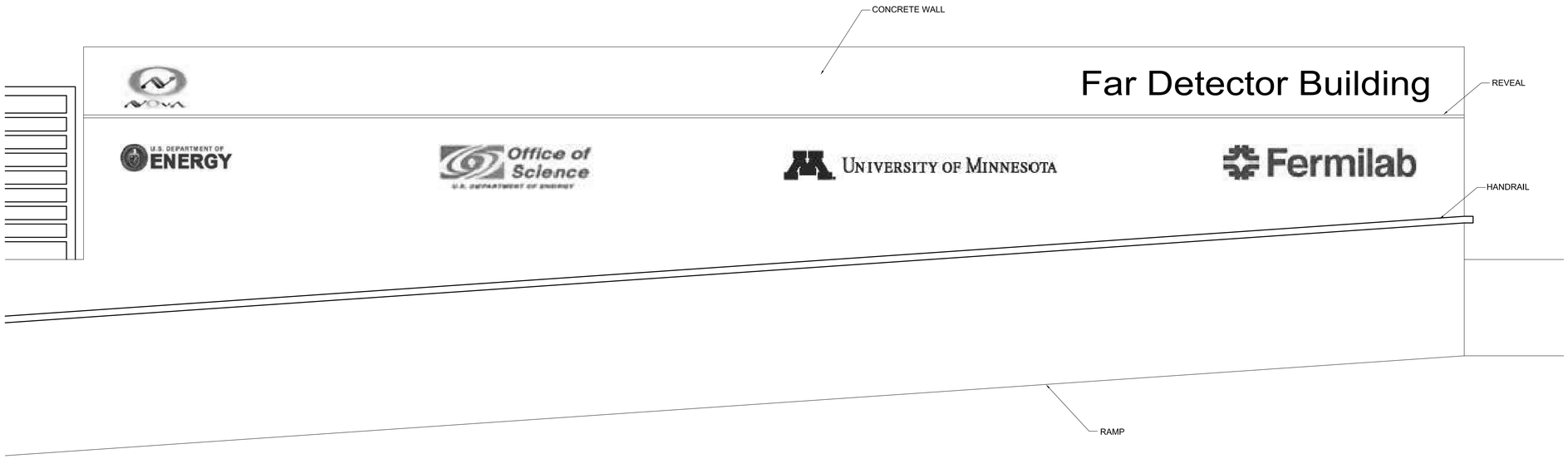
SIGNAGE MOUNTING HEIGHT — SCALE: NONE — 8 / -

NOTE: MOUNTING HEIGHT SHOWN IS TO TOP OF GRAPHIC SYMBOL FOR SIGN TYPES A1, AND B1 THROUGH B4.



EXPLODED ISO SIGNAGE TYPE A1 — SCALE: NONE — 9 / -

SIGN TYPE B7 — SCALE: NONE — 10 / -



ENTRANCE SIGNS — SCALE: NONE — A / A-16

GENERAL NOTES:

1. SEE FLOOR PLANS FOR ROOM NUMBERS AND DOOR NUMBERS.
2. SEE SIGNAGE MOUNTING HEIGHT, THIS SHEET FOR INSTALLATION.
3. FINISHES OF SIGNS SHALL BE/MATCH MOHAWK 505 MARSALA RED BACKGROUND COLOR WITH LETTERS AND BRAILLE IN WHITE.
4. SEE SPECIFICATION SECTION 10440 FOR SIGNAGE REQUIREMENTS.
5. ALL ROOM NAMES AND NUMBERS SHALL BE SELECTED BY OWNER. ALL ROOM NAMES & NUMBERS LISTED ON SIGNAGE SCHEDULES ARE REFERENCE ONLY.
6. SCHEDULES ARE REFERENCE ONLY.
7. COLORS FOR ENTRANCE SIGNS TO BE DETERMINED BY FERILAB.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE: Dubravka Sretenovic

DATE: 03/11/2009 LICENSE #46160

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE		OWNER / REPRESENTATIVE	DATE
DESIGNED	D. SRETENOVIC	03-11-09	NOvA FESS SUBMITTED	S. DIXON	03-11-09
DRAWN	D. SRETENOVIC	03-11-09	NOvA PROJECT MANAGER	J. COOPER	03-11-09
CHECKED	M. HANSON	03-11-09	HINES SUBMITTED	C. McNABNEY	03-11-09
APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

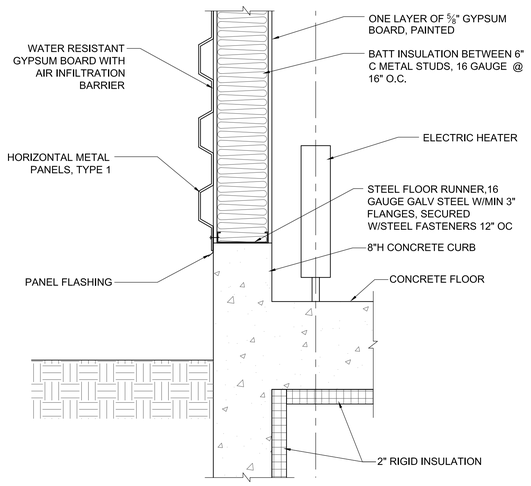
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

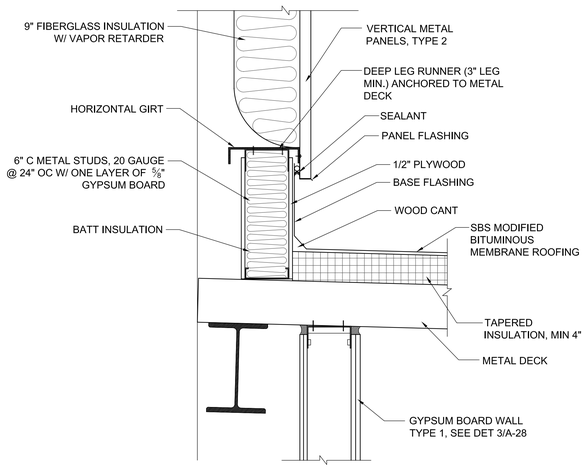
SIGNAGE SCHEDULE & DETAILS

DRAWING NO. 15-1-3B A-25 REV. 0

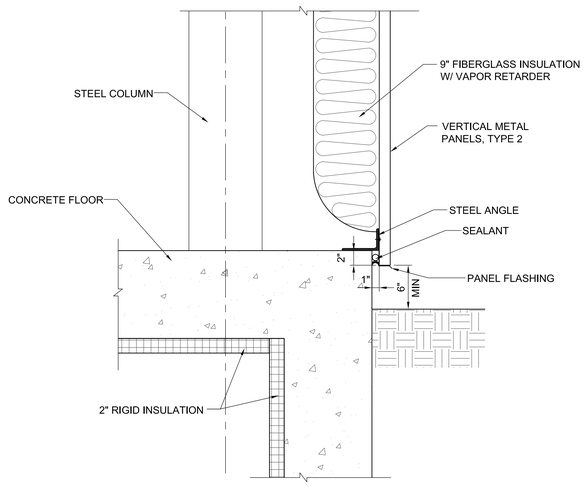
11 MAR, 2009



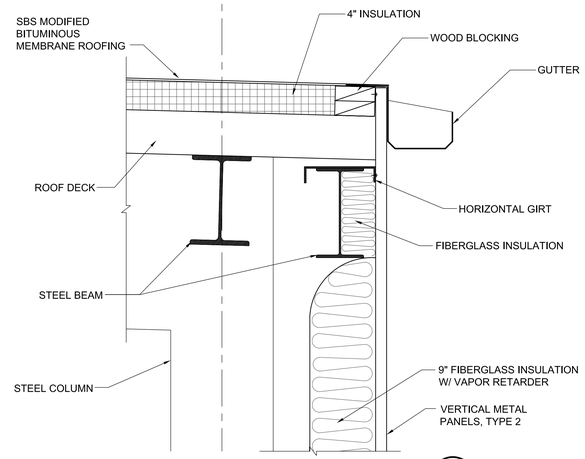
DETAIL 1 A-16 A-17
SCALE: 1 1/2" = 1'-0"



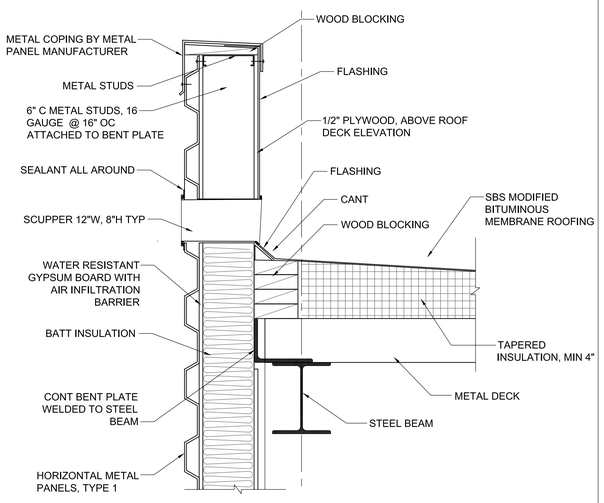
DETAIL 2 A-16
SCALE: 1 1/2" = 1'-0"



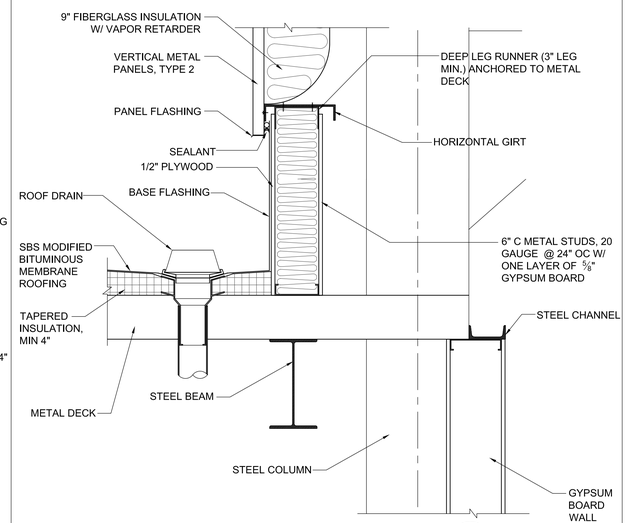
DETAIL 3 A-16
SCALE: 1 1/2" = 1'-0"



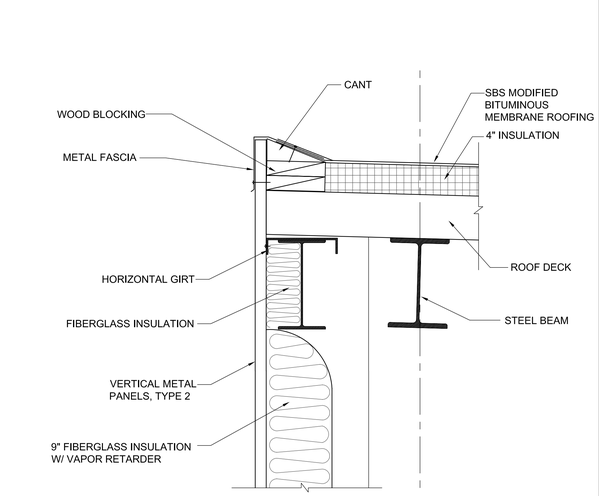
DETAIL 4 A-16
SCALE: 1 1/2" = 1'-0"



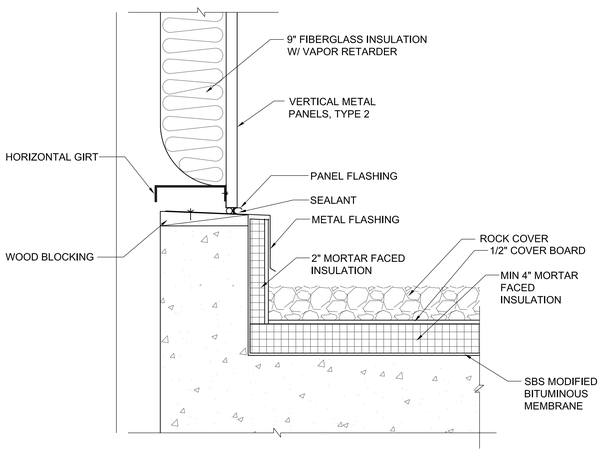
DETAIL 5 A-16
SCALE: 1 1/2" = 1'-0"



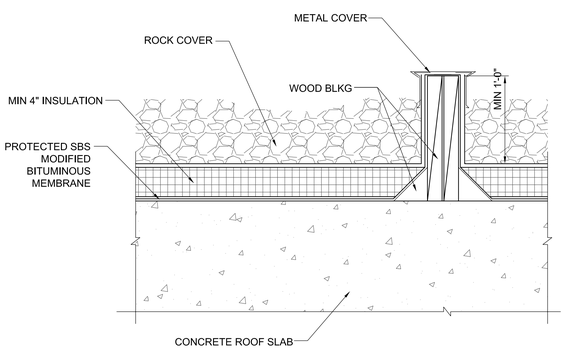
DETAIL 6 A-16
SCALE: 1 1/2" = 1'-0"



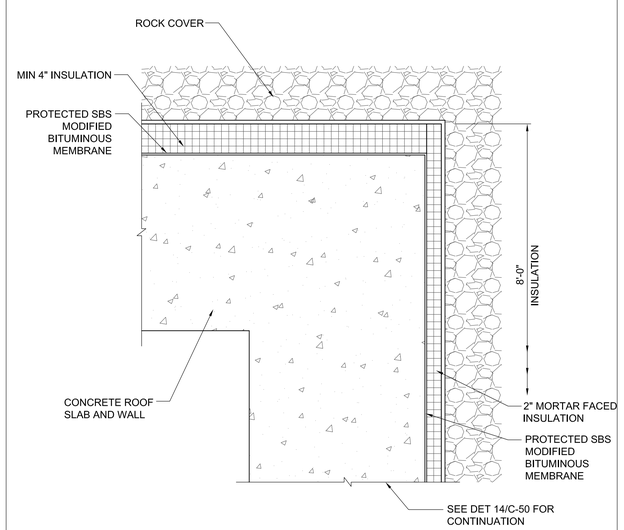
DETAIL 7 A-16 A-17
SCALE: 1 1/2" = 1'-0"



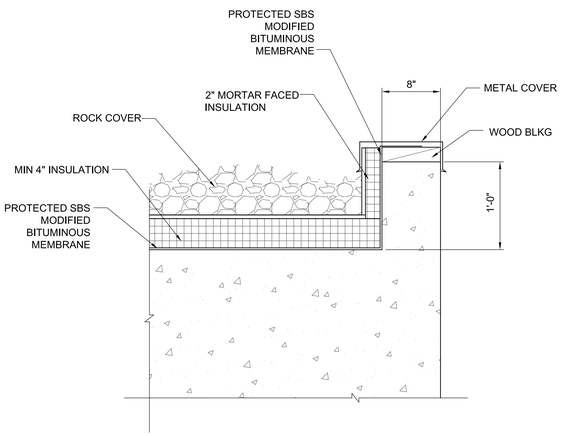
DETAIL 8 A-16
SCALE: 1 1/2" = 1'-0"



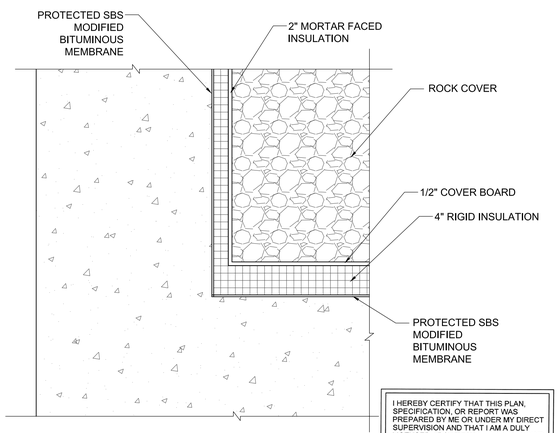
DETAIL 9 A-5
SCALE: 1 1/2" = 1'-0"



DETAIL 10 A-5
SCALE: 1 1/2" = 1'-0"



DETAIL 11 A-5
SCALE: 1 1/2" = 1'-0"



DETAIL 12 A-5
SCALE: 1 1/2" = 1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DUBRAVKA SRETENOVIC
SIGNATURE: [signature]
DATE: 03/11/2009 LICENSE #46160

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	D. SRETENOVIC	03-11-09
DRAWN	D. SRETENOVIC	03-11-09
CHECKED	M. HANSON	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

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

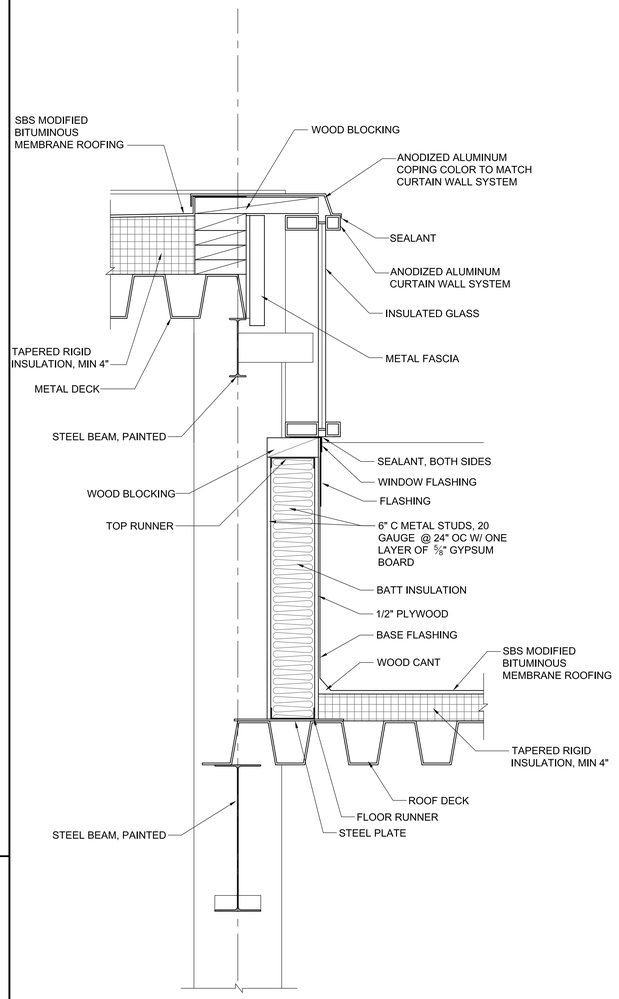
UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

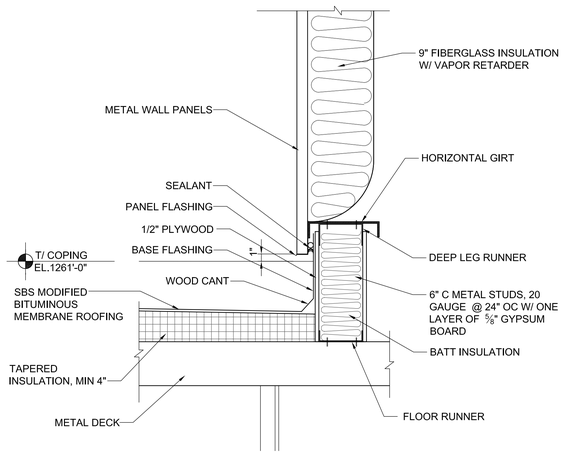
NOvA FAR DETECTOR BUILDING
BUILDING DETAILS - 1

DRAWING NO. **15-1-3B** **A-26** REV. 0

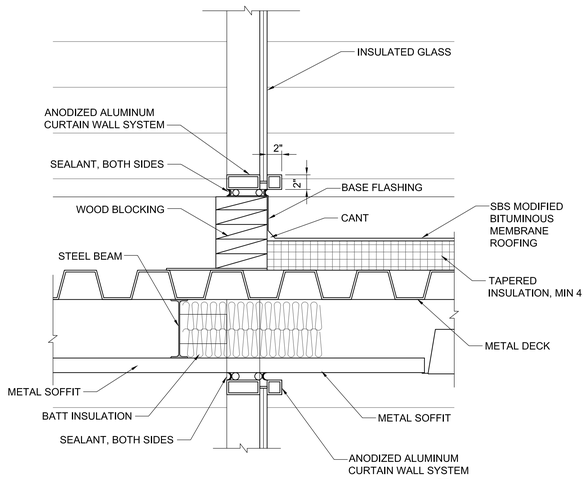
11 MAR, 2009



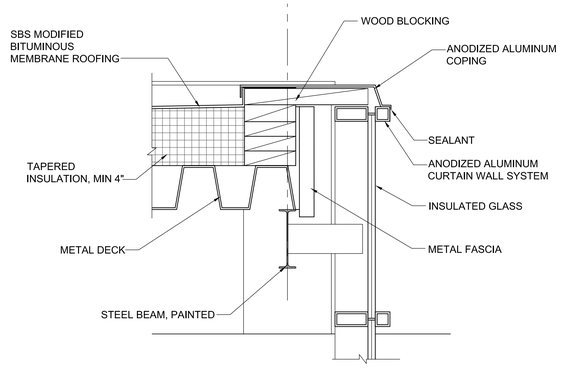
DETAIL 1 A-4 A-17
SCALE: 1 1/2" = 1'-0"



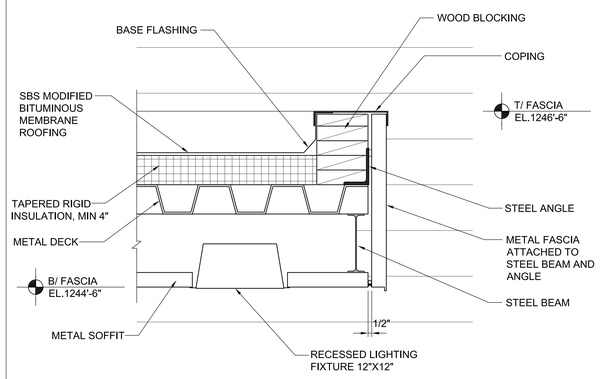
DETAIL 2 A-17
SCALE: 1 1/2" = 1'-0"



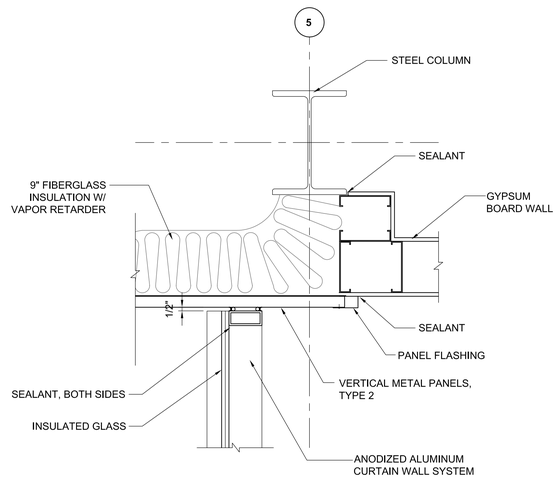
DETAIL 3 A-17
SCALE: 1 1/2" = 1'-0"



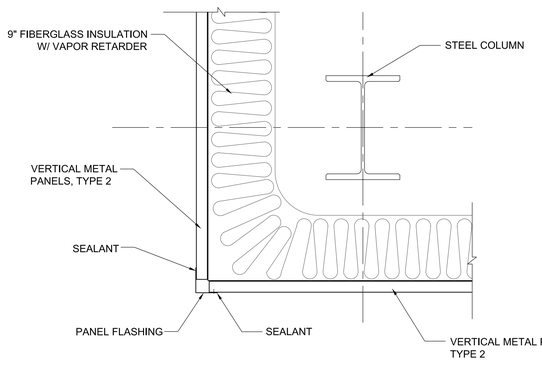
DETAIL 4 A-17
SCALE: 1 1/2" = 1'-0"



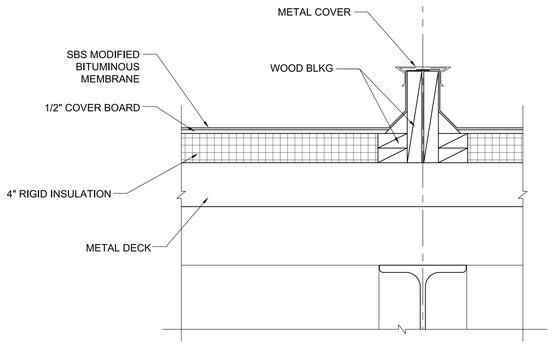
DETAIL 5 A-17
SCALE: 1 1/2" = 1'-0"



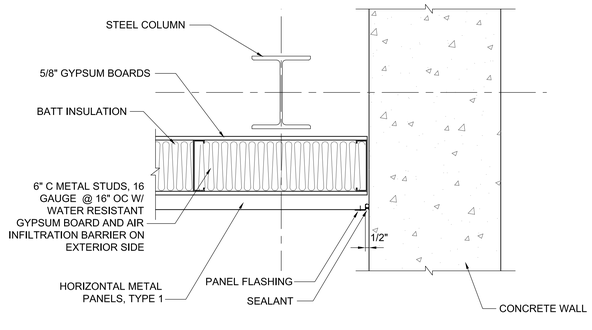
DETAIL 6 A-17
SCALE: 1 1/2" = 1'-0"



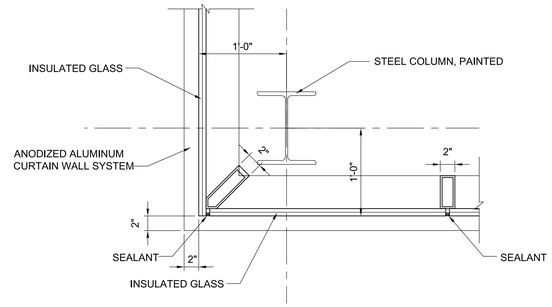
DETAIL 7 A-6
SCALE: 1 1/2" = 1'-0"



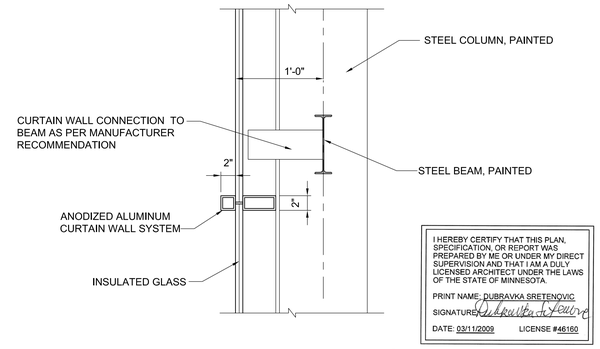
DETAIL 8 A-4
SCALE: 1 1/2" = 1'-0"



DETAIL 9 A-6
SCALE: 1 1/2" = 1'-0"



DETAIL 10 A-17
SCALE: 1 1/2" = 1'-0"



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PRINT NAME: DUBRAVKA SRETENOVIC
SIGNATURE:
DATE: 03/11/2009 LICENSE #46160

DETAIL 11 A-17
SCALE: 1 1/2" = 1'-0"

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE
DESIGNED	D. SRETENOVIC	03-11-09
DRAWN	D. SRETENOVIC	03-11-09
CHECKED	M. HANSON	03-11-09
APPROVED	J. STEENKEN	03-11-09

	OWNER / REPRESENTATIVE	DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

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

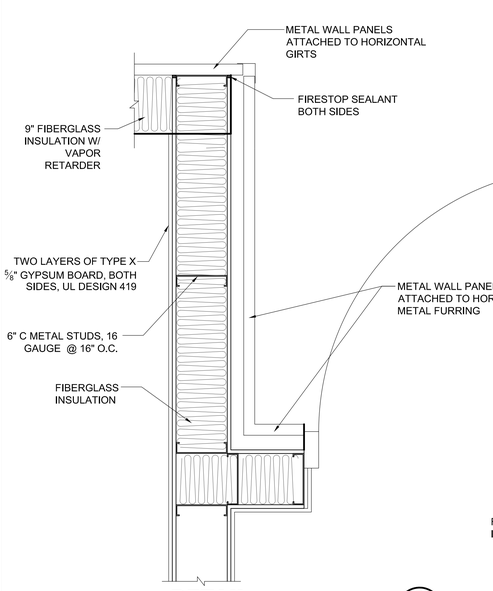
University of Minnesota
PROJECT NUMBER 896-06-1711
Hines

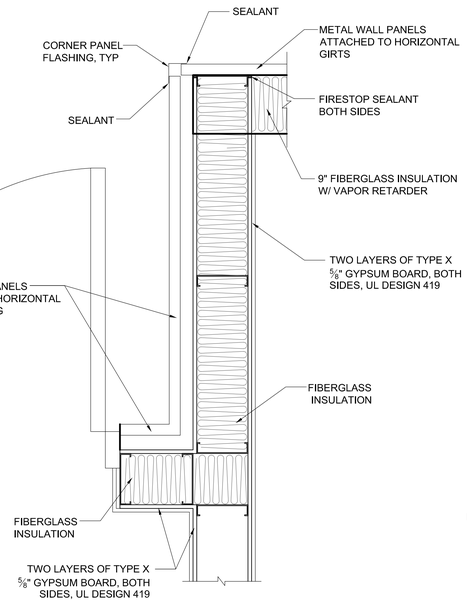
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
BUILDING DETAILS - 2

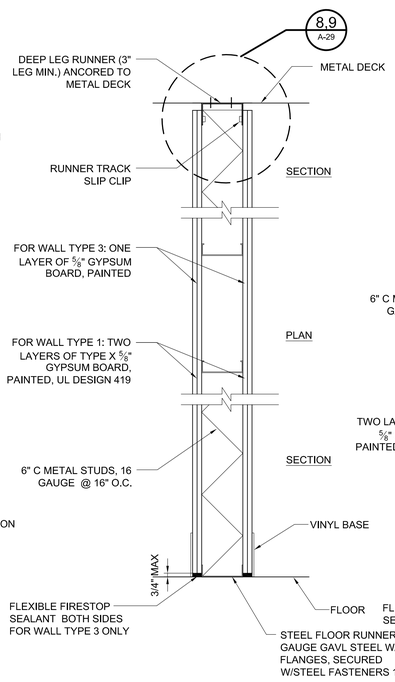
DRAWING NO. 15-1-3B A-27 REV. 0

11 MAR, 2009

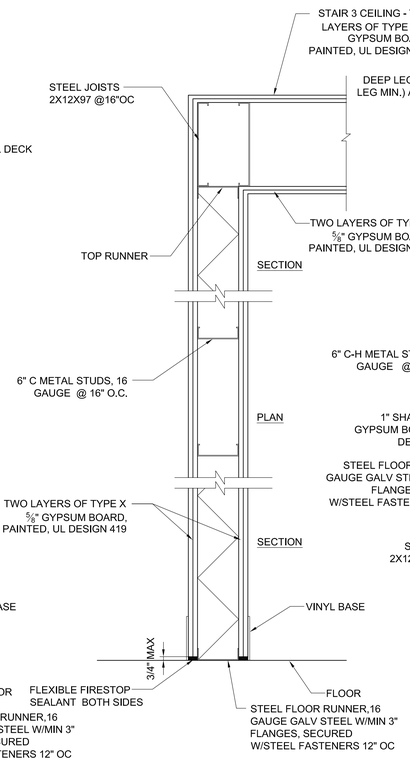




DETAIL 1 / A-6
SCALE: 1 1/2" = 1'-0"



WALL TYPE 1 AND 3 3 / -
SCALE: 1 1/2" = 1'-0"



WALL TYPE 1A 4 / -
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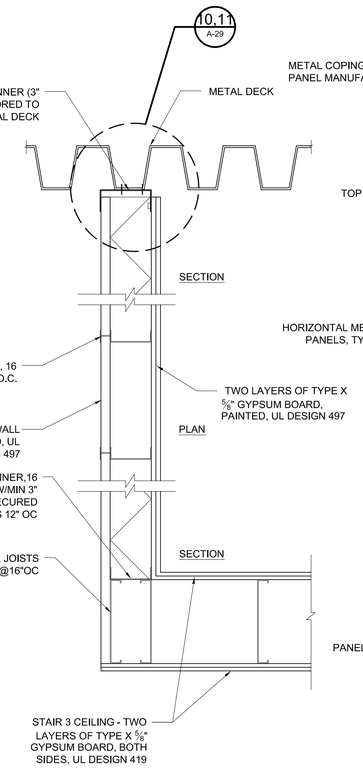

WALL TYPE 1B 5 / -
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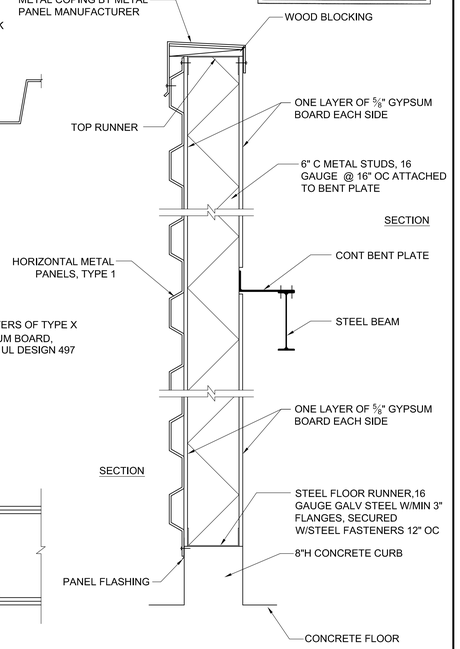

WALL TYPE 2 6 / -
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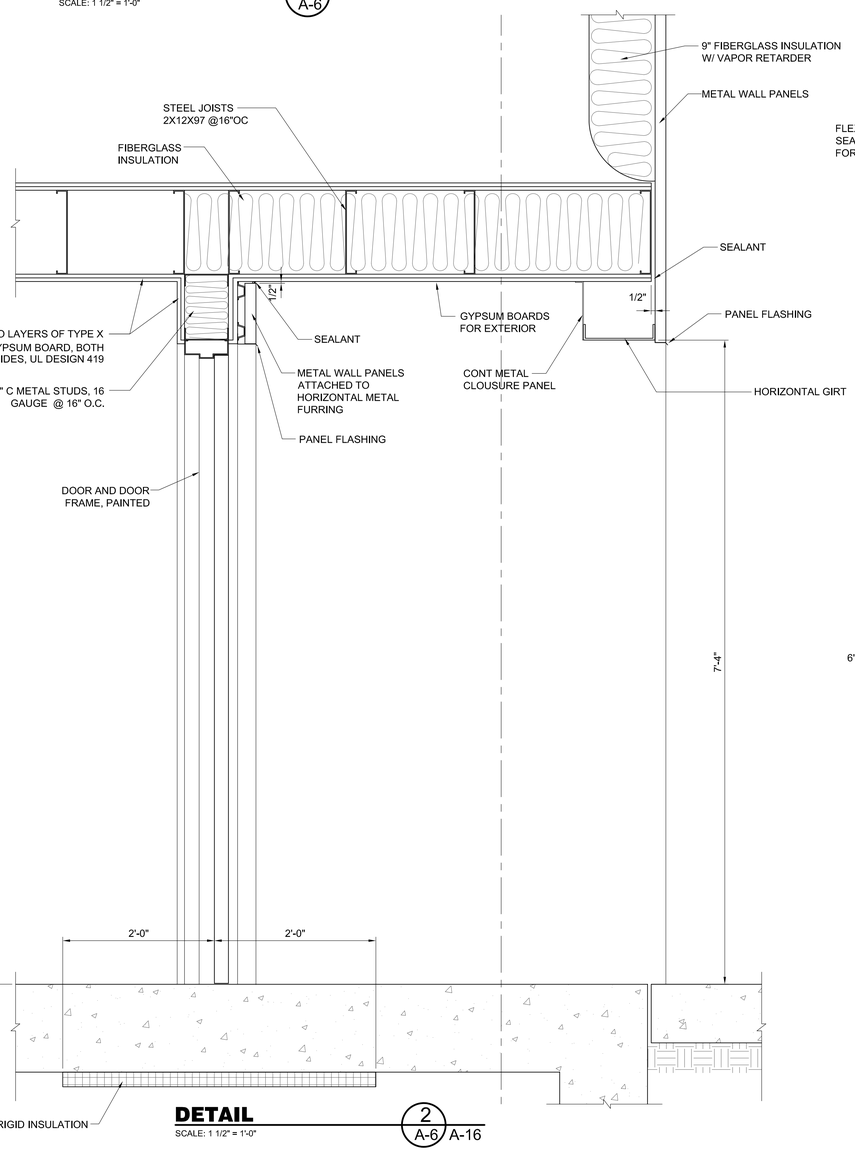
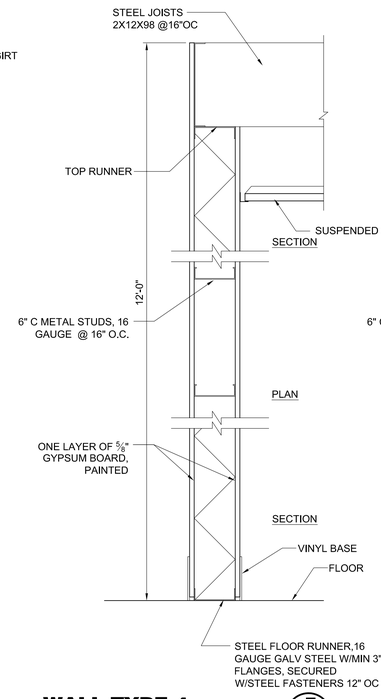


DETAIL 2 / A-6 A-16
SCALE: 1 1/2" = 1'-0"



WALL TYPE 4 7 / -
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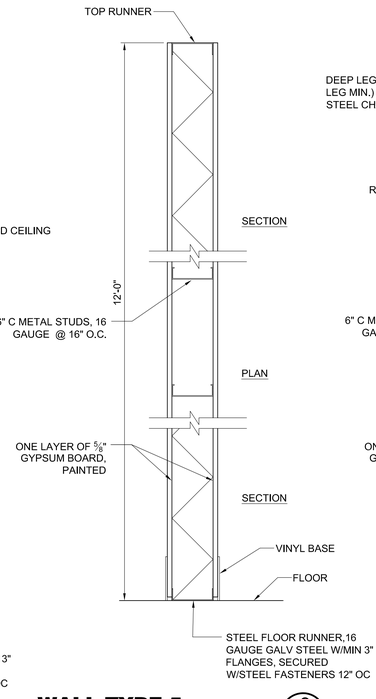

WALL TYPE 5 8 / -
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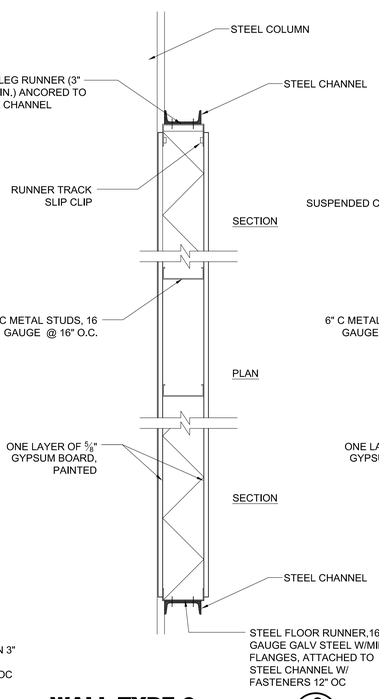

WALL TYPE 6 9 / -
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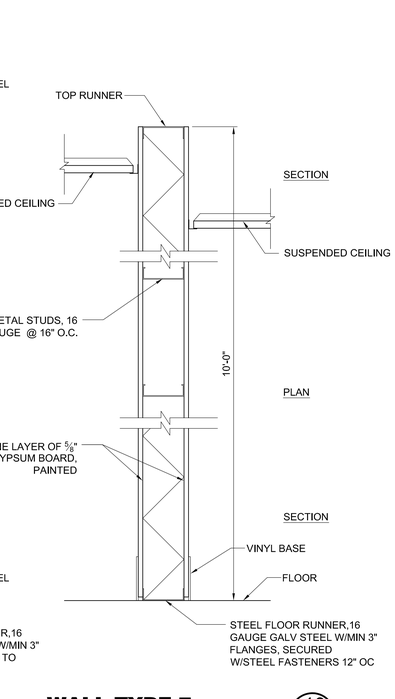


WALL TYPE 7 10 / -
SCALE: 1 1/2" = 1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: DUBRAVKA SRETENOVIC
SIGNATURE: Dubravka Sretenovic
DATE: 03/11/2009 LICENSE #46160

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	D. SRETENOVIC	03-11-09
DRAWN	D. SRETENOVIC	03-11-09
CHECKED	M. HANSON	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

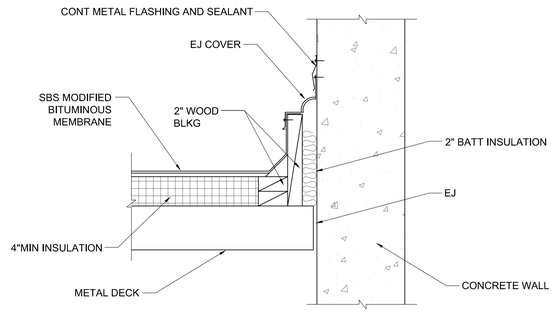
SCALE:
1 1/2"=1'-0"
1 0 1
SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

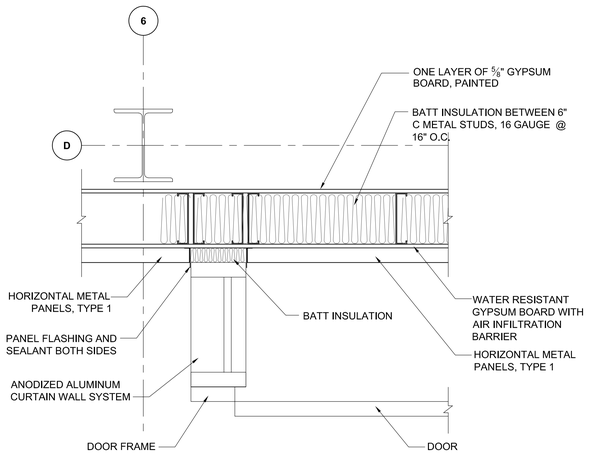
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
WALL TYPES & DETAILS

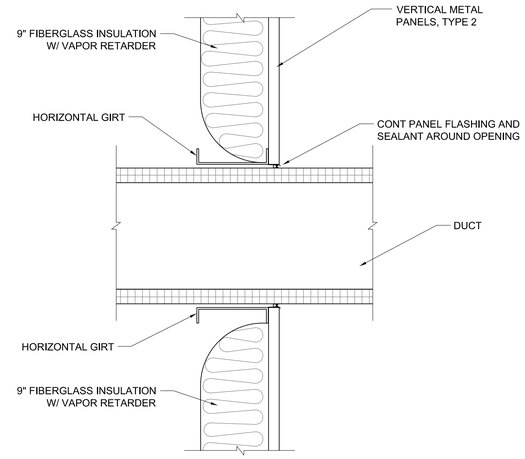
DRAWING NO. 15-1-3B | A-28 | REV. 0
11 MAR, 2009



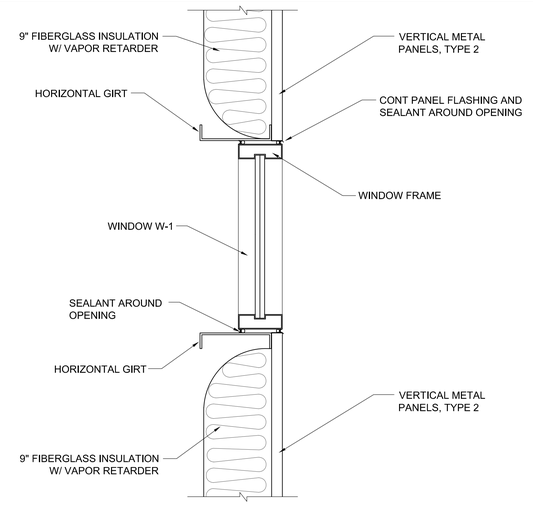
DETAIL
SCALE: 1 1/2" = 1'-0"
1 / A-4



DETAIL
SCALE: 1 1/2" = 1'-0"
2 / A-17



DETAIL- DUCT PENETRATION, TYP
SCALE: 1 1/2" = 1'-0"
3 / -



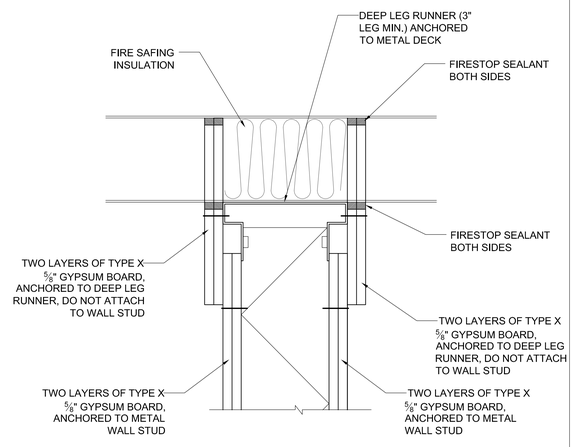
WINDOW W-2 DETAIL
SCALE: 1 1/2" = 1'-0"
4 / -

WINDOW W-1 DETAIL
SCALE: 1 1/2" = 1'-0"
5 / -

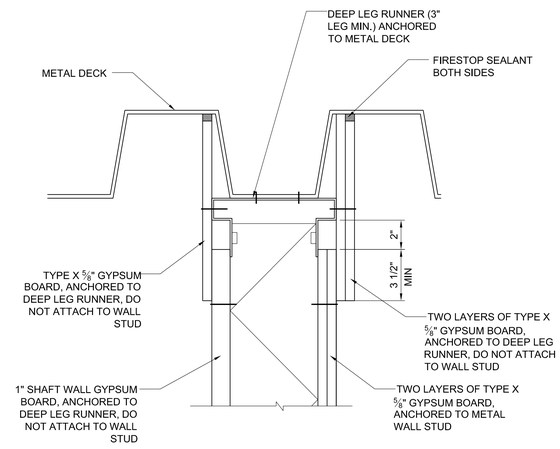
TYP ROOF CURB DET
SCALE: 1 1/2" = 1'-0"
6 / A-4

TYP ROOF VENT DET
SCALE: 1 1/2" = 1'-0"
7 / A-4

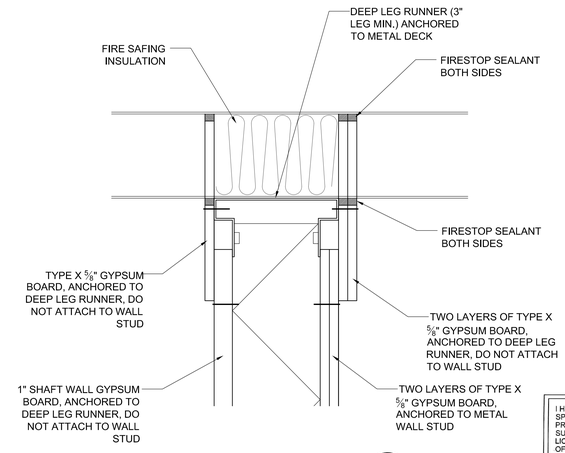
DETAIL
SCALE: 3" = 1'-0"
8 / A-28



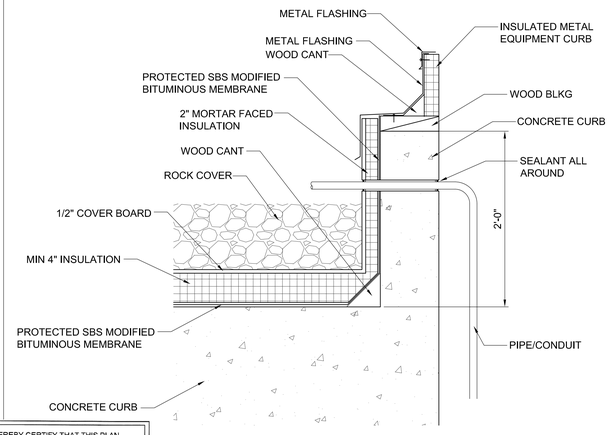
DETAIL
SCALE: 3" = 1'-0"
9 / A-28



DETAIL
SCALE: 3" = 1'-0"
10 / A-28



DETAIL
SCALE: 3" = 1'-0"
11 / A-28



TYP ROOF CURB DET
SCALE: 1 1/2" = 1'-0"
12 / A-5

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PRINT NAME: DUBRAVKA SRETENOVIC

SIGNATURE: Dubravka Sretenovic

DATE: 03/11/2009 LICENSE #46160

REV.	DATE	DESCRIPTIONS
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REVISIONS

Burns & McDonnell
SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	D. SRETENOVIC	03-11-09
DRAWN	D. SRETENOVIC	03-11-09
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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

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

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
BUILDING DETAILS

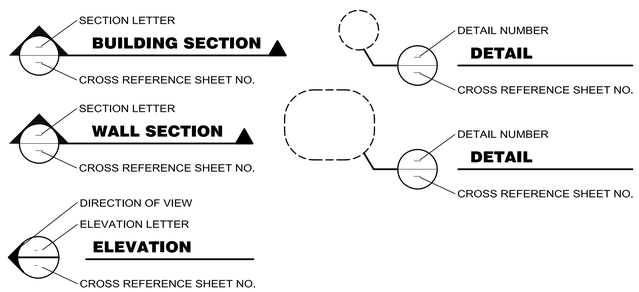
DRAWING NO. 15-1-3B A-29 REV. 0

11 MAR, 2009

ABBREVIATIONS

AA	-	ALUMINUM ASSOCIATION
AB	-	ANCHOR BOLT
ABT	-	ABOUT
ACI	-	AMERICAN CONCRETE INSTITUTE
ADH	-	ADHESIVE
AGGR	-	AGGREGATE
AHR	-	ANCHOR
AISC	-	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AISI	-	AMERICAN IRON AND STEEL INSTITUTE
AL	-	ALUMINUM
ALTN	-	ALTERNATE
ANSI	-	AMERICAN NATIONAL STANDARD INSTITUTE
APPROX	-	APPROXIMATE
ARCH	-	ARCHITECT
ASTM	-	AMERICAN SOCIETY FOR TESTING OF MATERIALS
AWS	-	AMERICAN WELDING SOCIETY
BC	-	BOLT CIRCLE
BETW	-	BETWEEN
BLDG	-	BUILDING
BM	-	BEAM
BOS	-	BOTTOM OF STEEL
BOT	-	BOTTOM
BRG	-	BEARING
BRKT	-	BRACKET
CAP	-	CAPACITY
C/C	-	CENTER TO CENTER
CF	-	CUBIC FEET
CHRK	-	CHECKER
CIP	-	CAST-IN-PLACE
CIR	-	CIRCLE
CJ	-	CONSTRUCTION JOINT
CL	-	CENTER LINE
CLJ	-	CONTROL JOINT
CLR	-	CLEAR
CMU	-	CONCRETE MASONRY UNIT
CO	-	CONCRETE OPENING
COL	-	COLUMN
CONC	-	CONCRETE
CONN	-	CONNECTION
CONT	-	CONTINUOUS
CONTR	-	CONTRACT
COORD	-	COORDINATE
COR	-	CORNER
CRSI	-	CONCRETE REINFORCING STEEL INSTITUTE
CTR	-	CENTER
CY	-	CUBIC YARD
DBL	-	DOUBLE
DET	-	DETAIL
DIA	-	DIAMETER
DIAG	-	DIAGONAL
DIM	-	DIMENSION
DK	-	DECKING
DL	-	DEAD LOAD
DN	-	DOWN
DWG	-	DRAWING
DWL	-	DOWEL
E	-	EAST
EA	-	EACH
ED	-	EQUIPMENT DRAIN
EF	-	EACH FACE
EJ	-	EXPANSION JOINT
EL	-	ELEVATION
ELEC	-	ELECTRICAL
ELEV	-	ELEVATOR
EMBED	-	EMBEDMENT
EQ	-	EQUAL
EQ SP	-	EQUALLY SPACED
EQUIP	-	EQUIPMENT
EQUIV	-	EQUIVALENT
EW	-	EACH WAY
EXIST	-	EXISTING
EXP	-	EXPANSION
EXT	-	EXTERIOR
FAB	-	FABRICATE
FD	-	FLOOR DRAIN
FDN	-	FOUNDATION
FF	-	FAR FACE
FL	-	FLOOR
FLG	-	FLANGE
FNSH	-	FINISH
FS	-	FAR SIDE
FT	-	FEET
FUT	-	FUTURE
GA	-	GAGE
GALV	-	GALVANIZE
GND	-	GROUND
GR	-	GRADE
GRTG	-	GRATING
H	-	HIGH
HEX	-	HEXAGON
HORIZ	-	HORIZONTAL
HPT	-	HIGH POINT
HR	-	HANDRAIL
HS	-	HIGH STRENGTH
IBC	-	INTERNATIONAL BUILDING CODE
ID	-	INSIDE DIAMETER
IF	-	INSIDE FACE
INTR	-	INTERIOR
INVT	-	INVERT
JT	-	JOINT
KB	-	KNEE BRACE
KPL	-	KICK PLATE
KSI	-	KIPS PER SQUARE INCH
LAD	-	LADDER
LB	-	POUND
L	-	LONG
LL	-	LIVE LOAD
LLH	-	LONG LEG HORIZONTAL
LLV	-	LONG LEG VERTICAL
LONG	-	LONGITUDINAL
LNTL	-	LINTEL
LPT	-	LOW POINT
LS	-	LAP SPLICE
MATL	-	MATERIAL
MAX	-	MAXIMUM
MECH	-	MECHANICAL
MEZZ	-	MEZZANINE
MFR	-	MANUFACTURER
MH	-	MANHOLE
MIN	-	MINIMUM
MISC	-	MISCELLANEOUS
MK	-	MARK
N	-	NORTH
NA	-	NOT APPLICABLE
NE	-	NORTHEAST
NF	-	NEAR FACE
NIC	-	NOT IN CONTRACT
NO	-	NUMBER
NOM	-	NOMINAL
NS	-	NEAR SIDE
NTS	-	NOT TO SCALE
NW	-	NORTHWEST
OC	-	ON CENTER
OD	-	OUTSIDE DIAMETER
OF	-	OUTSIDE FACE
OPNG	-	OPENING
OPP	-	OPPOSITE
OSHA	-	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OZ	-	OUNCE
PED	-	PEDESTAL
PEN	-	PENETRATE
PERP	-	PERPENDICULAR
PJNT	-	PROJECTION
PL	-	PLATE
PREFAB	-	PREFABRICATED
PSF	-	POUNDS PER SQUARE FOOT
PSI	-	POUNDS PER SQUARE INCH
PVC	-	POLYVINYL CHLORIDE
R	-	RISER
RAD	-	RADIUS
RD	-	ROOF DRAIN
REF	-	REFERENCE
REINF	-	REINFORCE
REQD	-	REQUIRED
REV	-	REVISION
RM	-	ROOM
S	-	SOUTH
SCHED	-	SCHEDULE
SE	-	SOUTHEAST
SECT	-	SECTION
SH	-	SHEET
SIM	-	SIMILAR
SLP	-	SLOPE
SLV	-	SLEEVE
SP	-	SPACE
SPEC	-	SPECIFICATION
SQ	-	SQUARE
SST	-	STAINLESS STEEL
STD	-	STANDARD
STIF	-	STIFFENER
STIR	-	STIRRUP
STL	-	STEEL
STR	-	STRAIGHT
STRL	-	STRUCTURAL
STRUC	-	STRUCTURE
SW	-	SOUTHWEST
SYMM	-	SYMMETRICAL
TEMP	-	TEMPORARY
THD	-	THREAD
THK	-	THICK
THRU	-	THROUGH
TOB	-	TOP OF BOLT
TOC	-	TOP OF CONCRETE
TOG	-	TOP OF GRATING
TOS	-	TOP OF STEEL
T&B	-	TOP & BOTTOM
TRD	-	TREAD
TYP	-	TYPICAL
UBC	-	UNIFORM BUILDING CODE
UNO	-	UNLESS NOTED OTHERWISE
VAR	-	VARIES
VERT	-	VERTICAL
W	-	WEST
W	-	WIDE
W/	-	WITH
WD	-	WIDTH
W/O	-	WITHOUT
WP	-	WORK POINT
WT	-	WEIGHT
WWF	-	WELDED WIRE FABRIC

LEGEND



GENERAL NOTES

1. GENERAL:
   - A. THESE NOTES, AND OTHER DRAWING NOTES CONTAINED WITHIN, ARE PROVIDED TO MEET SPECIFIC REQUIREMENTS AND TO SUPPLEMENT THE CONTRACT SPECIFICATIONS. THESE NOTES NEITHER REPLACE NOR OVERRIDE THE PROVISIONS AND REQUIREMENTS OF THE CONTRACT SPECIFICATIONS.
   - B. CONTRACTOR SHALL COORDINATE ALL STRUCTURAL WORK WITH WORK SHOWN ON ALL OTHER DRAWINGS.
   - C. CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF EXISTING CONSTRUCTION AND REPORT ANY DISCREPANCIES FROM THE CONTRACT (OR REFERENCE) DRAWINGS TO THE ENGINEER PRIOR TO COMMENCING WITH WORK. SCALING OF WORKING DIMENSIONS FROM THE STRUCTURAL DRAWINGS IS PROHIBITED.
   - D. CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MEANS AND METHODS OF CONSTRUCTION INCLUDING, BUT NOT LIMITED TO, SHORING AND TEMPORARY BRACING. CONTRACTOR SHALL UNDERTAKE ALL NECESSARY MEASURES TO ENSURE SAFETY OF ALL PERSONS AND STRUCTURES AT THE SITE AND ADJACENT TO THE SITE. VISITS TO THE SITE BY THE OWNER OR THE ENGINEER SHALL NOT RELIEVE THE CONTRACTOR OF SUCH RESPONSIBILITY.
   - E. IF CERTAIN FEATURES ARE NOT FULLY SHOWN OR CALLED FOR ON THE CONTRACT DRAWINGS OR SPECIFICATIONS, THEIR CONSTRUCTION SHALL BE OF THE SAME CHARACTER AS FOR SIMILAR CONDITIONS THAT ARE SHOWN OR CALLED FOR, WITH THE APPROVAL OF THE ENGINEER. WHERE SECTIONS VARY, CONTRACTOR SHALL PROVIDE FOR SMOOTH TRANSITIONS BETWEEN THEM, UNLESS NOTED OTHERWISE.
   - F. ALL PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS' WRITTEN INSTRUCTIONS AND RECOMMENDATIONS, UNLESS NOTED OTHERWISE.
2. DESIGN STANDARDS
   - A. PRINCIPAL CODE OF RECORD: INTERNATIONAL BUILDING CODE, 2006.
   - B. MINNESOTA STATE BUILDING CODE, 2007.
   - C. ASCE 7, MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, 2005.
   - D. ACI 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 2005.
   - E. ACI 530, BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES, 2002.
   - F. AISC MANUAL OF STEEL CONSTRUCTION, 13th EDITION.
3. DESIGN LOADS
   - A. DEAD LOADS:
     1. ROOFING AND INSULATION: 10 PSF
     2. CONCRETE ROOF: 150 PCF
     3. BARITE, LOOSE: 350 PCF
     4. GRATING: 10 PSF
     5. MOVEABLE PLATFORM: 7000 LBS, MAX
     6. EQUIPMENT LOADS: ACTUAL WEIGHT
   - B. LIVE LOADS:
     1. MINIMUM ROOF LIVE LOAD: 20 PSF
     2. FLOOR SLABS ON GRADE: 250 PSF
     3. ELEVATED PLATFORMS:
        - a. STEEL PLATFORM @ EL 1236'-6": 100 PSF
        - b. ALL OTHER PLATFORM LEVELS: 60 PSF
     4. MOVEABLE PLATFORM: 60 PSF
   - C. SNOW LOADS:
     1. GROUND SNOW LOAD: 60 PSF
     2. FLAT-ROOF SNOW LOAD: 42 PSF
   - D. WIND LOADS:
     1. BASIC WIND SPEED: 90 MPH 3-SECOND GUST
     2. IMPORTANCE FACTOR: 1.0
     3. EXPOSURE CATERGORY: C
     4. BUILDING CONDITION: ENCLOSED
     5. TOPOGRAPHIC FACTOR: 1.0
   - E. CRANE LOADS:
     1. 10 TON BRIDGE CRANES
        - a. VERTICAL WHEEL LOAD: 18 KIPS
        - b. IMPACT FACTOR: 25%
        - c. LATERAL LOAD: 4.5 KIPS TOTAL
        - d. LONGITUDINAL LOAD: 2 KIPS PER WHEEL
   - F. SEISMIC LOAD:
     1. NOT REQUIRED, PER MINNESOTA STATE BUILDING CODE.
4. GEOTECHNICAL INFORMATION
   - A. SOURCE: GEOTECHNICAL ENGINEERING REPORT FOR THE NUMI OFF-AXIS Ve, APPEARANCE EXPERIMENT, PREPARED ON MAY 8, 2007 BY SHORT ELLIOT HENDERICKSON, INC.
     1. UNIT WEIGHT FOR FINE AND COARSE GRAINED SOILS.
        - a. MOIST: 128 PCF
        - b. SATURATED: 134 PCF
     2. UNIT WEIGHT FOR BLAST/SHOT ROCK:
        - a. MOIST: 134 PCF
        - b. SATURATED: 138 PCF
   - B. LATERAL EARTH PRESSURE COEFFICIENTS
     1. FINE AND COURSE GRAINED SOILS:
        - a. AT-REST CONDITION: Ko: 0.47
        - b. ACTIVE CONDITION: Ka: 0.31
        - c. PASSIVE CONDITION: Kp: 3.25 (UNFACTORED)
     2. BLAST/SHOT ROCK:
        - a. AT-REST CONDITION: Ko: 0.36
        - b. ACTIVE CONDITION: Ka: 0.22
        - c. PASSIVE CONDITION: Kp: 4.60 (UNFACTORED)
   - C. SLAB, MAT, AND FOOTING DESIGN PARAMETERS
     1. MODULUS OF SUBGRADE REACTION:
        - a. ON FINE GRAINED SOILS: 150 PCI
        - b. ON COARSE GRAINED SOILS: 300 PCI
     2. ALLOWABLE BEARING CAPACITIES
        - a. ON BEDROCK: 190,000 PSF
        - b. ON FINE GRAINED SOILS: 2,000 PSF
        - c. ON COARSE GRAINED SOILS: 4,000 PSF
     3. FROST DEPTH:
        - a. HEATED STRUCTURES: 5'-0"
        - b. UNHEATED STRUCTURES: 7'-0"
     4. CONCRETE-SOIL COEFFICIENT OF FRICTION: 0.45
     5. CONCRETE-ROCK COEFFICIENT OF FRICTION: 0.7
     6. MINIMUM REQUIRED STABILITY FACTORS OF SAFETY:
        - a. OVERTURNING: 1.5
        - b. UPLIFTING: 1.5
        - c. SLIDING: 1.5
   - D. CONCRETE INFORMATION
     1. SEE SPECIFICATIONS FOR CONCRETE INFORMATION.

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PRINT NAME: KEVIN V. COMO

SIGNATURE:

DATE: 03/11/2009 LICENSE #46236

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REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

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DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

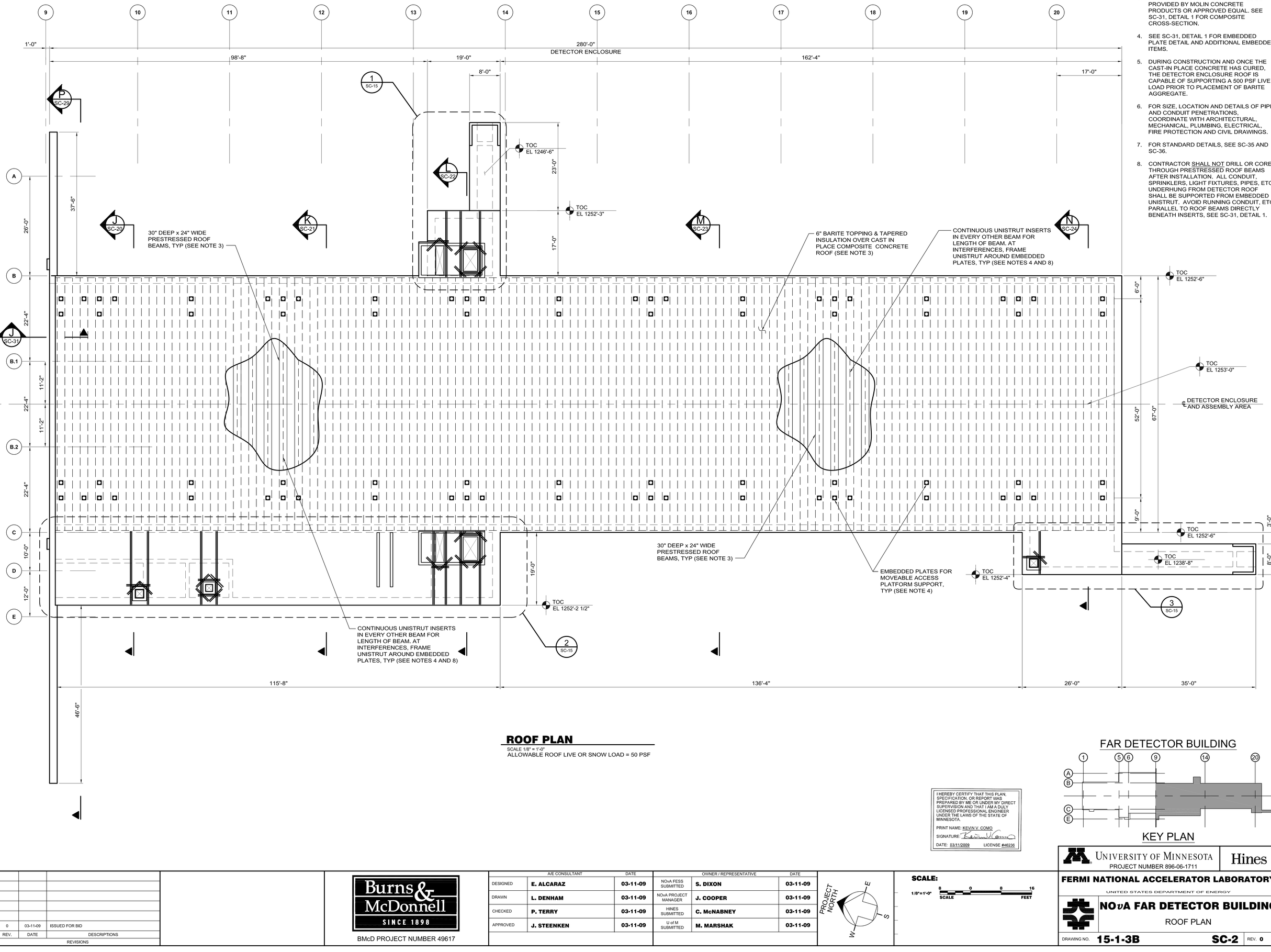
GENERAL NOTES & ABBREVIATIONS

DRAWING NO. **15-1-3B** **SC-1** REV. **0**

11 MAR, 2009

NOTES:

1. FOR ABBREVIATIONS AND GENERAL NOTES, SEE SC-1.
2. FOR EXACT BUILDING LOCATION AND ORIENTATION, SEE CIVIL DRAWINGS.
3. PRESTRESSED ROOF BEAMS SHALL BE PROVIDED BY MOLIN CONCRETE PRODUCTS OR APPROVED EQUAL. SEE SC-31, DETAIL 1 FOR COMPOSITE CROSS-SECTION.
4. SEE SC-31, DETAIL 1 FOR EMBEDDED PLATE DETAIL AND ADDITIONAL EMBEDDED ITEMS.
5. DURING CONSTRUCTION AND ONCE THE CAST-IN PLACE CONCRETE HAS CURED, THE DETECTOR ENCLOSURE ROOF IS CAPABLE OF SUPPORTING A 500 PSF LIVE LOAD PRIOR TO PLACEMENT OF BARITE AGGREGATE.
6. FOR SIZE, LOCATION AND DETAILS OF PIPE AND CONDUIT PENETRATIONS, COORDINATE WITH ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION AND CIVIL DRAWINGS.
7. FOR STANDARD DETAILS, SEE SC-35 AND SC-36.
8. CONTRACTOR SHALL NOT DRILL OR CORE THROUGH PRESTRESSED ROOF BEAMS AFTER INSTALLATION. ALL CONDUIT, SPRINKLERS, LIGHT FIXTURES, PIPES, ETC. UNDERHUNG FROM DETECTOR ROOF SHALL BE SUPPORTED FROM EMBEDDED UNISTRUT. AVOID RUNNING CONDUIT, ETC. PARALLEL TO ROOF BEAMS DIRECTLY BENEATH INSERTS, SEE SC-31, DETAIL 1.



ROOF PLAN

SCALE 1/8" = 1'-0"
ALLOWABLE ROOF LIVE OR SNOW LOAD = 50 PSF

FAR DETECTOR BUILDING

KEY PLAN

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PRINT NAME: KEVIN V. COMO
SIGNATURE:
DATE: 03/11/2009 LICENSE #46236

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Burns & McDonnell SINCE 1898

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APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

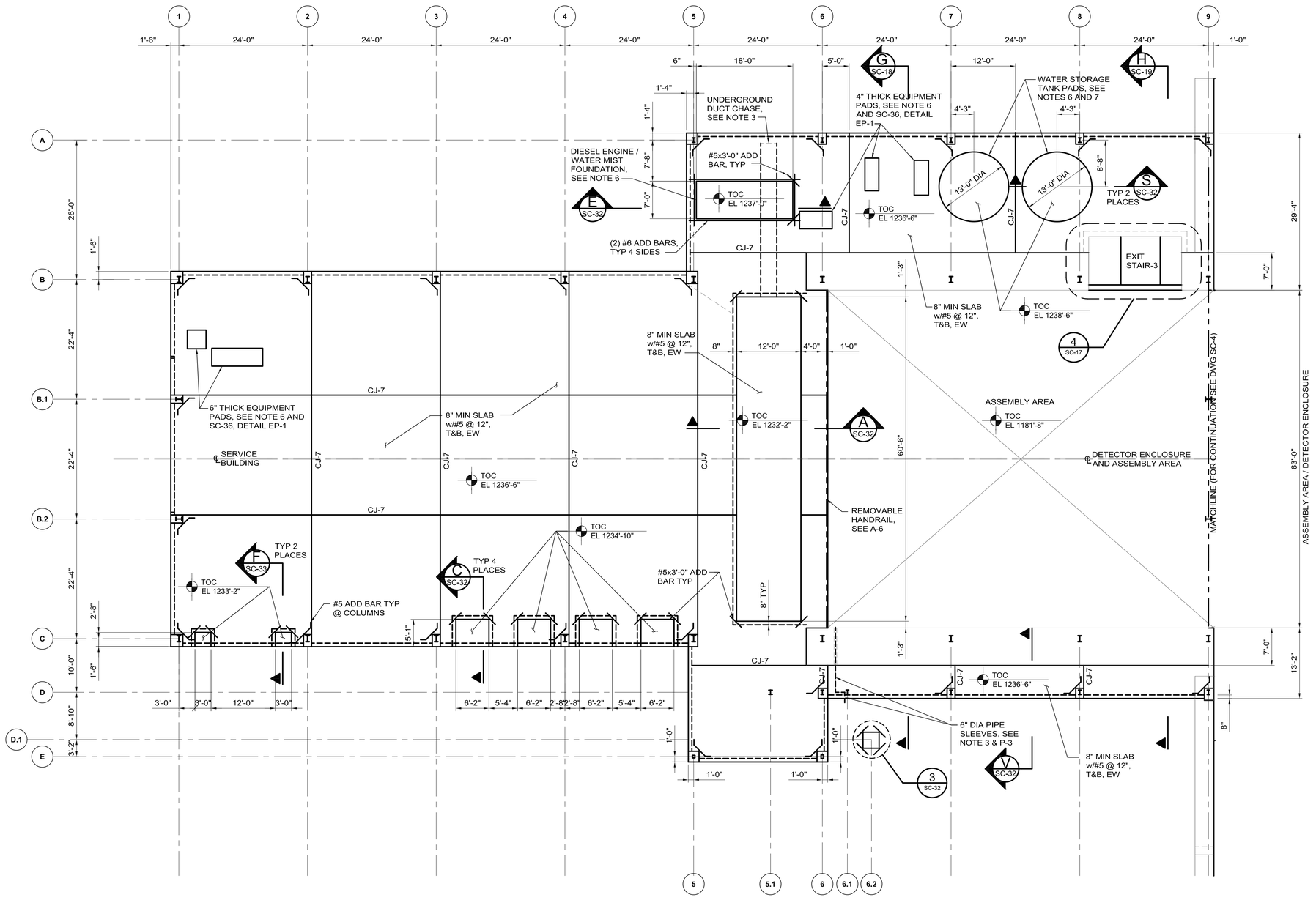
NOvA FAR DETECTOR BUILDING
ROOF PLAN

DRAWING NO. 15-1-3B SC-2 REV. 0

11 MAR, 2009

NOTES:

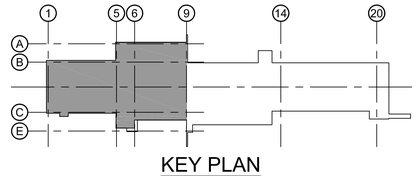
1. FOR ABBREVIATIONS AND GENERAL NOTES, SEE SC-1.
2. FOR EXACT BUILDING LOCATION AND ORIENTATION, SEE CIVIL DRAWINGS.
3. FOR SIZE, LOCATION AND DETAILS OF PIPE AND CONDUIT PENETRATIONS, COORDINATE WITH ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION AND CIVIL DRAWINGS. SEE SC-36, DETAIL CO-9 FOR PIPE SLEEVE DETAIL.
4. FOR STANDARD DETAILS, SEE SC-35 AND SC-36.
5. CONSTRUCTION JOINTS SHALL BE LOCATED AS SHOWN, SEE SC-36, DETAIL CJ-7.
6. CONTRACTOR SHALL COORDINATE EXACT SIZE AND LOCATION OF FOUNDATION AND EQUIPMENT PADS WITH EQUIPMENT PURCHASED.
7. CONTRACTOR SHALL VERIFY HEIGHT OF PAD WILL BE ADEQUATE TO PROVIDE FLOODED SUCTION FOR FEED PUMP (SEE FP-6).



SLAB PLAN @ EL 1236'-6" UNO

SCALE 1/8" = 1'-0"

FAR DETECTOR BUILDING



KEY PLAN

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SIGNATURE:

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

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

8 0 8 16

SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

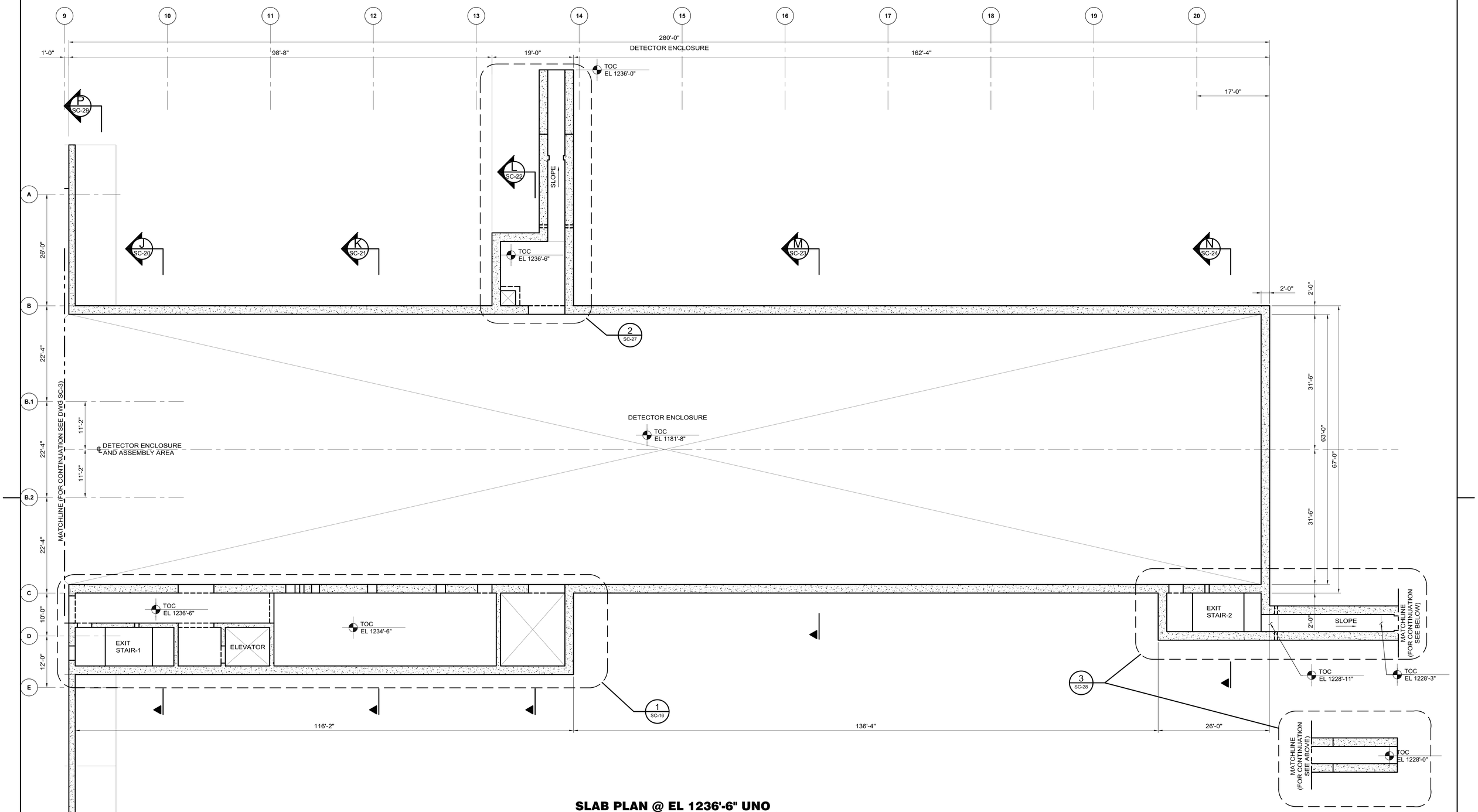
SLAB PLAN EL 1236'-6" 1 OF 2

DRAWING NO. **15-1-3B** **SC-3** REV. **0**

11 MAR, 2009

NOTE:

1. SEE NOTES ON SC-3.



SLAB PLAN @ EL 1236'-6" UNO

SCALE 1/8"=1'-0"

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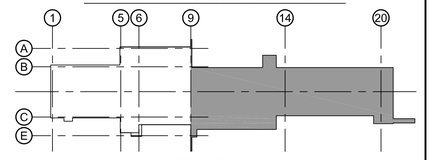

KEY PLAN

UNIVERSITY OF MINNESOTA
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PROJECT NORTH

SCALE:

1/8"=1'-0" SCALE 8 0 8 16 FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

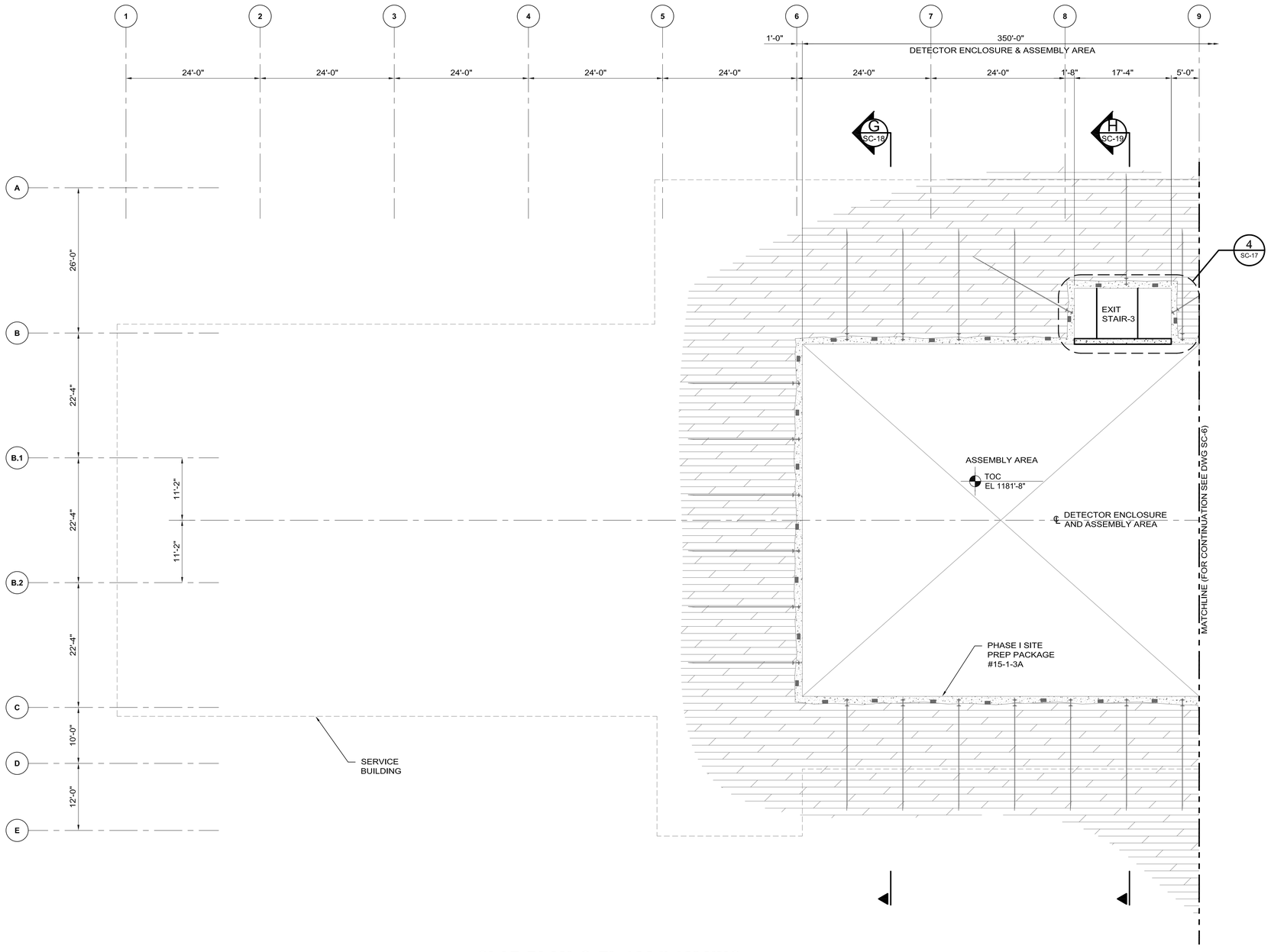
SLAB PLAN EL 1236'-6" 2 OF 2

DRAWING NO. 15-1-3B SC-4 REV. 0

11 MAR, 2009

NOTES:

1. FOR ABBREVIATIONS AND GENERAL NOTES, SEE SC-1.
2. FOR EXACT BUILDING LOCATION AND ORIENTATION, SEE CIVIL DRAWINGS.
3. FOR SIZE, LOCATION AND DETAILS OF PIPE AND CONDUIT PENETRATIONS, COORDINATE WITH ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION AND CIVIL DRAWINGS. SEE SC-36, DETAIL CO-9 FOR PIPE SLEEVE DETAIL.
4. DIMENSIONS ARE TO THE INSIDE FACE OF THE CONCRETE WALLS.
5. SEE SC-30 AND SC-35 FOR WALL REINFORCEMENT REQUIREMENTS.
6. FOR STANDARD DETAILS, SEE SC-35 AND SC-36.



SLAB PLAN @ EL 1224'-10" UNO

SCALE 1/8"=1'-0"

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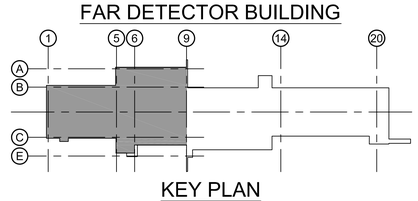
FAR DETECTOR BUILDING



KEY PLAN

UNIVERSITY OF MINNESOTA
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PROJECT NORTH

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

8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

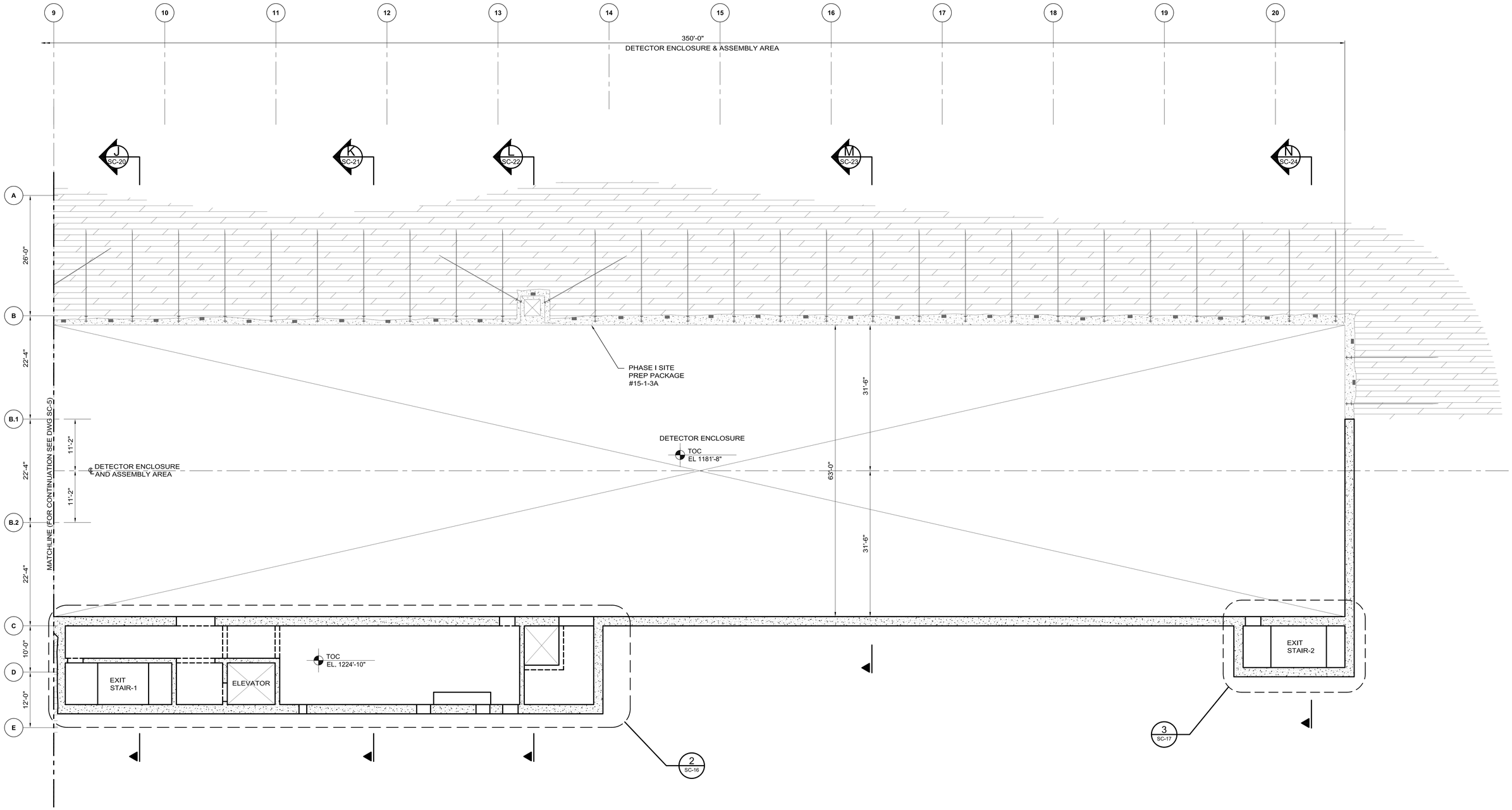
SLAB PLAN EL 1224'-10" 1 OF 2

DRAWING NO. 15-1-3B SC-5 REV. 0

11 MAR, 2009

NOTE:

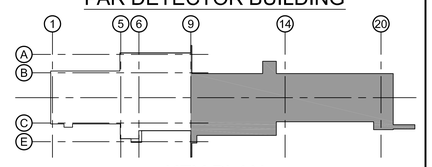
1. SEE NOTES ON SC-5.



SLAB PLAN @ EL 1224'-10" UNO

SCALE 1/8"=1'-0"

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE: 1/8"=1'-0" (0 8 16 FEET)

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

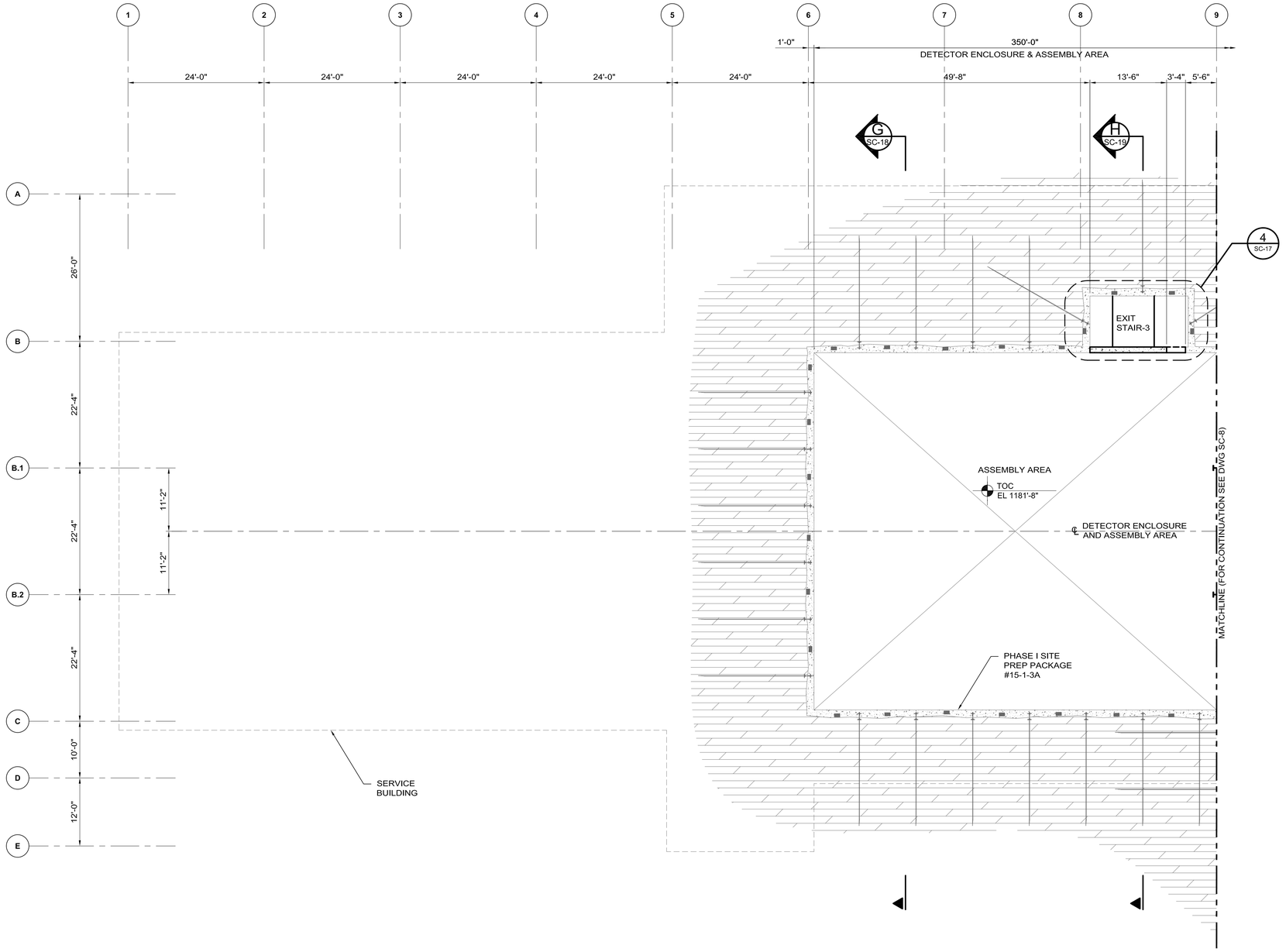
SLAB PLAN EL 1224'-10" 2 OF 2

DRAWING NO. 15-1-3B SC-6 REV. 0

11 MAR, 2009

NOTE:

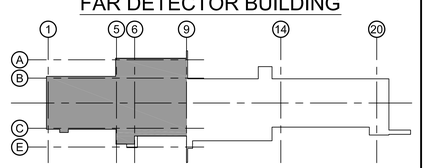
1. SEE NOTES ON SC-5.



SLAB PLAN @ EL 1206'-10" UNO

SCALE 1/8"=1'-0"

FAR DETECTOR BUILDING



KEY PLAN

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PRINT NAME: KEVIN V. COMO

SIGNATURE:

DATE: 03/11/2009 LICENSE #46236

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	E. ALCARAZ	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

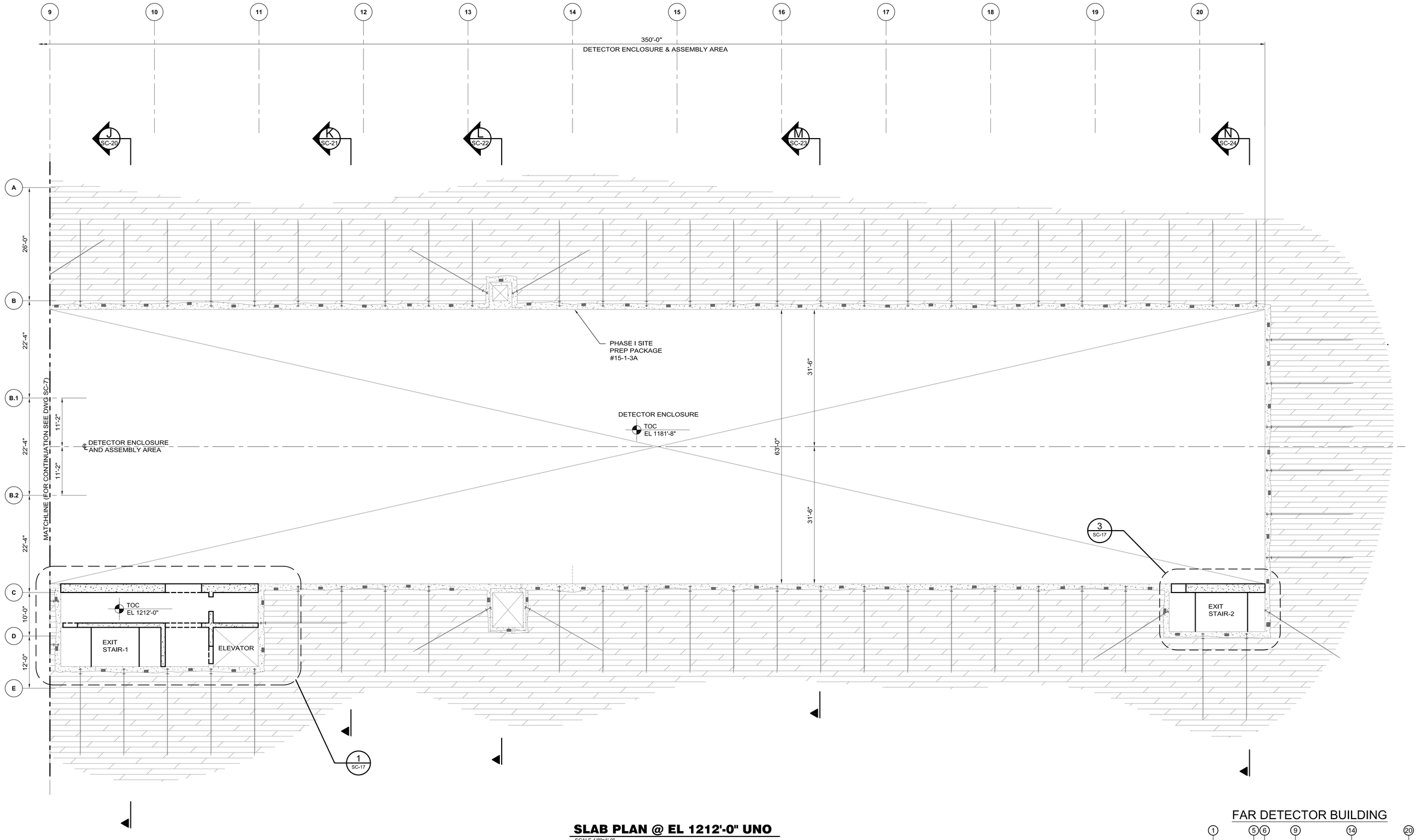
SLAB PLAN EL 1206'-10"

DRAWING NO. 15-1-3B SC-7 REV. 0

11 MAR, 2009

NOTE:

1. SEE NOTES ON SC-5.



SLAB PLAN @ EL 1212'-0" UNO

SCALE 1/8"=1'-0"

FAR DETECTOR BUILDING

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0"

0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

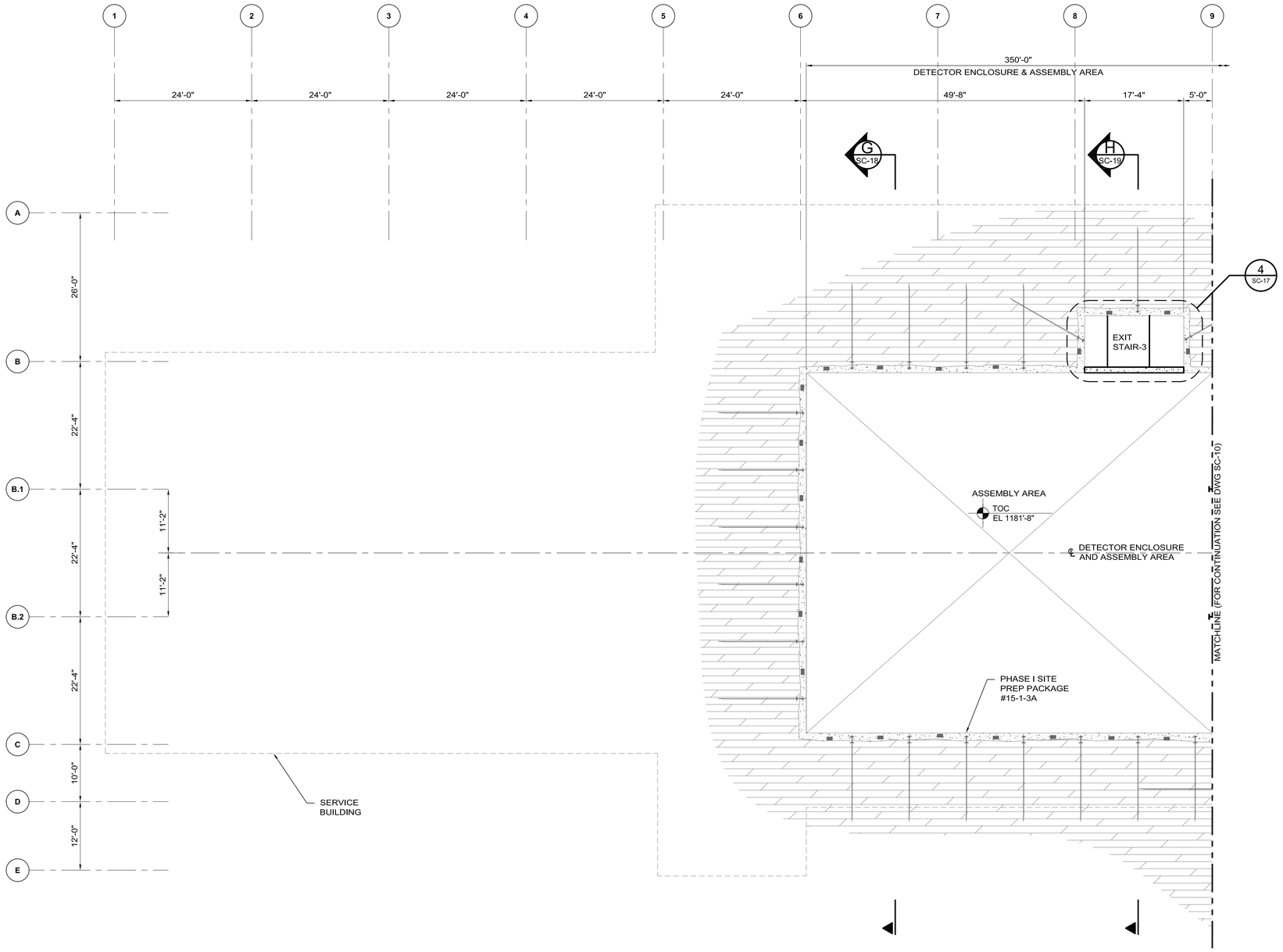
SLAB PLAN EL 1212'-0"

DRAWING NO. 15-1-3B SC-8 REV. 0

11 MAR, 2009

NOTE:

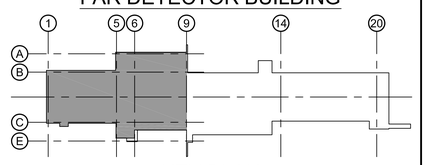
1. SEE NOTES ON SC-5.



SLAB PLAN @ EL 1196'-10" UNO

SCALE 1/8"=1'-0"

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

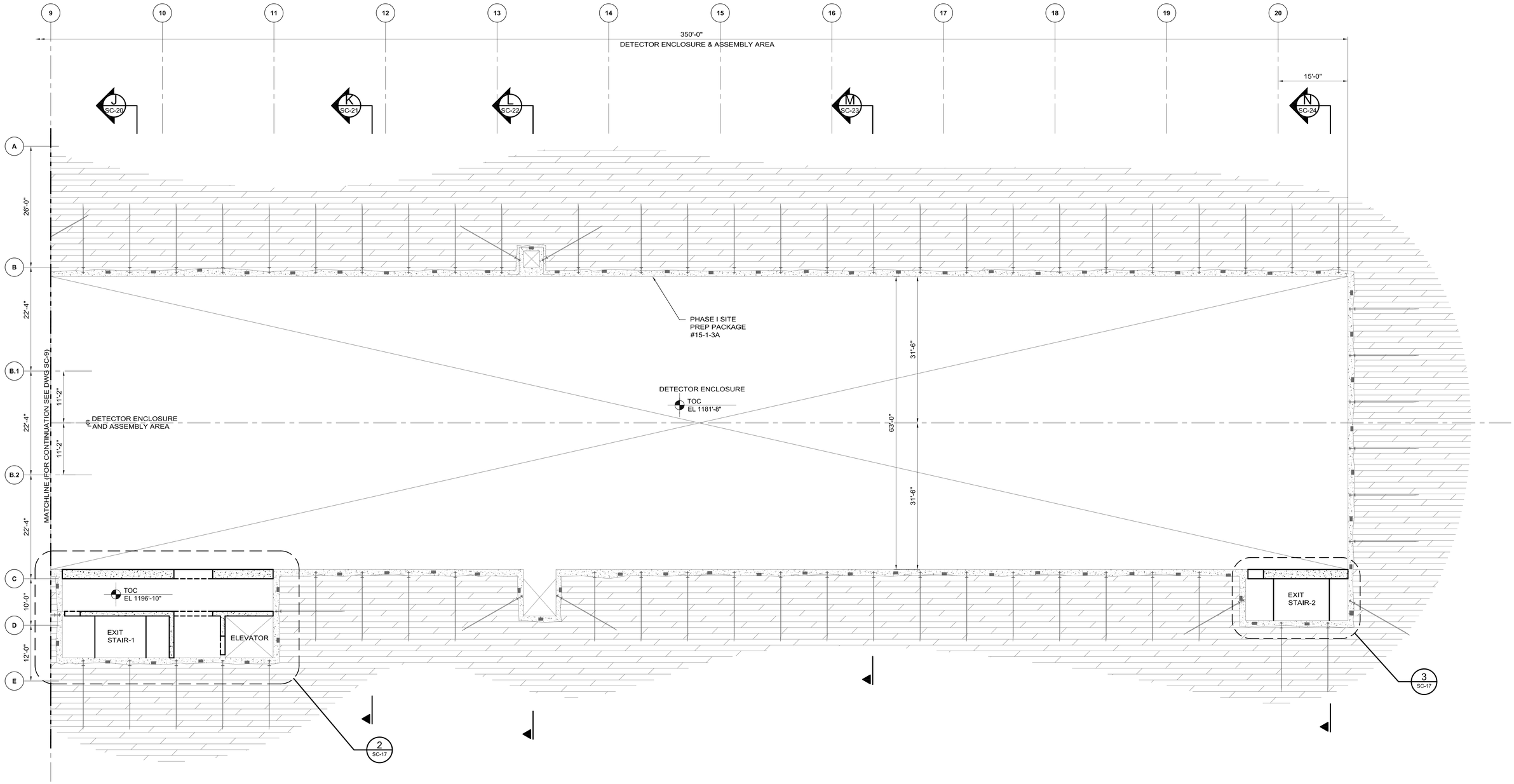
SLAB PLAN EL 1196'-10" 1 OF 2

DRAWING NO. 15-1-3B SC-9 REV. 0

11 MAR, 2009

NOTE:

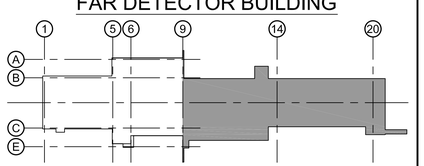
1. SEE NOTES ON SC-5.



SLAB PLAN @ EL 1196'-10" UNO

SCALE 1/8"=1'-0"

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" (8 0 8 16 SCALE FEET)

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

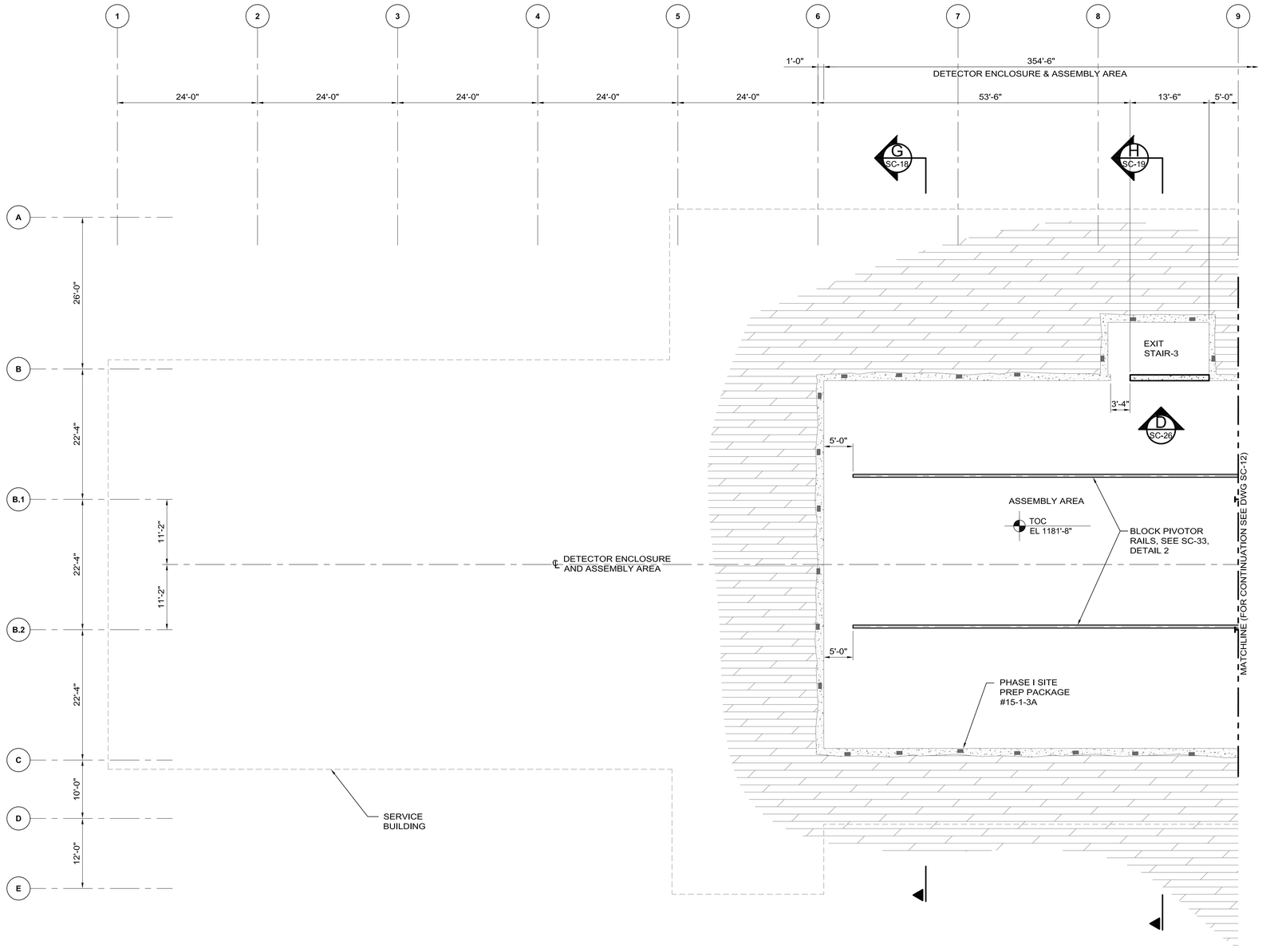
SLAB PLAN EL 1196'-10" 2 OF 2

DRAWING NO. 15-1-3B SC-10 REV. 0

11 MAR, 2009

NOTE:

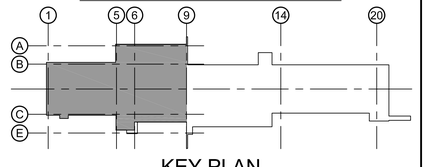
1. SEE NOTES ON SC-5.



SLAB PLAN @ EL 1181'-8"

SCALE 1/8"=1'-0"

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

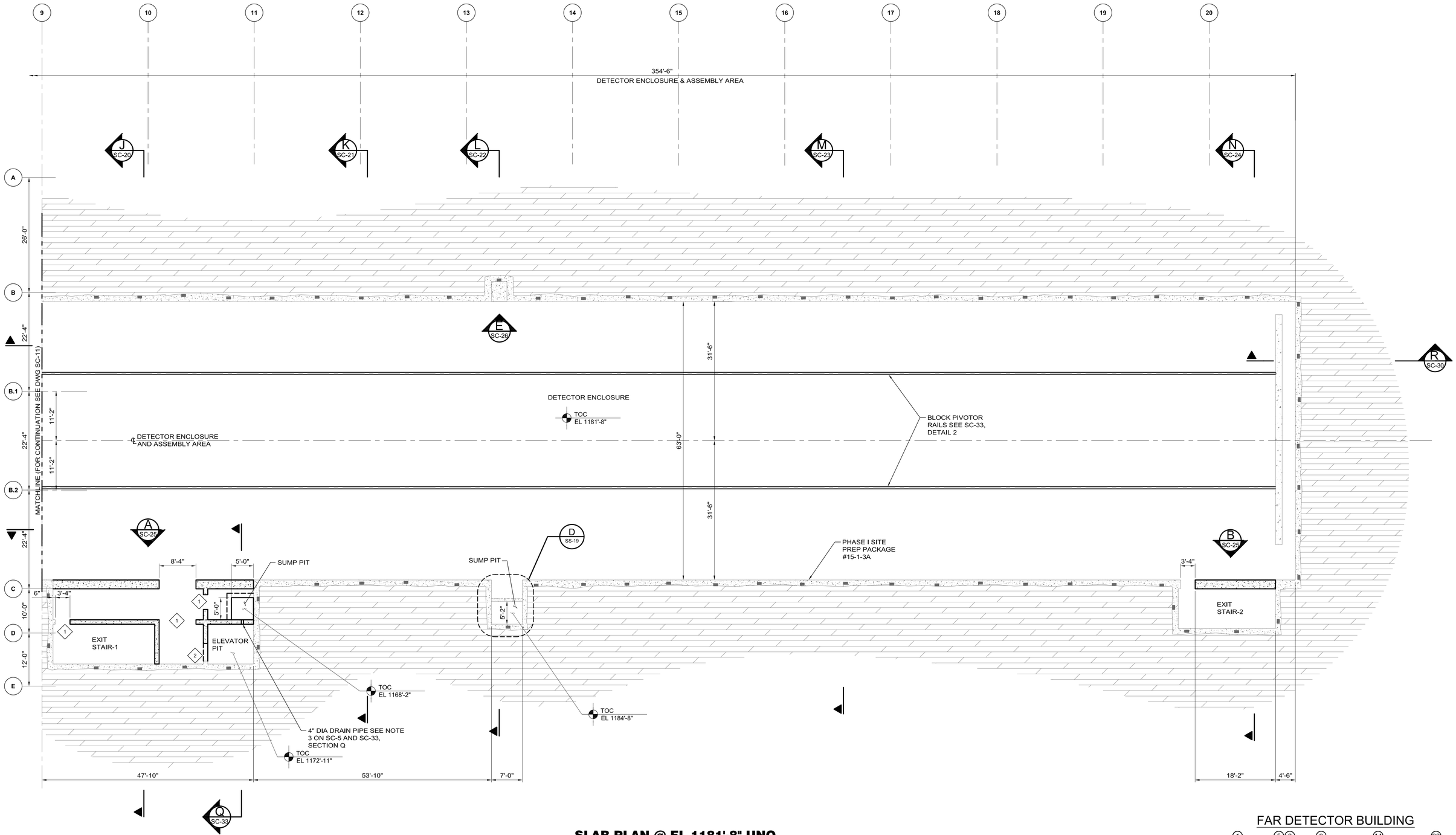
SLAB PLAN EL 1181'-8" 1 OF 2

DRAWING NO. 15-1-3B SC-11 REV. 0

11 MAR, 2009

NOTES:

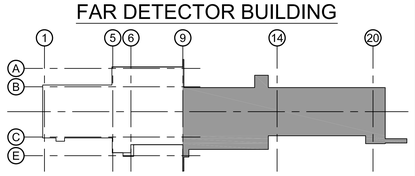
1. SEE NOTES ON SC-5.
2. (#) SEE SC-16 FOR KEYED NOTES.



SLAB PLAN @ EL 1181'-8" UNO

SCALE 1/8"=1'-0"

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" (8 0 8 16 SCALE FEET)

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

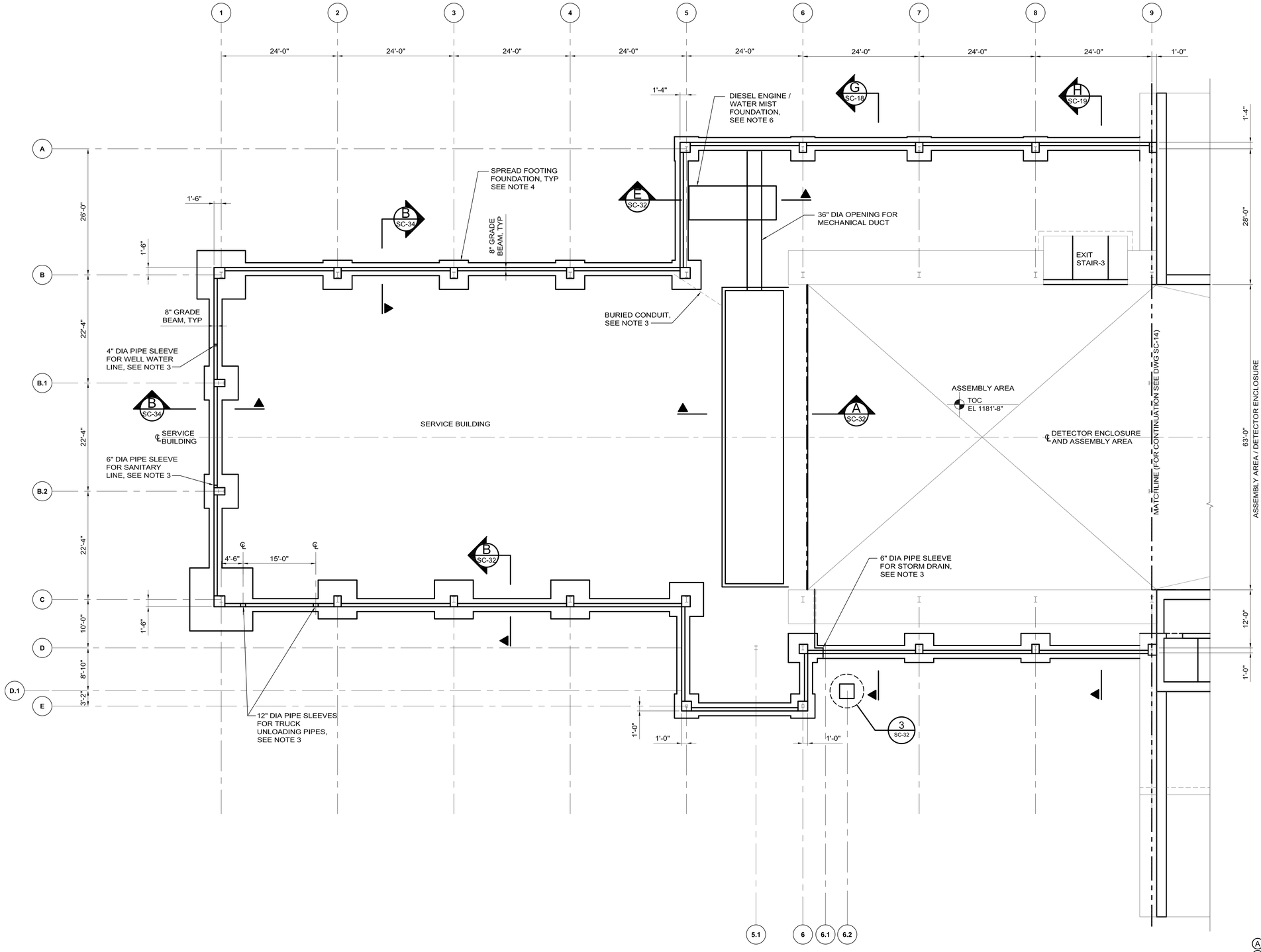
SLAB PLAN EL 1181'-8" 2 OF 2

DRAWING NO. 15-1-3B SC-12 REV. 0

11 MAR, 2009

NOTES:

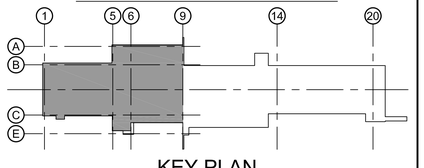
1. FOR ABBREVIATIONS AND GENERAL NOTES, SEE SC-1.
2. FOR EXACT BUILDING LOCATION AND ORIENTATION, SEE CIVIL DRAWINGS.
3. FOR SIZE, LOCATION AND DETAILS OF PIPE AND CONDUIT PENETRATIONS, COORDINATE WITH ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION AND CIVIL DRAWINGS. SEE SC-36, DETAIL CO-9 FOR PIPE SLEEVE DETAIL.
4. SEE SC-34 FOR FOUNDATION SCHEDULE AND DETAILS. COORDINATE THIS DRAWING WITH SC-3, SLAB PLAN.
5. FOR STANDARD DETAILS, SEE SC-35 AND SC-36.
6. CONTRACTOR SHALL COORDINATE EXACT SIZE AND LOCATION OF FOUNDATION WITH EQUIPMENT PURCHASED.



FOUNDATION PLAN

SCALE 1/8" = 1'-0"

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0"

8 0 8 16

SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

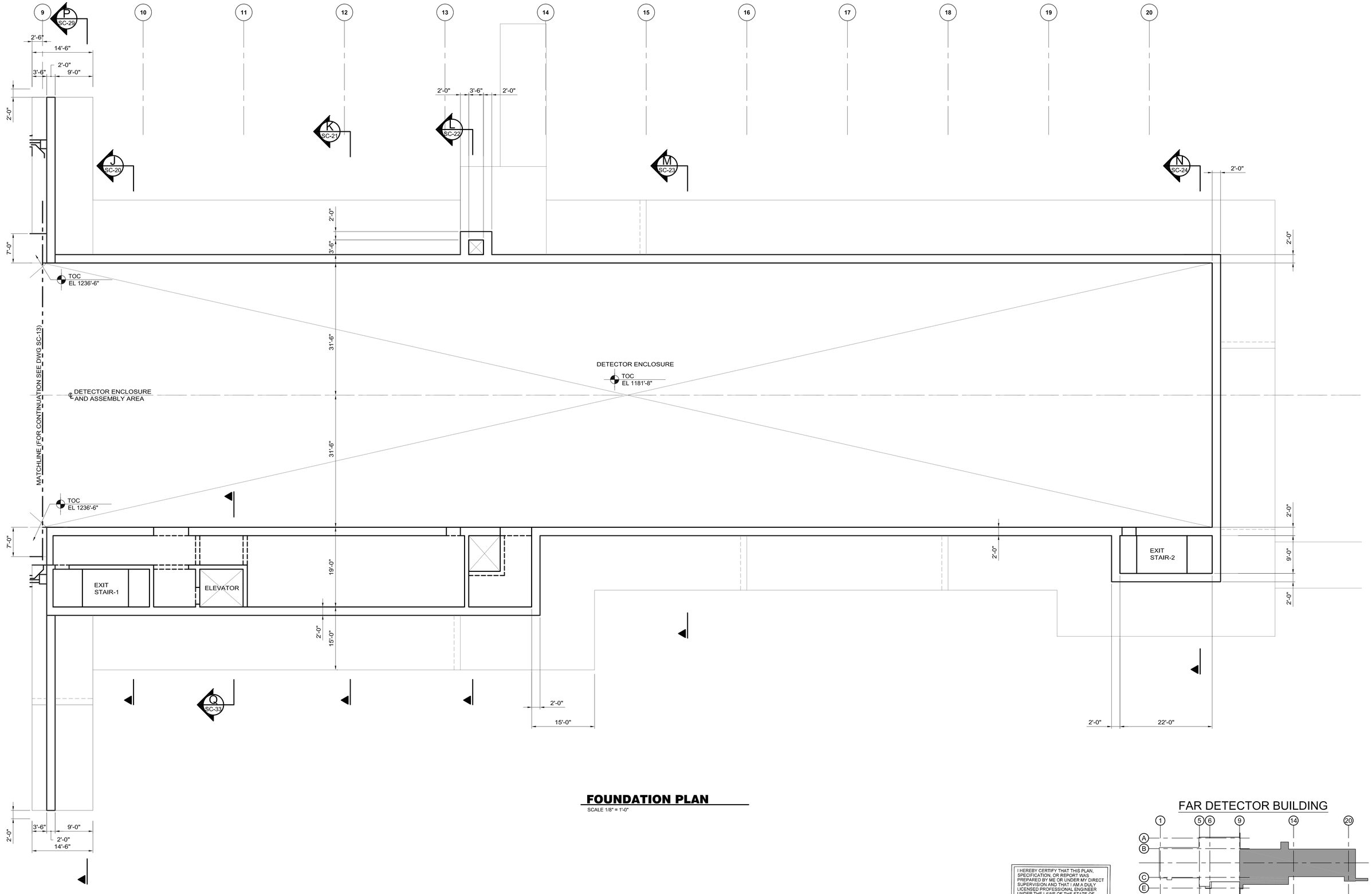
FOUNDATION PLAN 1 OF 2

DRAWING NO. 15-1-3B SC-13 REV. 0

11 MAR, 2009

NOTE:

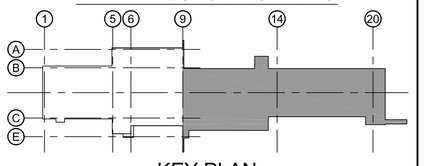
1. SEE NOTES ON SC-5.



FOUNDATION PLAN

SCALE 1/8" = 1'-0"

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

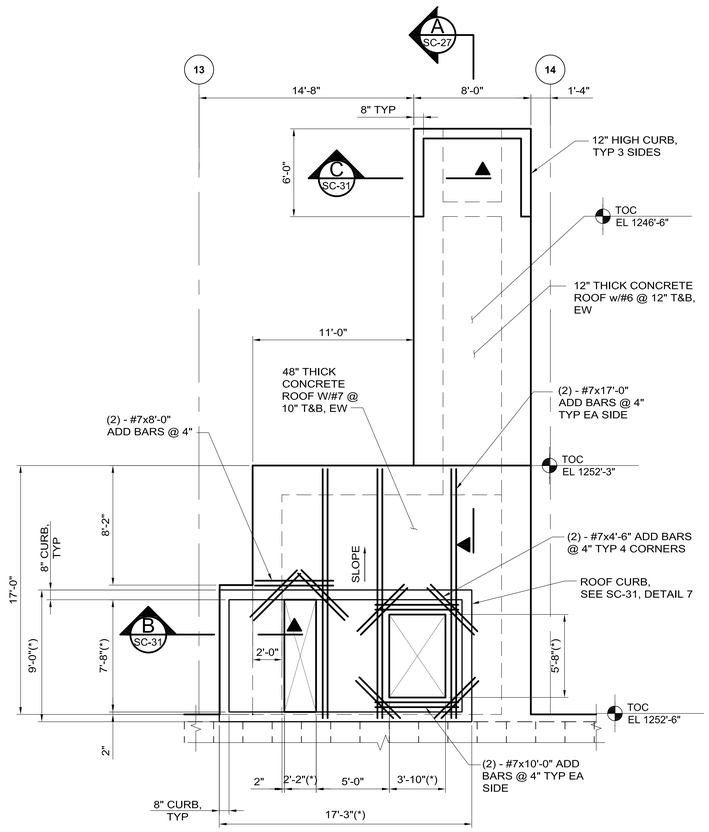
FOUNDATION PLAN 2 OF 2

DRAWING NO. 15-1-3B SC-14 REV. 0

11 MAR, 2009

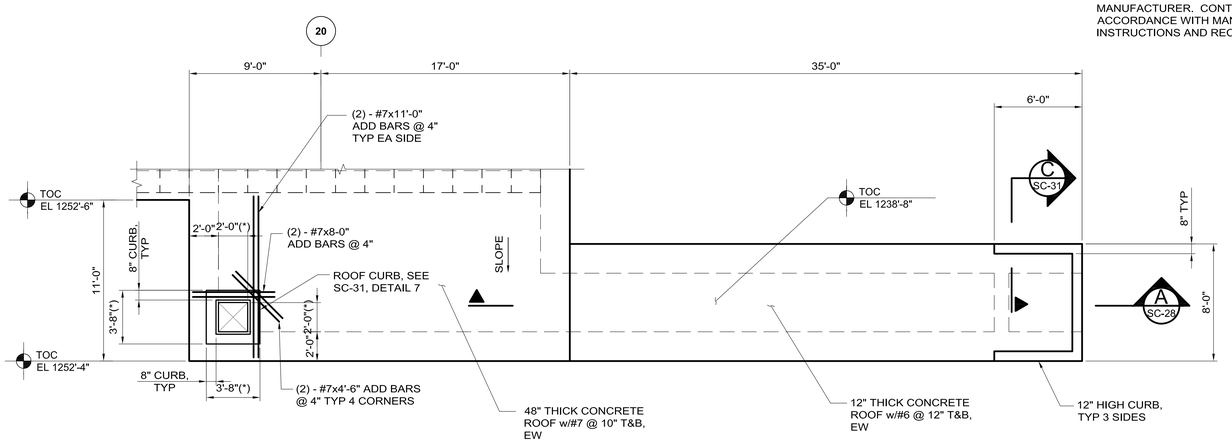
NOTES:

1. FOR ABBREVIATIONS AND GENERAL NOTES, SEE SC-1.
2. FOR EXACT BUILDING LOCATION AND ORIENTATION, SEE CIVIL DRAWINGS.
3. FOR SIZE, LOCATION AND DETAILS OF PIPE AND CONDUIT PENETRATIONS, COORDINATE WITH ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION AND CIVIL DRAWINGS. SEE SC-36, DETAIL CO-9 FOR PIPE SLEEVE DETAIL.
4. FOR STANDARD DETAILS, SEE SC-35 AND SC-36.
5. (*) INDICATES THAT CONTRACTOR SHALL COORDINATE DIMENSIONS OF ROOF CURB AND SIZE OF PENETRATIONS WITH SELECTED MANUFACTURER. CONTRACTOR SHALL INSTALL IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND RECOMMENDATIONS.



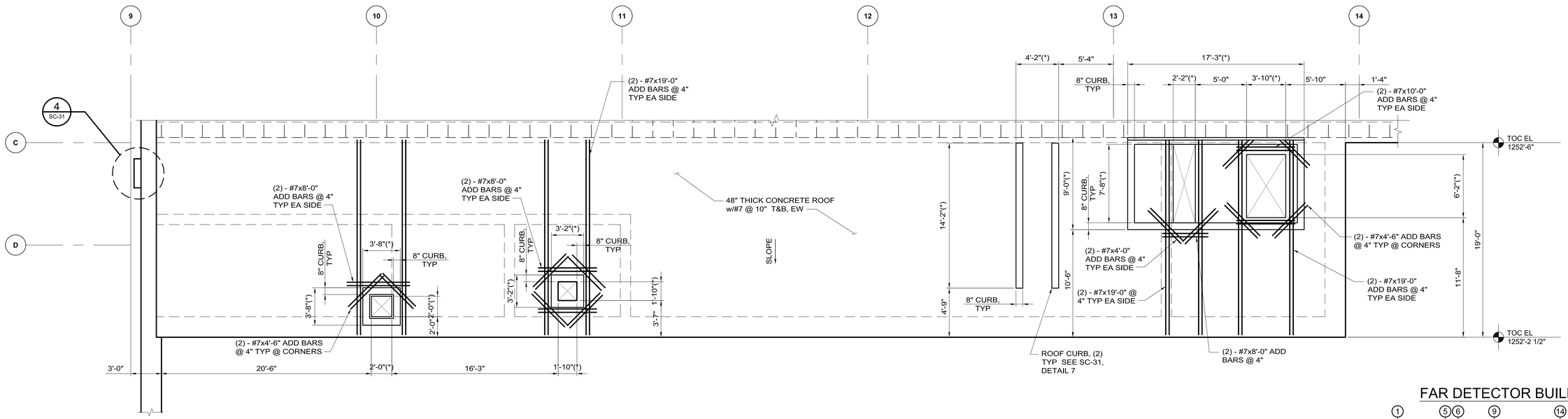
ENLARGED ROOF PLAN 1 SC-2

SCALE 1/4" = 1'-0"



ENLARGED ROOF PLAN 3 SC-2

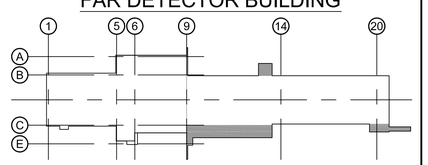
SCALE 1/4" = 1'-0"



ENLARGED ROOF PLAN 2 SC-2

SCALE 1/4" = 1'-0"

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/4"=1'-0" (4 0 4 8 FEET)

FERMI NATIONAL ACCELERATOR LABORATORY

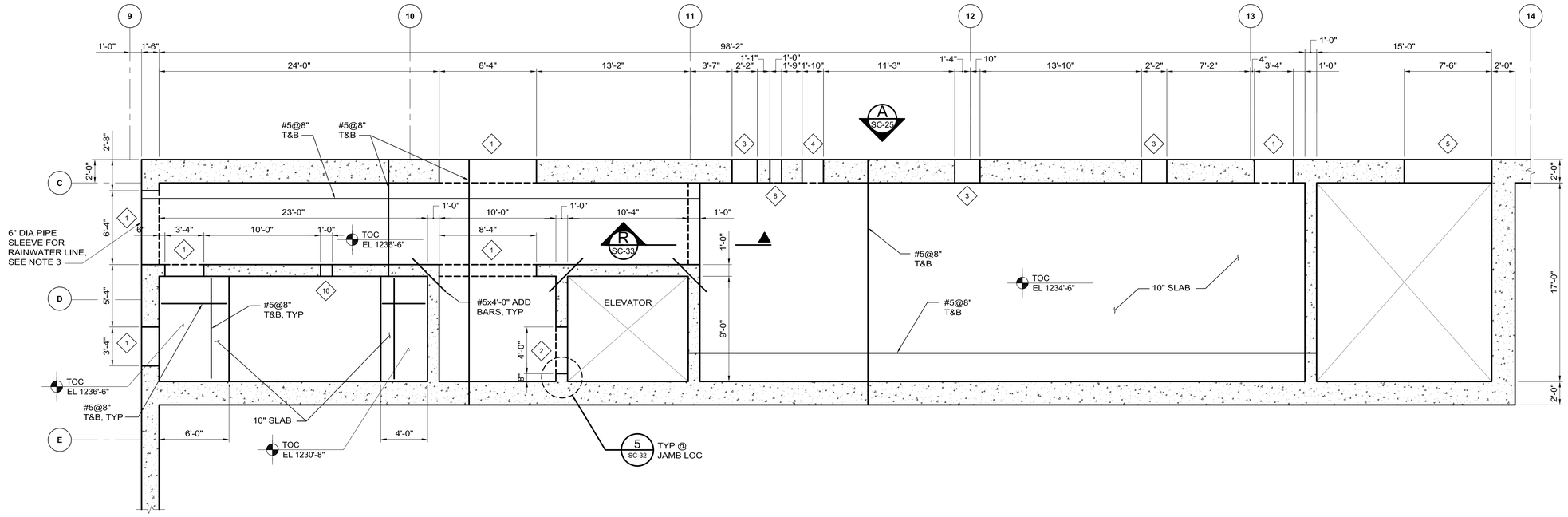
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ENLARGED ROOF PLANS

DRAWING NO. 15-1-3B | SC-15 | REV. 0

11 MAR, 2009



ENLARGED SLAB PLAN @ EL 1236'-6" & 1234'-6" UNO

1 SC-4

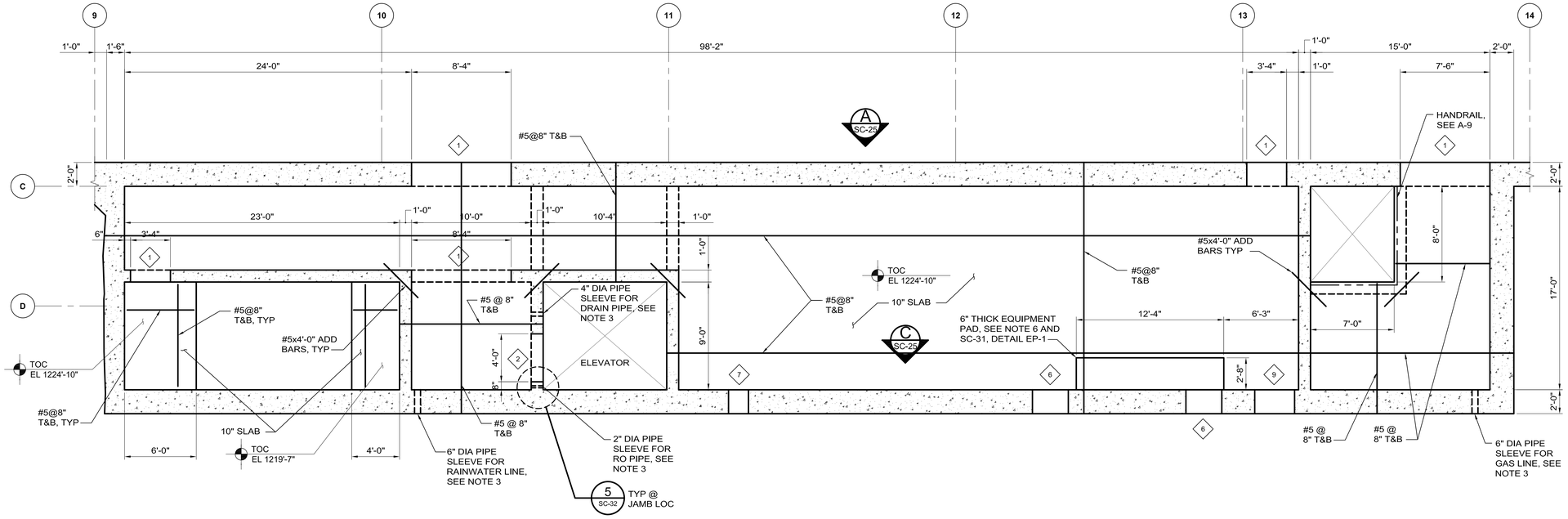
SCALE 1/4" = 1'-0"

NOTES:

1. FOR ABBREVIATIONS AND GENERAL NOTES, SEE SC-1.
2. FOR EXACT BUILDING LOCATION AND ORIENTATION, SEE CIVIL DRAWINGS.
3. FOR SIZE, LOCATION AND DETAILS OF PIPE AND CONDUIT PENETRATIONS, COORDINATE WITH ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION AND CIVIL DRAWINGS. SEE SC-36, DETAIL CO-9 FOR PIPE SLEEVE DETAIL.
4. ◇# SEE BELOW FOR KEYED NOTES.
5. FOR STANDARD DETAILS, SEE SC-35 AND SC-36.
6. CONTRACTOR SHALL COORDINATE EXACT SIZE AND LOCATION OF EQUIPMENT PAD WITH EQUIPMENT PURCHASED.

KEYED NOTES:

1. 8'-0" HIGH OPENING, SILL ELEVATION 0'-0" ABOVE FINISHED FLOOR.
2. OPENING HEIGHT TO BE COORDINATED WITH ELEVATOR MANUFACTURER, SILL ELEVATION 0'-0" ABOVE FINISHED FLOOR.
3. 1'-6" HIGH OPENING, SILL ELEVATION 7'-10" ABOVE FINISHED FLOOR.
4. 1'-7" HIGH OPENING, SILL ELEVATION 8'-7" ABOVE FINISHED FLOOR.
5. 3'-10" HIGH OPENING, SILL ELEVATION 6'-2" ABOVE FINISHED FLOOR.
6. 1'-8" HIGH OPENING, SILL ELEVATION 6'-2" ABOVE FINISHED FLOOR.
7. 1'-0" HIGH OPENING, SILL ELEVATION 6'-10" ABOVE FINISHED FLOOR.
8. 1'-9" HIGH OPENING, SILL ELEVATION 8'-5" ABOVE FINISHED FLOOR.
9. 1'-8" HIGH OPENING, SILL ELEVATION 6'-8" ABOVE FINISHED FLOOR.
10. 1'-0" HIGH OPENING, SILL ELEVATION 6'-5" ABOVE FINISHED FLOOR.

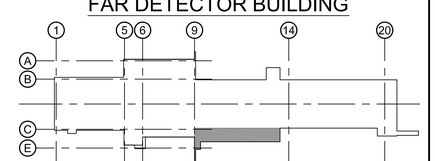


ENLARGED SLAB PLAN @ EL 1224'-10" UNO

2 SC-6

SCALE 1/4" = 1'-0"

FAR DETECTOR BUILDING



KEY PLAN

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO

SIGNATURE:

DATE: 03/11/2009 LICENSE #46236

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE
DESIGNED	E. ALCARAZ	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

	OWNER / REPRESENTATIVE	DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

UNIVERSITY OF MINNESOTA | Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

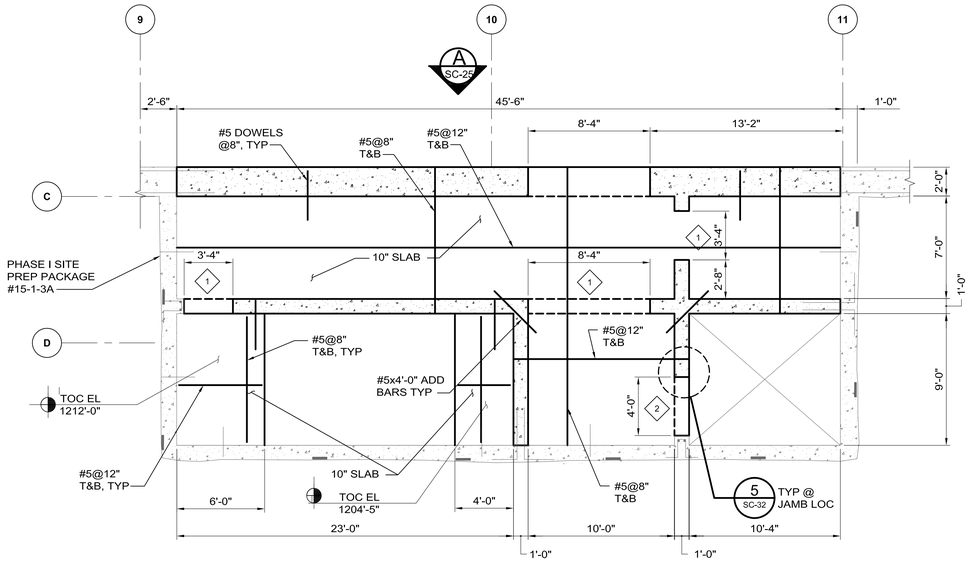
ENLARGED SLAB PLANS - 1

DRAWING NO. 15-1-3B SC-16 REV. 0

11 MAR, 2009

NOTES:

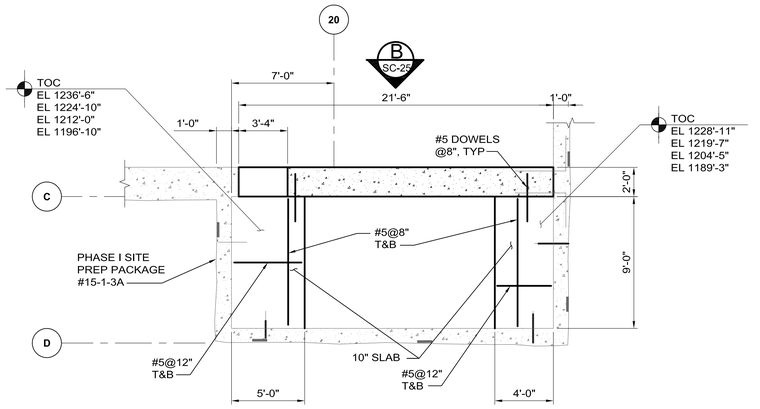
1. SEE NOTES ON SC-16.
2. (#) SEE SC-16 FOR KEYED NOTES.



ENLARGED SLAB PLAN @ EL 1212'-0" UNO

SCALE 1/4" = 1'-0"

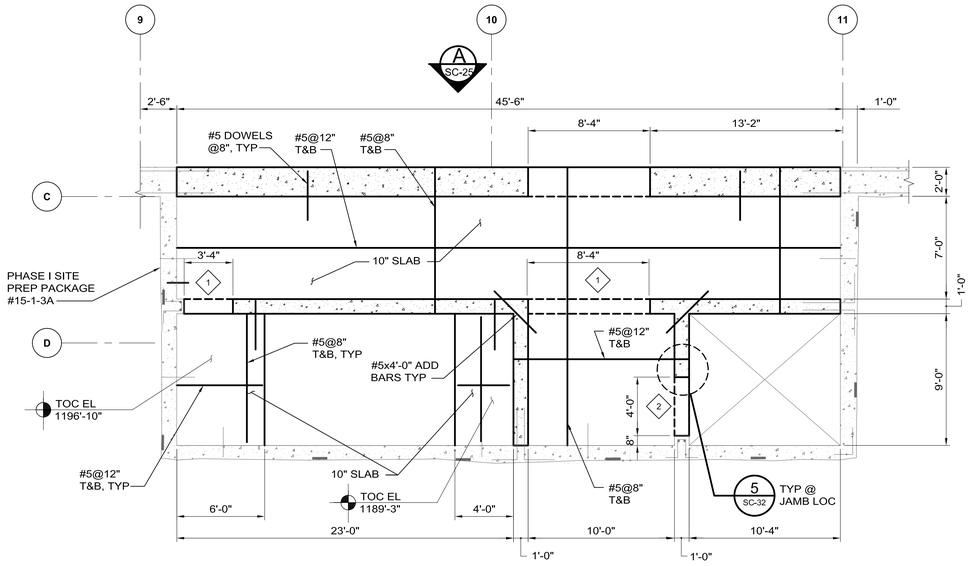
1 SC-8



ENLARGED SLAB PLAN FOR EXIT STAIR-2

SCALE 1/4" = 1'-0"

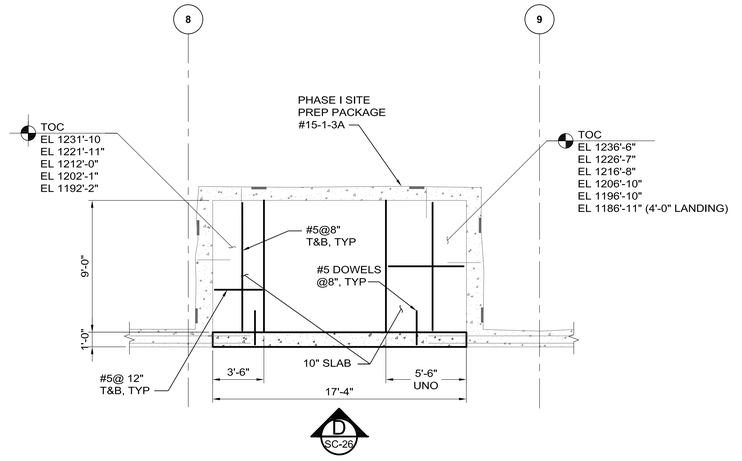
3 SC-3 SC-6 SC-8 SC-10



ENLARGED SLAB PLAN @ EL 1196'-10" UNO

SCALE 1/4" = 1'-0"

2 SC-10



ENLARGED SLAB PLAN FOR EXIT STAIR-3

SCALE 1/4" = 1'-0"

4 SC-3 SC-5 SC-7 SC-9

FAR DETECTOR BUILDING

KEY PLAN

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

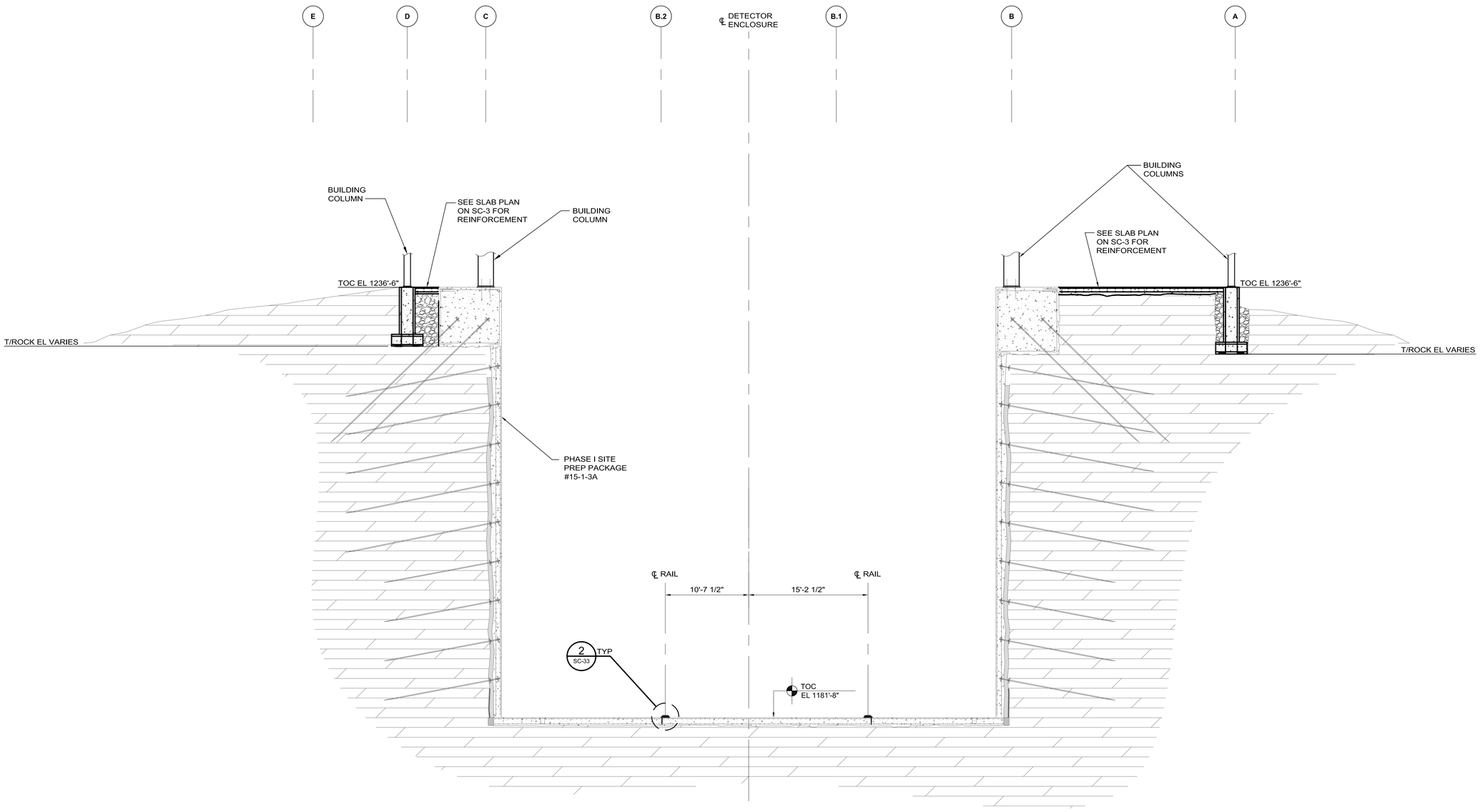
ENLARGED SLAB PLANS - 2

DRAWING NO. 15-1-3B SC-17 REV. 0

11 MAR, 2009

NOTES:

1. FOR ABBREVIATIONS AND GENERAL NOTES, SEE SC-1.
2. FOR EXACT BUILDING LOCATION AND ORIENTATION, SEE CIVIL DRAWINGS.
3. SEE SC-30 FOR WALL REINFORCEMENT REQUIREMENTS.
4. FOR STANDARD DETAILS, SEE SC-35 AND SC-36.
5. SEE C-9, DETAIL 11 FOR UNDERDRAIN DETAIL.



SECTION

SCALE 3/16" = 1'-0"

G
SC-3
SC-5
SC-7
SC-9
SC-11
SC-13

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

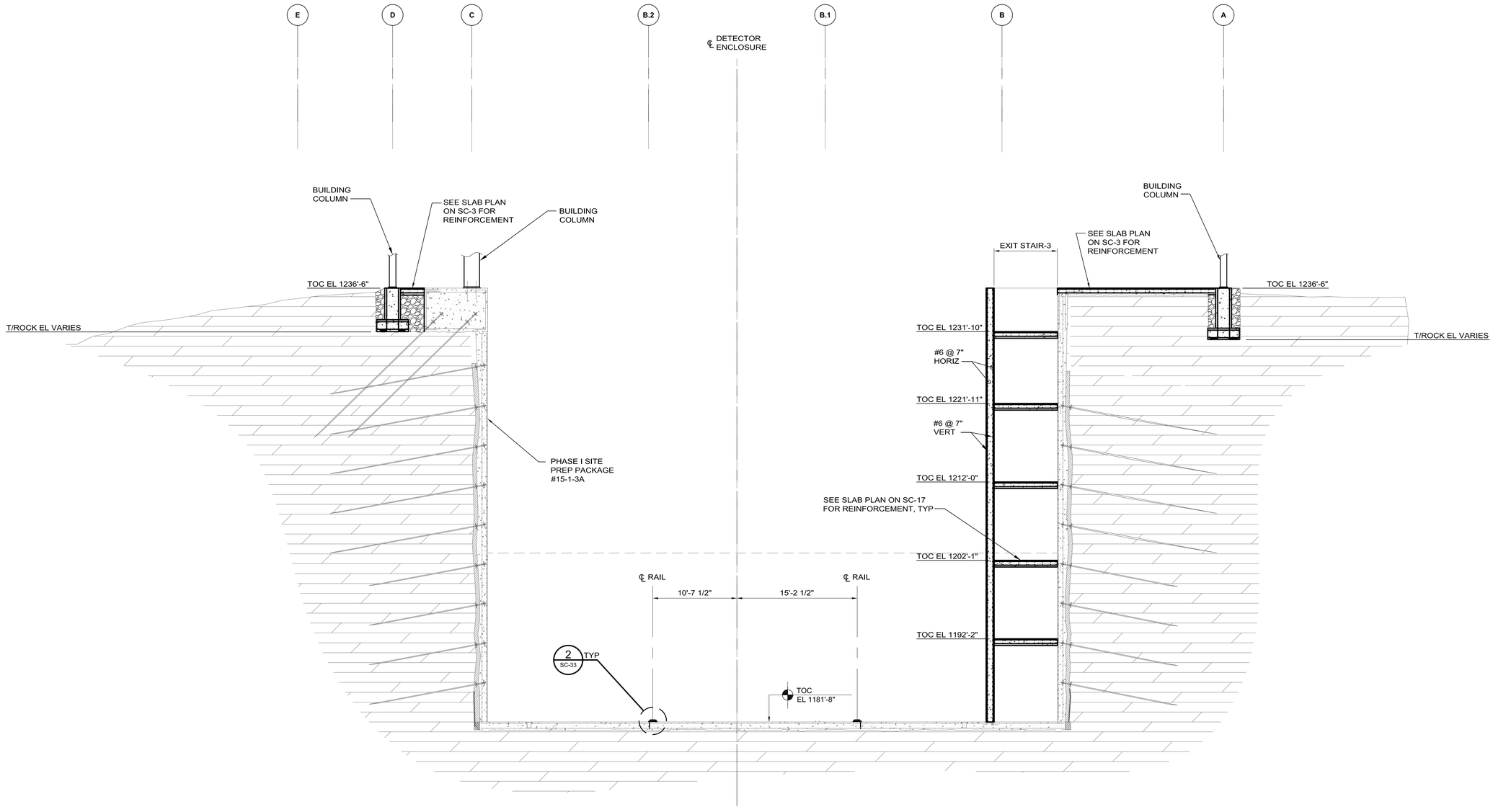
BUILDING SECTION G

DRAWING NO. **15-1-3B** **SC-18** REV. **0**

11 MAR, 2009

NOTES:

1. SEE NOTES ON SC-18.



SECTION

SCALE 3/16" = 1'-0"

H
SC-3
SC-5
SC-7
SC-9
SC-11
SC-13

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

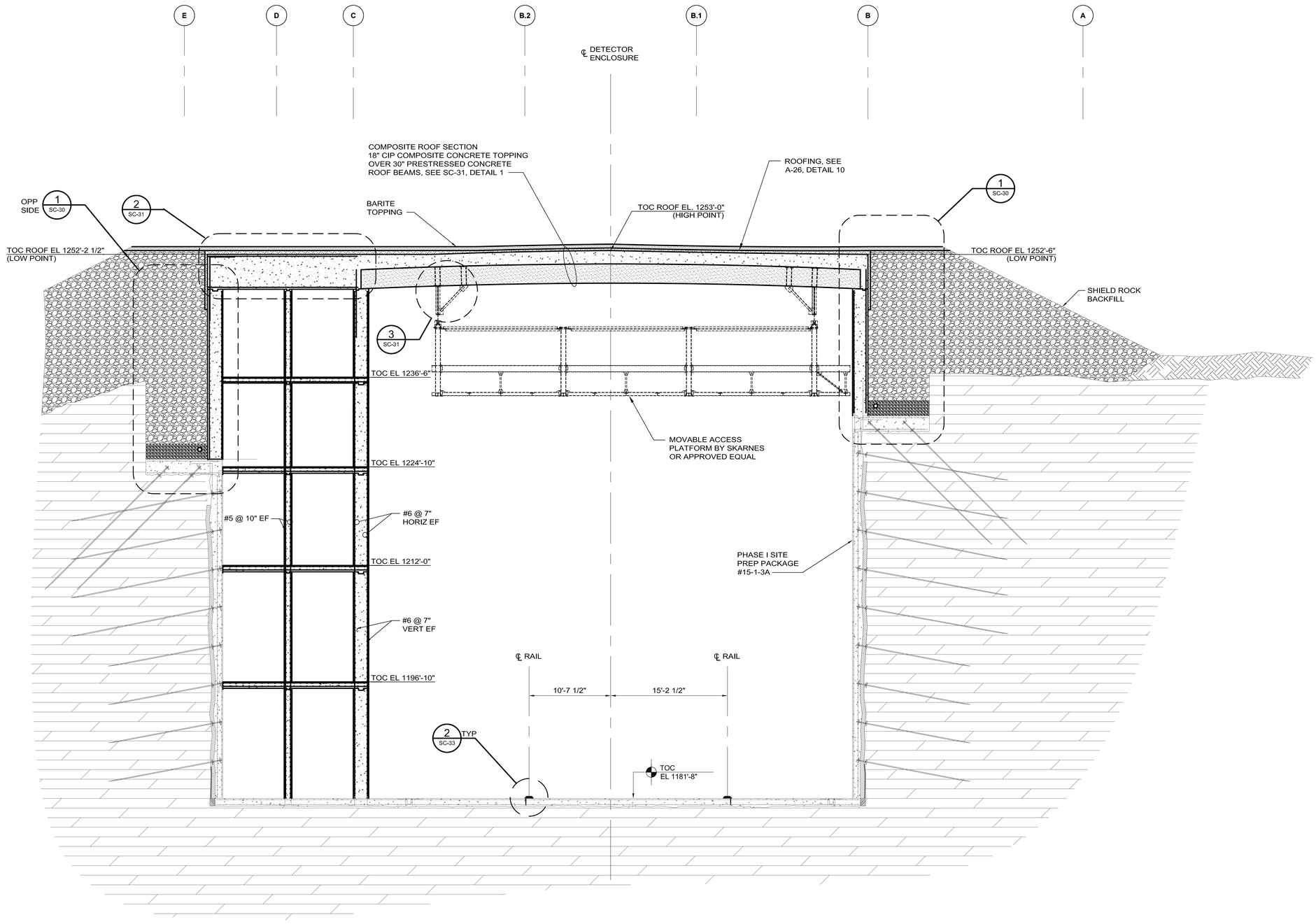
BUILDING SECTION H

DRAWING NO. **15-1-3B** **SC-19** REV. **0**

11 MAR, 2009

NOTE:

1. SEE NOTES ON SC-18.



SECTION

SCALE 3/16" - 1'-0"

J
SC-2
SC-4
SC-6
SC-8
SC-10
SC-12
SC-14

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

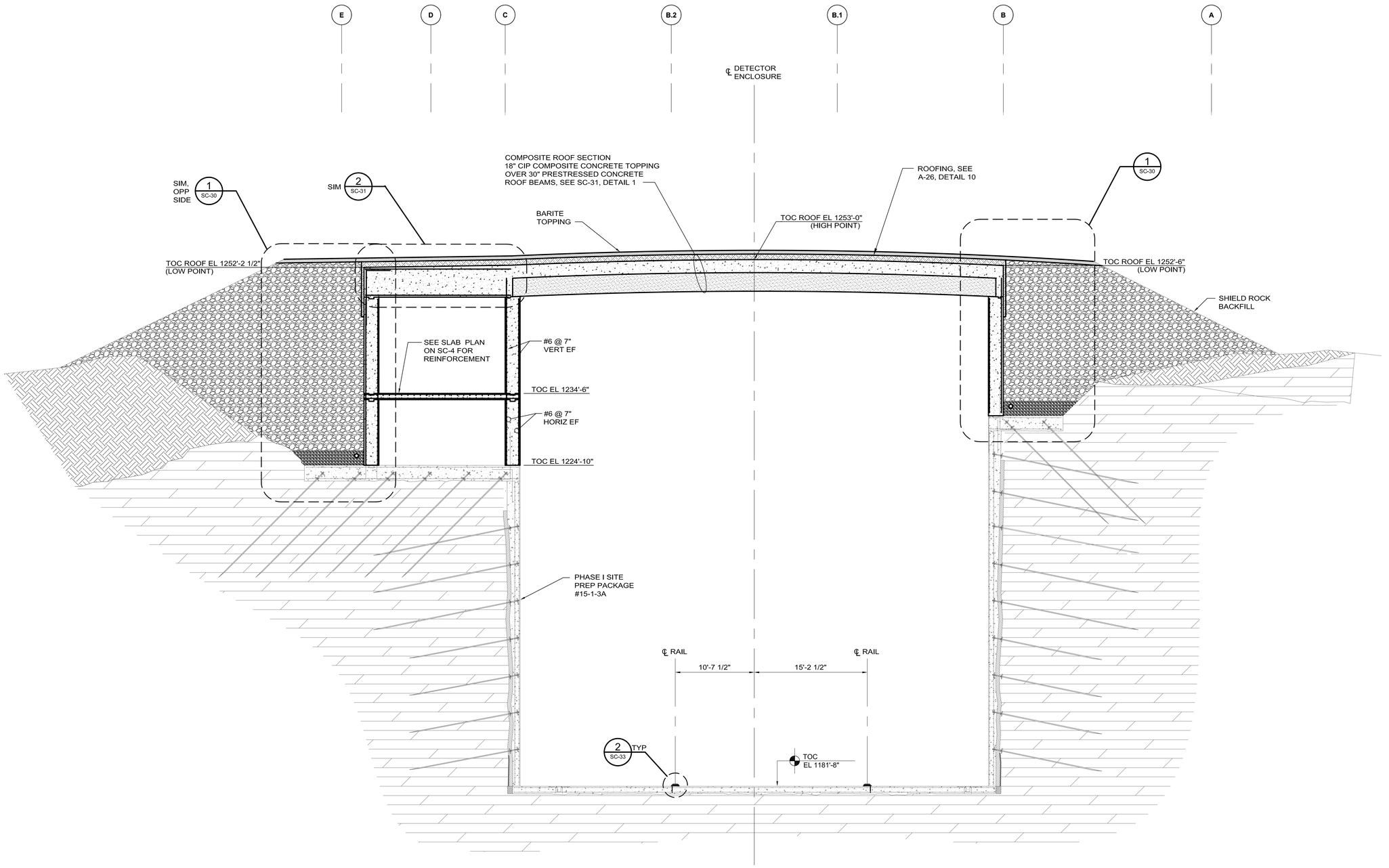
BUILDING SECTION J

DRAWING NO. **15-1-3B** **SC-20** REV. **0**

11 MAR, 2009

NOTE:

1. SEE NOTES ON SC-18.



SECTION

SCALE 3/16" - 1'-0"

K
SC-2
SC-4
SC-6
SC-8
SC-10
SC-12
SC-14

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

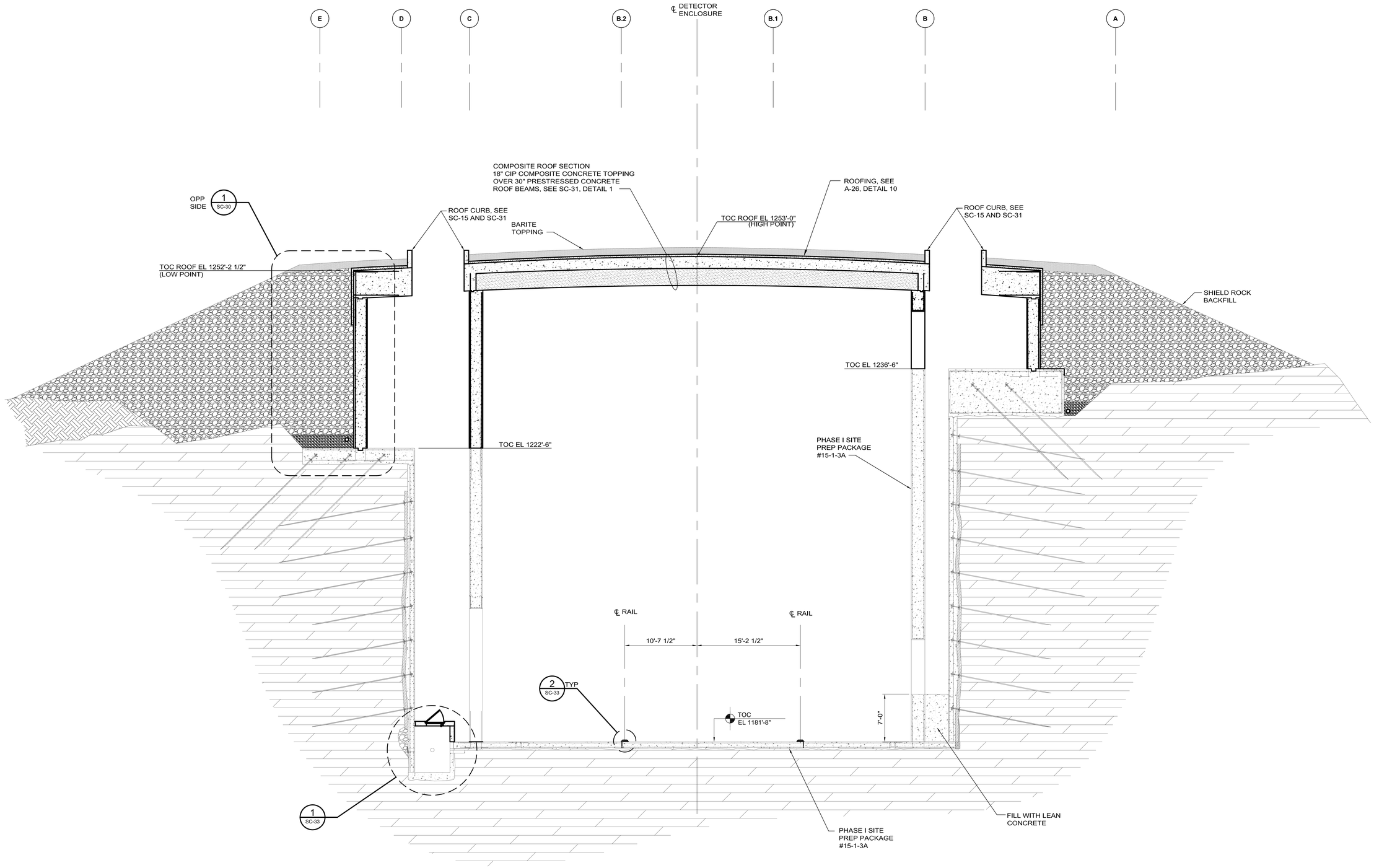
BUILDING SECTION K

DRAWING NO. **15-1-3B** **SC-21** REV. **0**

11 MAR, 2009

NOTE:

1. SEE NOTES ON SC-18.



SECTION

SCALE 3/16" - 1'-0"

L
SC-2
SC-4
SC-6
SC-8
SC-10
SC-12
SC-14

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

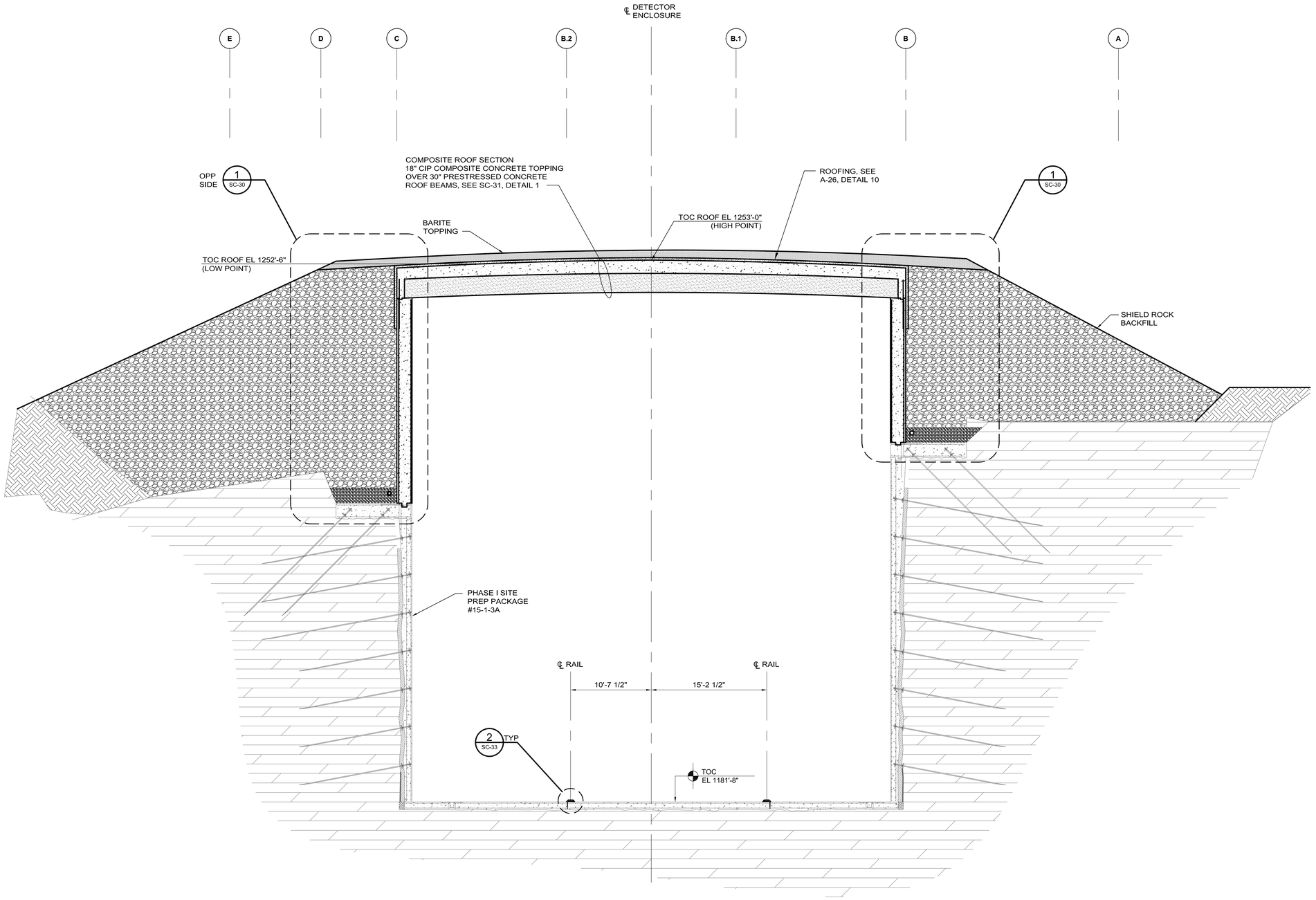
BUILDING SECTION L

DRAWING NO. **15-1-3B** **SC-22** REV. **0**

11 MAR, 2009

NOTE:

1. SEE NOTES ON SC-18.



SECTION

SCALE 3/16" - 1'-0"

M
SC-2
SC-4
SC-6
SC-8
SC-10
SC-12
SC-14

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SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

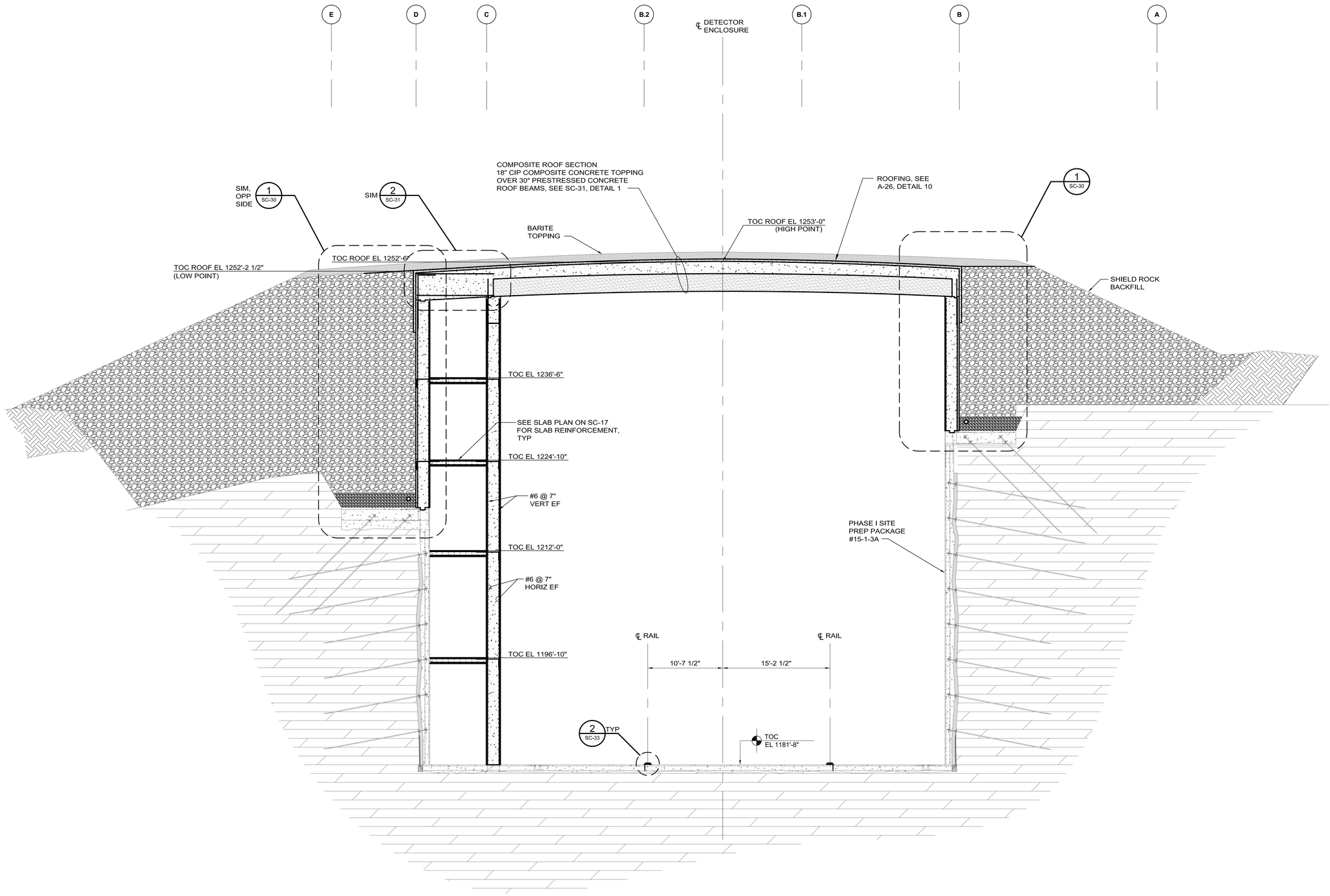
BUILDING SECTION M

DRAWING NO. **15-1-3B** **SC-23** REV. **0**

11 MAR, 2009

NOTES:

1. SEE NOTES ON SC-18.



SECTION

SCALE 3/16" - 1'-0"

N
SC-2
SC-4
SC-6
SC-8
SC-10
SC-12
SC-14

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

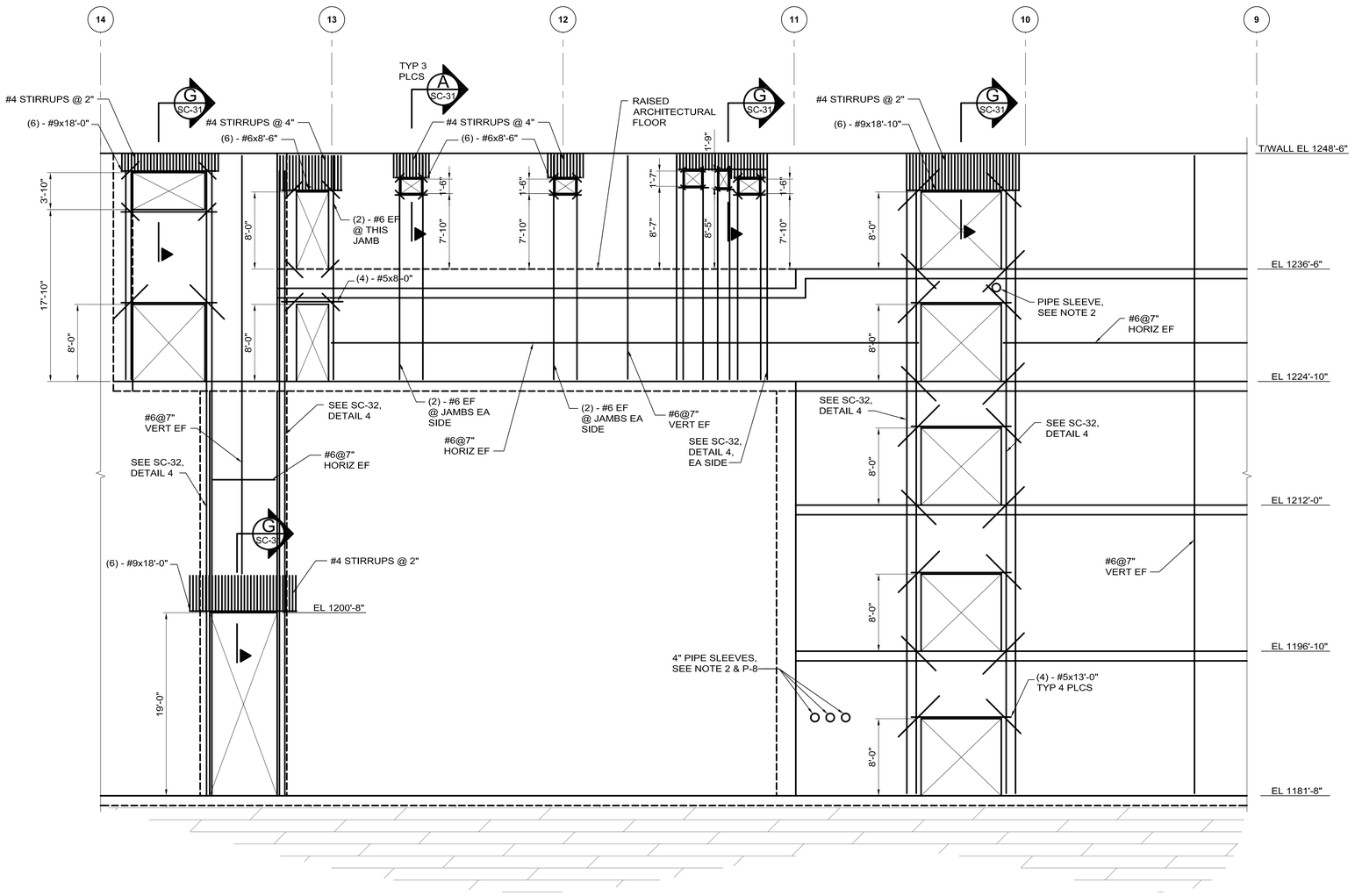
BUILDING SECTION N

DRAWING NO. 15-1-3B SC-24 REV. 0

11 MAR, 2009

NOTES:

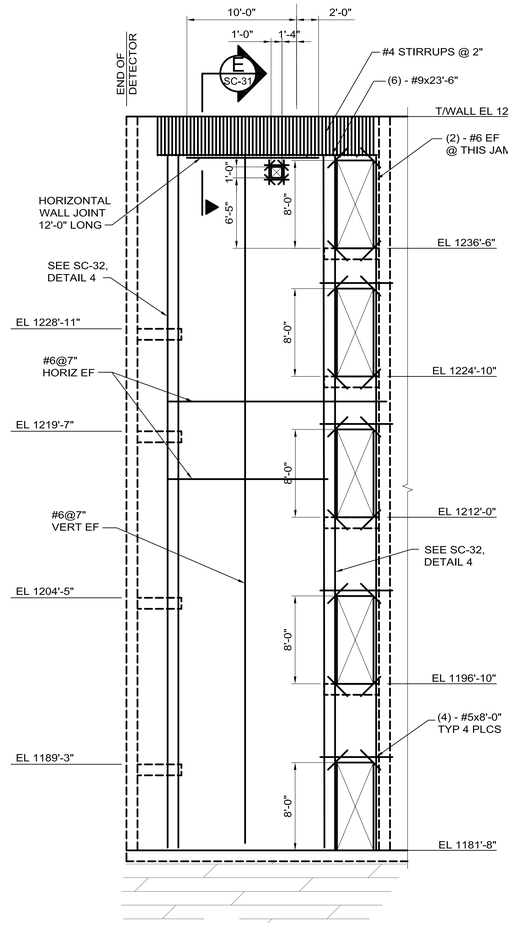
1. FOR ABBREVIATIONS AND GENERAL NOTES, SEE SC-1.
2. FOR SIZE, LOCATION AND DETAILS OF PIPE AND CONDUIT PENETRATIONS, DOOR OPENINGS AND DUCT PENETRATIONS, COORDINATE WITH ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION AND CIVIL DRAWINGS.
3. FOR STANDARD DETAILS, SEE SC-35 AND SC-36.



WALL ELEVATION

SCALE 3/16" = 1'-0"

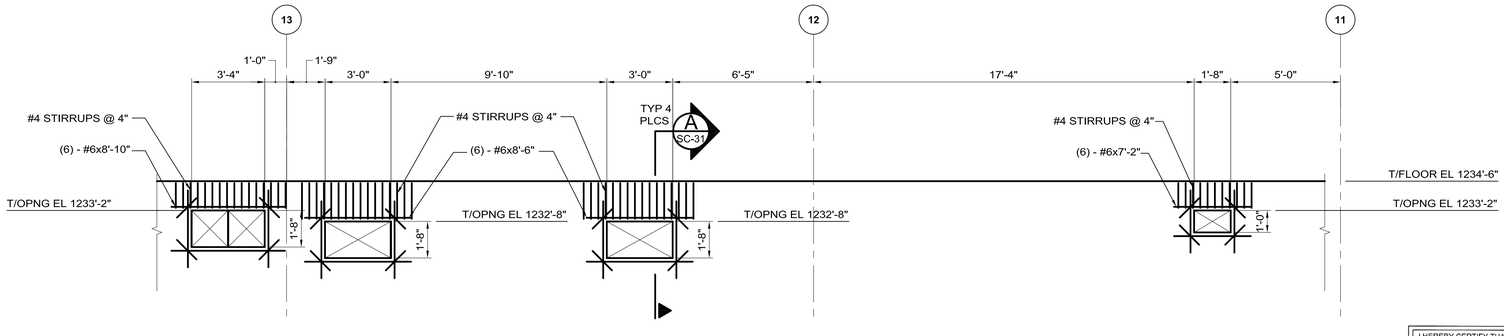
A
SC-12
SC-16
SC-17



WALL ELEVATION

SCALE 3/16" = 1'-0"

B
SC-12
SC-17



PARTIAL WALL ELEVATION

SCALE 3/8" = 1'-0"

C
SC-16

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

3/8"=1'-0" 1 0 1 2 3 4 5 6 7 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

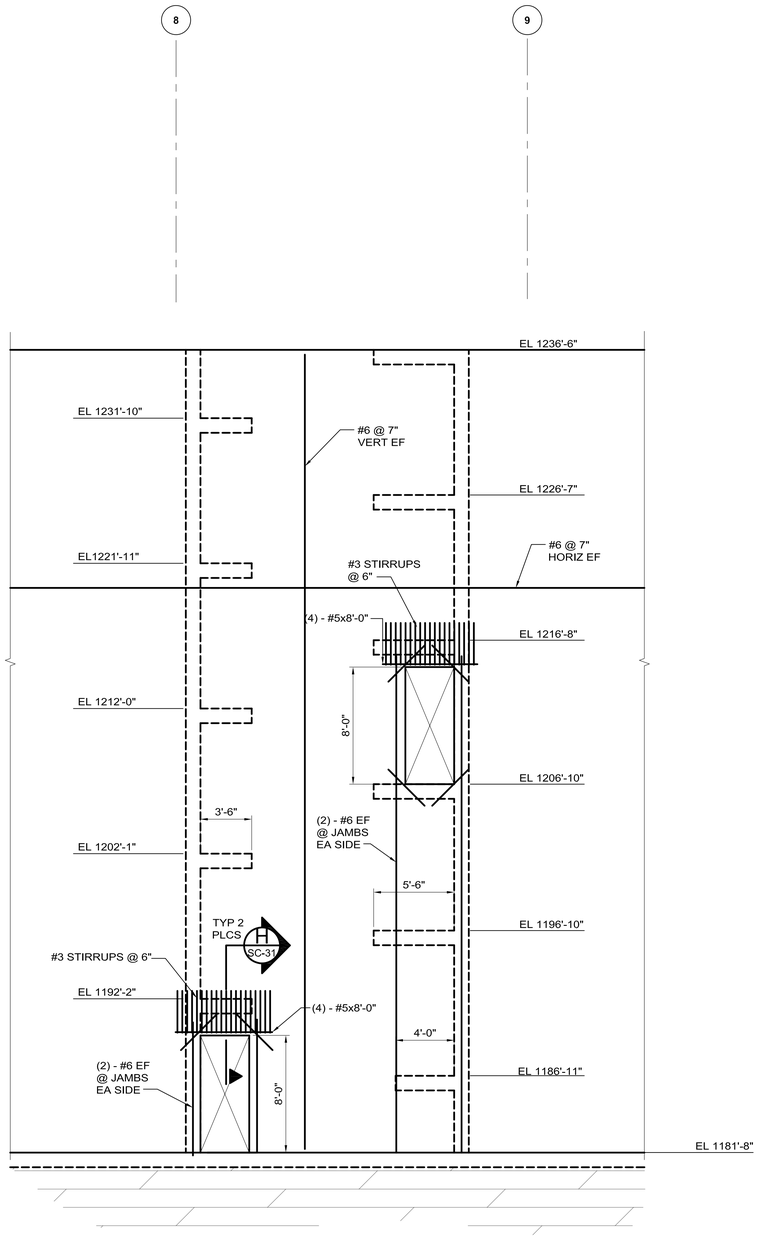
WALL ELEVATIONS A, B & C

DRAWING NO. **15-1-3B** **SC-25** REV. **0**

11 MAR, 2009

NOTE:

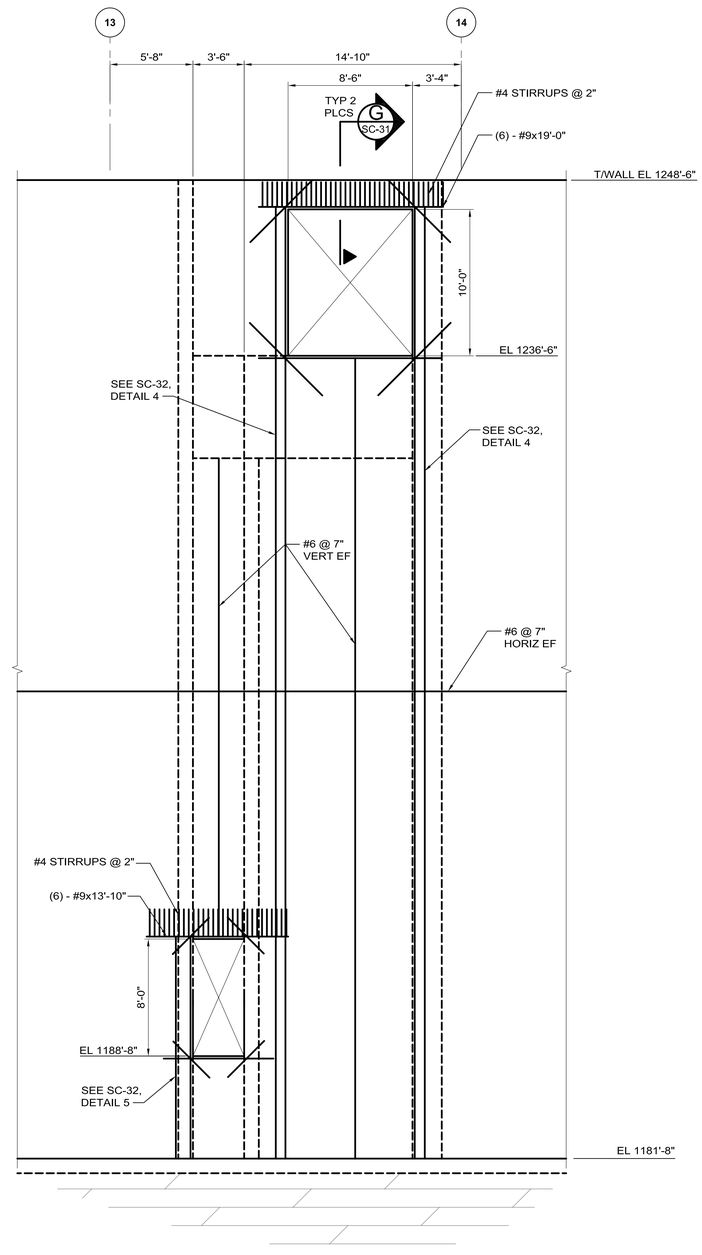
1. SEE NOTES ON SC-25.



WALL ELEVATION (EXIT-STAIR 3)

SCALE 1/4"=1'-0"

D
SC-11
SC-17



WALL ELEVATION

SCALE 1/4" = 1'-0"

E
SC-12
SC-27

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PRINT NAME: KEVIN V. COMO

SIGNATURE:

DATE: 03/11/2009 LICENSE #46236

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	E. ALCARAZ	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

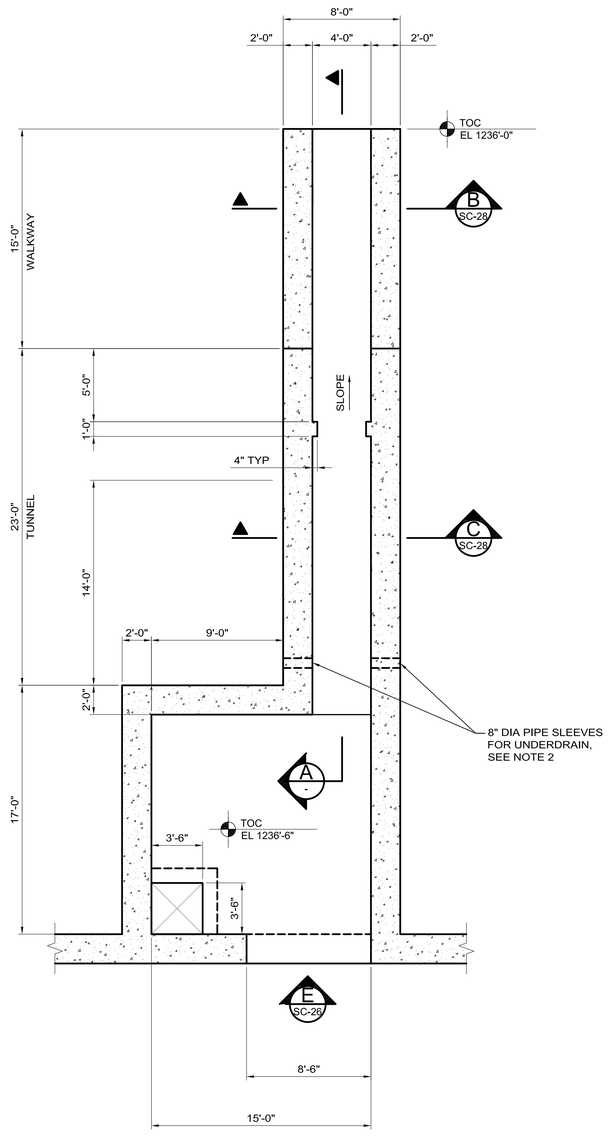
WALL ELEVATIONS D & E

DRAWING NO. 15-1-3B SC-26 REV. 0

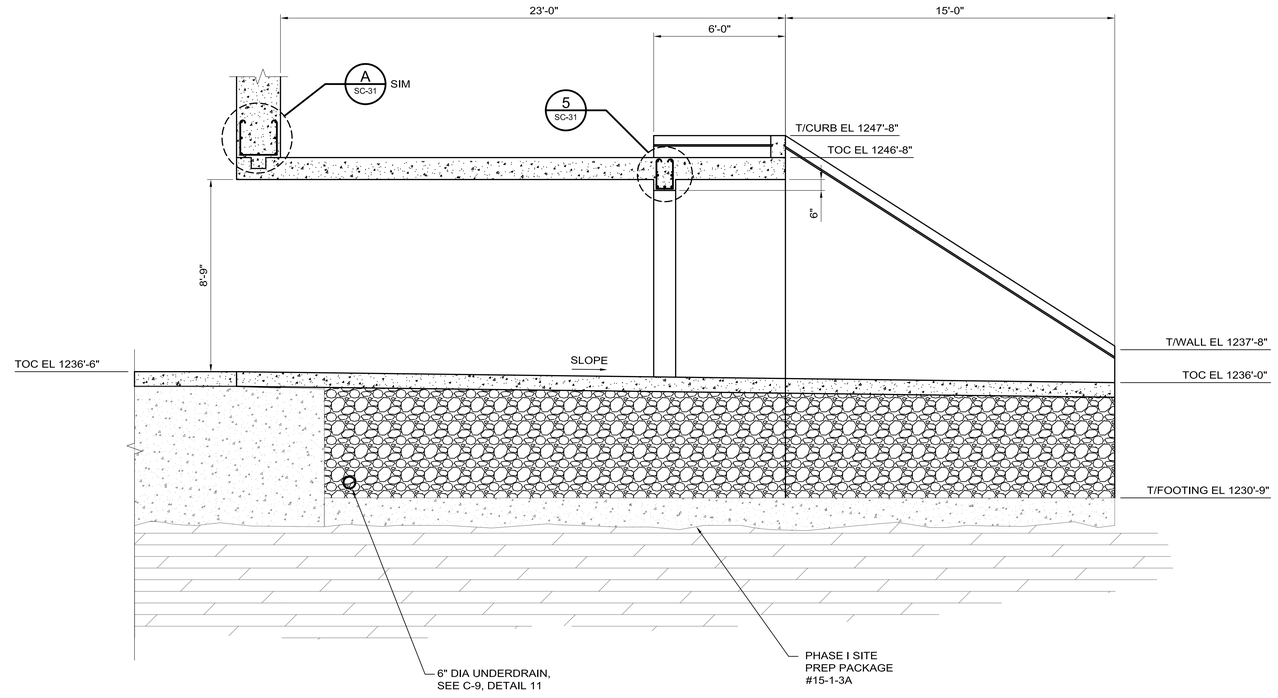
11 MAR, 2009

NOTES:

1. FOR ABBREVIATIONS AND GENERAL NOTES, SEE SC-1.
2. FOR SIZE, LOCATION AND DETAILS OF PIPE AND CONDUIT PENETRATIONS, COORDINATE WITH MECHANCIAL, PLUMBING, ELECTRICAL, FIRE PROTECTION AND CIVIL DRAWINGS. SEE SC-36, DETAIL CO-9 FOR PIPE SLEEVE DETAIL.
3. FOR STANDARD DETAILS, SEE SC-35 & SC-36.



EAST EXIT PLAN (2 / SC-4)
SCALE 1/4" = 1'-0"



SECTION (A / SC-15)
SCALE 3/8" = 1'-0"

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SIGNATURE: Kevin V. Como
DATE: 03/11/2009 LICENSE #46236

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DRAWN	L. DENHAM	03-11-09	NOvA PROJECT MANAGER	J. COOPER	03-11-09
CHECKED	P. TERRY	03-11-09	HINES SUBMITTED	C. McNABNEY	03-11-09
APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/4"=1'-0" 4 0 4 8 SCALE FEET
3/8"=1'-0" 1 0 1 2 3 4 5 6 7 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
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FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

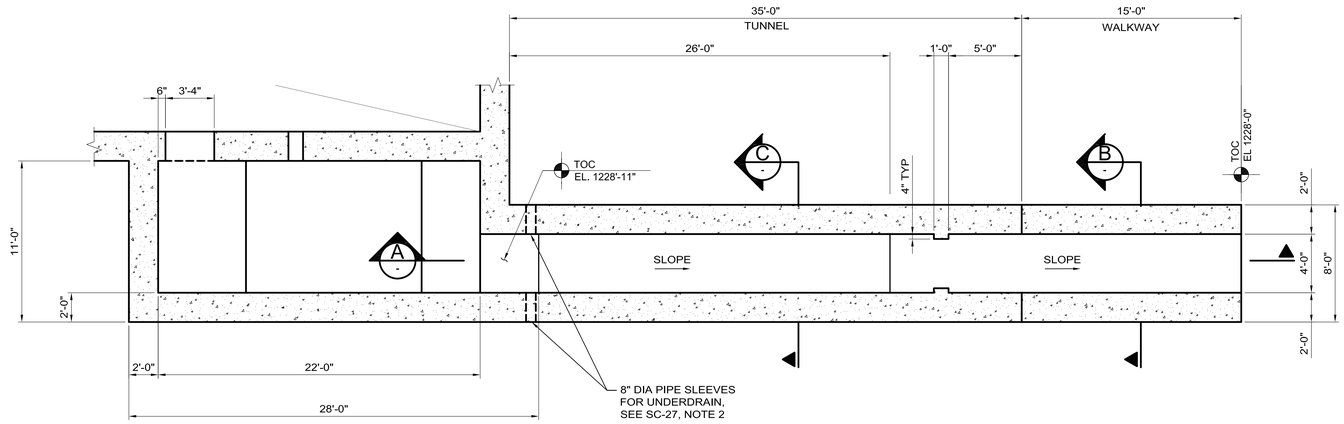
NOνA FAR DETECTOR BUILDING
EAST EXIT PLAN, SECTION & DETAILS

DRAWING NO. **15-1-3B** **SC-27** REV. **0**

11 MAR, 2009

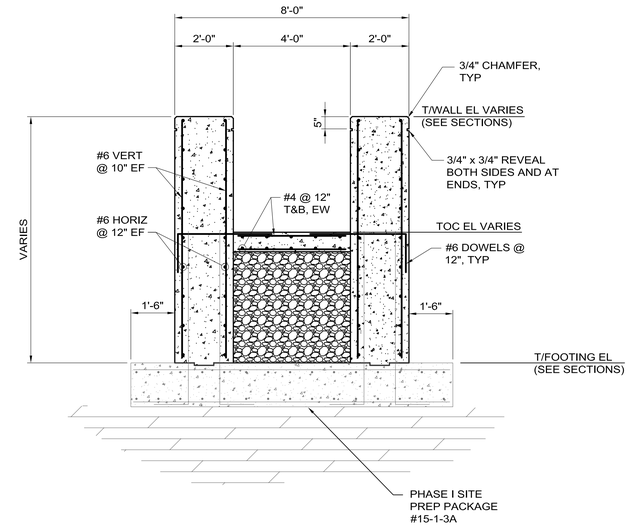
NOTE:

1. SEE NOTES ON SC-27.



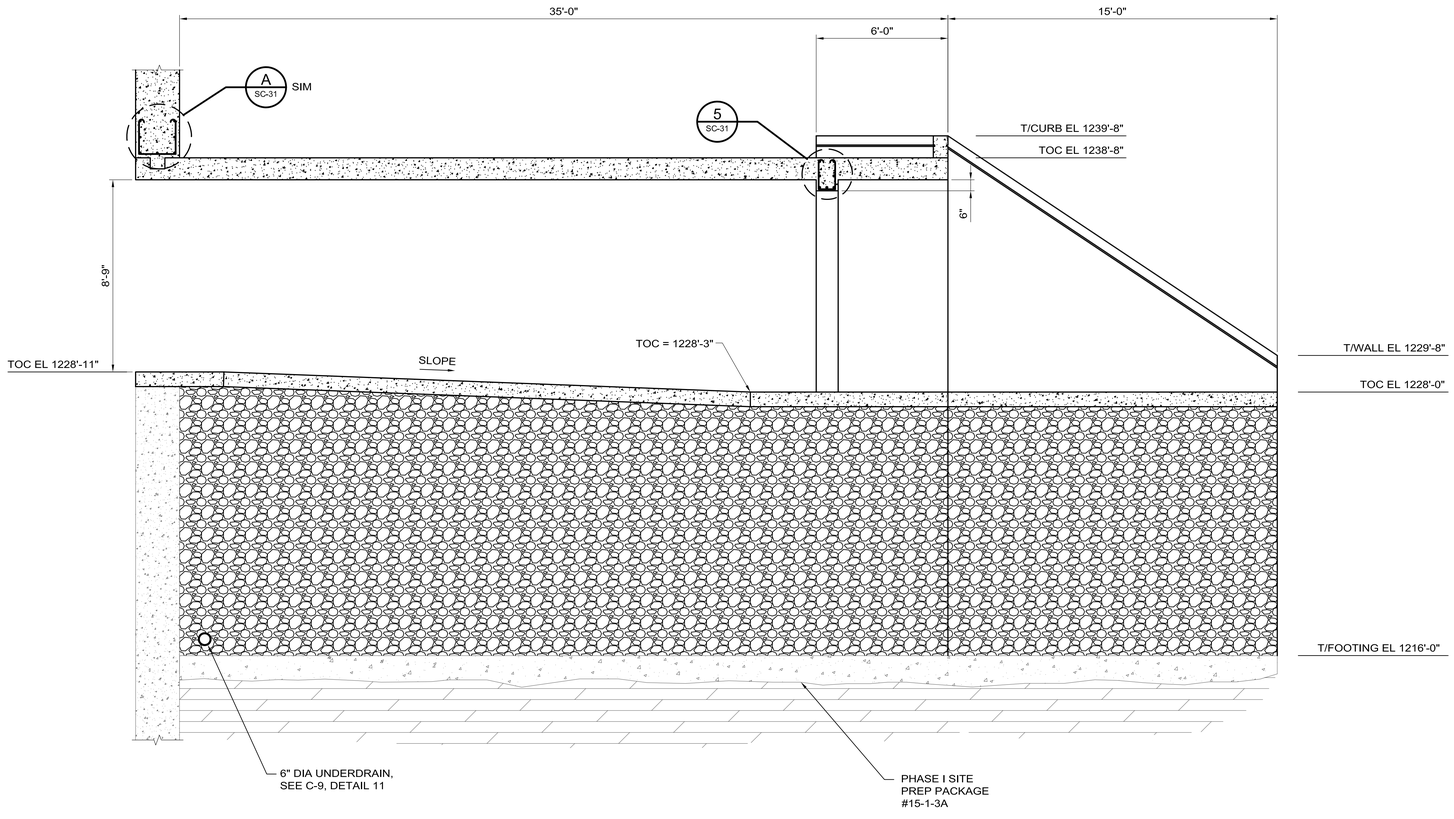
SOUTH EXIT PLAN (3 / SC-4)

SCALE 1/4" = 1'-0"



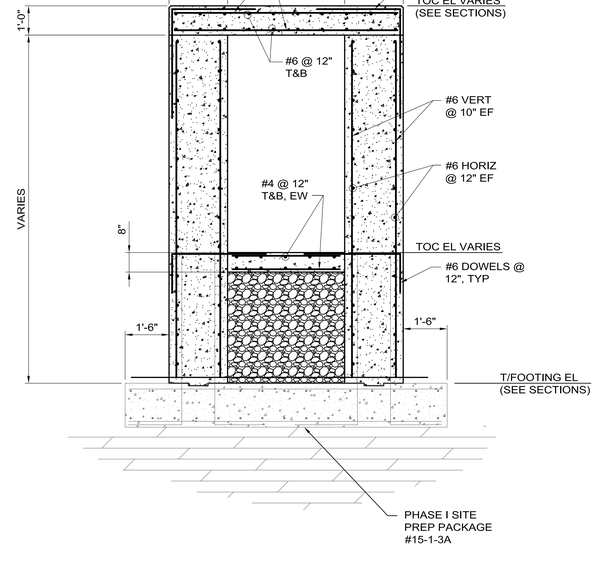
WALKWAY SECTION (B / SC-27)

SCALE 1/2" = 1'-0"



SECTION (A / SC-15)

SCALE 3/8" = 1'-0"



WALKWAY SECTION (C / SC-27)

SCALE 1/2" = 1'-0"

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

3/8"=1'-0" 1 0 1 2 3 4 5 6 7 SCALE FEET

1/2"=1'-0" 1 0 1 2 3 4 5 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

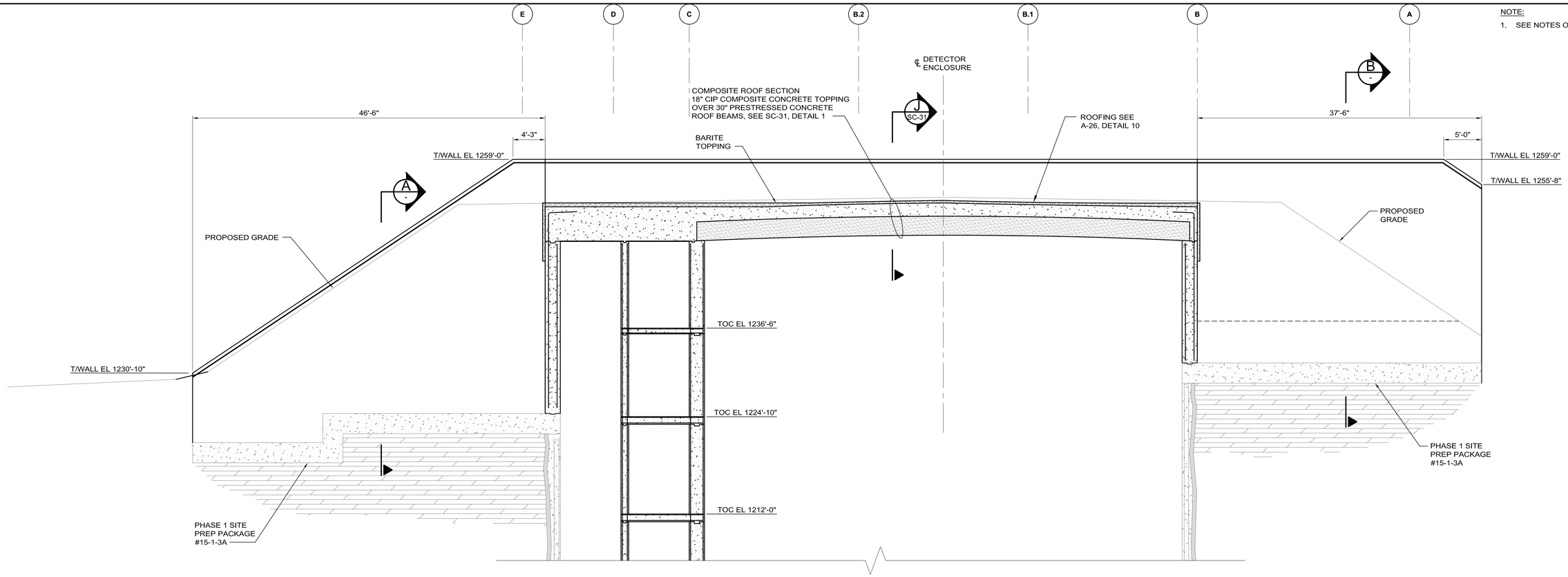
NOvA FAR DETECTOR BUILDING

SOUTH EXIT PLAN, SECTION & DETAILS

DRAWING NO. **15-1-3B** **SC-28** REV. **0**

11 MAR, 2009

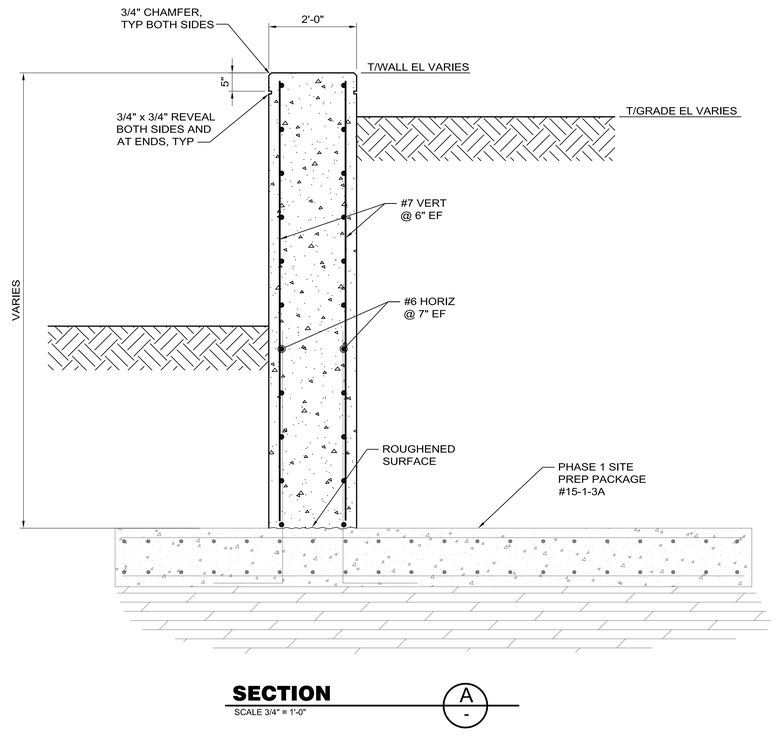
NOTE:
1. SEE NOTES ON SC-27.



RETAINING WALL ELEVATION

SCALE 3/16" = 1'-0"

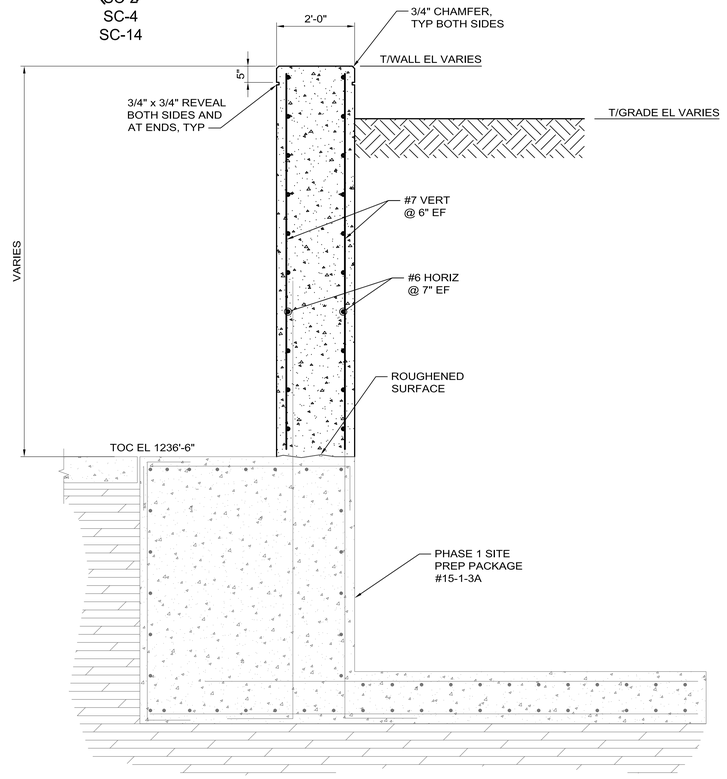
P
SC-2
SC-4
SC-14



SECTION

SCALE 3/4" = 1'-0"

A
-



SECTION

NTS

B
-

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

3/4"=1'-0" 1 0 1 2 3 SCALE FEET

UNIVERSITY OF MINNESOTA | Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

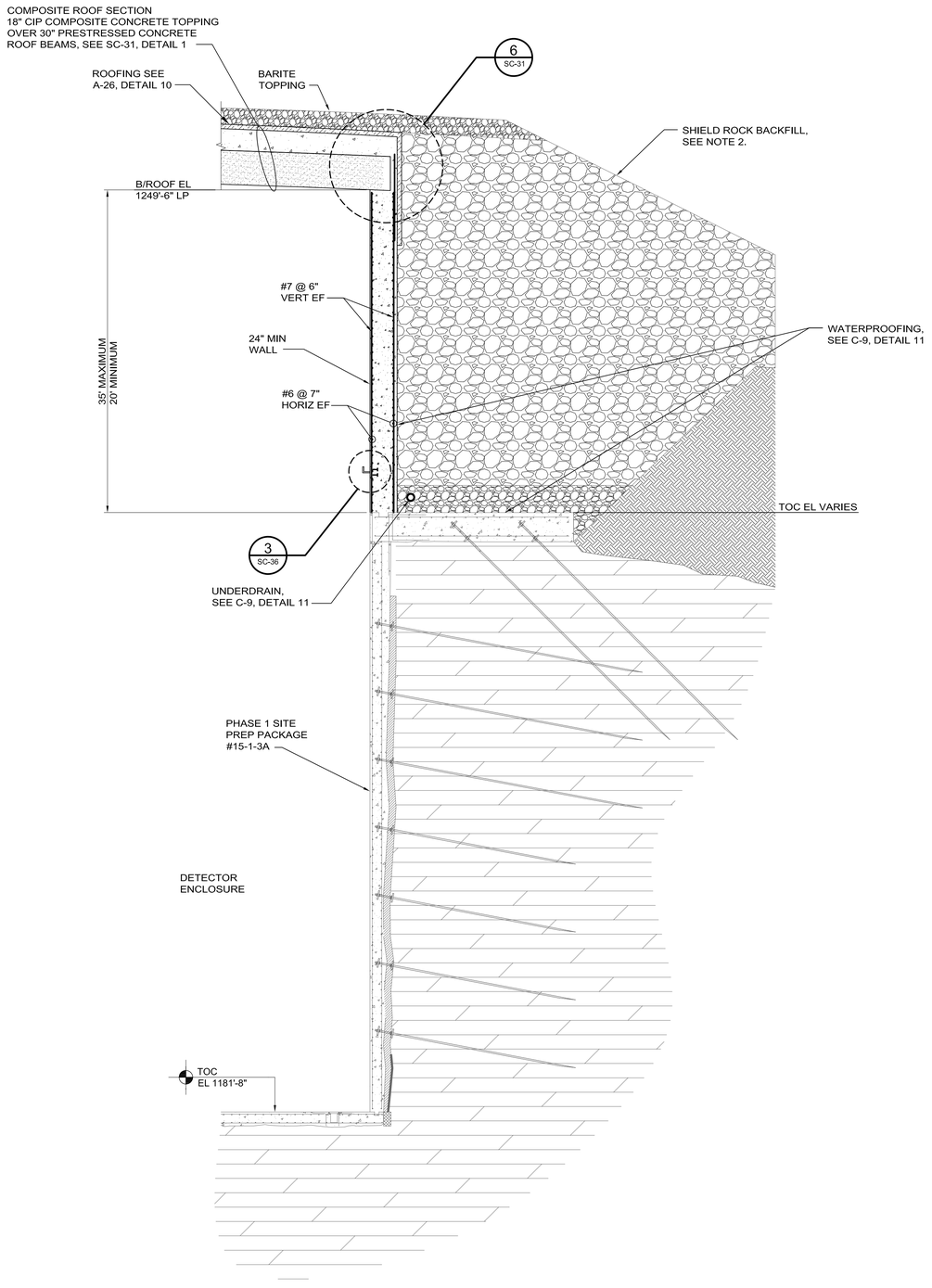
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

SITE RETAINING WALLS & SECTION

DRAWING NO. **15-1-3B** **SC-29** REV. **0**

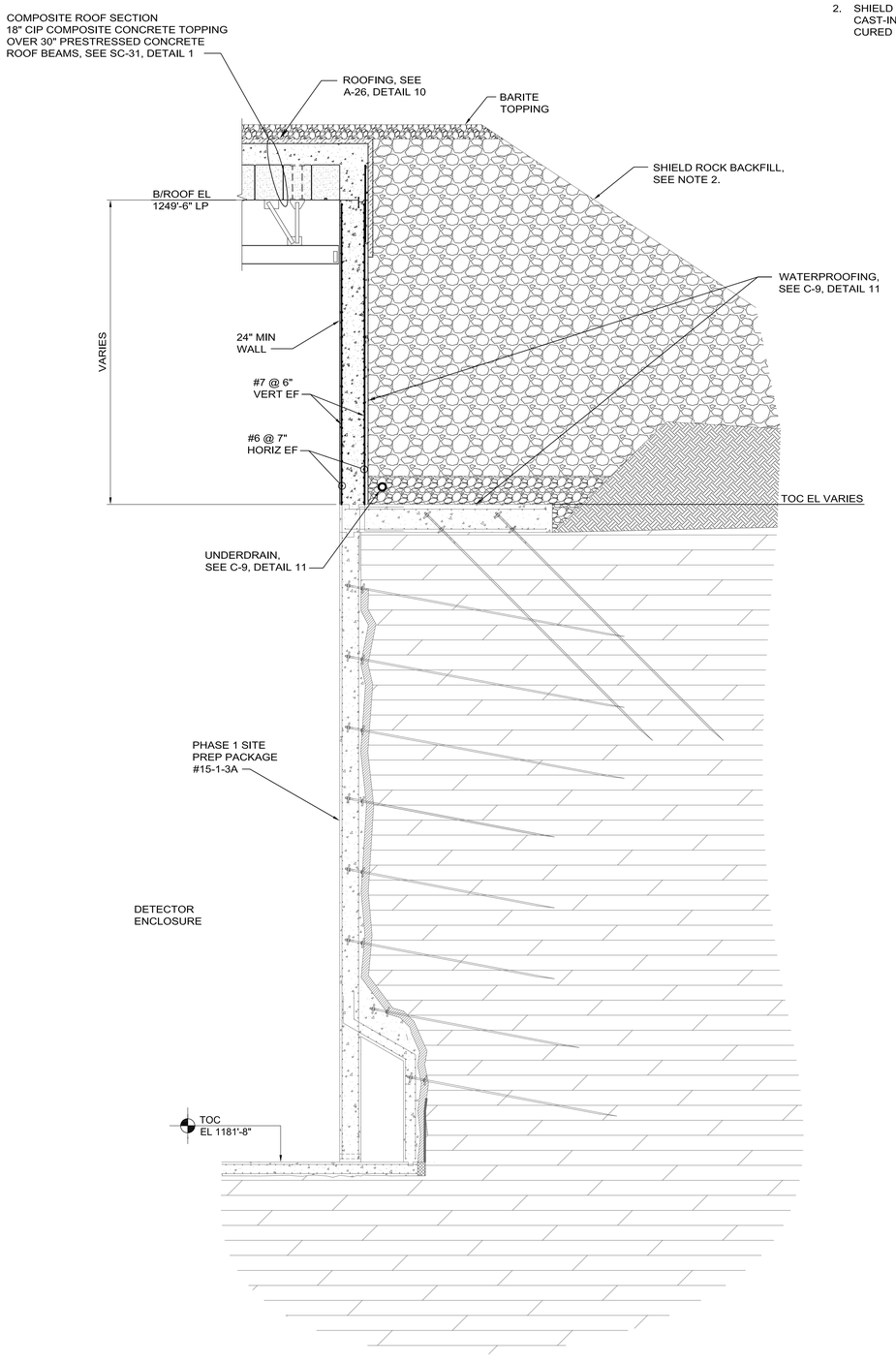
11 MAR, 2009



TYPICAL WALL SECTION

SCALE 1/4" = 1'-0"

1
SC-20
SC-21
SC-22
SC-23
SC-24



SECTION

SCALE 1/4" - 1'-0"

R
SC-12

NOTES:

1. SEE NOTES ON SC-18.
2. SHIELD ROCK BACKFILL LIMITED TO 10'-0" UNTIL CAST-IN-PLACE ROOF SLAB HAS BEEN PLACED AND CURED FOR 14 DAYS.

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

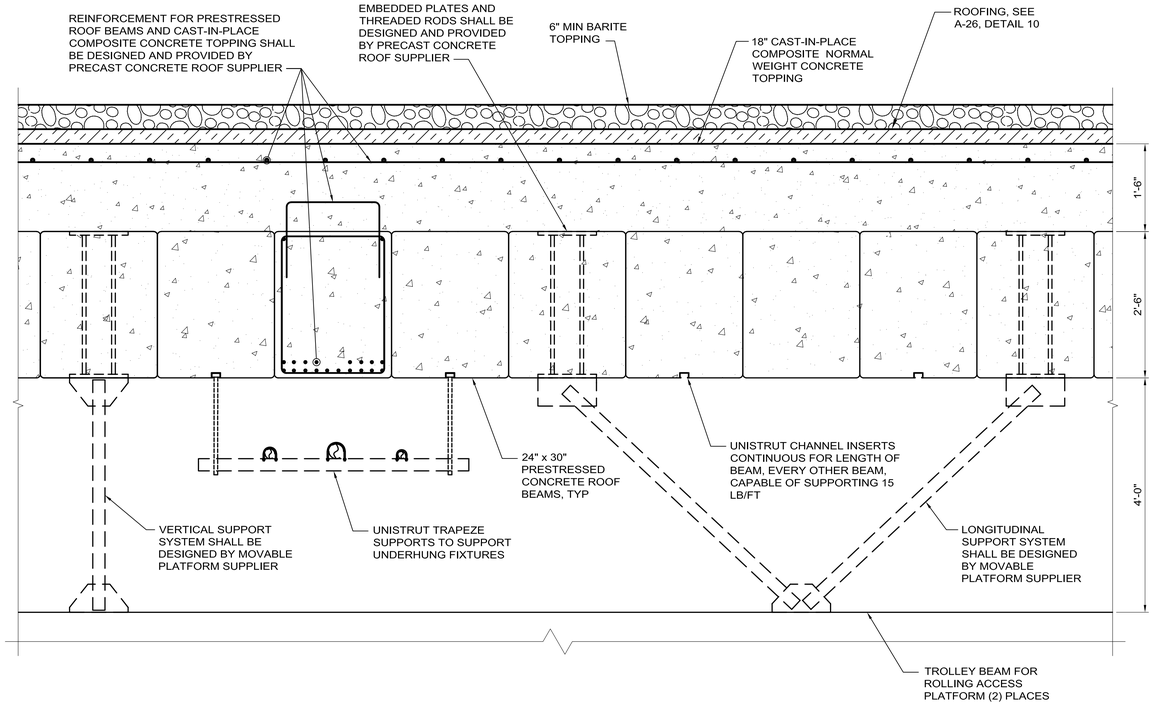
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

WALL SECTIONS

DRAWING NO. **15-1-3B** **SC-30** REV. **0**

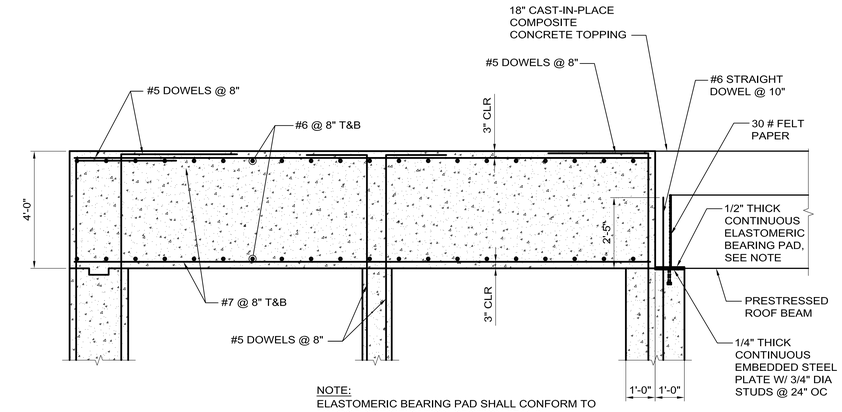
11 MAR, 2009



TYPICAL ROOF DETAIL

SCALE 1" = 1'-0"

1



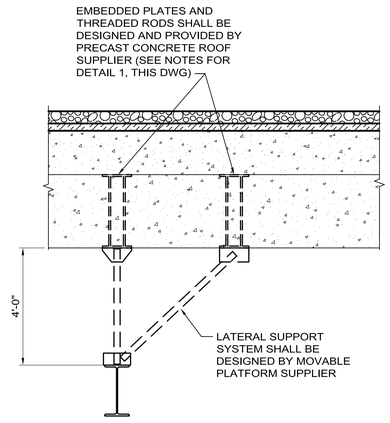
NOTE:
ELASTOMERIC BEARING PAD SHALL CONFORM TO MN/DOT SPECIFICATION SECTION 3741.2. CONTRACTOR SHALL SUBMIT MANUFACTURER'S CERTICATION SHOWING PAD MEETS REQUIREMENTS.

DETAIL

SCALE 1/2" = 1'-0"

2

SC-20
SC-21
SC-24



DETAIL

SCALE 1/2" = 1'-0"

3

SC-20

NOTES FOR DETAIL 1:

A. PROVIDE 24-INCH WIDE BY 30-INCH DEEP NORMAL WEIGHT PRESTRESSED CONCRETE BEAMS TO SPAN WIDTH OF DETECTOR ENCLOSURE. BEAMS SHALL HAVE 12-INCHES OF BEARING SURFACE ON EACH END.

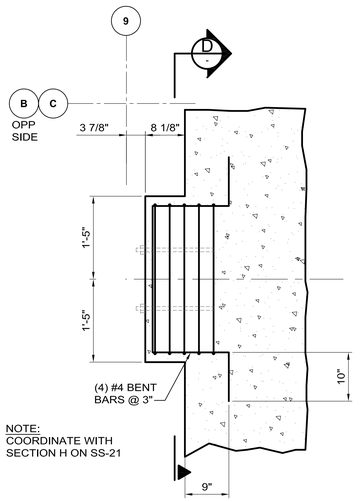
B. PROVIDE 18-INCH CAST-IN-PLACE NORMAL WEIGHT COMPOSITE CONCRETE ROOF LAYER OVER PRESTRESSED BEAMS.

C. PROVIDE EMBEDDED PLATES AND THREADED RODS AS SHOWN ON ROOF PLAN AND IN THIS SECTION TO SUPPORT A MOVEABLE ACCESS PLATFORM PER SPECIFICATION 14610.

D. PROVIDE EMBEDDED UNISTRUT CHANNEL INSERTS AS SHOWN ON ROOF PLAN AND IN THIS SECTION.

E. THE REINFORCEMENT SHOWN ON THIS DETAIL IS FOR ILLUSTRATION ONLY. PRESTRESSED CONCRETE BEAMS AND CAST-IN-PLACE TOPPING SHALL BE DESIGNED FOR THE FOLLOWING LOADS AND CONDITIONS:

1. 18" COMPOSITE CONCRETE TOPPING
2. 30 PSF ROOFING, MECHANCIAL & ELECTRICAL LOADS
3. 24" LOOSE BARITE TOPPING
4. 42 PSF SNOW OR ROOF LIVE LOAD
5. 3 KIP DEAD LOAD PER HANGER LOCATION
6. 12 KIP LIVE LOAD PER HANGER LOCATION
7. 50 KIP AXIAL LOAD PER ROOF BEAM



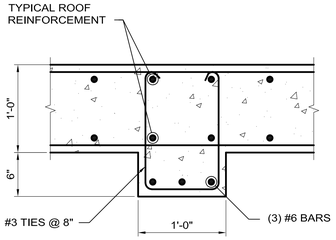
NOTE:
COORDINATE WITH SECTION H ON SS-21

DETAIL

SCALE 3" = 1'-0"

4

SC-15

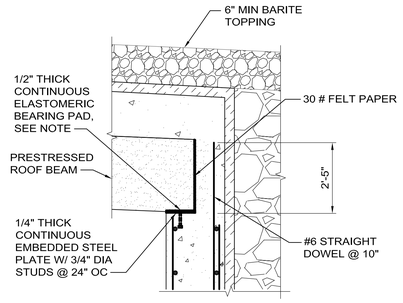


DETAIL

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

5

SC-27
SC-28



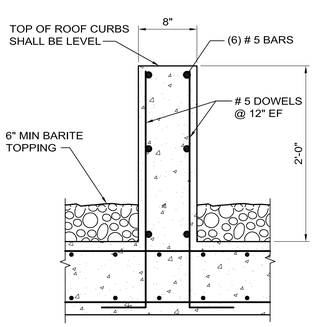
NOTE:
ELASTOMERIC BEARING PAD SHALL CONFORM TO MN/DOT SPECIFICATION SECTION 3741.2. CONTRACTOR SHALL SUBMIT MANUFACTURER'S CERTICATION SHOWING PAD MEETS REQUIREMENTS.

DETAIL

SCALE 1/2" = 1'-0"

6

SC-30

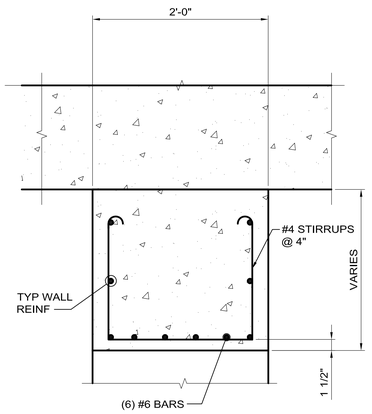


ROOF CURB DETAIL

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

7

SC-15

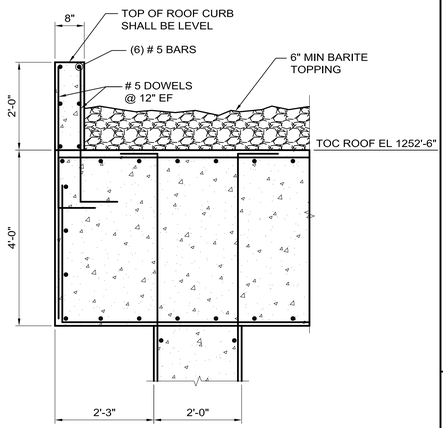


SECTION

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

A

SC-25
SC-27
SC-28

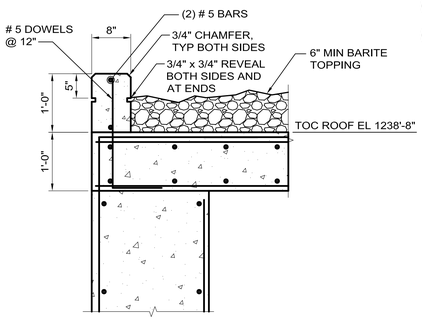


SECTION

SCALE 3/4" = 1'-0"

B

SC-15

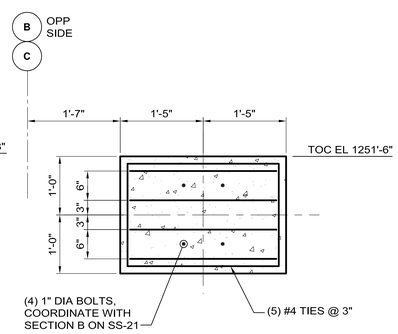


SECTION

SCALE 1" = 1'-0"

C

SC-15

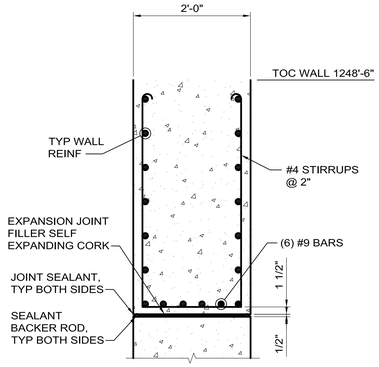


SECTION

SCALE 3/4" = 1'-0"

D

-

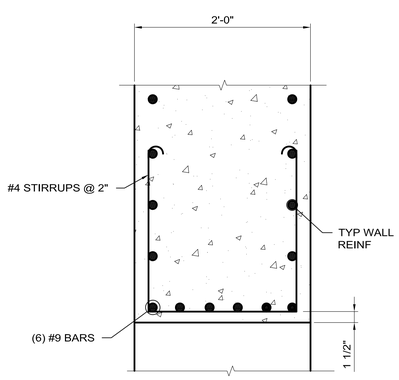


SECTION

SCALE 1" = 1'-0"

E

SC-25

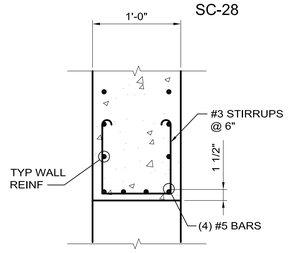


SECTION

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

G

SC-25
SC-26

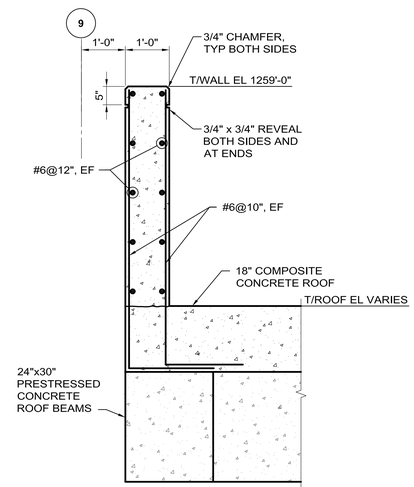


SECTION

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

H

SC-26



SECTION

SCALE 3/4" = 1'-0"

J

SC-2
SC-29

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SIGNATURE:

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:
1/2"=1'-0" 1 0 1 2 3 4 5 SCALE FEET
3/4"=1'-0" 1 0 1 2 3 SCALE FEET
1"=1'-0" 1 0 1 2 SCALE FEET
1 1/2"=1'-0" 1 0 1 SCALE FEET
3"=1'-0" 0 1 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

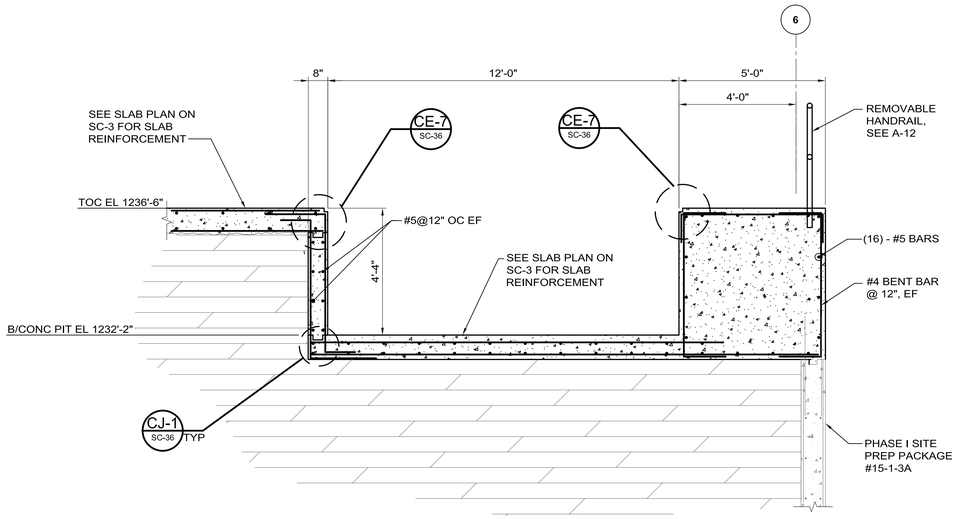
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

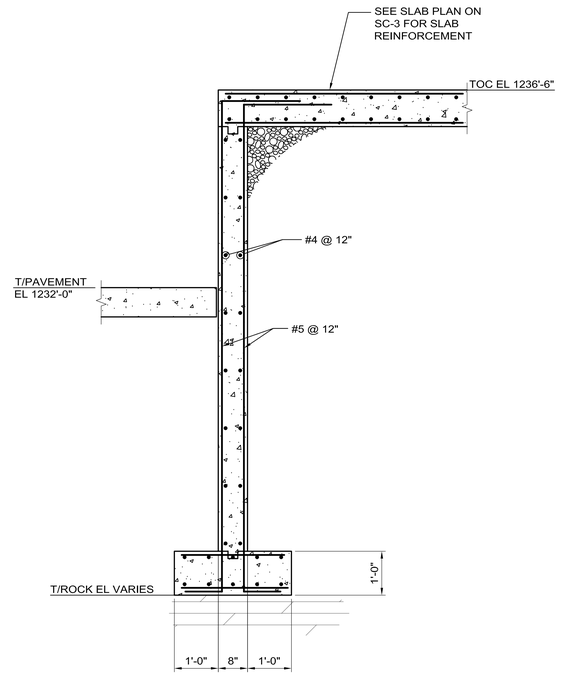
ROOF SECTIONS & DETAILS

DRAWING NO. 15-1-3B SC-31 REV. 0

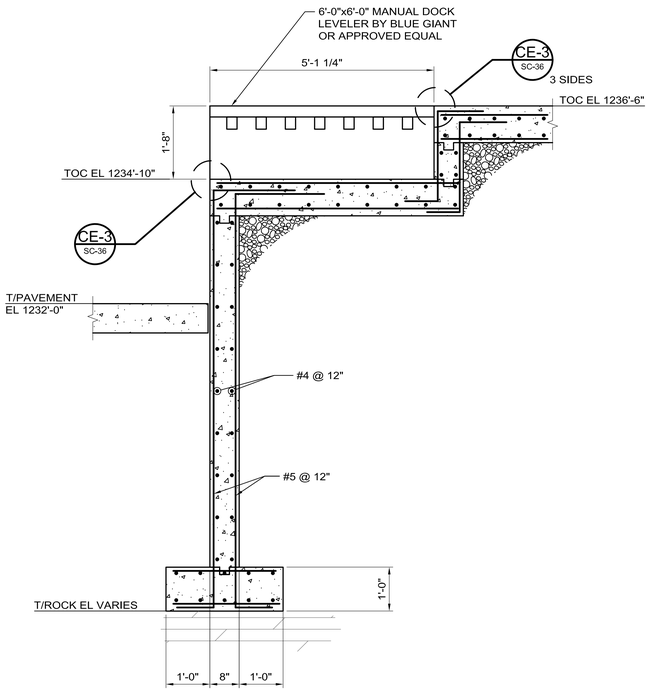
11 MAR, 2009



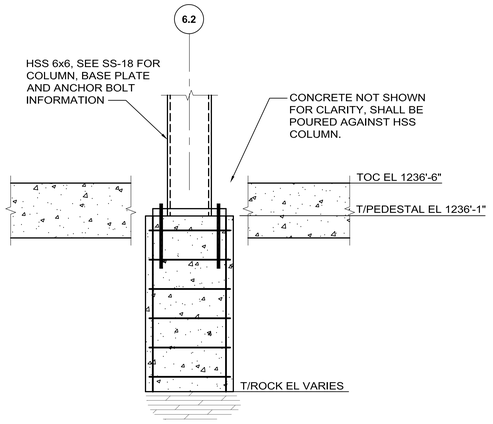
SECTION A SC-3 SC-13
SCALE 1/2" = 1'-0"



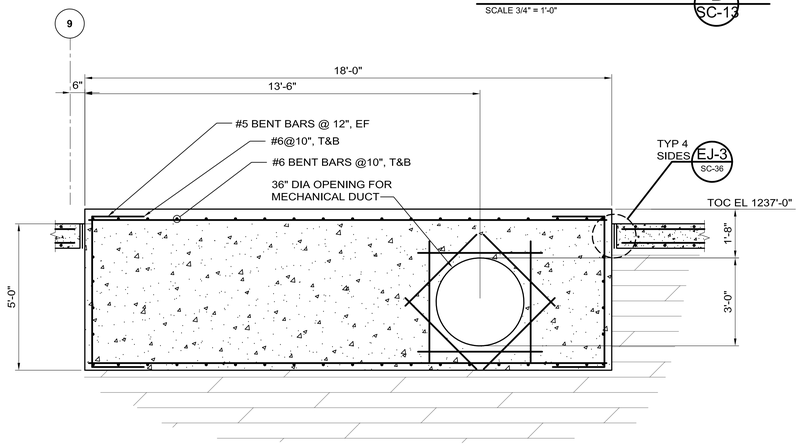
SECTION B SC-13
SCALE 3/4" = 1'-0"



SECTION C SC-3
SCALE 3/4" = 1'-0"



SECTION D -
NTS



NOTES:

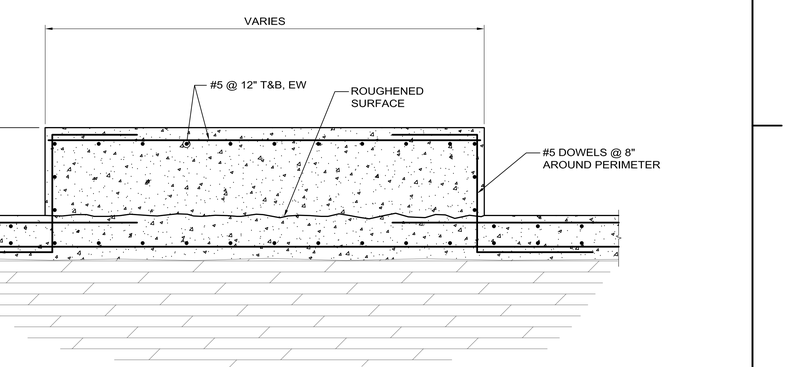
A. PROVIDE ISOLATED EQUIPMENT FOUNDATION WHERE INDICATED.

B. PROVIDE ANCHOR BOLT AND GROUT AS REQUIRED BY EQUIPMENT MANUFACTURER.

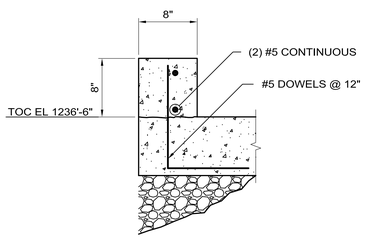
C. EQUIPMENT FOUNDATION SHALL CONFORM TO THIS DETAIL, EQUIPMENT MANUFACTURER'S REQUIREMENTS, AND THE FOLLOWING:

1. REINFORCE FOUNDATION TO CONFORM WITH THIS DETAIL.
2. EQUIPMENT SHALL BE GROUTED IN PLACE USING NON-SHRINK GROUT, UNLESS OTHERWISE RECOMMENDED BY THE EQUIPMENT MANUFACTURER.
3. EQUIPMENT ANCHOR BOLTS SHALL BE STANDARD TYPE II AB, UNLESS OTHERWISE RECOMMENDED BY THE EQUIPMENT MANUFACTURER.

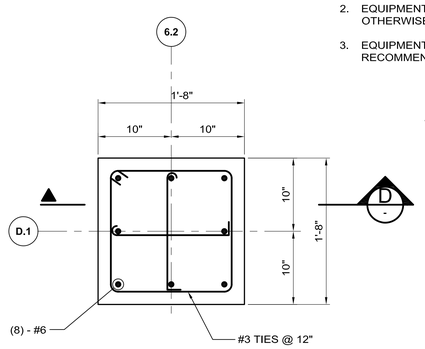
SECTION E SC-3 SC-13
SCALE 1/2" = 1'-0"



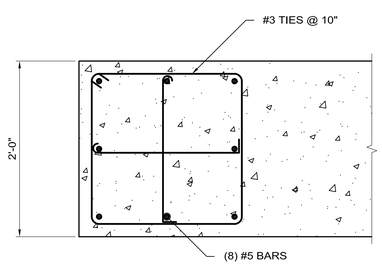
SECTION S SC-3
SCALE 3/4" = 1'-0"



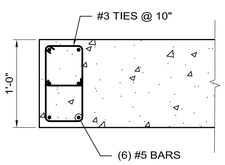
SECTION V SC-3
SCALE 1 1/2" = 1'-0"



DETAIL 3 SC-3 SC-13
SCALE 1 1/2" = 1'-0"



DETAIL 4 SC-25 SC-26
SCALE 1 1/2" = 1'-0"



DETAIL 5 SC-16 SC-17 SC-26
SCALE 1 1/2" = 1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO
SIGNATURE: Kevin V. Como
DATE: 03/11/2009 LICENSE #46236

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	E. ALCARAZ	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:
1/2"=1'-0" 1 0 1 2 3 4 5 SCALE FEET
3/4"=1'-0" 1 0 1 2 3 SCALE FEET
1 1/2"=1'-0" 1 0 1 SCALE FEET

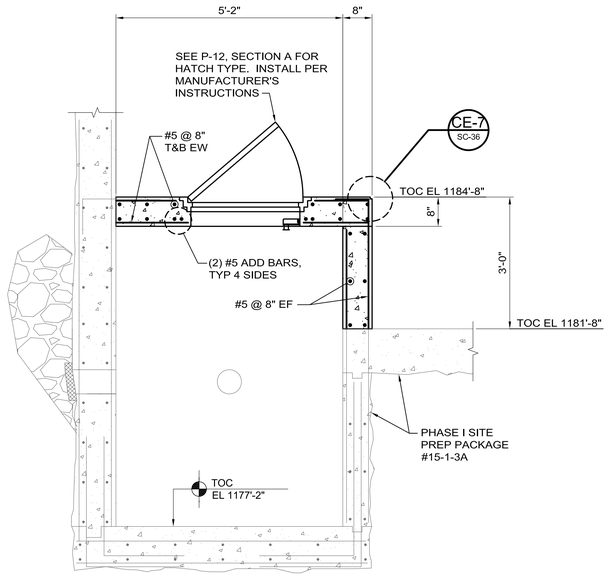
UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
SLAB SECTIONS & DETAILS - 1

DRAWING NO. 15-1-3B SC-32 REV. 0

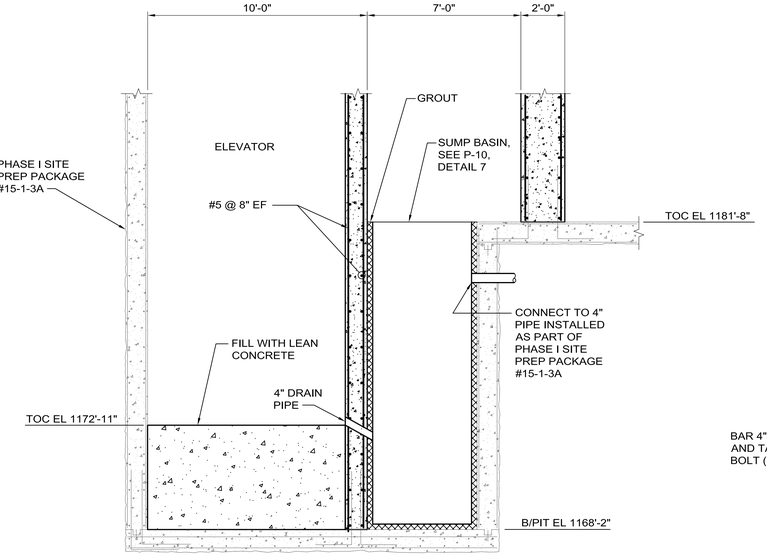
11 MAR, 2009



SUMP PIT DETAIL

SCALE 3/4" = 1' - 0"

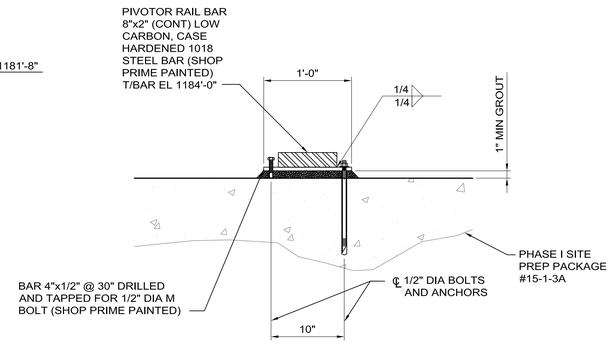
1 / SC-22



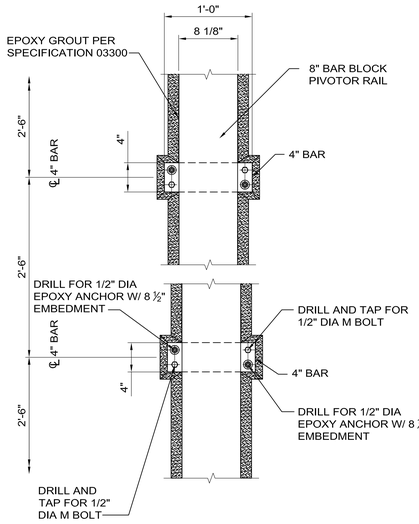
SECTION

SCALE 3/8" = 1'-0"

Q / SC-12, SC-14



ELEVATION

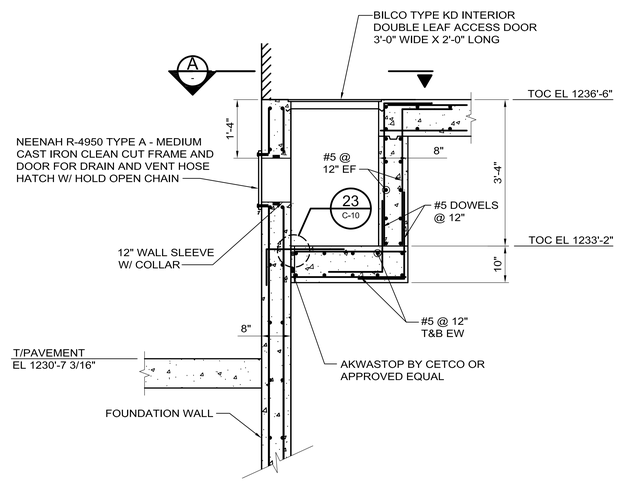


PLAN

BLOCK PIVOTOR DETAIL

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

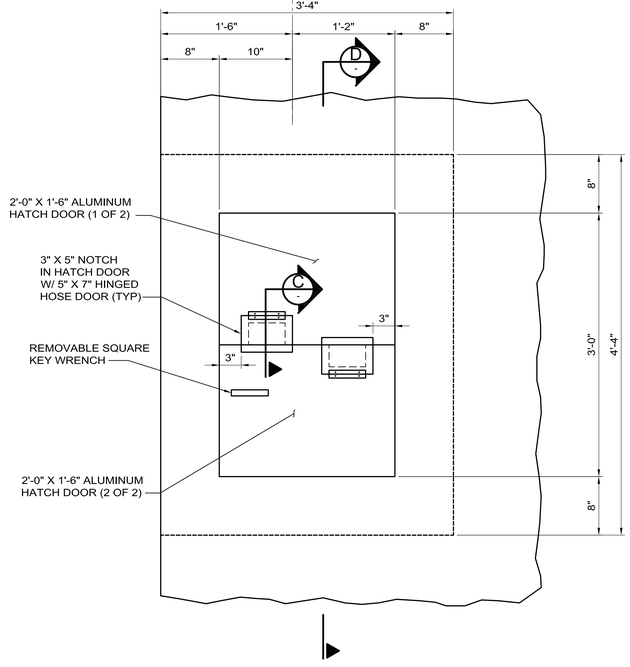
2 / SC-11, SC-12, SC-18, SC-19, SC-20, SC-21, SC-22, SC-23, SC-24



SECTION

SCALE 3/4" = 1'-0"

F / SC-3

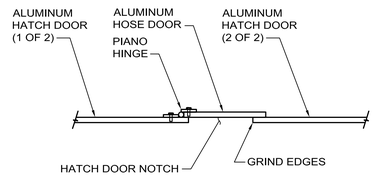


SECTION

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

A / -

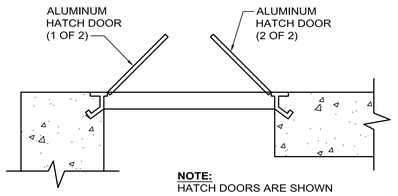
NOTE:
ACCESS DOOR SHALL BE RATED FOR 100 LB/SQ. FT. PEDESTRIAN LOAD RATING



SECTION

NOT TO SCALE

C / -

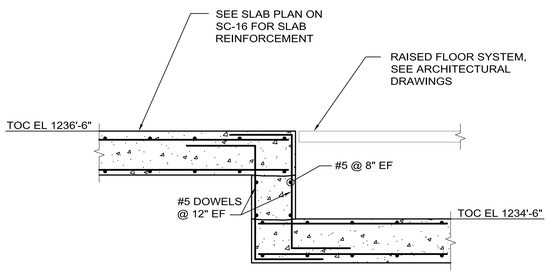


NOTE:
HATCH DOORS ARE SHOWN PARTIALLY OPEN.

SECTION

NOT TO SCALE

D / -



SECTION

SCALE 3/4" = 1'-0"

R / SC-16

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REV.	DATE	DESCRIPTIONS
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Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/8"=1'-0" 1 0 1 2 3 4 5 6 7 SCALE FEET

3/4"=1'-0" 1 0 1 2 3 SCALE FEET

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

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

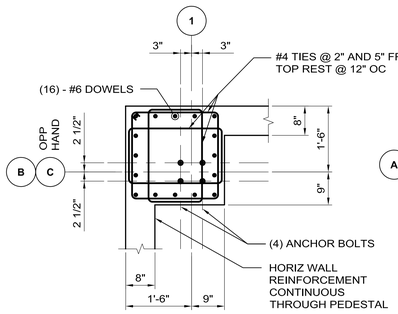
SLAB SECTIONS & DETAILS - 2

DRAWING NO. 15-1-3B SC-33 REV. 0

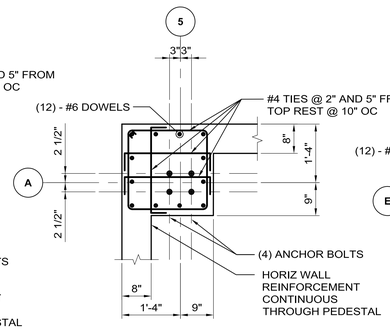
11 MAR, 2009

NOTES:

1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE SC-1.
2. SEE SC-36 FOR ANCHOR BOLT DETAIL.
3. SEE SC-35 FOR CORNER REINFORCEMENT OF GRADE BEAMS.
4. SEE SS-17 FOR COLUMN AND BASE PLATE INFORMATION.



P1



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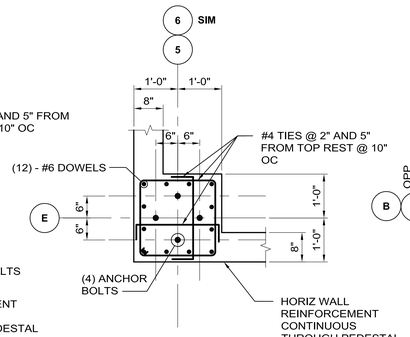

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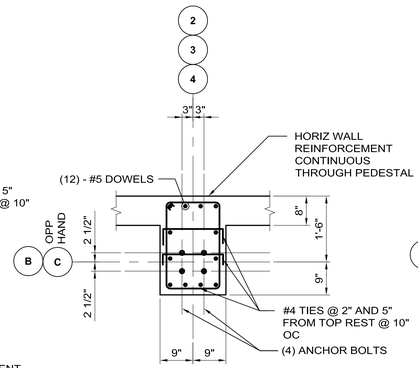

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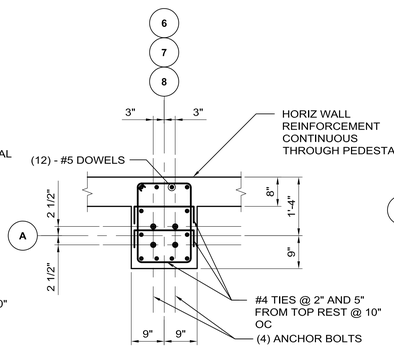

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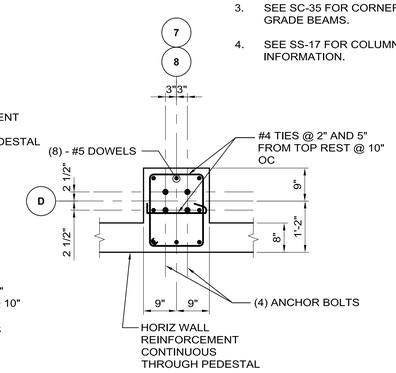

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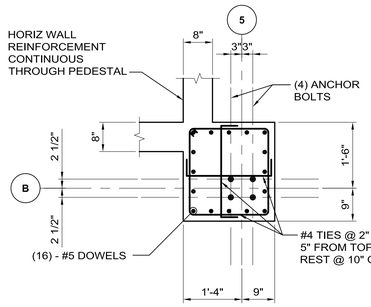

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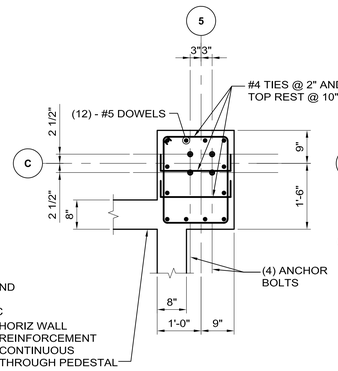

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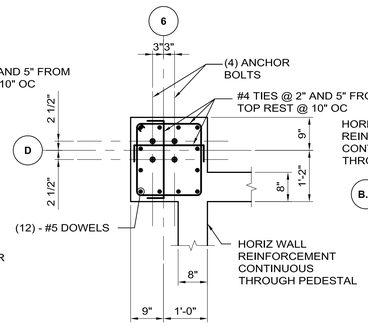

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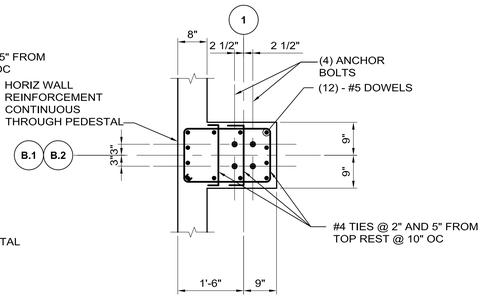

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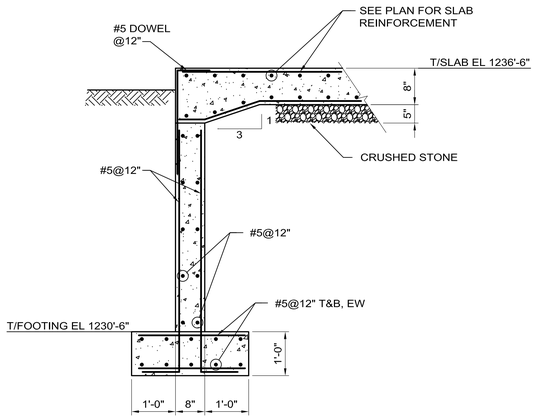
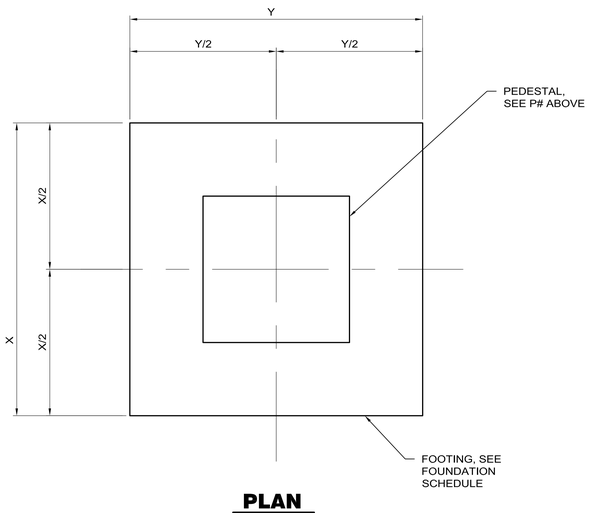
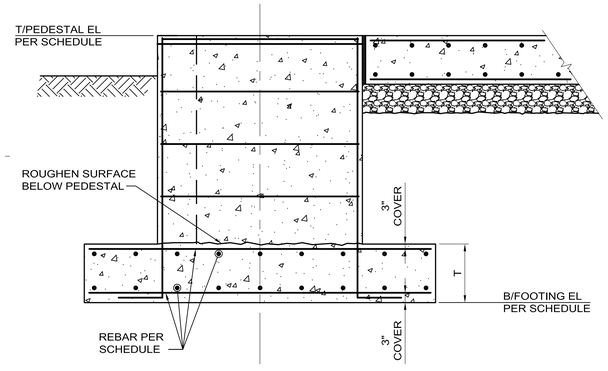


SECTION
SCALE 3/4" = 1'-0"
B
SC-13



PLAN



ELEVATION

FOUNDATION SCHEDULE

COLUMN DESIGNATION	QUANTITY	FOOTING					PEDESTAL		ANCHOR BOLTS			GROUT THICK.	COLUMN DESIGNATION
		X (FT)	Y (FT)	THICKNESS "T" (FT)	B/CONC EL (FT)	REBARS	TYPE	TOC EL (FT)	TYPE	SIZE	T/BOLT EL (FT)		
A-5	1	5	5	1	1229.5	#4@12" T&B, EW	P2	1236.5	II	3/4"	1237.0	1"	A-5
A-6, A-7, A-8	3	5	5	1	1229.5	#4@12" T&B, EW	P5	1236.5	II	3/4"	1237.0	1"	A-6, A-7, A-8
B-1	1	10	10	1.5	1226.5	#5@12" T&B, EW	P1	1236.5	II	1 1/4"	1237.0	1"	B-1
B-2, B-3, B-4	3	6	6	1	1229	#6@12" T&B, EW	P4	1236.5	II	3/4"	1237.0	1"	B-2, B-3, B-4
B-5	1	6	6	1	1229.5	#5@12" T&B, EW	P7	1236.5	II	3/4"	1237.0	1"	B-5
B.1-1, B.2-1	2	7	7	1	1226.5	#4@12" T&B, EW	P10	1236.5	II	1"	1237.0	1"	B.1, B.2
C-1	1	13	13	1.5	1226.5	#5@12" T&B, EW	P1	1236.5	II	1 1/4"	1237.0	1"	C-1
C-2, C-3, C-4	3	8	8	1	1227.5	#6@12" T&B, EW	P4	1236.5	II	3/4"	1237.0	1"	C-2, C-3, C-4
C-5	1	7	7	1	1227.5	#6@12" T&B, EW	P8	1236.5	II	3/4"	1237.0	1"	C-5
D-6	1	6	6	1	1229.5	#4@12" T&B, EW	P9	1236.5	II	3/4"	1237.0	1"	D-6
D-7, D-8	2	6	6	1	1229.5	#4@12" T&B, EW	P6	1236.5	II	3/4"	1237.0	1"	D-7, D-8
E-5	1	5	5	1	1227.5	#4@12" T&B, EW	P3	1236.5	II	3/4"	1237.0	1"	E-5
E-6	1	5	5	1	1229.5	#4@12" T&B, EW	P3	1236.5	II	3/4"	1237.0	1"	E-6

TYPICAL COLUMN FOUNDATION

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PRINT NAME: KEVIN V. COMO
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REVISIONS

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BMcD PROJECT NUMBER 49617

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U of M SUBMITTED	M. MARSHAK	03-11-09

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

UNIVERSITY OF MINNESOTA | Hines
PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
FOUNDATION SECTIONS & DETAILS

DRAWING NO. 15-1-3B | SC-34 | REV. 0

11 MAR, 2009

GENERAL NOTES AND ABBREVIATIONS: (APPLICABLE TO ALL DRAWINGS)

ITEMS WHICH ARE TO BE FURNISHED AND INSTALLED BY SEPARATE CONTRACTS ARE IDENTIFIED AND LABELED FOR EACH CONTRACT.

SPLICES AT FLOOR SLAB (UNLESS NOTED OTHERWISE):
TOP BARS - NEAR MID SPAN
BOT BARS - OVER SUPPORTS

CONCRETE COVER FOR REINFORCING (UNLESS NOTED OTHERWISE):

A. CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH = 3"

B. EXPOSED TO EARTH OR WEATHER:
#6 THRU #18 BARS = 2"
#5 BARS, 5/8 " WIRE AND SMALLER = 1 1/2"

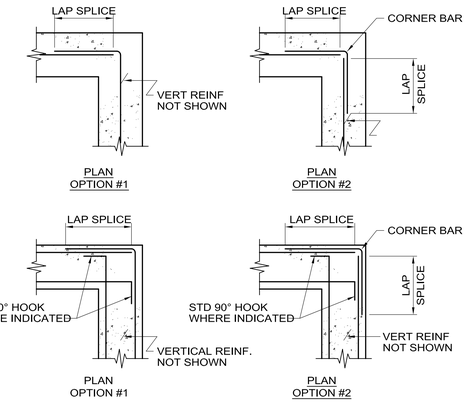
C. NOT EXPOSED TO EARTH OR WEATHER:
1. SLABS, WALLS AND JOISTS
#8 AND LARGER BARS = 1 1/2"
#6 AND #7 BARS = 1"
#5 AND SMALLER BARS = 3/4"
2. BEAMS, GIRDERS AND COLUMNS;
PRINCIPAL REINFORCEMENT, TIES, STIRRUPS AND SPIRALS = 1 1/2"

4. MINIMUM CLEAR SPACING BETWEEN PARALLEL BARS IN A LAYER INCLUDING SPLICE BARS, SHALL NOT BE LESS THAN:
A. FOR COLUMNS & PEDESTALS:
1. THE DIAMETER OF THE BAR TIMES 1.5
2. 1 1/2"
3. 1.33 TIMES THE MAXIMUM AGGREGATE SIZE.
B. FOR ALL OTHER BARS:
1. THE DIAMETER OF THE BAR
2. 1"
3. 1.33 TIMES THE MAXIMUM AGGREGATE SIZE.

5. CONCRETE REINFORCING DEVELOPMENT AND LAP SPLICE LENGTHS, HOOKED BAR EMBEDMENT LENGTHS, AND CONCRETE REINFORCING DETAILS FOR WALL CORNERS AND INTERSECTIONS AS SHOWN ON THIS DRAWING ARE APPLICABLE TO ALL DRAWINGS UNLESS OTHERWISE INDICATED.

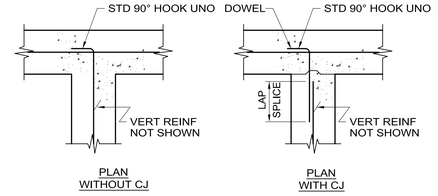
GENERAL NOTES: (APPLICABLE TO THIS DRAWING)

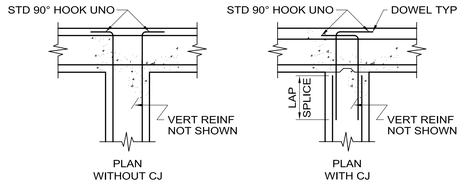
1. ALL DETAILS AND NOTES ON THIS DRAWING ARE BURNS & McDONNELL STANDARDS WITHOUT RESPECT TO CONTRACTS. USE ONLY THOSE DETAILS AS CALLED FOR ON PLANS, SPECIFIED OR AS REQUIRED TO ACCOMPLISH THE WORK.



HORIZONTAL WALL REINFORCEMENT DETAILS CORNERS

SEE CORNER REINFORCEMENT NOTE 1





HORIZONTAL WALL REINFORCEMENT DETAILS INTERSECTIONS

SEE CORNER REINFORCEMENT NOTE 2

VERTICAL WALL TO SLAB CORNER AND INTERSECTION REINFORCEMENT DETAILS
SEE CORNER REINFORCEMENT NOTE 3

STANDARD REINFORCEMENT DETAILS

NTS

CORNER REINFORCEMENT NOTES:

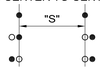
1. UNLESS OTHERWISE INDICATED, THE CONTRACTOR HAS THE OPTION OF REINFORCING CORNERS IN ACCORDANCE WITH OPTION #1 OR OPTION #2.
2. UNLESS OTHERWISE INDICATED, THE CONTRACTOR HAS THE OPTION OF CONSTRUCTING INTERSECTIONS WITH OR WITHOUT CONSTRUCTION JOINTS. REINFORCE PER APPLICABLE DETAIL.
3. ✳ INDICATES CONTRACTOR OPTION: WITH OR WITHOUT LAP SPLICE AT THESE LOCATIONS.

REINFORCING DEVELOPMENT AND SPLICES f'c=5000psi

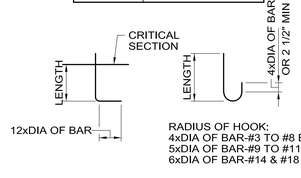
BAR SIZE	DEVELOPMENT LENGTH		SPLICE LENGTH	
	OTHER	TOP	OTHER	TOP
#3	1'-1"	1'-5"	1'-5"	1'-10"
#4	1'-5"	1'-10"	1'-10"	2'-5"
#5	1'-10"	2'-4"	2'-4"	3'-0"
#6	2'-2"	2'-9"	2'-9"	3'-7"
#7	3'-2"	4'-1"	4'-1"	5'-3"
#8	3'-7"	4'-8"	4'-8"	6'-0"
#9	4'-0"	5'-3"	5'-3"	6'-9"
#10	4'-6"	5'-10"	5'-10"	7'-7"
#11	5'-0"	6'-6"	6'-6"	8'-5"

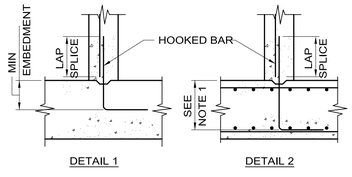
TYPICAL REINFORCING NOTES:

1. REINFORCING BAR DEVELOPMENT AND LAP SPLICE LENGTHS SHALL BE AS SHOWN IN THESE TABLES UNLESS NOTED OTHERWISE ON THE DRAWINGS.
2. THE LENGTHS SHOWN IN THE TABLES ARE BASED ON THE FOLLOWING CONCRETE COVERAGE AND REINFORCING C-C SPACING:
BEAMS OR COLUMNS: COVER ≥ 1.0bd (BAR DIAMETER)
CENTER TO CENTER (C-C) SPACING ≥ 2.0bd.
ALL OTHERS: COVER ≥ 1.0bd
CENTER TO CENTER SPACING ≥ 3.0bd.
3. TOP BARS ARE DEFINED AS HORIZONTAL REINFORCEMENT PLACED SUCH THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE DEVELOPMENT LENGTH OR SPLICE.
4. THE DEVELOPMENT AND SPLICE LENGTHS SHOWN SHALL NOT APPLY IF ANY OF THE FOLLOWING CONDITIONS OCCUR:
A) f'c < 5000 psi
B) fy > 60,000 psi
C) THE COVER OR C-C BAR SPACING IS NOT AS LISTED ABOVE.
D) THE REINFORCING STEEL IS EPOXY COATED.
E) LIGHT WEIGHT CONCRETE IS USED.
5. WHERE BAR SPLICES ARE STAGGERED SUCH THAT ONE-HALF OR LESS OF TOTAL REINFORCEMENT IS SPLICED WITHIN REQUIRED LAP LENGTH, SPLICE LENGTH MAY EQUAL DEVELOPMENT LENGTH.
6. CENTER TO CENTER SPACING (S) IS DEFINED AS BELOW



DEVELOPMENT LENGTHS HOOKED BARS (f'c = 5000psi)	
BAR SIZE	LENGTH OR MIN EMBEDMENT
#3	7"
#4	9"
#5	11"
#6	1'-1"
#7	1'-3"
#8	1'-5"
#9	1'-8"
#10	1'-10"
#11	2'-0"





DEVELOPMENT LENGTH NOTES:

1. WHERE DWGS ARE DETAILED SIMILAR TO DETAIL 2, EXTEND THE EMBEDMENT LENGTH SUCH THAT THE HOOKED BAR CONTACTS THE LAYER OF MAIN REINFORCING SHOWN.
2. EMBEDMENT LENGTHS IN CHART ARE TYPICAL EXCEPT AS NOTED IN DETAIL 2, OR AS INDICATED ON DRAWINGS.

TYPICAL REINFORCING DEVELOPMENT AND SPLICES

NTS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO

SIGNATURE:

DATE: 03/11/2009 LICENSE #46236

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	E. ALCARAZ	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

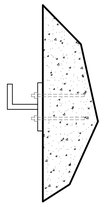
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

STANDARD DETAILS - 1

DRAWING NO. 15-1-3B SC-35 REV. 0

11 MAR, 2009

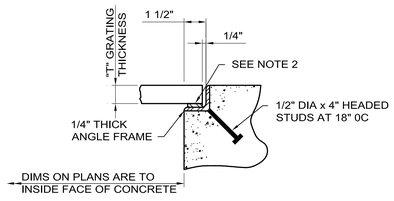


NOTE:
PROVIDE CONCRETE EMBEDS AS NEEDED TO SUPPORT ANTI-SWAY GUIDE SYSTEM PER SECTION "D" ON SS-10. CONTRACTOR SHALL COORDINATE LOCATION AND TYPE OF LATERAL RESTRAINT ANCHORAGE/EMBEDS WITH MOVABLE ACCESS PLATFORM SUPPLIER.

PLATFORM STOP DETAIL

NTS

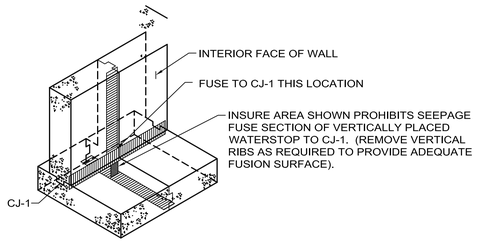
3
SC-30



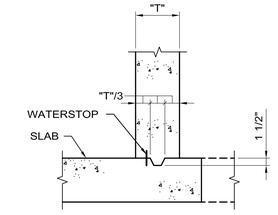
CE-7

NOTES:

1. MITER, WELD AND GRIND SMOOTH ANGLE FRAME AT CORNERS.
2. WELD CONTINUOUS BAR TO ANGLE AS SHOWN WHEN NECESSARY TO BRING GRATING UP FLUSH WITH CURB ANGLE FRAME.
   OPTION: DELETE CONTINUOUS BAR, TRIM ANGLE AT TOP AS REQUIRED.



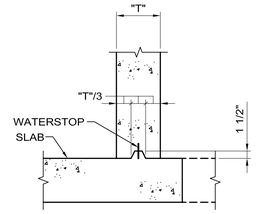
CONSTRUCTION JOINT INTERSECTION DETAIL



CJ-1 - WITH WATERSTOP

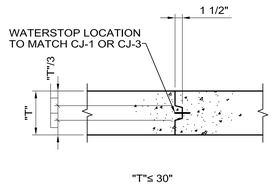
CJ-2 - WITHOUT WATERSTOP

"T"≤ 30"



CJ-3

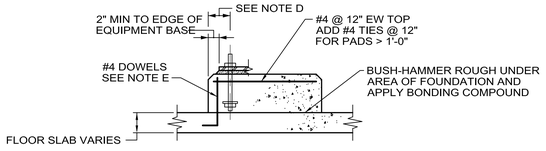
"T"≤ 30"



NOTE:
USE FOR VERTICAL AND HORIZONTAL JOINTS. REINFORCEMENT IS NOT SHOWN ON CJ DETAILS FOR CLARITY, HOWEVER, ALL REINFORCEMENT SHALL BE CONTINUOUS THROUGH CONSTRUCTION JOINTS UNO.

CJ-6 - WITH WATERSTOP

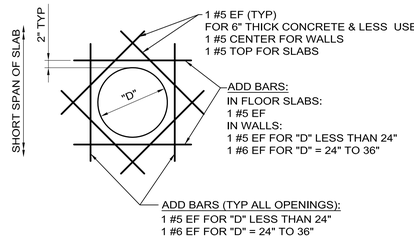
CJ-7 - WITHOUT WATERSTOP



SECTION
EP-1
EQUIPMENT PAD FOUNDATION

NOTES:

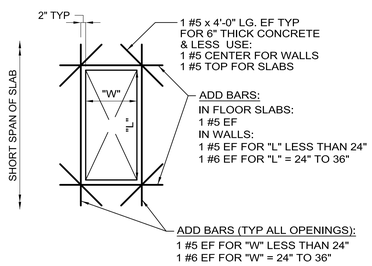
A. PROVIDE EP-1 EQUIPMENT PAD FOUNDATION FOR EQUIPMENT WHEN OTHER FOUNDATIONS HAVE NOT BEEN INDICATED.
B. PROVIDE ANCHOR BOLTS AND GROUT AS REQUIRED BY EQUIPMENT MANUFACTURER.
C. EQUIPMENT PAD FOUNDATIONS SHALL CONFORM TO THIS DETAIL, EQUIPMENT MANUFACTURER'S REQUIREMENTS, AND THE FOLLOWING:
   1. REINFORCE PAD TO CONFORM WITH THIS DETAIL. IF THE FLOOR IS CONSTRUCTED BEFORE THE DOWELS ARE PLACED, THE DOWELS SHALL BE INSTALLED USING ADHESIVE ANCHORS INTO THE FLOOR SLAB.
   2. EQUIPMENT SHALL BE GROUTED IN PLACE WITH NON-SHRINK GROUT, UNLESS OTHERWISE RECOMMENDED BY THE EQUIPMENT MANUFACTURER.
   3. EQUIPMENT ANCHOR BOLTS SHALL BE STANDARD TYPE II A.B., UNLESS OTHERWISE RECOMMENDED BY THE EQUIPMENT MANUFACTURER.
D. DIMENSION SHALL BE 4-INCHES MINIMUM FOR PADS WITH 1-INCH DIAMETER ANCHOR BOLTS, 6-INCHES MINIMUM FOR PADS WITH ANCHOR BOLTS GREATER THAN 1-INCH DIAMETER.
E. PROVIDE DOWELS AT 12-INCHES MINIMUM CENTER TO CENTER, OR PROVIDE NUMBER OF DOWELS TO EQUAL TOTAL CROSS SECTIONAL AREA OF ANCHOR BOLTS OF PAD, EQUALLY SPACED AROUND PAD.



CO-1 - UNSLEEVED OPENING

NOTES:

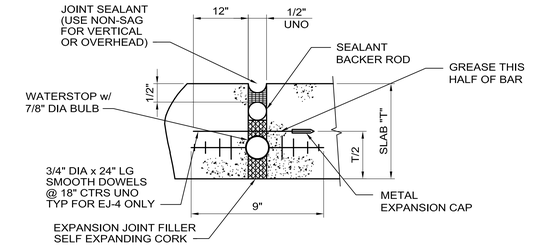
1. MINIMUM LENGTH OF ALL BARS SHALL BE "D" + 3'-6" WITH BARS CENTERED ON OPENING.
2. FOR OPENINGS LESS THAN 12" IN DIAMETER, THE ADD BARS ARE NOT REQUIRED IF NO REINFORCING IS CUT BY THE OPENING.
3. SHORT SPAN OF SLAB = LESSER DISTANCE BETWEEN SUPPORT MEMBERS.
4. REINFORCE OPENINGS WITH "D" LARGER THAN 3'-0" AS INDICATED ON THE DRAWINGS. IF NOT INDICATED, CONTACT THE ENGINEER.
5. FOR CONCRETE OPENINGS THROUGH STEEL DECKING, BLOCK OUT CONCRETE WITHIN OPENING WITH STYROFOAM OR OTHER APPROVED MATERIAL AND SEAL WITH DUCT TAPE. CUT DECK TO MATCH INSIDE DIMENSION OF OPENING AFTER CONCRETE HAS SET FOR 7 DAYS.
6. METAL DECKING HOLES AND OPENINGS SHALL NOT BE CUT UNTIL IMMEDIATELY PRIOR TO BEING PERMANENTLY FILLED WITH THE EQUIPMENT OR STRUCTURE INTENDED TO FULFILL ITS SPECIFIC USE OR SHALL BE IMMEDIATELY COVERED. SEE OSHA SECTION 29CFR1926 SUBPART R.
7. REINFORCING SHOWN REPRESENTS THE MINIMUM REQUIRED AT ALL C0-1 OPENINGS UNO.



CO-2 - UNSLEEVED OPENING

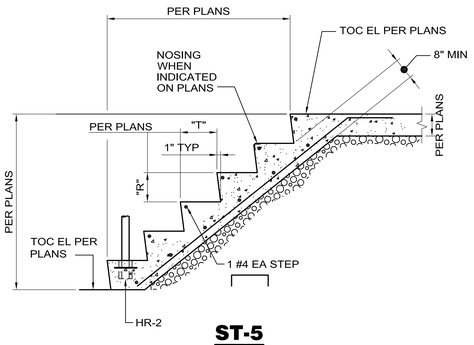
NOTES:

1. ALL MINIMUM LENGTHS TO BE (L OR W) + 3'-6" WITH BARS CENTERED ON OPENING. FOR OPENING (W, L) LESS THAN 12", THE ADD BARS ARE NOT REQUIRED IF NO REINFORCING IS CUT BY THE OPENING.
2. SHORT SPAN OF SLAB = LESSER DISTANCE BETWEEN SUPPORT MEMBERS. REINFORCE OPENINGS WITH "L" OR "W" LARGER THAN 3'-0" AS INDICATED ON THE DRAWINGS. IF NOT INDICATED, CONTACT THE ENGINEER.
3. FOR CONCRETE OPENINGS THROUGH STEEL DECKING, BLOCK OUT CONCRETE WITHIN OPENING WITH STYROFOAM OR OTHER APPROVED MATERIAL AND SEAL WITH DUCT TAPE. CUT DECK TO MATCH INSIDE DIMENSION OF OPENING AFTER CONCRETE HAS SET FOR 7 DAYS.
4. METAL DECKING HOLES AND OPENINGS SHALL NOT BE CUT UNTIL IMMEDIATELY PRIOR TO BEING PERMANENTLY FILLED WITH THE EQUIPMENT OR STRUCTURE INTENDED TO FULFILL ITS SPECIFIC USE OR SHALL BE IMMEDIATELY COVERED. SEE OSHA SECTION 29CFR1926 SUBPART R.
5. REINFORCING SHOWN REPRESENTS THE MINIMUM REQUIRED AT ALL C0-2 OPENINGS UNO.



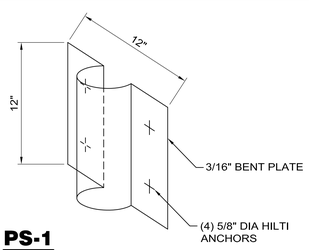
EJ-3 - WITHOUT DOWEL OR WATERSTOP

EJ-4 - WITH DOWEL



ST-5

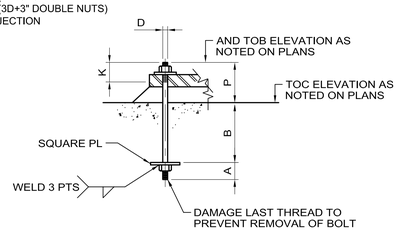
TYPICAL CONCRETE STAIR



PS-1

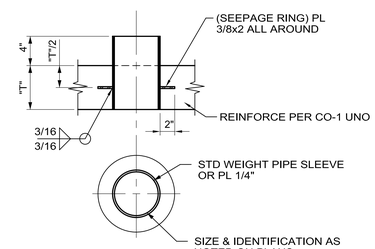
PIPE SHIELD DETAIL

D = BOLT DIAMETER
K = THREADS (2D+3" SINGLE NUT THREADS (3D+3" DOUBLE NUTS)
P = BOLT PROJECTION



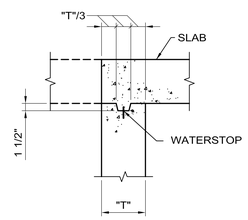
SCHEDULE				
D	A	B	SQUARE PL	REMARKS
5/8"	2"	8"	PL 1/2x2 1/2" SQ	
3/4"	2"	10"	PL 1/2x3" SQ	
7/8"	3"	1'-0"	PL 5/8x3 1/2" SQ	
1"	3"	1'-2"	PL 5/8x3 1/2" SQ	
1 1/8"	3"	1'-4"	PL 3/4x4" SQ	
1 1/4"	3"	1'-6"	PL 3/4x4 1/2" SQ	
1 3/8"	4"	1'-8"	PL 7/8x5" SQ	
1 1/2"	4"	1'-10"	PL 7/8x5 1/2" SQ	
1 3/4"	4"	2'-0"	PL 1x6" SQ	
2"	4"	2'-2"	PL 1 1/4x7" SQ	
2 1/4"	5"	2'-4"	PL 1 1/2x7 1/2" SQ	
2 1/2"	6"	2'-6"	PL 1 3/4x8 1/2" SQ	
2 3/4"	6"	2'-9"	PL 2x9 1/2" SQ	
3"	7"	3'-0"	PL 2 1/4x10" SQ	

TYPE II ANCHOR BOLT
UNSLEEVED BOLT



CO-8 WITH 4" PROJECTION
CO-9 WITHOUT 4" PROJECTION

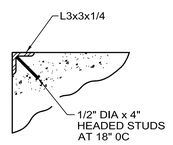
NOTE:
METAL DECKING HOLES AND OPENINGS SHALL NOT BE CUT UNTIL IMMEDIATELY PRIOR TO BEING PERMANENTLY FILLED WITH THE EQUIPMENT OR STRUCTURE INTENDED TO FULFILL ITS SPECIFIC USE OR SHALL BE IMMEDIATELY COVERED. SEE OSHA SECTION 29CFR1926 SUBPART R.



CJ-10 - WITH WATERSTOP

CJ-11 - WITHOUT WATERSTOP

"T"≤ 30"



CE-3

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO

SIGNATURE:

DATE: 03/11/2009 LICENSE #46236

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell
SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	E. ALCARAZ	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

STANDARD DETAILS - 2

DRAWING NO. 15-1-3B SC-36 REV. 0

11 MAR, 2009

GENERAL NOTES

1. SEE DRAWING SC-1 FOR ADDITIONAL GENERAL NOTES AND DESIGN INFORMATION.

2. STRUCTURAL STEEL MATERIALS:

   WIDE FLANGE SECTIONS.....ASTM A992 GRADE 50

   PLATES AND SHAPES.....ASTM A36

   BOLTS.....ASTM A325

   ROUND PIPES.....ASTM A53, TYPE E OR S, GRADE B

   STRUCTURAL TUBES (HSS).....ASTM A500, GRADE B

   ANCHOR BOLTS.....ASTM F1554, GRADE 55

   WELD ELECTRODES.....E70XX

3. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE PROVISION OF THE AISC STEEL CONSTRUCTION MANUAL, 13th EDITION.

4. ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY CODE AWS D1.1.

5. BOLTED STRUCTURAL CONNECTIONS SHALL USE 3/4" DIAMETER, A325 BOLTS IN STANDARD HOLES, UNLESS INDICATED TO BE SLIP CRITICAL.

ABBREVIATIONS

AA	-	ALUMINUM ASSOCIATION
AB	-	ANCHOR BOLT
ABT	-	ABOUT
ACI	-	AMERICAN CONCRETE INSTITUTE
ADH	-	ADHESIVE
AGGR	-	AGGREGATE
AHR	-	ANCHOR
AISC	-	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AISI	-	AMERICAN IRON AND STEEL INSTITUTE
AL	-	ALUMINUM
ALTN	-	ALTERNATE
ANSI	-	AMERICAN NATIONAL STANDARD INSTITUTE
APPROX	-	APPROXIMATE
ARCH	-	ARCHITECT
ASTM	-	AMERICAN SOCIETY FOR TESTING OF MATERIALS
AWS	-	AMERICAN WELDING SOCIETY
BC	-	BOLT CIRCLE
BETW	-	BETWEEN
BLDG	-	BUILDING
BM	-	BEAM
BOS	-	BOTTOM OF STEEL
BOT	-	BOTTOM
BRG	-	BEARING
BRKT	-	BRACKET
CAP	-	CAPACITY
C/C	-	CENTER TO CENTER
CF	-	CUBIC FEET
CHKR	-	CHECKER
CIR	-	CIRCLE
CJ	-	CONSTRUCTION JOINT
CL	-	CENTER LINE
CLJ	-	CONTROL JOINT
CLR	-	CLEAR
CMU	-	CONCRETE MASONRY UNIT
CO	-	CONCRETE OPENING
COL	-	COLUMN
CONC	-	CONCRETE
CONN	-	CONNECTION
CONT	-	CONTINUOUS
CONTR	-	CONTRACT
COORD	-	COORDINATE
COR	-	CORNER
CRSI	-	CONCRETE REINFORCING STEEL INSTITUTE
CTR	-	CENTER
CY	-	CUBIC YARD
DBL	-	DOUBLE
DET	-	DETAIL
DIAG	-	DIAGONAL
DIA	-	DIAMETER
DIM	-	DIMENSION
DK	-	DECKING
DL	-	DEAD LOAD
DN	-	DOWN
DWG	-	DRAWING
DWL	-	DOWEL
E	-	EAST
EA	-	EACH
ED	-	EQUIPMENT DRAIN
EF	-	EACH FACE
EJ	-	EXPANSION JOINT
EL	-	ELEVATION
ELEC	-	ELECTRICAL
ELEV	-	ELEVATOR
EMBED	-	EMBEDMENT
EQ	-	EQUAL
EQ SP	-	EQUALLY SPACED
EQUIP	-	EQUIPMENT
EQUIV	-	EQUIVALENT
EW	-	EACH WAY
EXIST	-	EXISTING
EXP	-	EXPANSION
EXT	-	EXTERIOR
FAB	-	FABRICATE
FD	-	FLOOR DRAIN
FDN	-	FOUNDATION
FF	-	FAR FACE
FL	-	FLOOR
FLG	-	FLANGE
FNSH	-	FINISH
FS	-	FAR SIDE
FT	-	FEET
FUT	-	FUTURE
GA	-	GAGE
GALV	-	GALVANIZE
GR	-	GRADE
GRTG	-	GRATING
H	-	HIGH
HEX	-	HEXAGON
HORIZ	-	HORIZONTAL
HPT	-	HIGH POINT
HR	-	HANDRAIL
HS	-	HIGH STRENGTH
IBC	-	INTERNATIONAL BUILDING CODE
ID	-	INSIDE DIAMETER
IF	-	INSIDE FACE
INTR	-	INTERIOR
INVT	-	INVERT
JT	-	JOINT
KB	-	KNEE BRACE
KPL	-	KICK PLATE
KSI	-	KIPS PER SQUARE INCH
LAD	-	LADDER
LB	-	POUND
L	-	LONG
LL	-	LIVE LOAD
LLH	-	LONG LEG HORIZONTAL
LLV	-	LONG LEG VERTICAL
LONG	-	LONGITUDINAL
LNTL	-	LINTEL
LPT	-	LOW POINT
LS	-	LAP SPLICE
MATL	-	MATERIAL
MAX	-	MAXIMUM
MECH	-	MECHANICAL
MEZZ	-	MEZZANINE
MFR	-	MANUFACTURER
MH	-	MANHOLE
MIN	-	MINIMUM
MISC	-	MISCELLANEOUS
MK	-	MARK
N	-	NORTH
NA	-	NOT APPLICABLE
NE	-	NORTHEAST
NF	-	NEAR FACE
NIC	-	NOT IN CONTRACT
NO	-	NUMBER
NOM	-	NOMINAL
NTS	-	NOT TO SCALE
NS	-	NEAR SIDE
NW	-	NORTHWEST
OC	-	ON CENTER
OD	-	OUTSIDE DIAMETER
OF	-	OUTSIDE FACE
OPNG	-	OPENING
OPP	-	OPPOSITE
OSHA	-	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OZ	-	OUNCE
PED	-	PEDESTAL
PERP	-	PERPENDICULAR
PJNT	-	PROJECTION
PL	-	PLATE
PREFAB		PREFABRICATED
PSF	-	POUNDS PER SQUARE FOOT
PSI	-	POUNDS PER SQUARE INCH
PVC	-	POLYVINYL CHLORIDE
R	-	RISER
RAD	-	RADIUS
RD	-	ROOF DRAIN
REF	-	REFERENCE
REINF	-	REINFORCE
REQD	-	REQUIRED
REV	-	REVISION
RM	-	ROOM
S	-	SOUTH
SCHED	-	SCHEDULE
SE	-	SOUTHEAST
SECT	-	SECTION
SH	-	SHEET
SIM	-	SIMILAR
SLP	-	SLOPE
SLV	-	SLEEVE
SP	-	SPACE
SPEC	-	SPECIFICATION
SQ	-	SQUARE
SST	-	STAINLESS STEEL
STD	-	STANDARD
STIF	-	STIFFENER
STIR	-	STIRRUP
STL	-	STEEL
STR	-	STRAIGHT
STRL	-	STRUCTURAL
STRUC	-	STRUCTURE
SW	-	SOUTHWEST
SYMM	-	SYMMETRICAL
T&B	-	TOP & BOTTOM
TEMP	-	TEMPORARY
THD	-	THREAD
THK	-	THICK
THRU	-	THROUGH
TOB	-	TOP OF BOLT
TOC	-	TOP OF CONCRETE
TOG	-	TOP OF GRATING
TOS	-	TOP OF STEEL
TRD	-	TREAD
TYP	-	TYPICAL
UBC	-	UNIFORM BUILDING CODE
UNO	-	UNLESS NOTED OTHERWISE
VAR	-	VARIES
VB	-	VERTICAL BRACE
VERT	-	VERTICAL
W	-	WEST
W	-	WIDE
W/	-	WITH
W/O	-	WITHOUT
WD	-	WIDTH
WP	-	WORK POINT
WT	-	WEIGHT
WWF	-	WELDED WIRE FABRIC

SYMBOLS

[A] SPECIAL FRAMED BEAM CONNECTIONS
SEE SCHEDULE ON DWG. SS-24

⬡5 BRACING CONNECTIONS
SEE SCHEDULE ON DWG. SS-24

(A) STANDARD FRAMED BEAM CONNECTIONS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO

SIGNATURE: Kevin V. Como

DATE: 03/11/2009 LICENSE: #46236

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	J. RUHDE	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

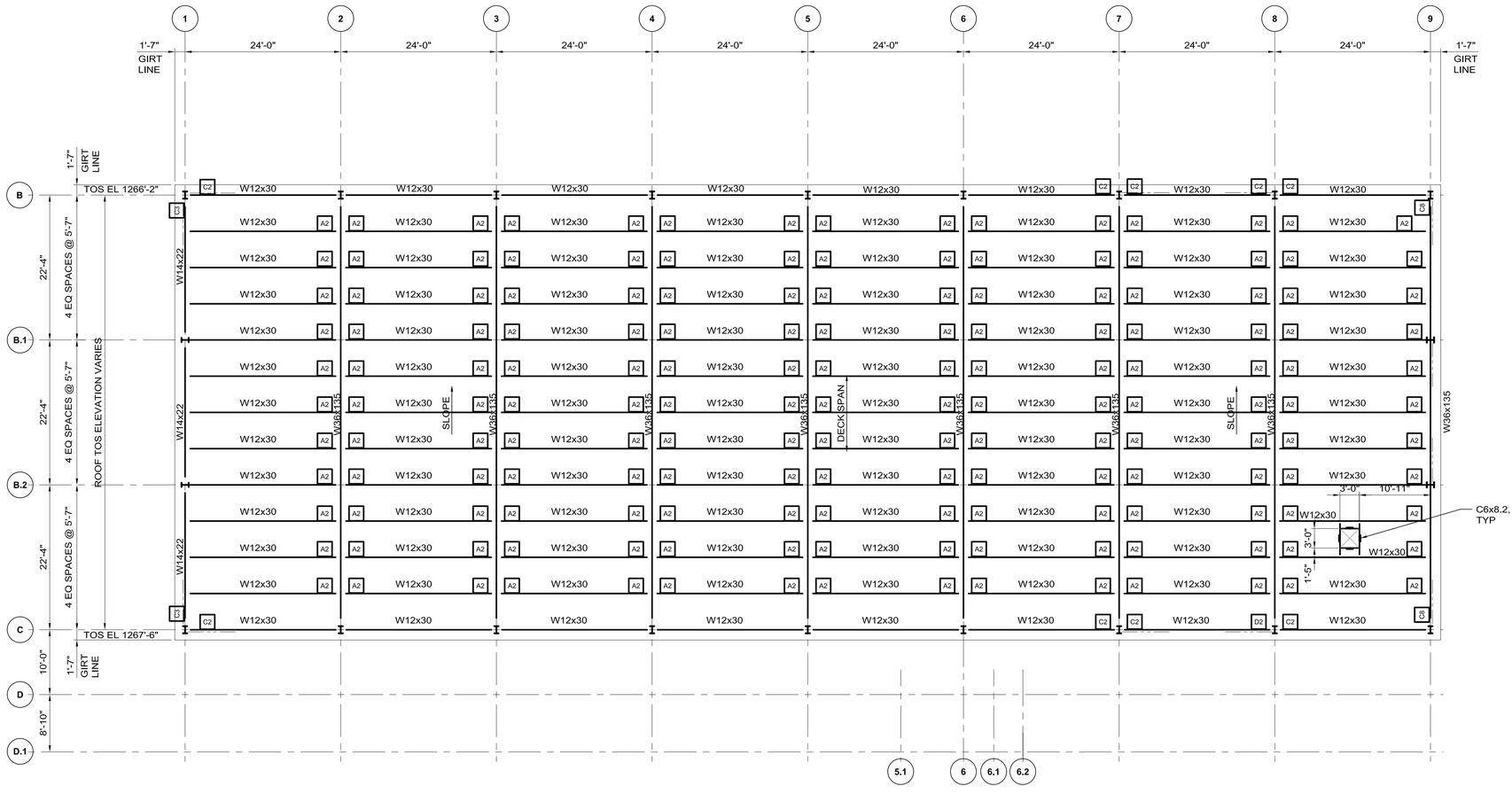
GENERAL NOTES & ABBREVIATIONS

DRAWING NO. **15-1-3B** **SS-1** REV. **0**

11 MAR, 2009

NOTES:

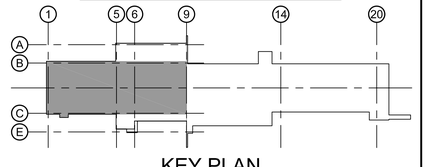
1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.
2. FOR STANDARD DETAILS, SEE DRAWINGS SS-23 THRU SS-26.
3. ALL BEAMS SHALL HAVE STANDARD FRAMED BEAM CONNECTIONS UNLESS NOTED OTHERWISE.
4. THE ROOF DECK AND DECK ATTACHMENTS SHALL BE CAPABLE OF RESISTING AN UPLIFT WIND PRESSURE OF 55 PSF.
5. ALL ROOF DECK SHALL BE SUPPORTED AT EDGES OF ROOF PENETRATIONS AND AROUND COLUMNS. CONTRACTOR SHALL PROVIDE ALL ADDITIONAL SUPPORT STEEL.
6. ROOF DECK SHALL BE 1½"x20 GAGE WIDE RIB STEEL AND MUST BE CAPABLE OF SUPPORTING AN UNFACTORED DIAPHRAGM SHEAR OF 450#/FT. THE DECK SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:
   Fy = 33 KSI
   Imin = 0.212 IN^4/FT
   Smin = 0.234 IN³/FT
7. ROOF DECK SHALL BE FASTENED AT EACH END, INTERMEDIATE SUPPORTS, AND PERIMETER OF ROOF BY ⅝" DIAMETER PUDDLE WELDS. SIDELAP CONNECTIONS SHALL BE MADE AT SEAMS WITH #10 SCREWS. ATTACHMENT PATTERN AT A MINIMUM SHALL BE PATTERN 3⅝ WITH 6 SIDELAP ATTACHMENTS PER SPAN.



HIGH ROOF PLAN

SCALE 1/8" = 1'-0"
SNOW LOAD = 42 PSF

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
HIGH ROOF PLAN

DRAWING NO. 15-1-3B SS-2 REV. 0

11 MAR, 2009

NOTES:

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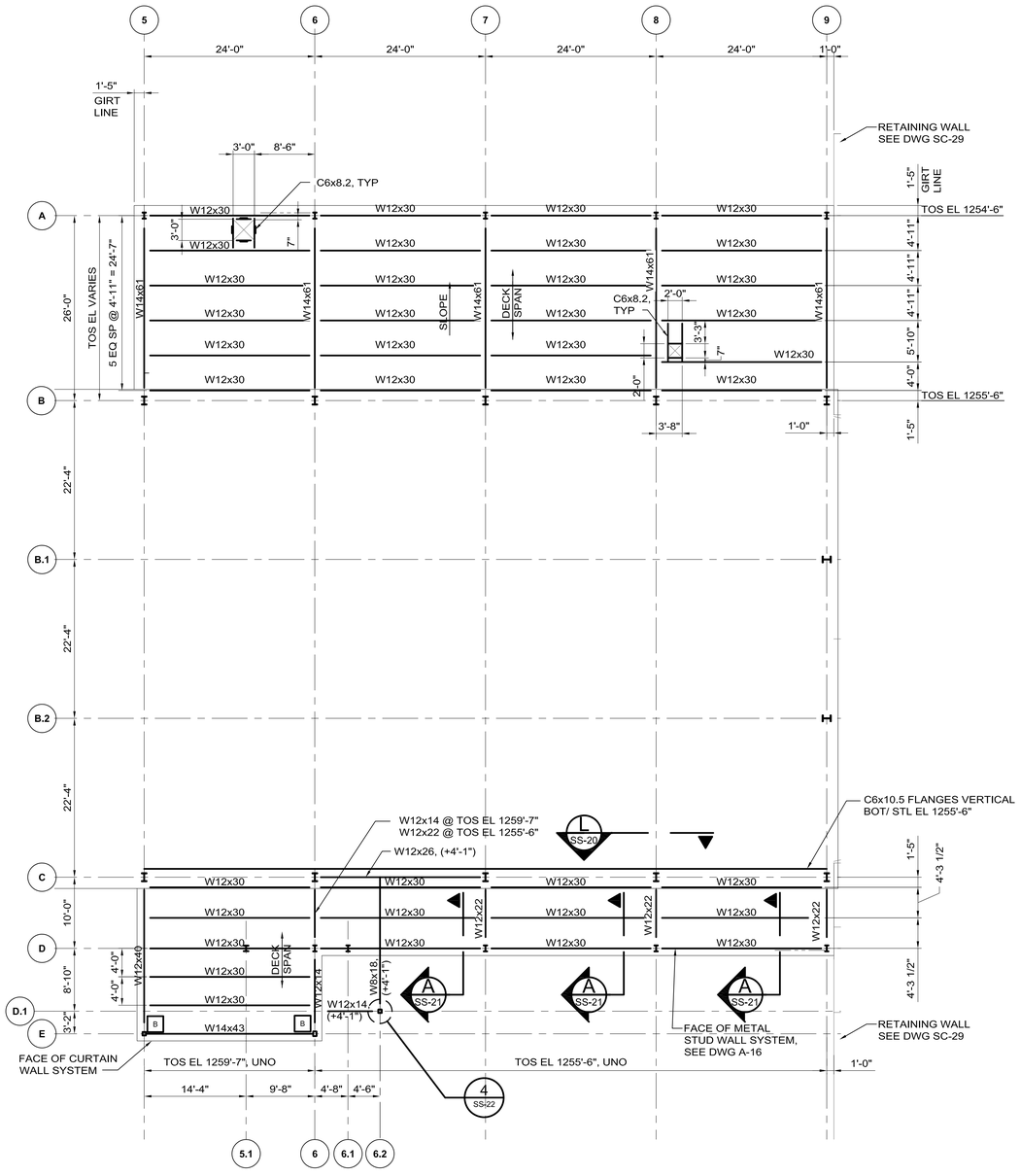
2. FOR STANDARD DETAILS, SEE DRAWINGS SS-23 THRU SS-26.
3. ALL BEAMS SHALL HAVE STANDARD FRAMED BEAM CONNECTIONS UNLESS NOTED OTHERWISE.
4. FOR ROOF DECK NOTES, SEE DRAWING SS-2.

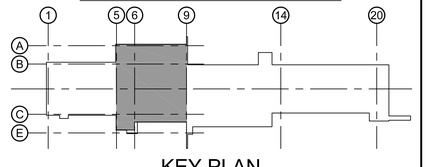


LOW ROOF PLAN

SCALE 1/8" = 1'-0"

SNOW LOAD = 42 PSF

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" SCALE 8 0 8 16 FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

LOW ROOF PLAN

DRAWING NO. 15-1-3B SS-3 REV. 0

11 MAR, 2009

NOTES:

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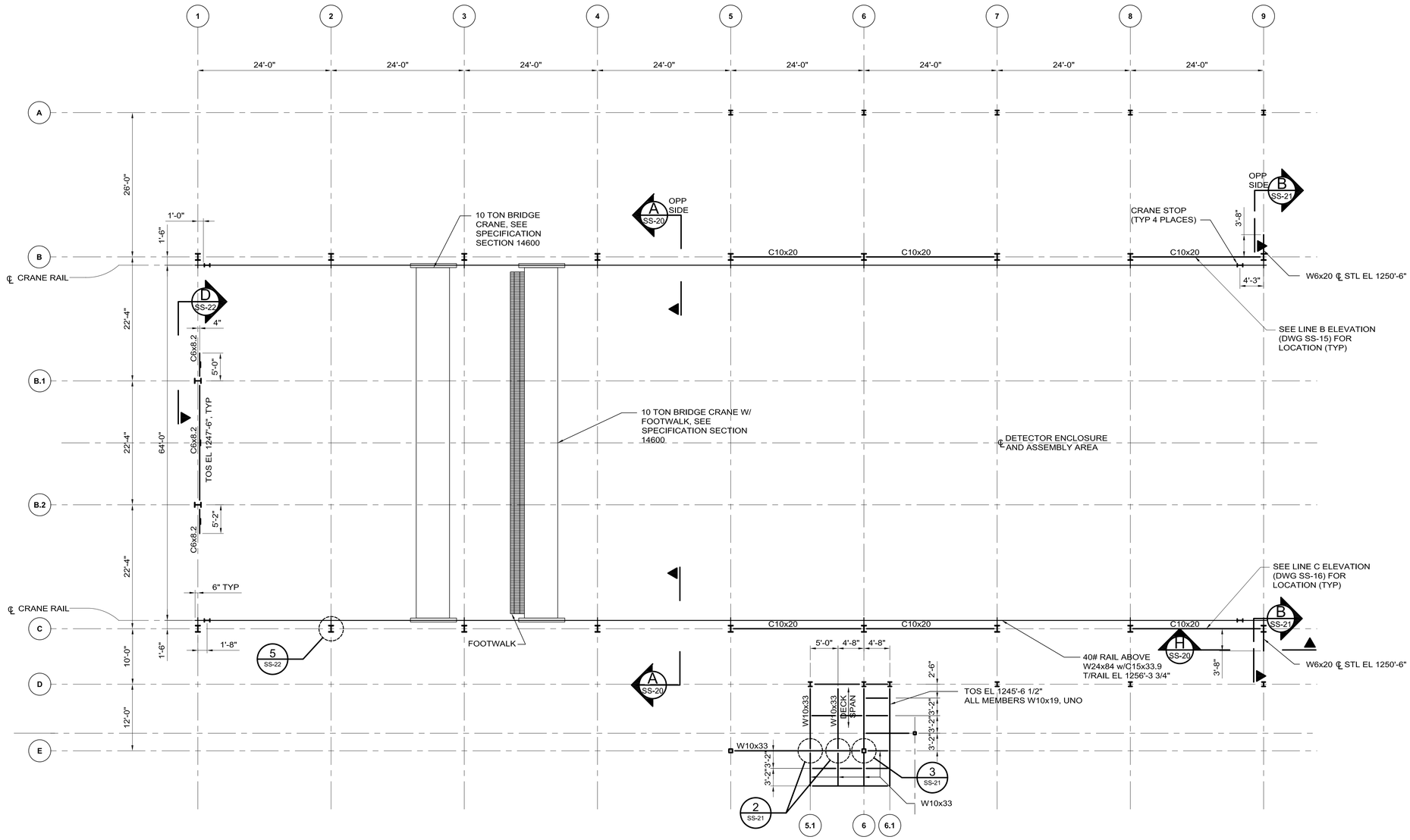
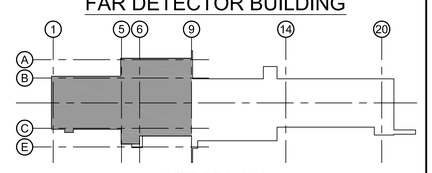
2. FOR STANDARD DETAILS, SEE DRAWINGS SS-23 THRU SS-26.
3. ALL BEAMS SHALL HAVE STANDARD FRAMED BEAM CONNECTIONS UNLESS NOTED OTHERWISE.



INTERMEDIATE STEEL PLAN

SCALE 1/8" = 1'-0"
(TOS EL AS NOTED)

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

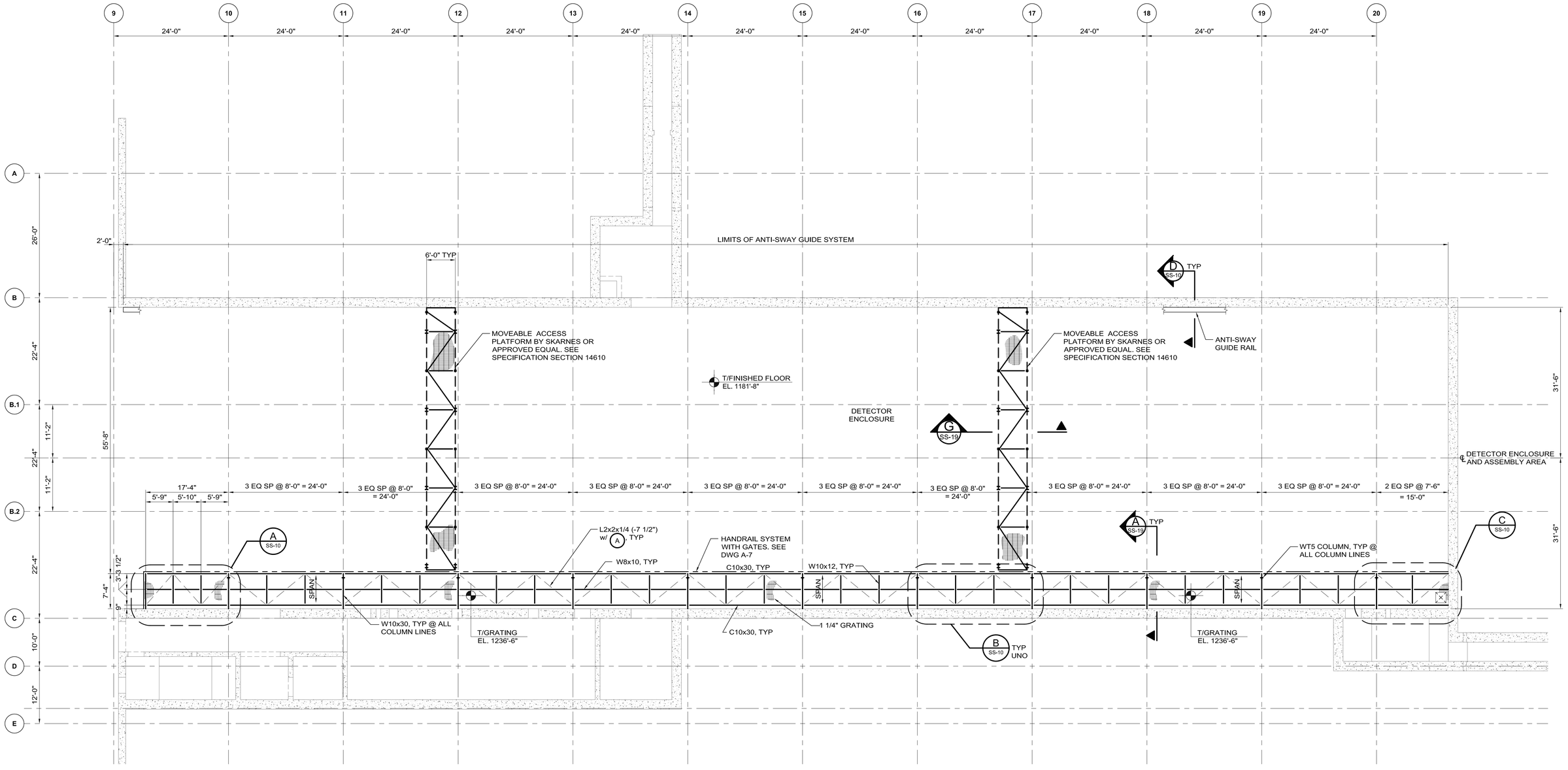
NOvA FAR DETECTOR BUILDING
INTERMEDIATE STEEL PLAN

DRAWING NO. 15-1-3B SS-4 REV. 0

11 MAR, 2009

NOTES:

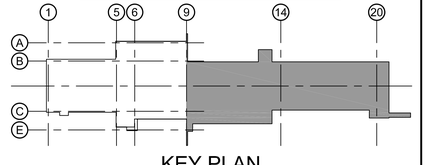
1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.
2. ALL BEAMS SHALL HAVE STANDARD FRAMED BEAM CONNECTIONS UNLESS NOTED OTHERWISE.
3. FOR STANDARD DETAILS, SEE DRAWINGS SS-23 THRU SS-26.
4. FOR CONNECTION W8, W10 AND C10 TO CONCRETE WALL, SEE DRAWING SS-20, SECTIONS E, F AND G.
5. FOR FIELD CUT GRATING OPENINGS GREATER THAN 4 INCHES, SEE 'FIELD CUT OPENING' DETAIL ON SS-23.



GRATING PLAN @ EL 1236'-6"

SCALE 1/8" = 1'-0"
(TOS EL 1236'-4 3/4" UNO)
ALLOWABLE FLOOR LIVE LOAD = 80 PSF

FAR DETECTOR BUILDING



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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

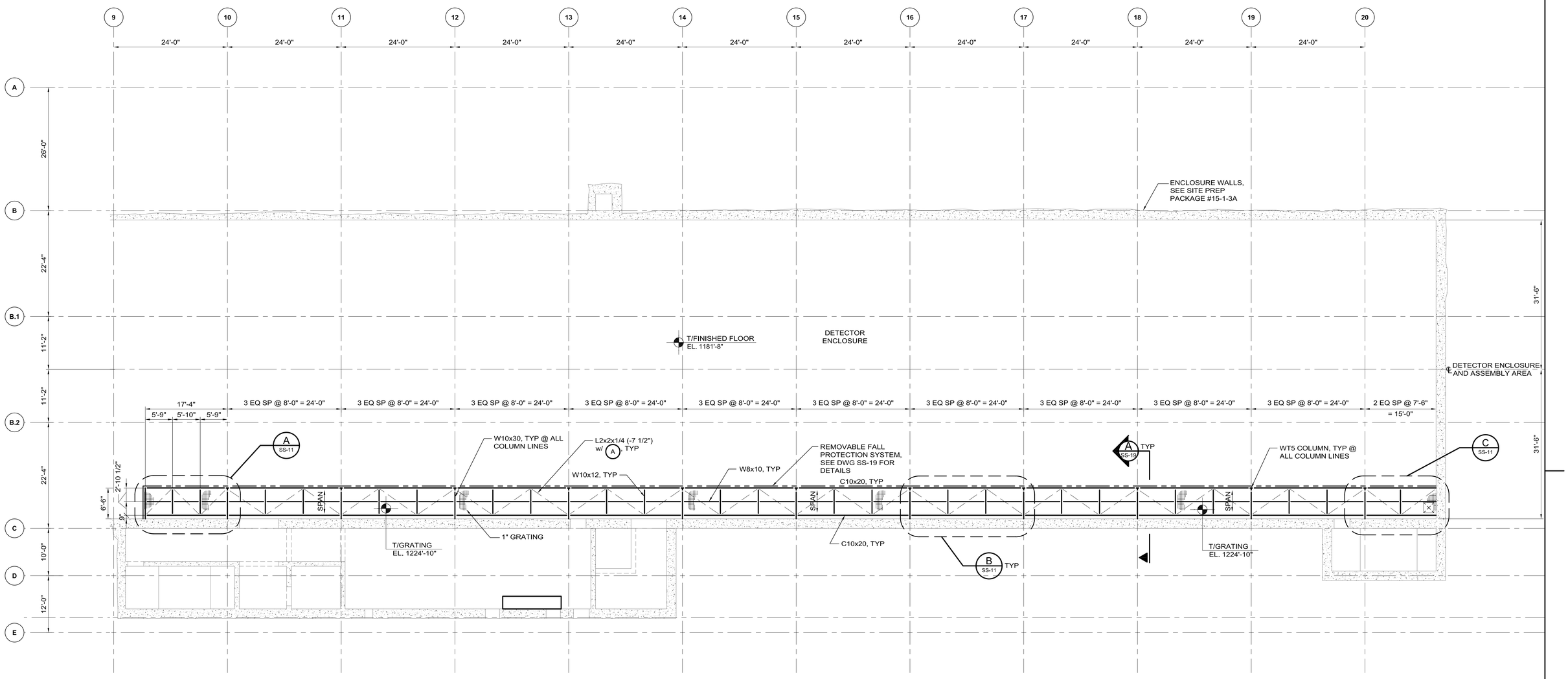
NOνA FAR DETECTOR BUILDING
GRATING PLAN EL 1236'-6"

DRAWING NO. **15-1-3B** **SS-5** REV. **0**

11 MAR, 2009

NOTES:

1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.
2. ALL BEAMS SHALL HAVE STANDARD FRAMED BEAM CONNECTIONS UNLESS NOTED OTHERWISE.
3. FOR STANDARD DETAILS, SEE DRAWINGS SS-23 THRU SS-26.
4. FOR CONNECTION W8, W10 AND C10 TO CONCRETE WALL, SEE DRAWING SS-20, SECTIONS E, F AND G.

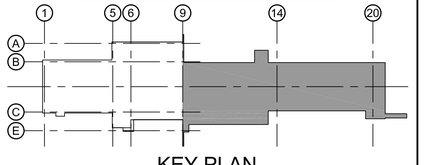


GRATING PLAN @ EL 1224'-10"

SCALE 1/8"=1'-0"

(TOS EL 1224'-9" UNO)
ALLOWABLE FLOOR LIVE LOAD = 60 PSF

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" (0 0 8 16 SCALE FEET)

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

GRATING PLAN EL 1224'-10"

DRAWING NO. **15-1-3B** **SS-6** REV. **0**

11 MAR, 2009

NOTES:

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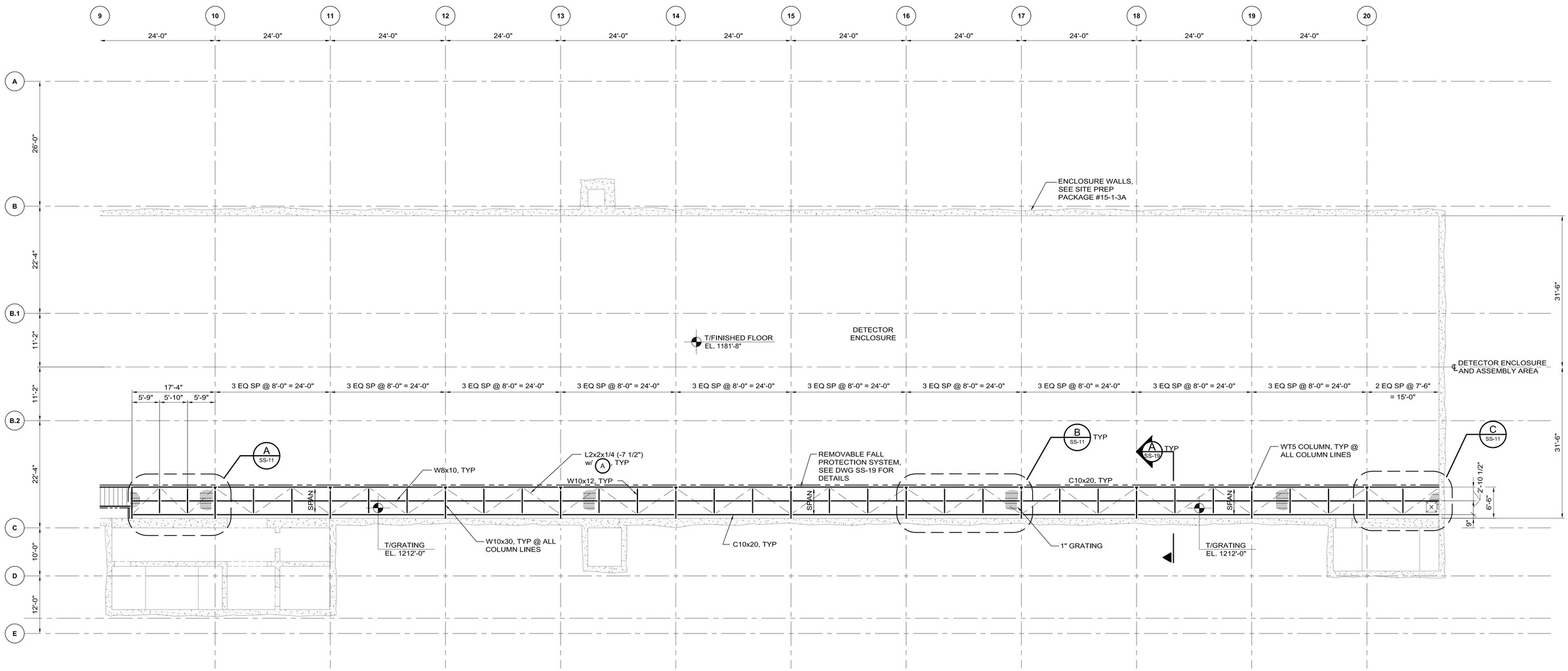
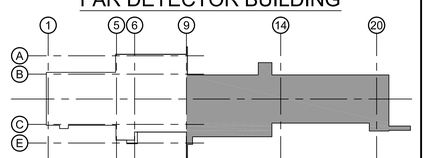


GRATING PLAN @ EL 1212'-0"

SCALE 1/8"=1'-0"
(TOS EL 1211'-11" UNO)
ALLOWABLE FLOOR LIVE LOAD = 60 PSF

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/8"=1'-0" 8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
GRATING PLAN EL 1212'-0"

DRAWING NO. 15-1-3B SS-7 REV. 0

11 MAR, 2009

NOTES:

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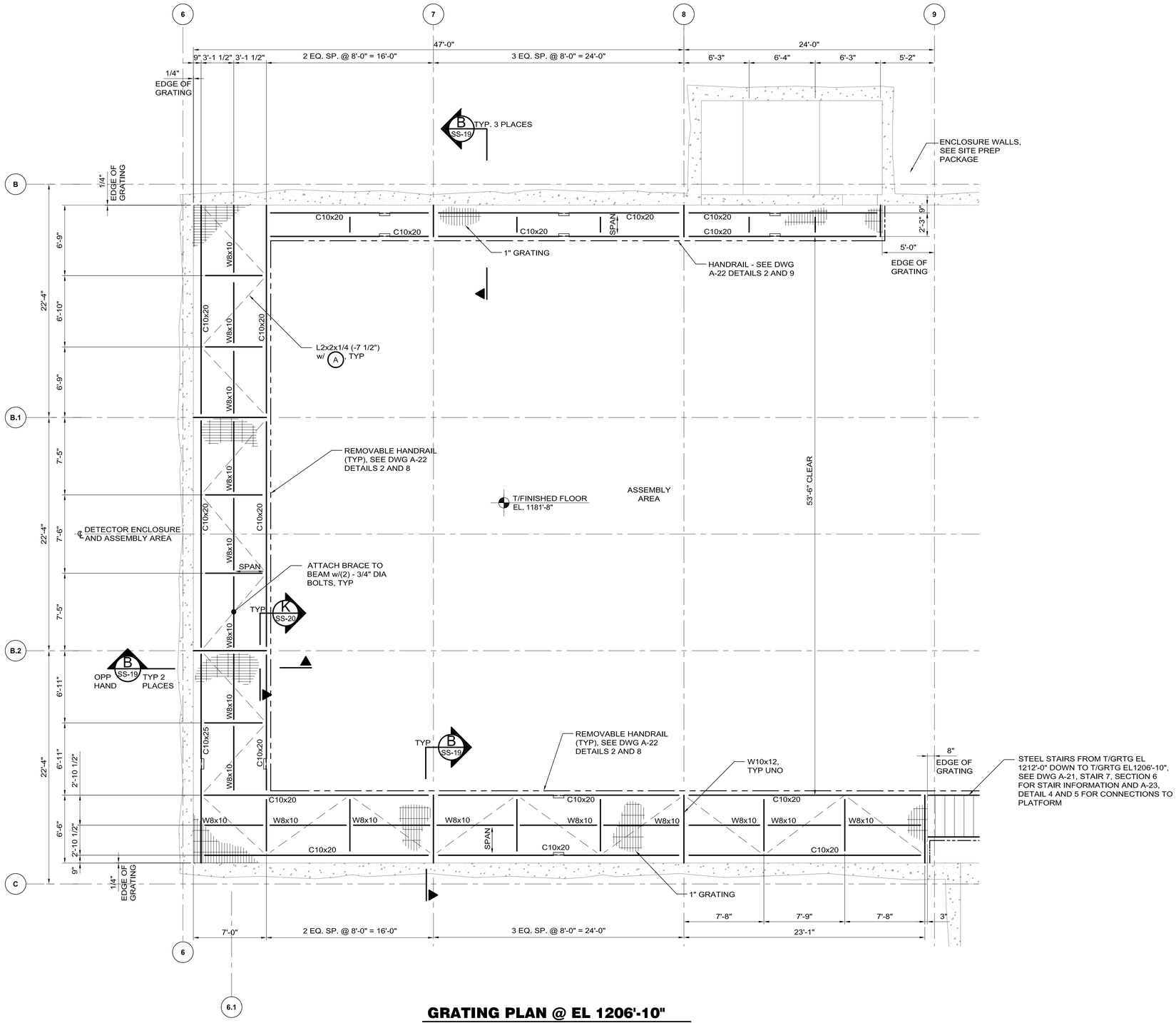
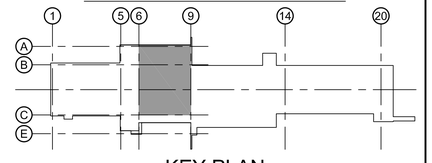


GRATING PLAN @ EL 1206'-10"

SCALE 1/4" = 1'-0"
(TOS EL 1206'-9" UNO)
ALLOWABLE FLOOR LIVE LOAD = 60 PSF

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH E S W

SCALE:
1/4"=1'-0" 4 0 4 8 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

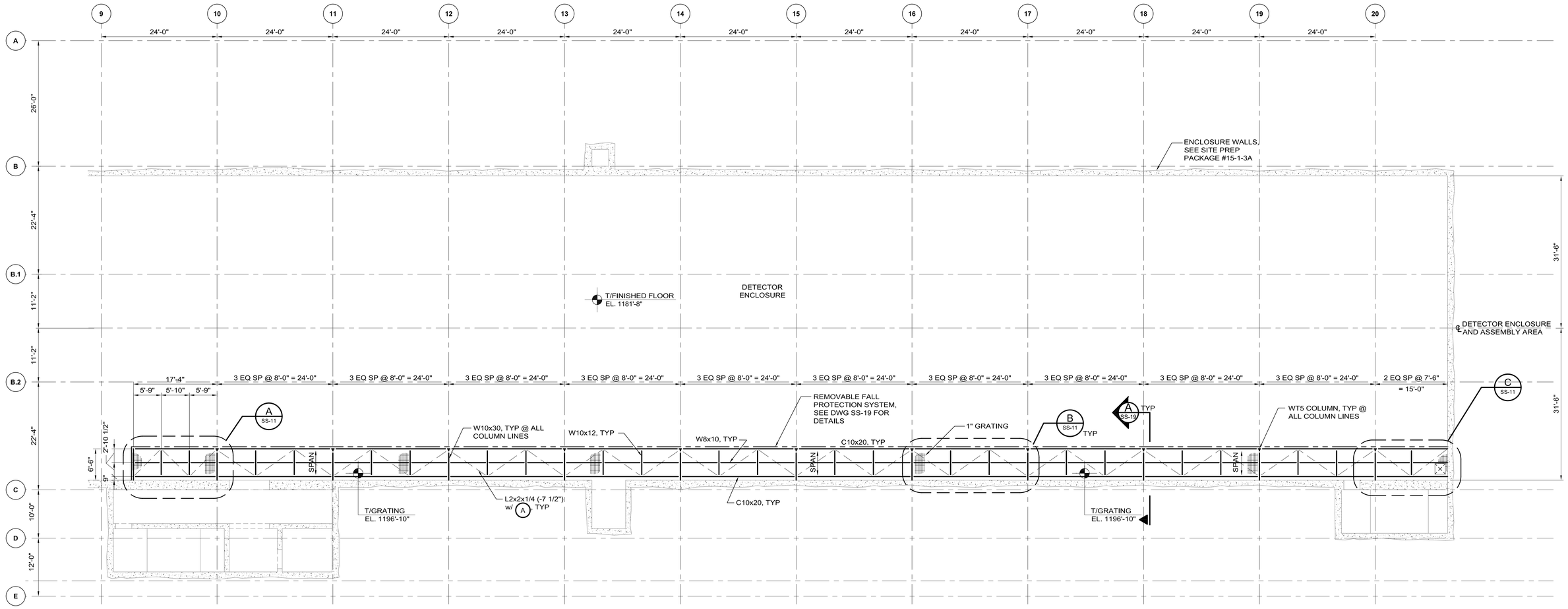
NOνA FAR DETECTOR BUILDING
GRATING PLAN EL 1206'-10"

DRAWING NO. 15-1-3B SS-8 REV. 0

11 MAR, 2009

NOTES:

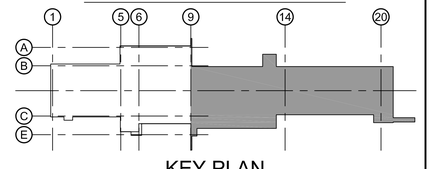
1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.
2. ALL BEAMS SHALL HAVE STANDARD FRAMED BEAM CONNECTIONS UNLESS NOTED OTHERWISE.
3. FOR STANDARD DETAILS, SEE DRAWINGS SS-23 THRU SS-26.
4. FOR CONNECTION W8, W10 AND C10 TO CONCRETE WALL, SEE DRAWING SS-20, SECTIONS E, F AND G.



GRATING PLAN @ EL 1196'-10"

SCALE 1/8"=1'-0"
(TOS EL 1196'-9" UNO)
ALLOWABLE FLOOR LIVE LOAD = 60 PSF

FAR DETECTOR BUILDING



KEY PLAN

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO
SIGNATURE:
DATE: 03/11/2009 LICENSE #46236

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	J. RUHDE	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

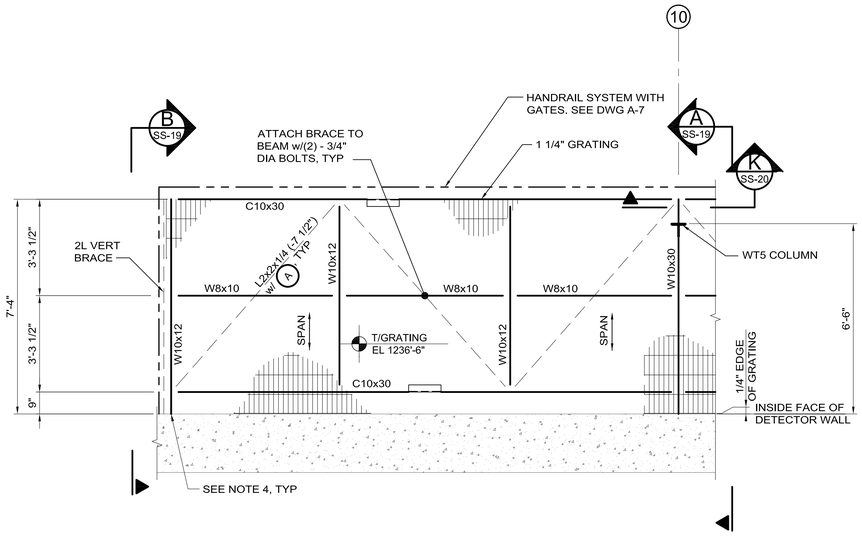
NOνA FAR DETECTOR BUILDING
GRATING PLAN EL 1196'-10"

DRAWING NO. 15-1-3B SS-9 REV. 0

11 MAR, 2009

NOTES:

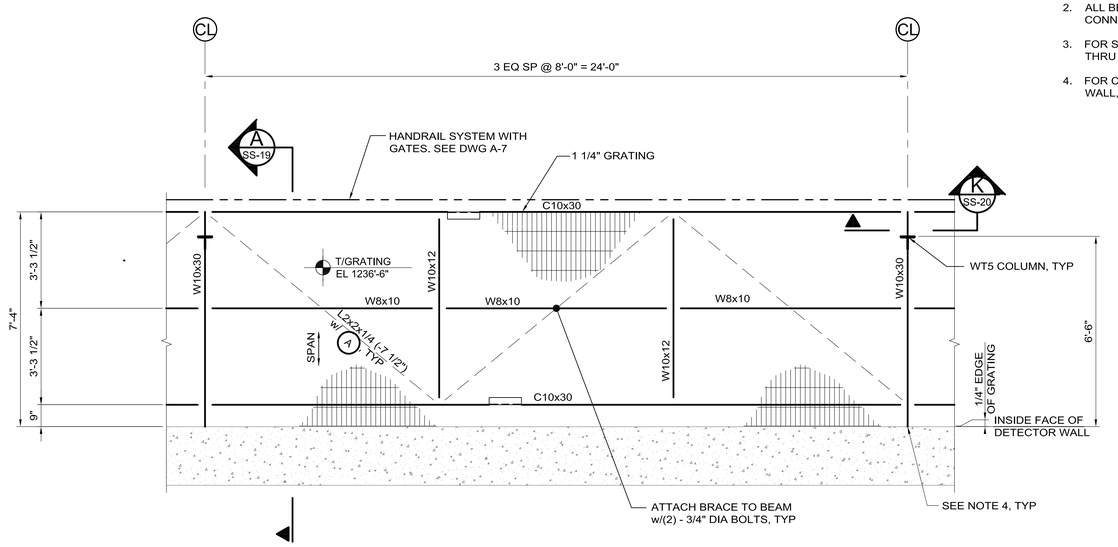
1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.
2. ALL BEAMS SHALL HAVE STANDARD FRAMED BEAM CONNECTIONS UNLESS NOTED OTHERWISE.
3. FOR STANDARD DETAILS, SEE DRAWINGS SS-23 THRU SS-26.
4. FOR CONNECTION W8, W10 AND C10 TO CONCRETE WALL, SEE DRAWING SS-20, SECTIONS E, F AND G.



ENLARGED GRATING PLAN

A SS-5

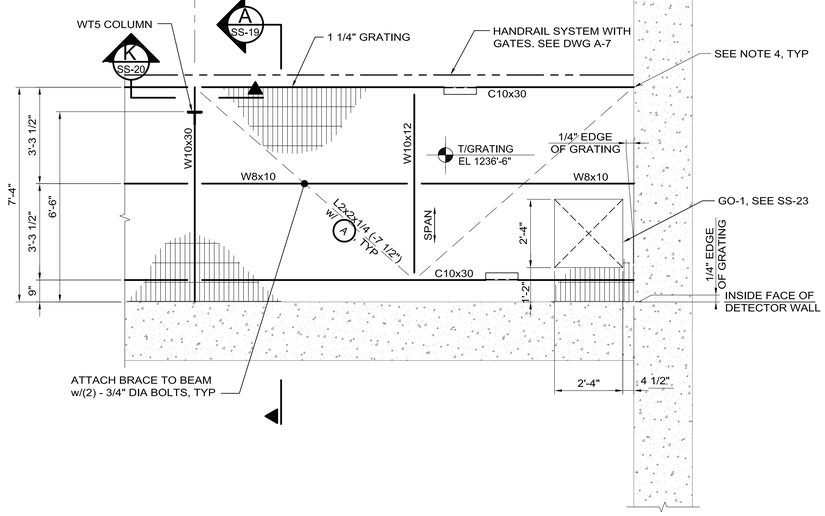
SCALE 1/2"=1'-0"
(TOS EL 1236'-4 3/4" UNO)
ALLOWABLE FLOOR LIVE LOAD = 80 PSF



TYPICAL ENLARGED GRATING PLAN

B SS-5

SCALE 1/2"=1'-0"
(TOS EL 1236'-4 3/4" UNO)
ALLOWABLE FLOOR LIVE LOAD = 80 PSF

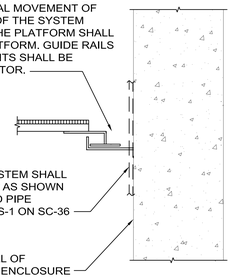


ENLARGED GRATING PLAN

C SS-5

SCALE 1/2"=1'-0"
(TOS EL 1236'-4 3/4" UNO)
ALLOWABLE FLOOR LIVE LOAD = 80 PSF

MOVABLE ACCESS PLATFORM VENDOR SHALL PROVIDE DETAILS FOR AN ANTI-SWAY GUIDE SYSTEM TO MINIMIZE LATERAL MOVEMENT OF THE PLATFORM. PORTIONS OF THE SYSTEM WHICH ARE ATTACHED TO THE PLATFORM SHALL BE PROVIDED WITH THE PLATFORM. GUIDE RAILS AND CONCRETE ATTACHMENTS SHALL BE PROVIDED BY THE CONTRACTOR.



SECTION

D SS-5

NOT TO SCALE

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Burns & McDonnell SINCE 1898

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CHECKED	P. TERRY	03-11-09	HINES SUBMITTED	C. McNABNEY	03-11-09
APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/2"=1'-0" (1 0 1 2 3 4 5 SCALE FEET)

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ENLARGED GRATING PLANS EL 1236'-6"

DRAWING NO. **15-1-3B** **SS-10** REV. **0**

11 MAR, 2009

NOTES:

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2. ALL BEAMS SHALL HAVE STANDARD FRAMED BEAM CONNECTIONS UNLESS NOTED OTHERWISE.
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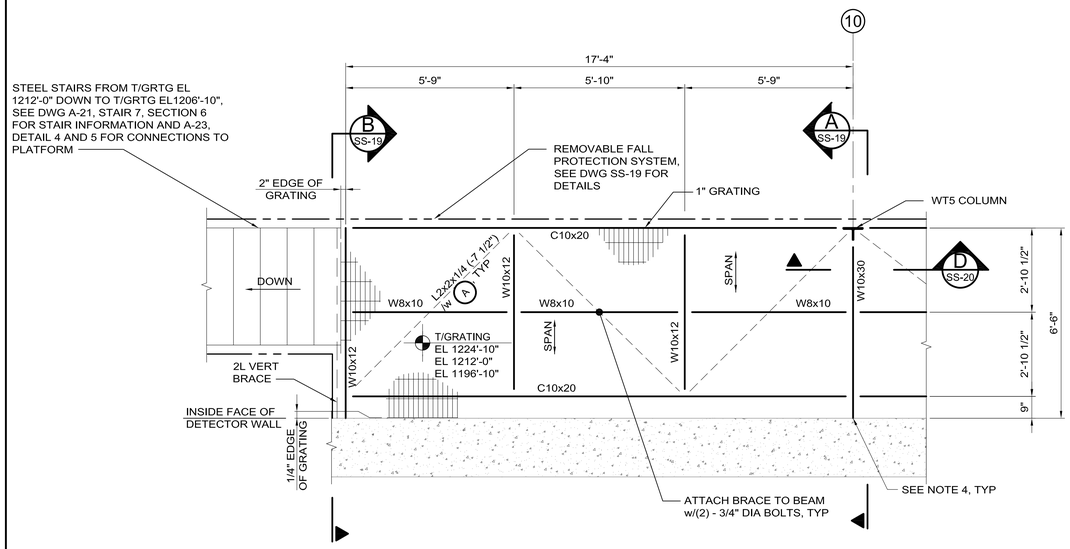
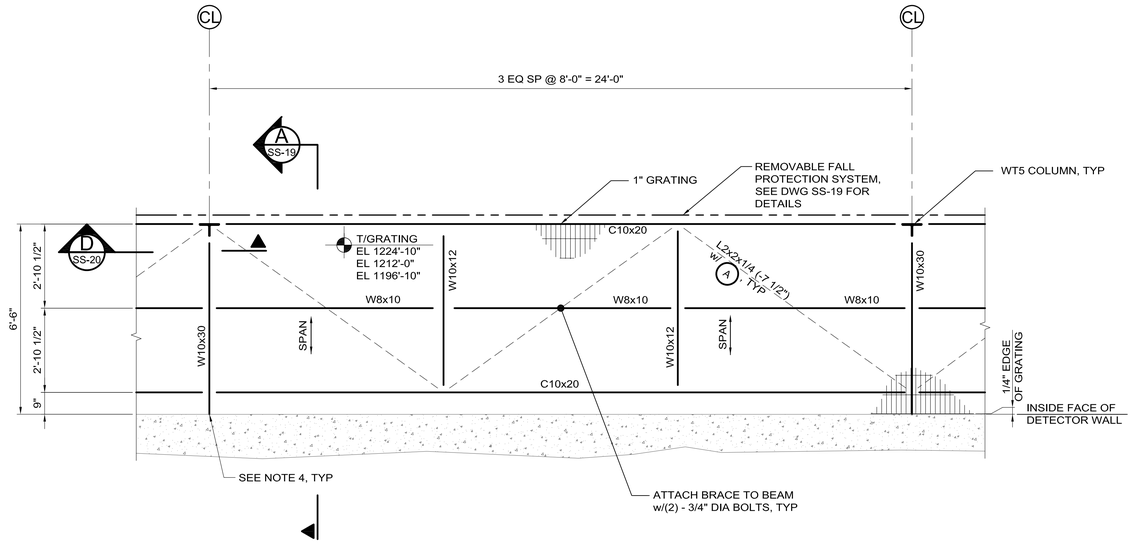


ENLARGED GRATING PLAN

SCALE 1/2"=1'-0"
(TOS EL 1224'-9", 1211'-11", 1196'-9" UNO)
ALLOWABLE FLOOR LIVE LOAD = 60 PSF

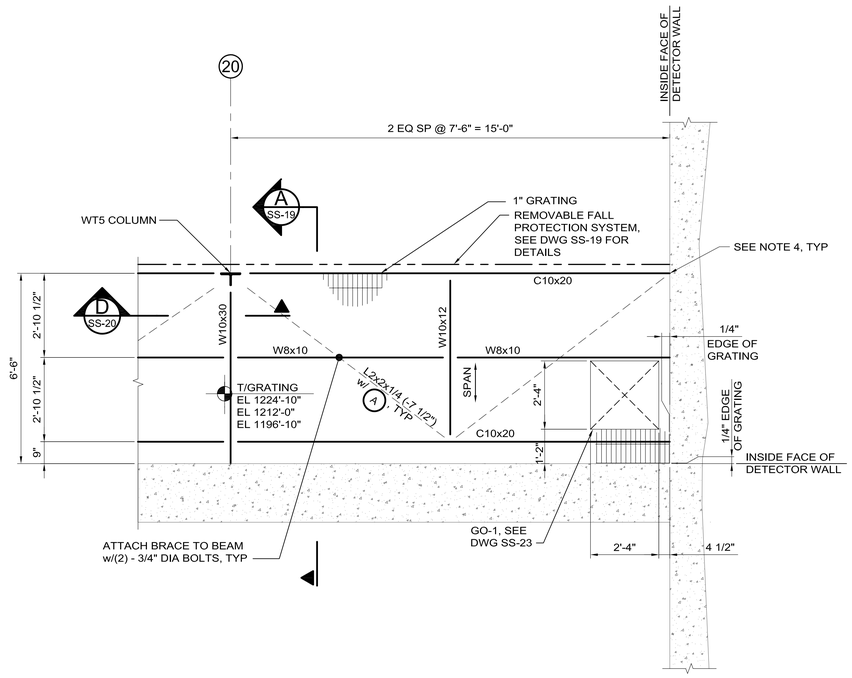
A SS-6
SS-7
SS-9



TYPICAL ENLARGED GRATING PLAN

SCALE 1/2"=1'-0"
(TOS EL 1224'-9", 1211'-11", 1196'-9" UNO)
ALLOWABLE FLOOR LIVE LOAD = 60 PSF

B SS-6
SS-7
SS-9



ENLARGED GRATING PLAN

SCALE 1/2"=1'-0"
(TOS EL 1224'-9", 1211'-11", 1196'-9" UNO)
ALLOWABLE FLOOR LIVE LOAD = 60 PSF

C SS-6
SS-7
SS-9

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/2"=1'-0" 1 0 1 2 3 4 5 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

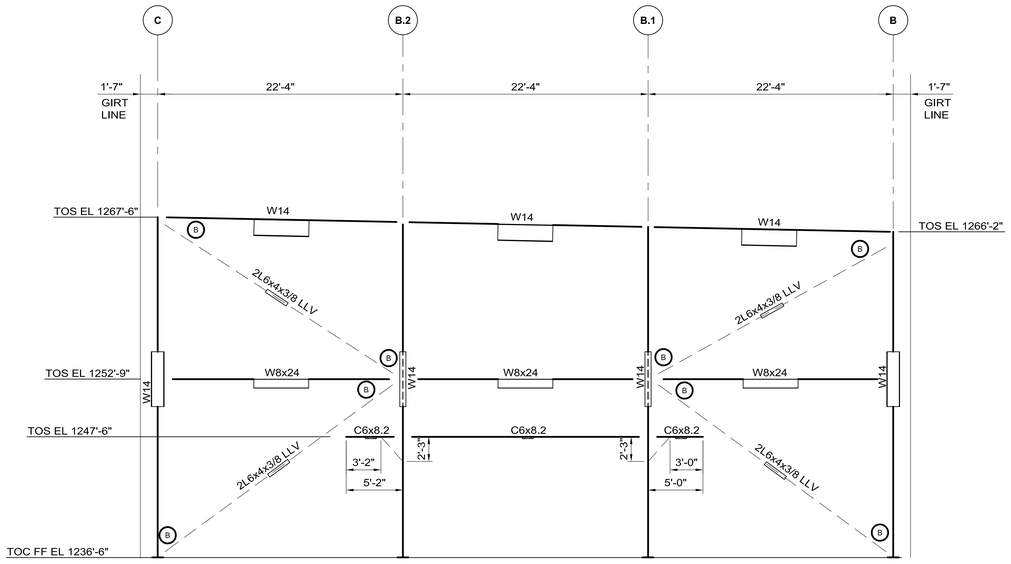
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

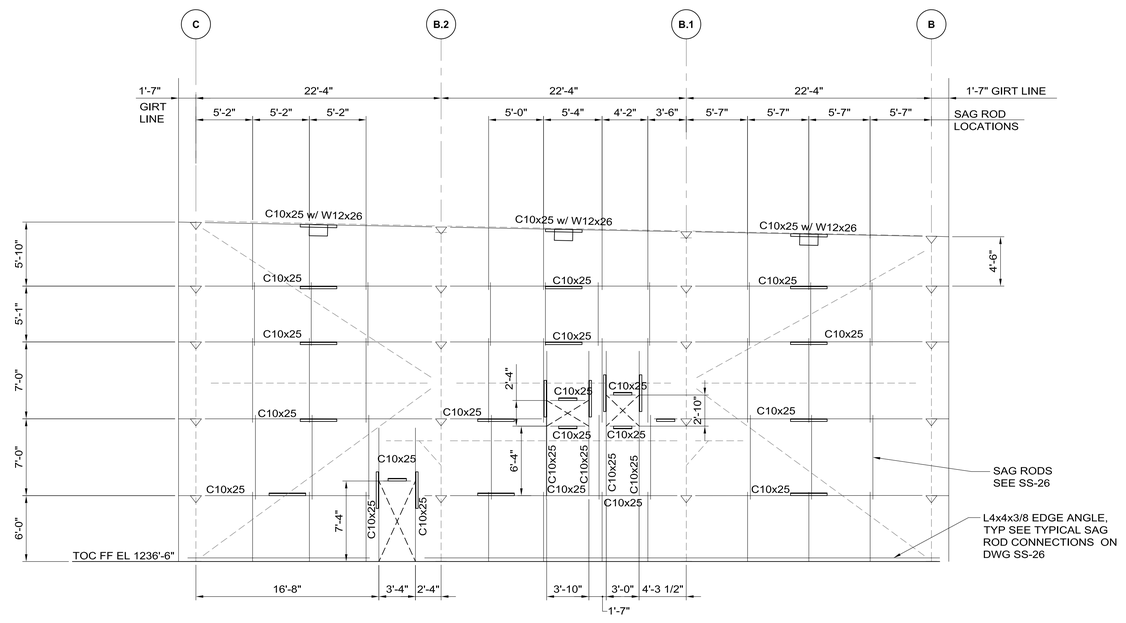
NOvA FAR DETECTOR BUILDING

ENLARGED GRATING PLANS

DRAWING NO. 15-1-3B SS-11 REV. 0

11 MAR, 2009





NOTES:

1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.
2. ALL BEAMS SHALL HAVE STANDARD FRAMED BEAM CONNECTIONS UNLESS NOTED OTHERWISE.
3. FOR STANDARD DETAILS, SEE DRAWINGS SS-23 THRU SS-26.

ELEVATION @ COLUMN LINE 1

SCALE 3/16" = 1'-0"

GIRT ELEVATION @ COLUMN LINE 5

SCALE 3/16" = 1'-0"

GIRT ELEVATION @ COLUMN LINE 1

SCALE 3/16" = 1'-0"

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APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ELEVATION @ COLUMN LINES 1 & 5

DRAWING NO. **15-1-3B** **SS-12** REV. **0**

11 MAR, 2009

NOTES:

1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.
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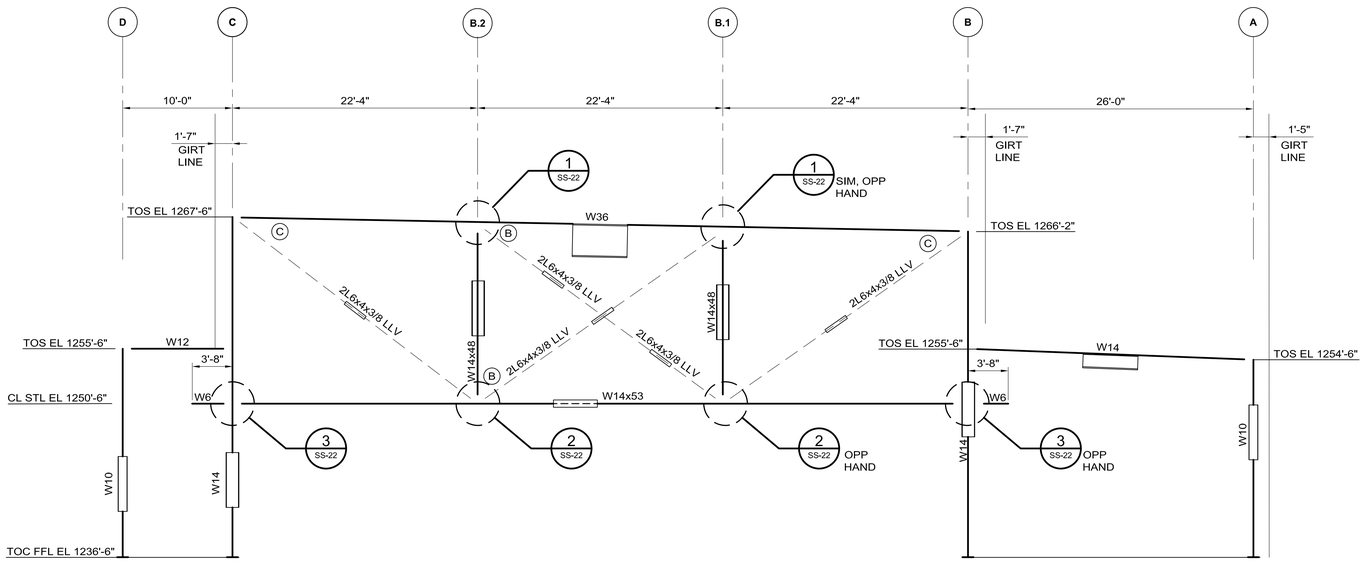
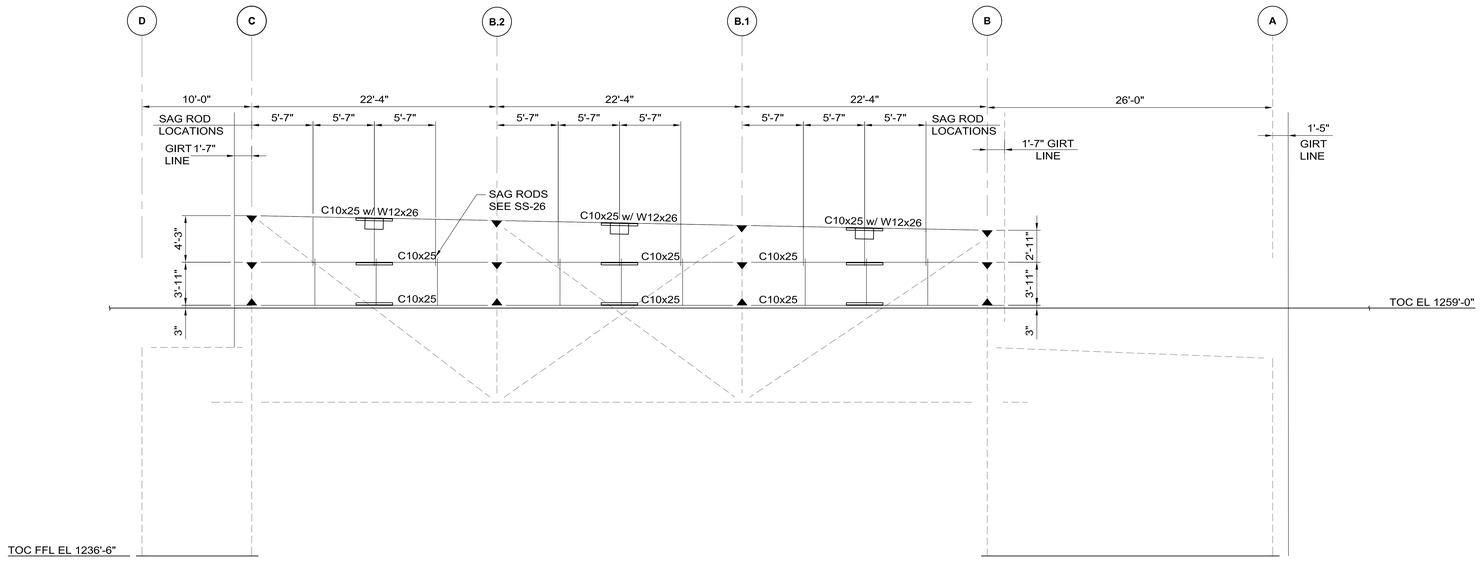
3. FOR STANDARD DETAILS, SEE DRAWINGS SS-23 THRU SS-26.



ELEVATION @ COLUMN LINE 9

SCALE 3/16" = 1'-0"



GIRT ELEVATION @ COLUMN LINE 9

SCALE 3/16" = 1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

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APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ELEVATION @ COLUMN LINE 9

DRAWING NO. 15-1-3B SS-13 REV. 0

11 MAR, 2009

NOTES:

1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.
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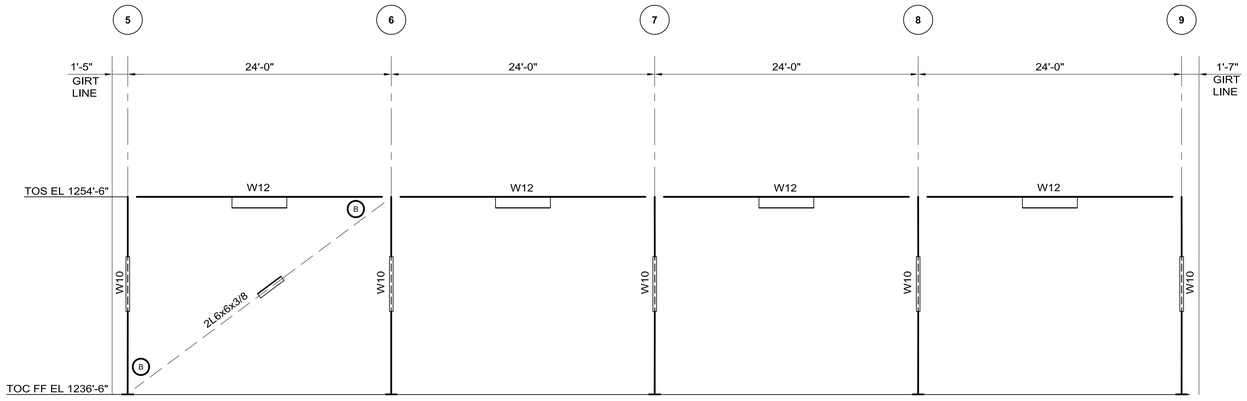
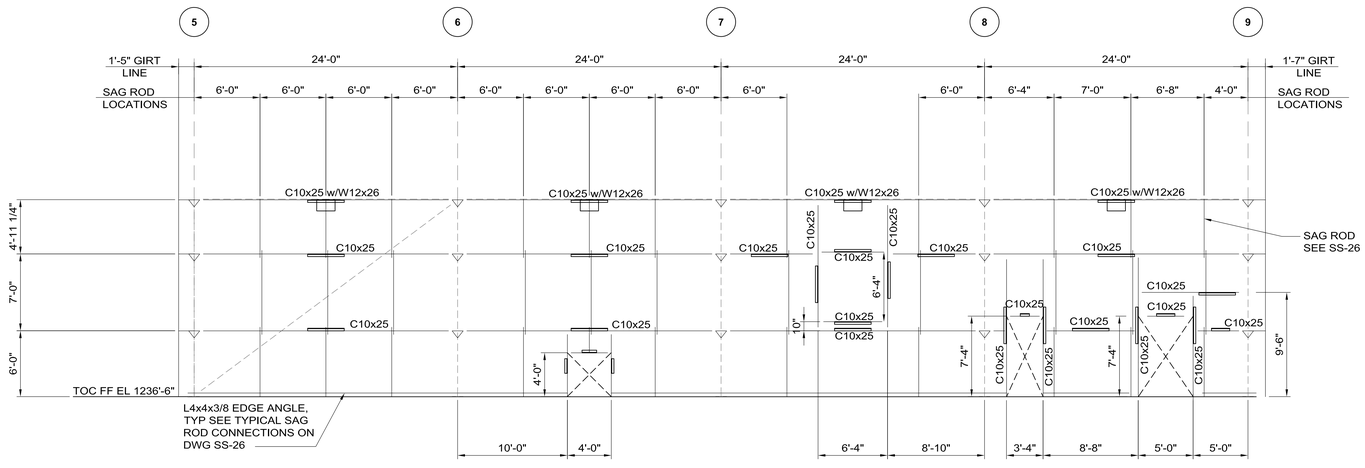


ELEVATION @ COLUMN LINE A

SCALE 3/16" = 1'-0"



GIRT ELEVATION @ COLUMN LINE A

SCALE 3/16" = 1'-0"

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SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
ELEVATION @ COLUMN LINE A

DRAWING NO. **15-1-3B** **SS-14** REV. **0**

11 MAR, 2009

NOTES:

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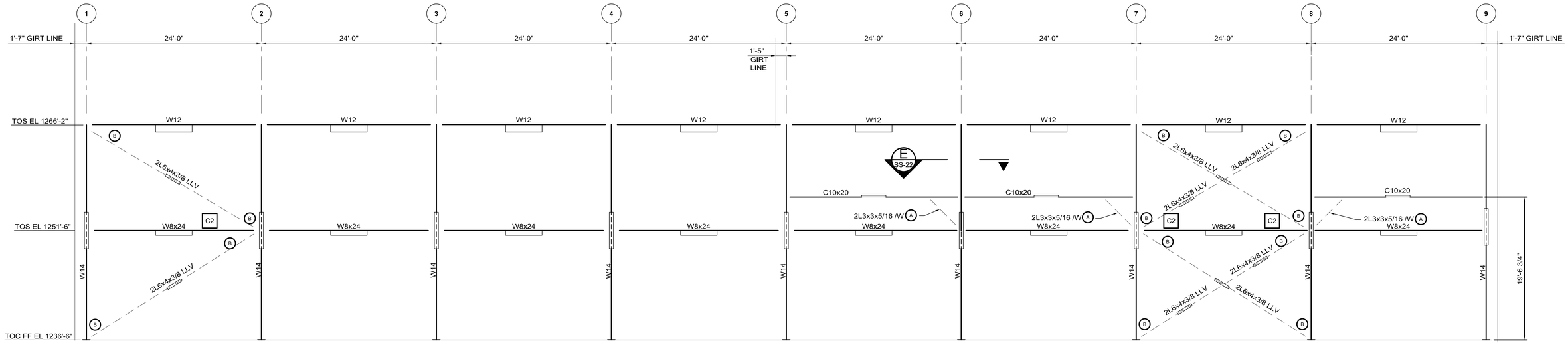
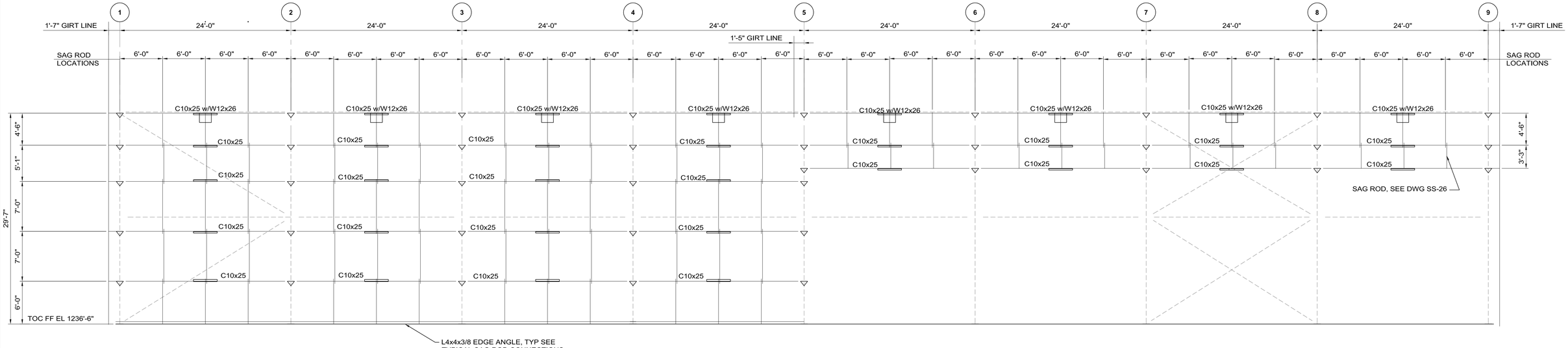


ELEVATION @ COLUMN LINE B

SCALE 3/16" = 1'-0"



GIRT ELEVATION @ COLUMN LINE B

SCALE 3/16" = 1'-0"

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ELEVATION @ COLUMN LINE B

DRAWING NO. 15-1-3B SS-15 REV. 0

11 MAR, 2009

NOTES:

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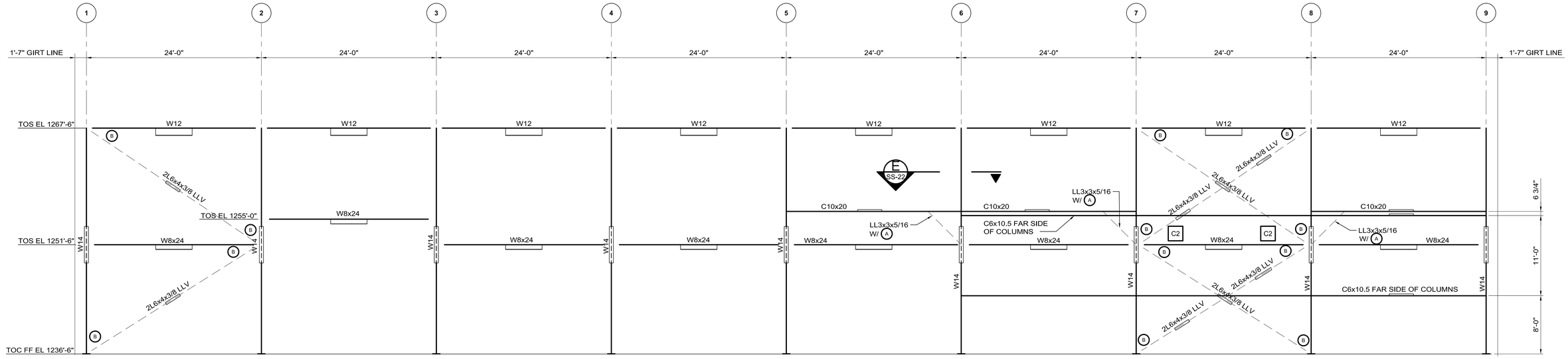
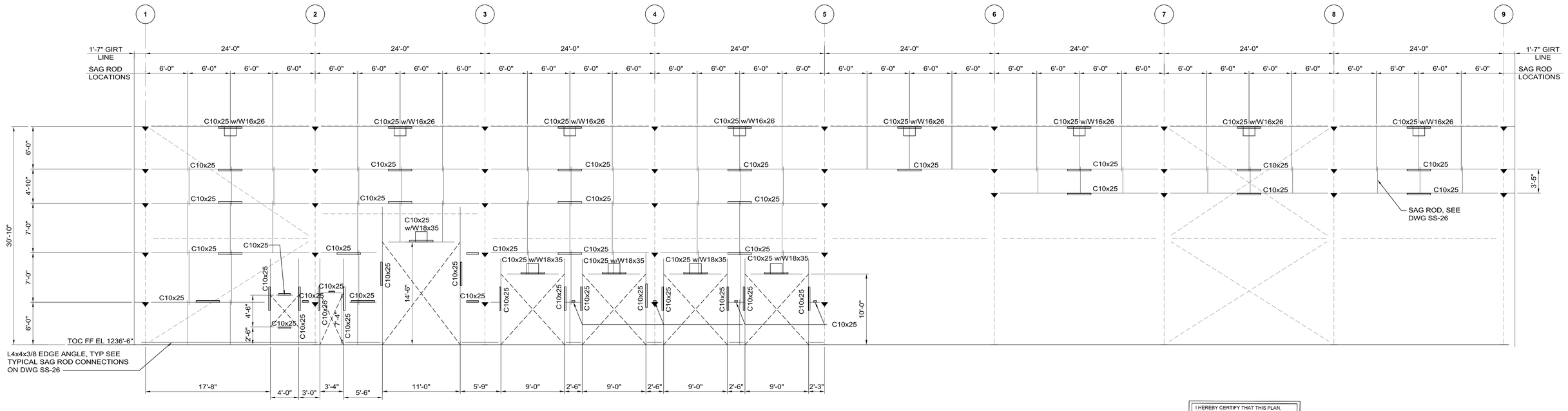


ELEVATION @ COLUMN LINE C

SCALE 3/16" = 1'-0"



GIRT ELEVATION @ COLUMN LINE C

SCALE 3/16" = 1'-0"

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:
3/16"=1'-0"
2 0 2 4 6 8 10 12 14
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ELEVATION @ COLUMN LINE C

DRAWING NO. 15-1-3B SS-16 REV. 0

11 MAR, 2009

NOTES:

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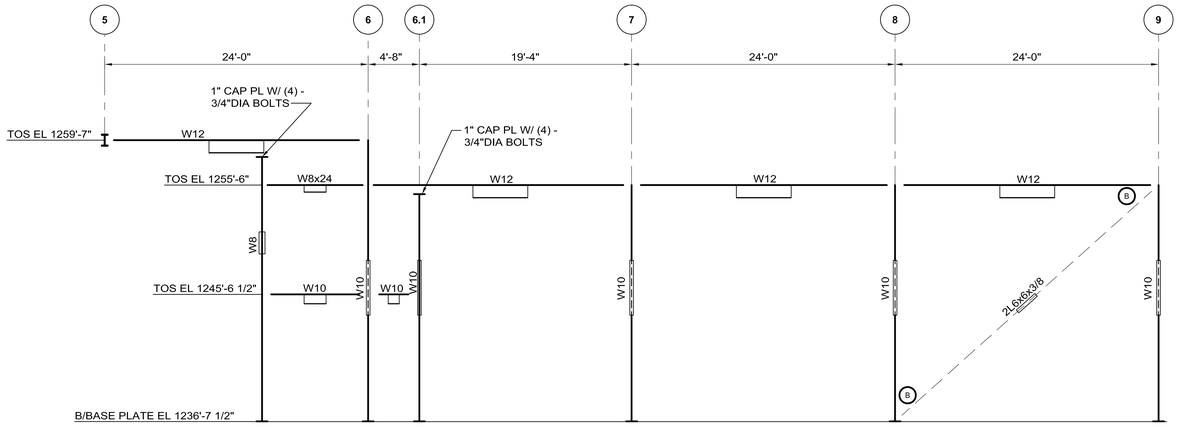
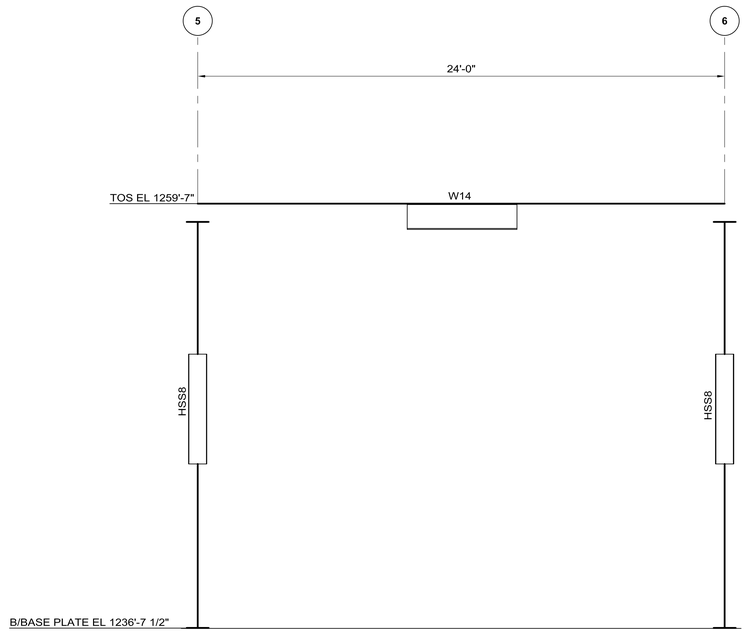


ELEVATION @ COLUMN LINE D

SCALE 3/16" = 1'-0"



ELEVATION @ COLUMN LINE E

SCALE 3/8" = 1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO

SIGNATURE:

DATE: 03/11/2009 LICENSE #46236

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	J. RUHDE	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/16"=1'-0" 2 0 2 4 6 8 10 12 14 SCALE FEET

3/8"=1'-0" 1 0 1 2 3 4 5 6 7 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ELEVATION @ COLUMN LINES D & E

DRAWING NO. 15-1-3B SS-17 REV. 0

11 MAR, 2009

NOTES:

1. BASE PLATE DIMENSIONS.

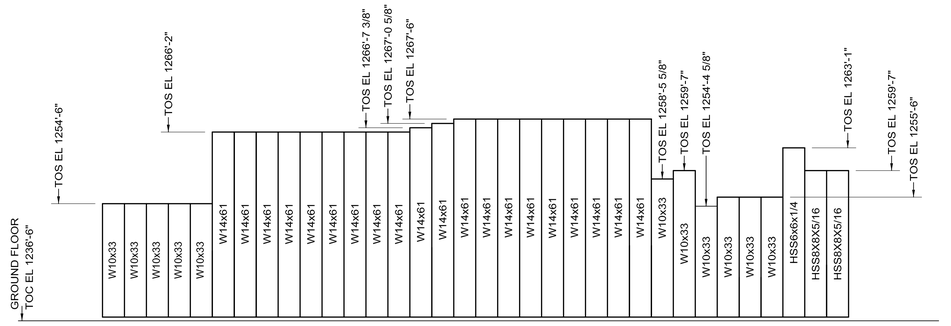
   W = DIMENSION PARALLEL TO COLUMN FLANGE.
   L = DIMENSION PARALLEL TO COLUMN WEB.
   t = THICKNESS OF PLATE (IF MILLED IT IS THE MILLED THICKNESS).

2. GROUT THICKNESS EQUALS TOP OF BASE PLATE ELEVATION MINUS TOP OF CONCRETE ELEVATION MINUS BASE PLATE THICKNESS FOR ALL WIDE FLANGE COLUMNS. ALL HSS COLUMNS ARE TO BE EMBEDDED A MINIMUM OF 6".

3. PLATE WASHER SIZE SHALL BE DETERMINED BASED ON ANCHOR BOLT DIAMETER AS FOLLOWS:

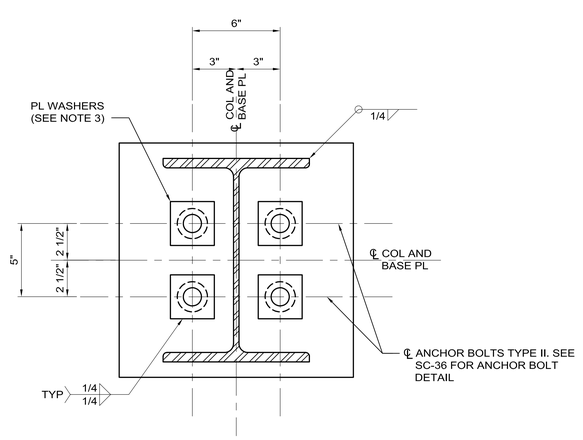
ANCHOR BOLT DIA	PLATE WASHER
3/4"	PL1/4x2x2
1"	PL3/8x3x3
1 1/4"	PL1/2x3x3

HOLES IN PLATE WASHERS SHALL BE 1/16" LARGER THAN BOLT DIAMETER.



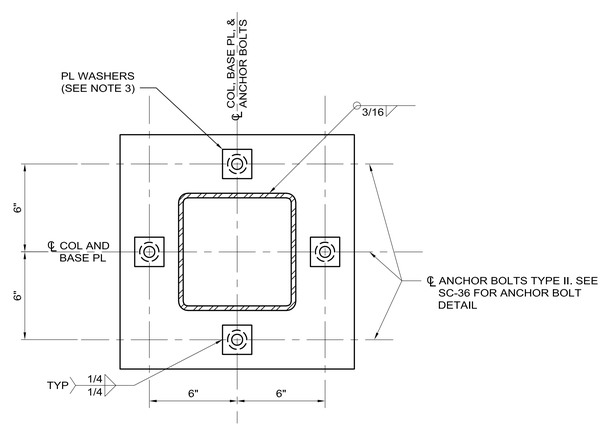
COLUMN DESIGNATION	BASE PLATE (INCHES) TYPE	t	W	L	ANCHOR BOLT NUMBER AND SIZE	TOP OF BASE PLATE ELEVATION	COLUMN DESIGNATION
A-5	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	A-5
A-6	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	A-6
A-7	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	A-7
A-8	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	A-8
A-9	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	A-9
B-1	1	1	16	16	(4) - 1 1/4	1236'-8"	B-1
B-2	1	3/4	16	16	(4) - 3/4	1236'-7 3/4"	B-2
B-3	1	3/4	16	16	(4) - 3/4	1236'-7 3/4"	B-3
B-4	1	3/4	16	16	(4) - 3/4	1236'-7 3/4"	B-4
B-5	1	1	16	16	(4) - 3/4	1236'-8"	B-5
B-6	1	1	16	16	(4) - 3/4	1236'-8"	B-6
B-7	1	1	16	16	(4) - 1	1236'-8"	B-7
B-8	1	1	16	16	(4) - 1	1236'-8"	B-8
B-9	1	3/4	16	16	(4) - 3/4	1236'-7 3/4"	B-9
B.1-1	1	1	16	16	(4) - 1	1236'-8"	B.1-1
B.2-1	1	1	16	16	(4) - 1	1236'-6"	B.2-1
C-1	1	1	16	16	(4) - 1 1/4	1236'-8"	C-1
C-2	1	1	16	16	(4) - 3/4	1236'-8"	C-2
C-3	1	3/4	16	16	(4) - 3/4	1236'-7 3/4"	C-3
C-4	1	3/4	16	16	(4) - 3/4	1236'-7 3/4"	C-4
C-5	1	1	16	16	(4) - 3/4	1236'-8"	C-5
C-6	1	1	16	16	(4) - 3/4	1236'-8"	C-6
C-7	1	1	16	16	(4) - 3/4	1236'-6"	C-7
C-8	1	1	16	16	(4) - 1	1236'-8"	C-8
C-9	1	3/4	16	16	(4) - 3/4	1236'-7 3/4"	C-9
D-5.1	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	D-5.1
D-6	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	D-6
D-6.1	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	D-6.1
D-7	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	D-7
D-8	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	D-8
D-9	1	3/4	12	12	(4) - 3/4	1236'-7 3/4"	D-9
D.1-6.2	2	3/4	16	16	(4) - 3/4	1236'-1 3/4"	D.1-6.2
E-5	2	3/4	16	16	(4) - 3/4	1236'-1 3/4"	E-5
E-6	2	3/4	16	16	(4) - 3/4	1236'-1 3/4"	E-6

COLUMN SCHEDULE



BASE PLATE TYPE 1

3"=1'-0"



BASE PLATE TYPE 2

3"=1'-0"

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SIGNATURE:

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3"=1'-0" 0 1 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

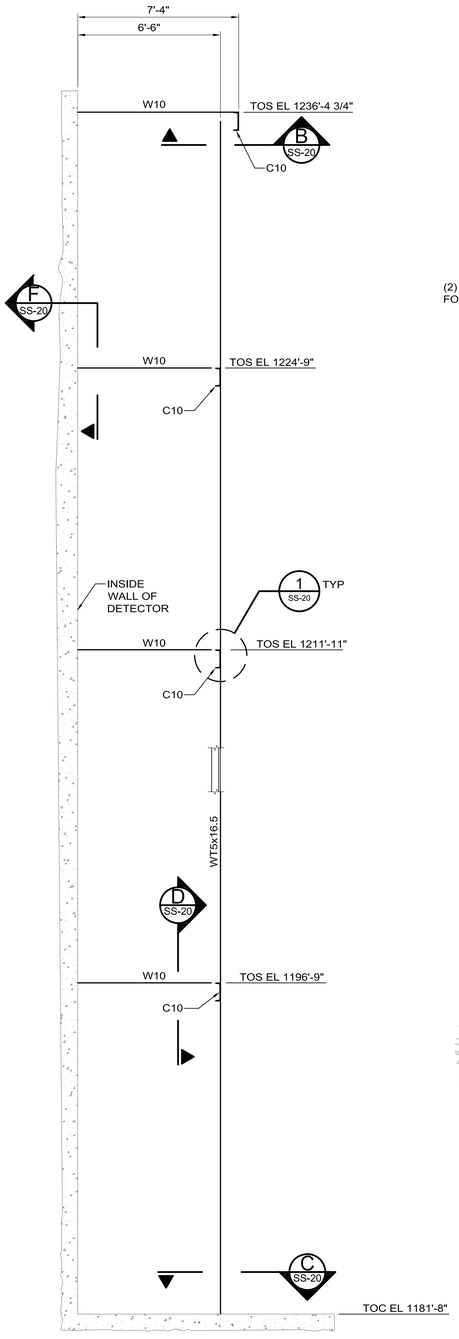
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

SCHEDULE

DRAWING NO. 15-1-3B SS-18 REV. 0

11 MAR, 2009

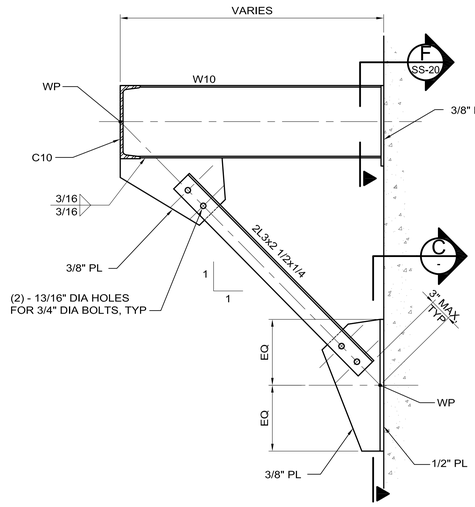


TYPICAL SECTION

SCALE 3/8" = 1'-0"

A SS-5

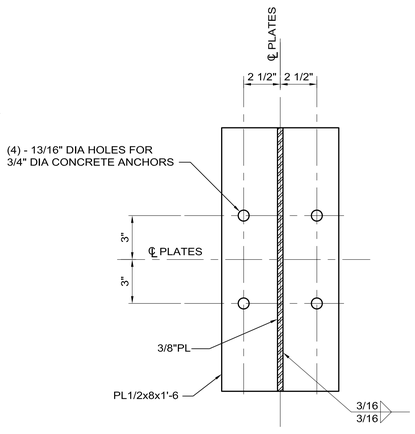
SS-6
SS-7
SS-9
SS-10
SS-11



SECTION

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

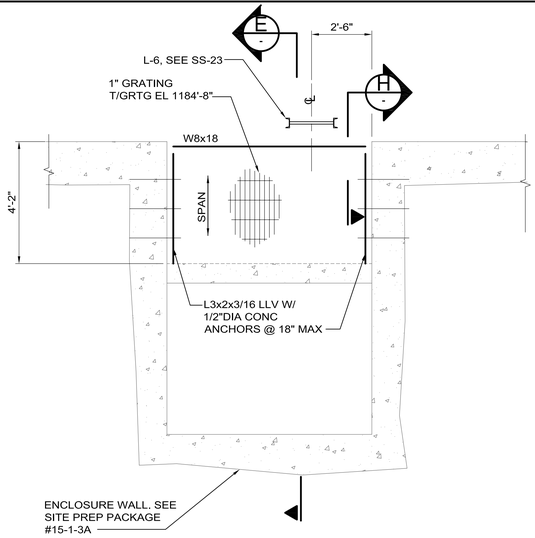
B SS-8
SS-10
SS-11



SECTION

SCALE 3" = 1'-0"

C -



ENLARGED GRATING PLAN

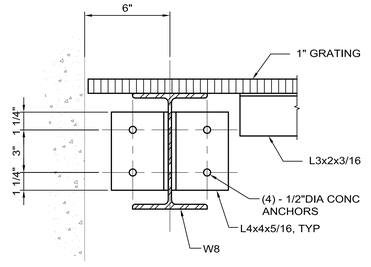
NOT TO SCALE

ALLOWABLE FLOOR LIVE LOAD = 60 PSF

D SC-12

NOTES:

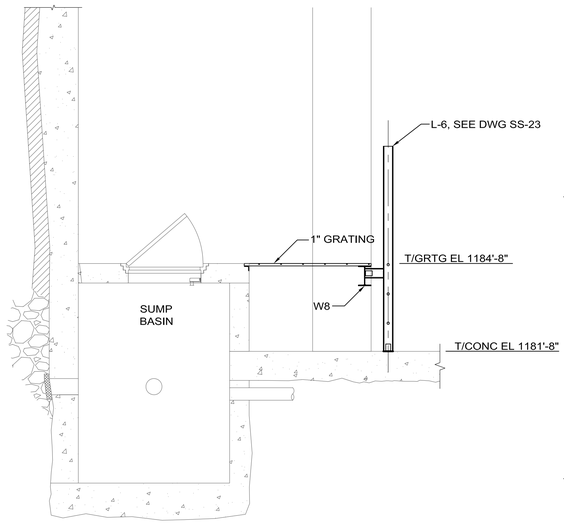
1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.
2. ALL BEAMS SHALL HAVE STANDARD FRAMED BEAM CONNECTIONS UNLESS NOTED OTHERWISE.
3. FOR STANDARD DETAILS, SEE DRAWINGS SS-23 THRU SS-26.



SECTION

NOT TO SCALE

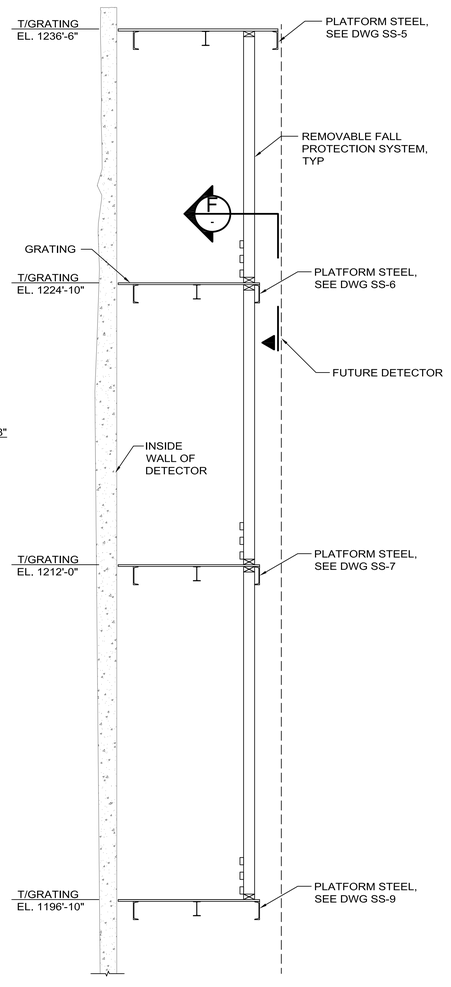
H -



SECTION

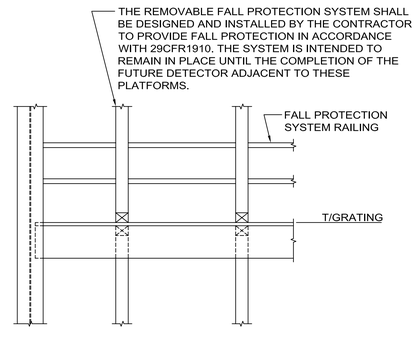
SCALE 1/2"=1'-0"

E -



REMOVABLE FALL PROTECTION

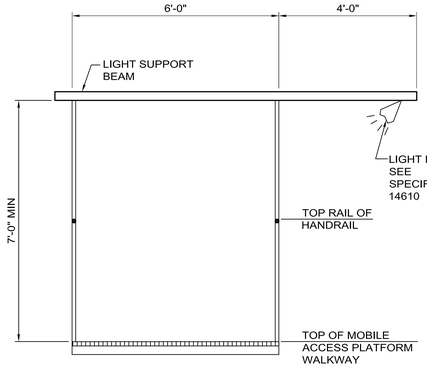
NOT TO SCALE



SECTION

NOT TO SCALE

F -



MOVABLE ACCESS PLATFORMS SHALL INCLUDE BEAMS TO SUPPORT 7 LIGHT FIXTURES ON EACH PLATFORM AS SHOWN ON DWG E-15. VENDOR MAY UTILIZE AN ALTERNATE SUPPORT CONFIGURATION TO WHAT IS SHOWN

SECTION

NOT TO SCALE

G SS-5

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APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/8"=1'-0" 1 0 1 2 3 4 5 6 7 SCALE FEET

1/2"=1'-0" 1 0 1 2 3 4 5 SCALE FEET

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

3"=1'-0" 0 1 SCALE FEET

UNIVERSITY OF MINNESOTA | Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

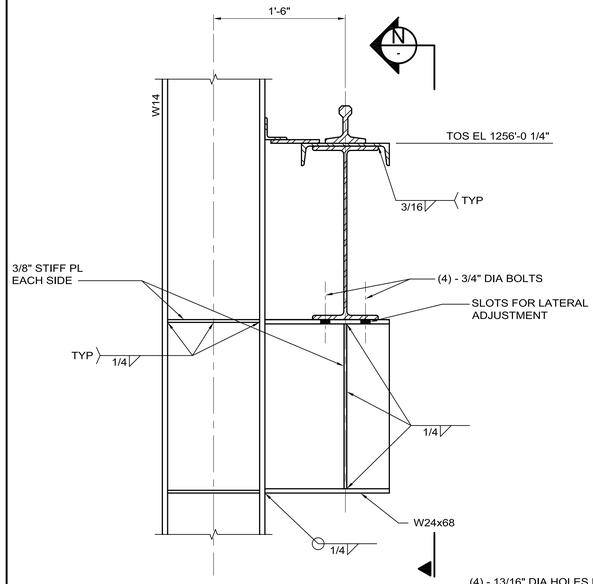
SECTIONS

DRAWING NO. 15-1-3B SS-19 REV. 0

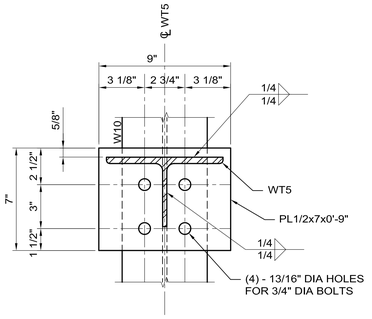
11 MAR, 2009

NOTES:

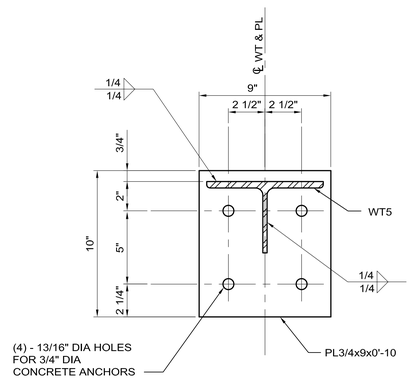
1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.



SECTION A — SS-4
NOT TO SCALE

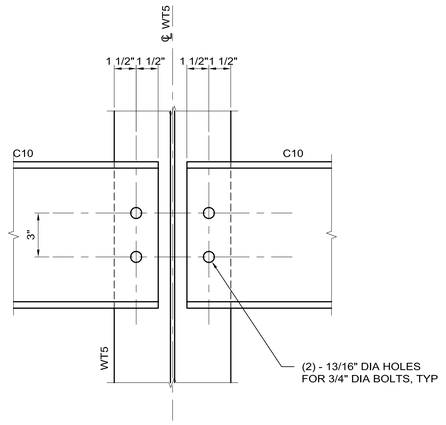


SECTION B — SS-19
SCALE 3" = 1'-0"

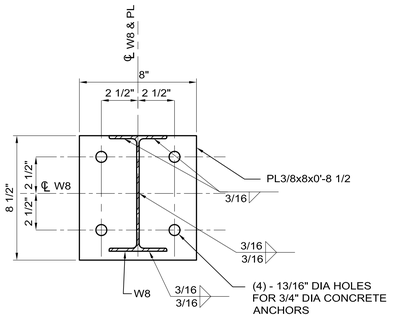


NOTE:
PROVIDE GROUNDING CONNECTION AS SHOWN ON E-27, DETAIL 4 AT LOCATIONS SHOWN ON E-3

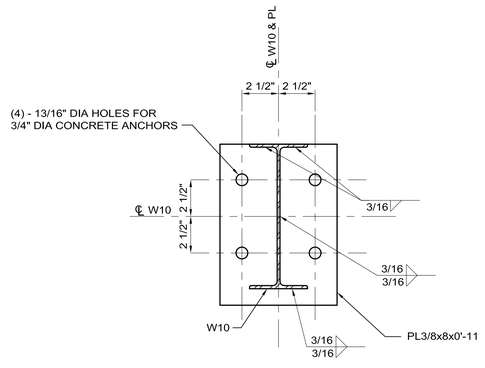
SECTION C — SS-19
SCALE 3" = 1'-0"



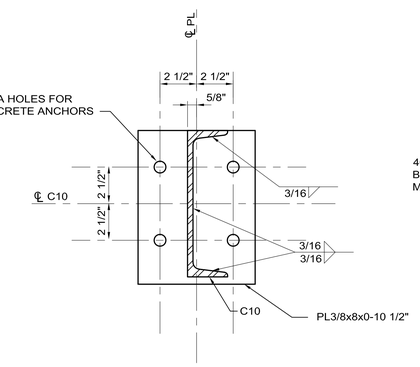
SECTION D — SS-17, SS-19
SCALE 3" = 1'-0"



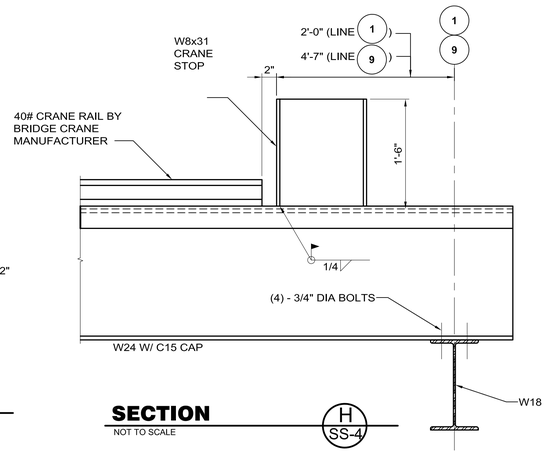
SECTION E — SS-5, SS-6, SS-7, SS-8, SS-9, SS-10, SS-11
SCALE 3" = 1'-0"



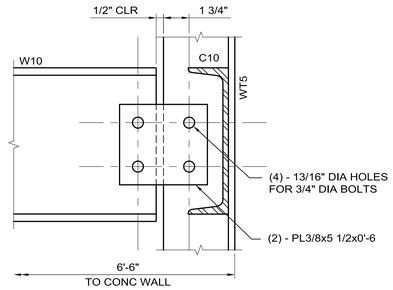
SECTION F — SS-5, SS-6, SS-7, SS-8, SS-9, SS-10, SS-11, SS-19
SCALE 3" = 1'-0"



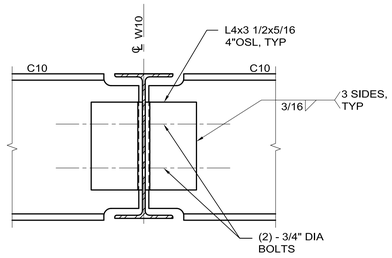
SECTION G — SS-5, SS-6, SS-7, SS-8, SS-9, SS-10, SS-11
SCALE 3" = 1'-0"



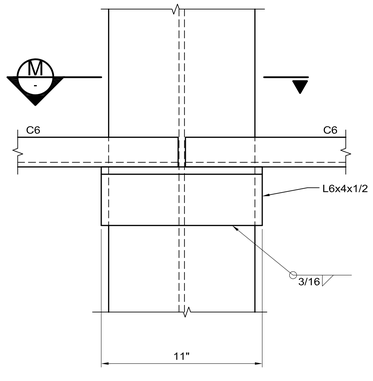
SECTION H — SS-4
NOT TO SCALE



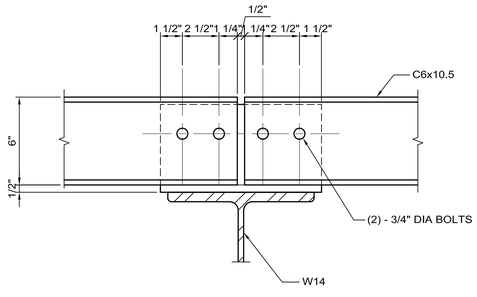
DETAIL 1 — SS-19
SCALE 3" = 1'-0"



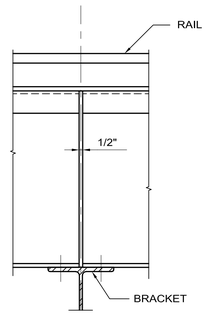
SECTION K — SS-8, SS-10
SCALE 3" = 1'-0"



SECTION L — SS-3
SCALE 3" = 1'-0"



SECTION M — -
SCALE 3" = 1'-0"



SECTION N — -
NOT TO SCALE

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE: 3"=1'-0" (0 — 1 SCALE FEET)

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NO*v*A FAR DETECTOR BUILDING

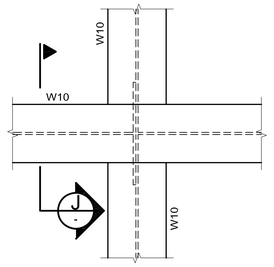
DETAILS - 1

DRAWING NO. **15-1-3B** **SS-20** REV. **0**

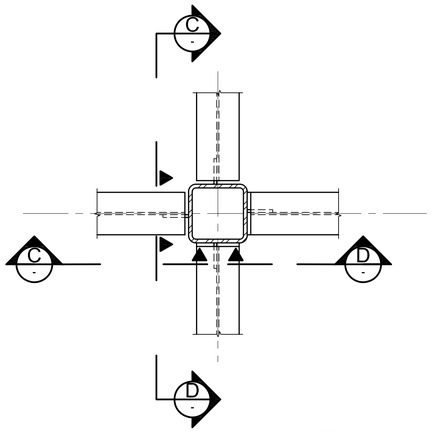
11 MAR, 2009

NOTES:

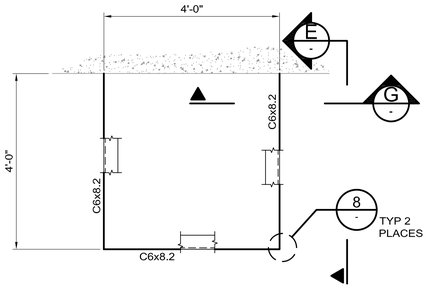
1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.



DETAIL 2 SS-4
SCALE 1 1/2" = 1'-0"

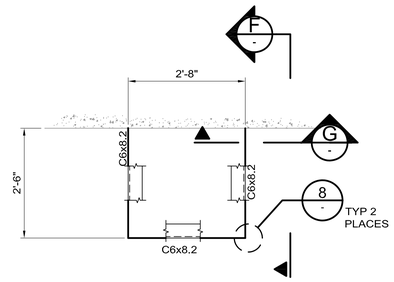


DETAIL 3 SS-4
SCALE 1-1/2" = 1'-0"



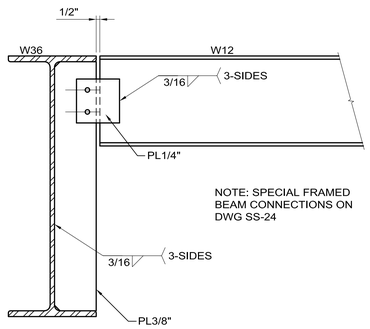
NOTE: CONTRACTOR SHALL COORDINATE EXACT SIZE OF SUPPORT FRAME WITH EQUIPMENT PURCHASED. LOCATION OF DEHUMIDIFIER SUPPORTS SHALL BE COORDINATED WITH MECHANICAL DRAWINGS (2 REQUIRED)

DEHUMIDIFIER SUPPORT DETAIL 4 -
SCALE 3/4" = 1'-0"



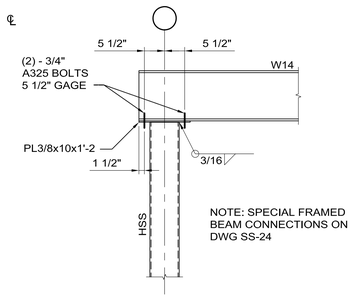
NOTE: CONTRACTOR SHALL COORDINATE EXACT SIZE OF SUPPORT FRAME WITH EQUIPMENT PURCHASED. LOCATION OF TRANSFORMER SUPPORTS SHALL BE COORDINATED WITH ELECTRICAL DRAWINGS (7 REQUIRED)

TRANSFORMER SUPPORT DETAIL 5 -
SCALE 3/4" = 1'-0"



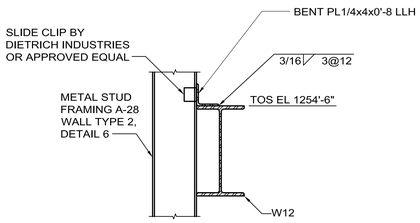
NOTE: SPECIAL FRAMED BEAM CONNECTIONS ON DWG SS-24

DETAIL 6 SS-24
SCALE 1-1/2" = 1'-0"

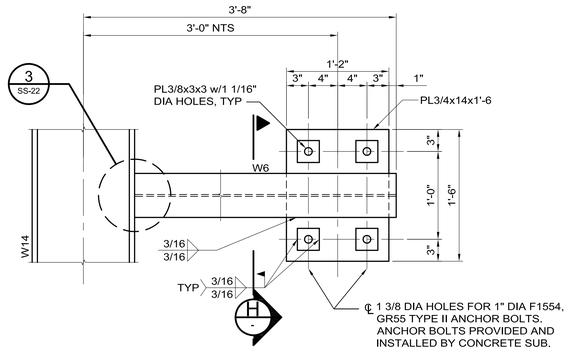


NOTE: SPECIAL FRAMED BEAM CONNECTIONS ON DWG SS-24

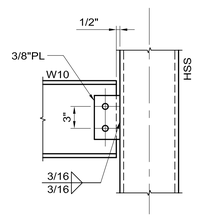
DETAIL 7 SS-24
SCALE 3/4" = 1'-0"



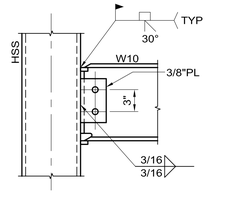
SECTION A SS-3
SCALE 1-1/2" = 1'-0"



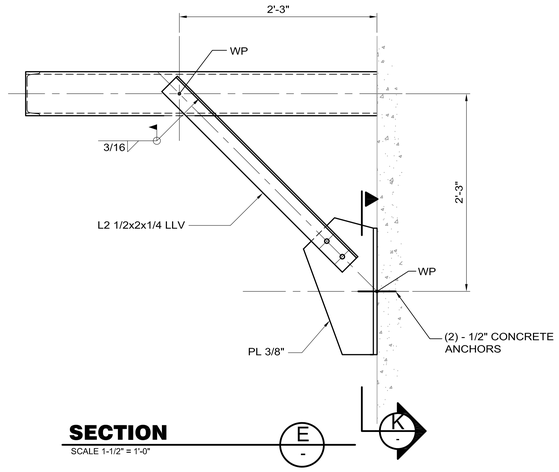
SECTION B SS-4
SCALE 1-1/2" = 1'-0"



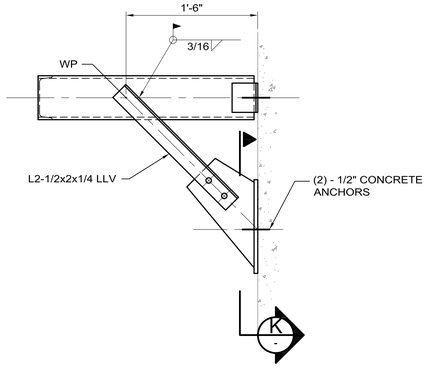
SECTION C -
SCALE 1-1/2" = 1'-0"



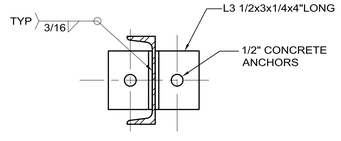
SECTION D -
SCALE 1-1/2" = 1'-0"



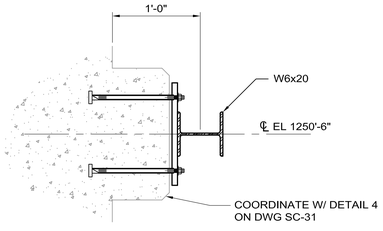
SECTION E -
SCALE 1-1/2" = 1'-0"



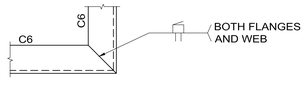
SECTION F -
SCALE 1-1/2" = 1'-0"



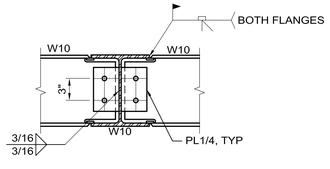
SECTION G -
SCALE 3" = 1'-0"



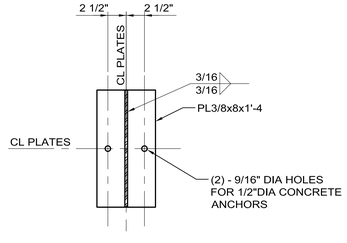
SECTION H -
SCALE 3" = 1'-0"



DETAIL 8 -
SCALE 3" = 1'-0"



SECTION J -
SCALE 1-1/2" = 1'-0"



SECTION K -
SCALE 1-1/2" = 1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO

SIGNATURE:

DATE: 03/11/2009 LICENSE #46236

REV.	DATE	DESCRIPTIONS
		REVISIONS
0	03-11-09	ISSUED FOR BID

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	J. RUHDE	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3/4"= 1'-0" — 1 0 1 2 3 SCALE FEET

1 1/2"= 1'-0" — 1 0 1 SCALE FEET

3"= 1'-0" — 0 1 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

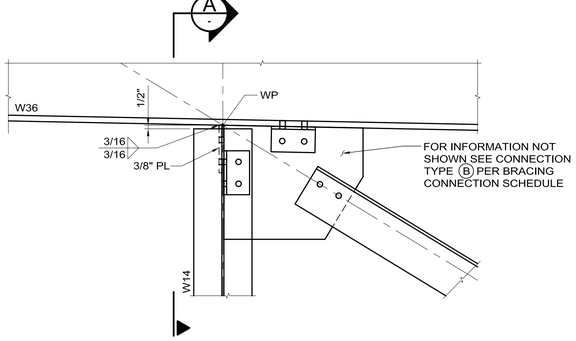
DETAILS - 2

DRAWING NO. 15-1-3B SS-21 REV. 0

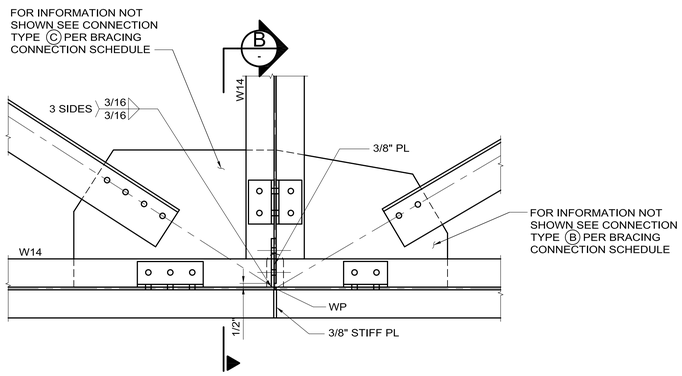
11 MAR, 2009

NOTES:

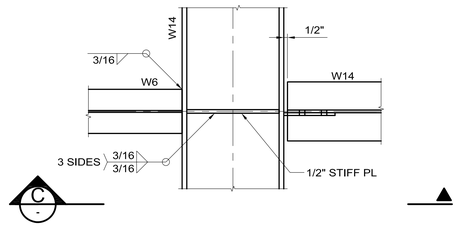
1. FOR GENERAL NOTES AND ABBREVIATIONS, SEE DRAWING SS-1.



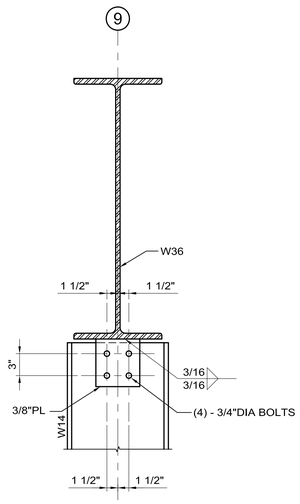
DETAIL 1 SS-13
SCALE 1-1/2"=1'-0"

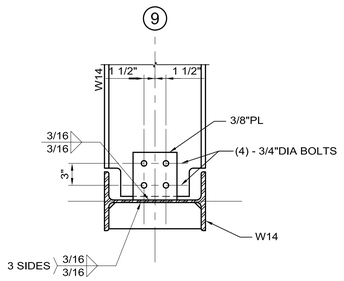


DETAIL 2 SS-13
SCALE 1-1/2"=1'-0"

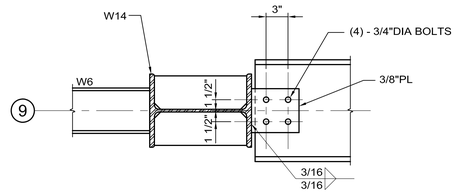


DETAIL 3 SS-13
SCALE 1-1/2"=1'-0"

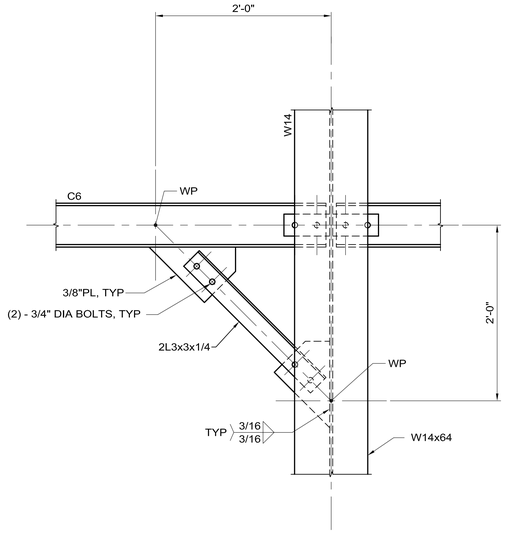




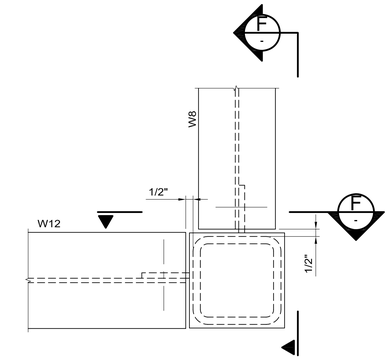
SECTION B
SCALE 1-1/2"=1'-0"



SECTION C
SCALE 1-1/2"=1'-0"

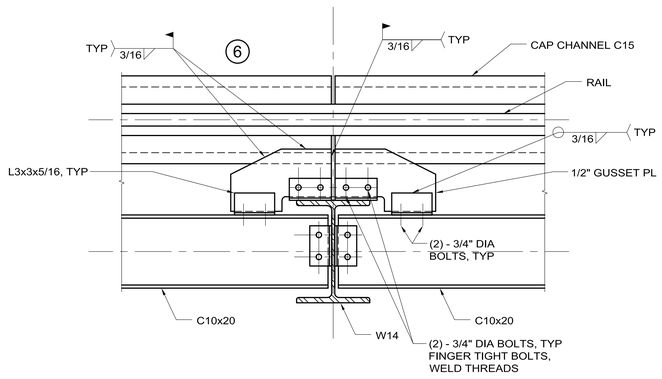


SECTION D
SCALE 1-1/2"=1'-0"



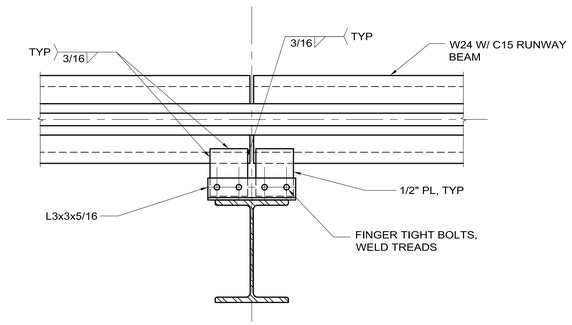
DETAIL 4 SS-3
SCALE 3"=1'-0"

SECTION A
SCALE 1-1/2"=1'-0"



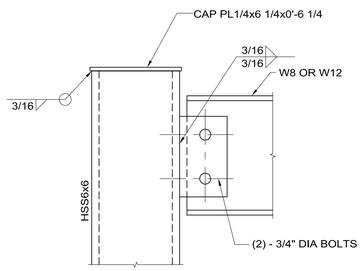
NOTE: USE SIMILAR CONNECTION TO C10 ON ONE SIDE OF COLUMN ONLY ON LINES 5, 7, 8 AND 9

SECTION E
SCALE 1-1/2"=1'-0"
SS-15
SS-16



NOTE: USE THIS CONNECTION AT ALL COLUMNS EXCEPT AS NOTED IN SECTION E THIS DWG

DETAIL 5 SS-4
SCALE 1-1/2"=1'-0"



SECTION F
SCALE 3"=1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

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SIGNATURE:
DATE: 03/11/2009 LICENSE #46236

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REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

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DRAWN	L. DENHAM	03-11-09
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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:
1 1/2"=1'-0" 1 0 1 SCALE FEET
3"=1'-0" 0 1 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

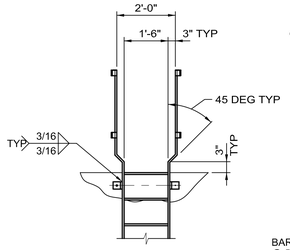
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

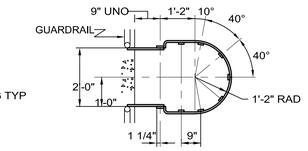
DETAILS - 3

DRAWING NO. 15-1-3B SS-22 REV. 0

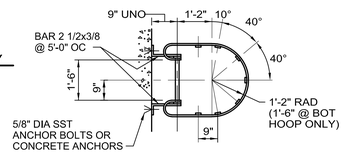
11 MAR, 2009



PARTIAL ELEVATION THROUGH ENTRY

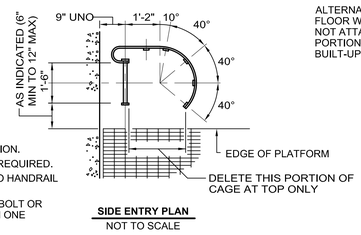


THROUGH ENTRY PLAN
NOT TO SCALE

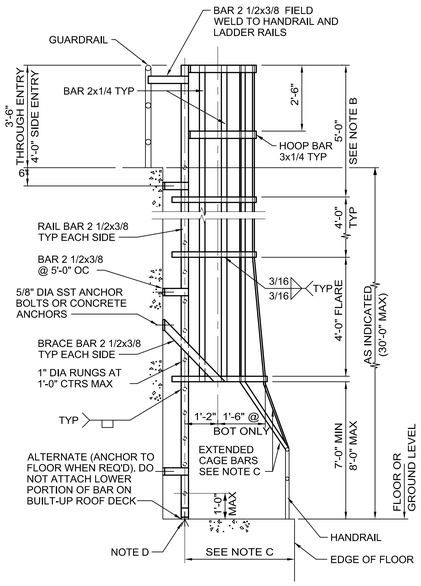


PLAN

TYPICAL HOOP DETAILS AND LADDER ATTACHMENT
NOT TO SCALE



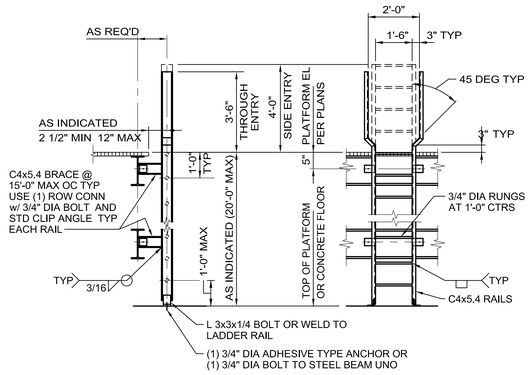
SIDE ENTRY PLAN
NOT TO SCALE



NOTES:

A. LADDER AND CAGE TO BE ALL WELDED CONSTRUCTION.
B. DELETE CAGE VERTICAL BARS FOR SIDE ENTRY AS REQUIRED.
C. EXTEND EXTERIOR THREE CAGE BARS AND WELD TO HANDRAIL WHEN 4'-0" OR LESS.
D. CONNECT EACH ANGLE WITH ONE 3/4" DIA ANCHOR BOLT OR CONCRETE ANCHOR TO CONCRETE FLOOR OR WITH ONE 3/4" DIA BOLT TO STEEL BEAM (UNO).

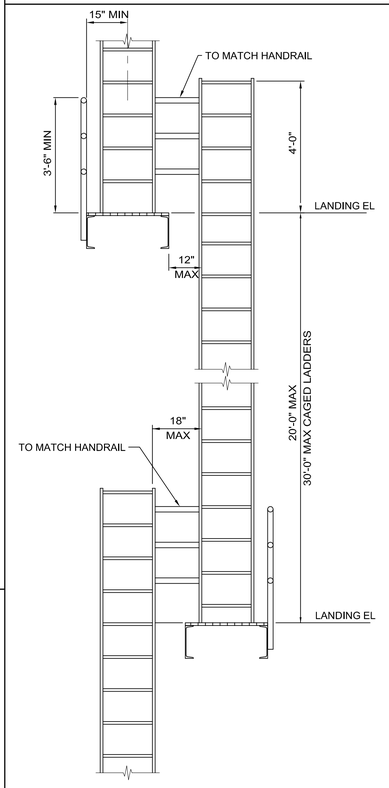
L-3



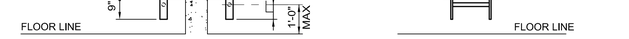
L-6 WITH EXTENSION
L-7 WITHOUT EXTENSION

GENERAL NOTES: (APPLICABLE TO ALL DRAWINGS)

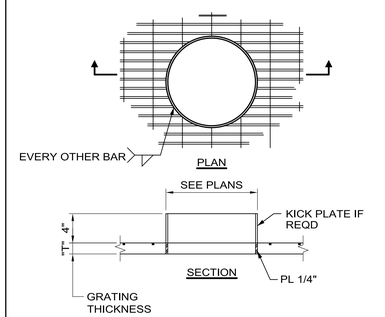
1. ALL DETAILS AND NOTES ON THIS DRAWING ARE BURNS & McDONNELL STANDARDS WITHOUT RESPECT TO CONTRACTS. USE ONLY THOSE DETAILS AS CALLED FOR ON PLANS, SPECIFIED OR AS REQUIRED TO ACCOMPLISH THE WORK.
2. ITEMS WHICH ARE TO BE FURNISHED AND INSTALLED BY SEPARATE CONTRACTS ARE IDENTIFIED AND LABELED FOR EACH CONTRACT.



LADDER EXTENSION PARAMETERS

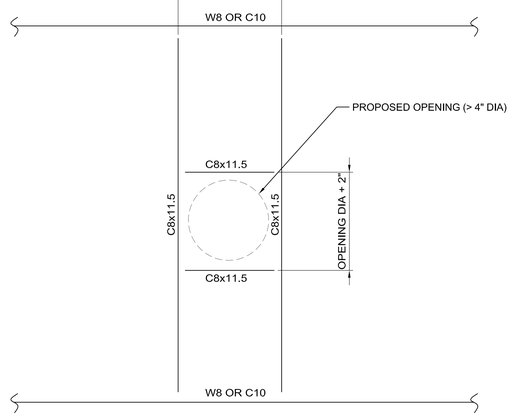


L-8



GO-1 - WITH KICK PLATE

NOTE:
COVER ALL OPENINGS DURING CONSTRUCTION.



NOTE:
USE STANDARD FRAMED BEAM CONNECTIONS

GRATING SUPPORT FOR FIELD CUT OPENINGS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO
SIGNATURE:
DATE: 03/11/2009 LICENSE #46236

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE		OWNER / REPRESENTATIVE	DATE
DESIGNED	J. RUHDE	03-11-09	NOvA FESS SUBMITTED	S. DIXON	03-11-09
DRAWN	L. DENHAM	03-11-09	NOvA PROJECT MANAGER	J. COOPER	03-11-09
CHECKED	P. TERRY	03-11-09	HINES SUBMITTED	C. McNABNEY	03-11-09
APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

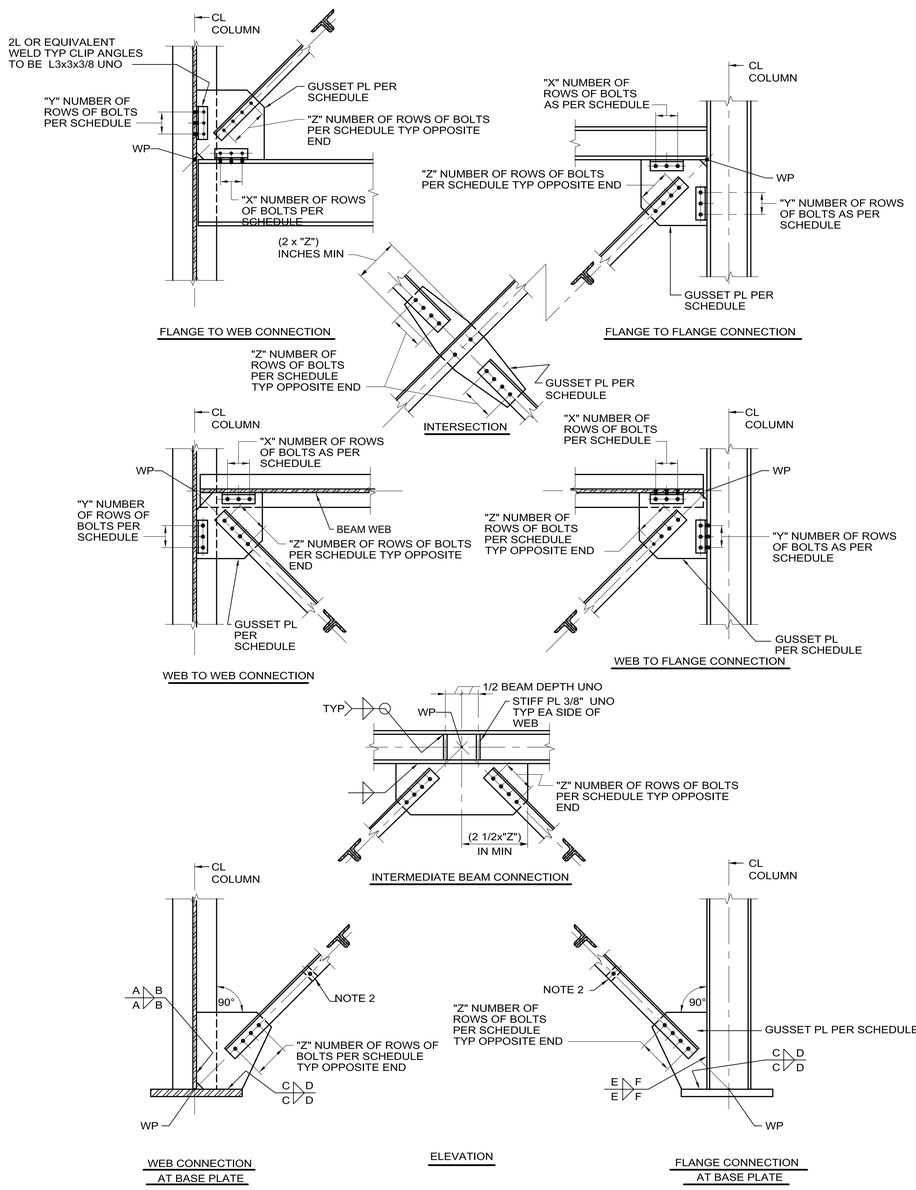
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

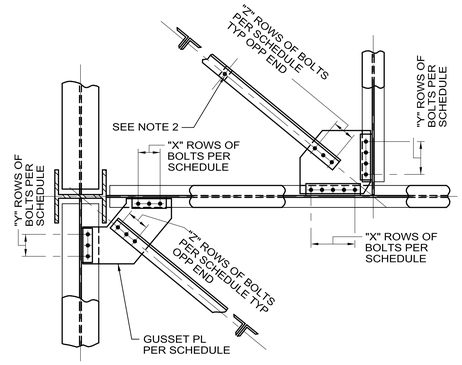
NOvA FAR DETECTOR BUILDING
STANDARD DETAILS - 1

DRAWING NO. 15-1-3B SS-23 REV. 0

11 MAR, 2009

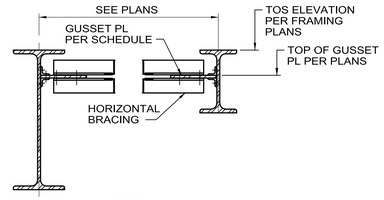


TYPICAL VERTICAL BRACING CONNECTIONS DOUBLE ANGLE BRACING



PLAN

TYPICAL HORIZONTAL BRACING TYPE II



SECTION

HORIZONTAL BRACING

ELEVATION VIEW

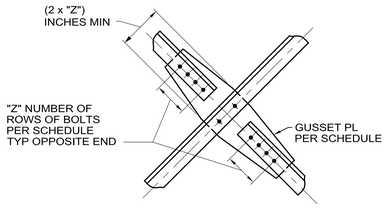
NOTES:

A. WHEN NOT EQUAL, THE AXES OF "X" AND "Y" ROWS OF BOLTS SHALL BE GIVEN ON PLANS.

B. AXIS OF "Z" ROWS OF BOLTS IS PARALLEL TO CENTERLINE OF BRACING.

C. CLIP ANGLES TO BE L3x3x3/8 UNO.

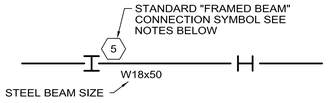
D. PROVIDE (1) ONE CLIP ANGLE IF CLEARANCE IS NOT ENOUGH.



TYPICAL INTERSECTION CONNECTION TYPE II HORIZONTAL BRACING

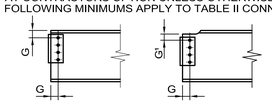
PLAN VIEW
(NOT TO SCALE)

STANDARD FRAMED BEAM CONNECTIONS



NOTES:

1. UNLESS NOTED OTHERWISE ALL BEAMS ON COLUMN ROW SHALL BE TABLE III CASE I CONNECTIONS WITH SHOP WELDS.
2. THE NUMBER INDICATES THE MINIMUM NUMBER OF ROWS OF HIGH STRENGTH BOLTS FOR THAT END CONNECTION. END CONNECTIONS SHALL BE STANDARD "FRAMED BEAM" SLIP CRITICAL CONNECTIONS PER TABLE II-A, II-B OR III CASE I OF AISC ASD MANUAL 9th EDITION. AT CONTRACTORS OPTION UNLESS OTHERWISE INDICATED THE FOLLOWING MINIMUMS APPLY TO TABLE II CONNECTIONS.



G & G' = 2" MIN FOR STD HOLES (G 1 1/4" MIN FOR BEAMS LESS THAN A W12)
G & G' = 2 1/4" MIN FOR OVERSIZED AND SHORT SLOTTED HOLES G 1 3/8" MIN FOR BEAMS LESS THAN A W12)
MINIMUM CLIP ANGLE THICKNESS SHALL BE 5/16" BEAM TO BEAM CONN. MINIMUM CLIP ANGLE THICKNESS SHALL BE 3/8" BEAM TO COLUMN CONN.
TABLE III CASE I WELDS TO BE 3/16"

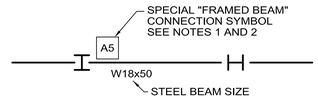
3. WHERE NO STANDARD "FRAMED BEAM" CONNECTIONS SYMBOL (X) IS INDICATED BEAM END CONNECTIONS SHALL BE IN ACCORDANCE WITH THESE NOTES AND WITH THE FOLLOWING MINIMUM NUMBER OF HIGH STRENGTH BOLTS:

C6, W6 OR LESS = 1 ROW (2 BOLTS ON WEB)

C8 OR W8	= 2 ROWS	W21 = 4 ROWS	
C10 OR W10	= 2 ROWS	W24 = 5 ROWS	
C12 OR W12	= 2 ROWS	W27 = 6 ROWS	
W14	= 3 ROWS	W30 = 7 ROWS	
C15 OR W16	= 3 ROWS	W33 = 8 ROWS	
W18	= 4 ROWS	W36 = 8 ROWS	

4. THE NUMBER OF BOLTS AND NUMBER OF ROWS OF BOLTS INDICATED OR STATED IS THE MINIMUM NUMBER OF BOLTS OR ROWS. PROVIDE ADDITIONAL BOLTS OR CONNECTION DEVICES, IF NECESSARY, TO COMPLY WITH OSHA REGULATION 29CFR1926 SUBPART R-STEEL ERECTION.
5. ROWS OF BOLTS: THE NUMBER OF FASTENERS IN A VERTICAL ROW.
6. BEAM CONNECTIONS ARE BASED ON THE USE OF STANDARD, OVERSIZED OR SHORT-SLOTTED HOLES AS DEFINED BY AISC ASD MANUAL 9th EDITION. LONG-SLOTTED HOLES ARE NOT PERMITTED.
7. BEAM CONNECTIONS GAGE SHALL BE 5 1/2" MAX GAGE MAY BE REDUCED AT FABRICATORS OPTION.

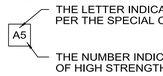
SPECIAL FRAMED BEAM CONNECTIONS



SPECIAL CONNECTION SCHEDULE						
CONNECTION DESIGNATION	CONNECTION TYPE	CLIP ANGLE THICKNESS	WELD SIZE	BOLT DIAMETER	GAGE	REFERENCE DETAIL & DWGS
A	SPECIAL	-	-	3/4	-	DET 6, SS-21
B	SPECIAL	-	-	3/4	-	DET 7, SS-21
C	STD	1/2	-	3/4	5 1/2	-
D	STD	5/8	-	3/4	5 1/2	-

NOTES:

1. SPECIAL CONNECTION SYMBOL AS NOTED ON PLANS.



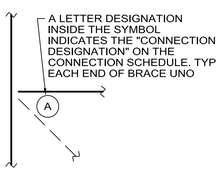
2. CONNECTION TYPES:
   STD - SIMILAR TO STANDARD "FRAMED BEAM" CONNECTION PER THIS DRAWING USING AISC TABLE III CONNECTIONS EXCEPT AS NOTED IN THIS SCHEDULE.
   SPECIAL- CONNECTION PER DETAIL NOTED IN THIS SCHEDULE.
3. FOR "SPECIAL FRAMED BEAM CONNECTIONS", GENERAL NOTES 1 THRU 6 APPLY AS DEFINED FOR "STANDARD FRAMED BEAM CONNECTIONS".

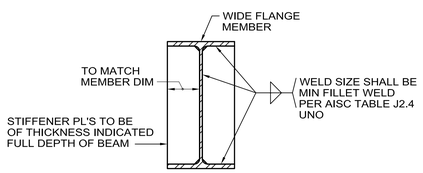
NOTES:

1. ALL DETAILS AND NOTES ON THIS DRAWING ARE BURNS & MCDONNELL STANDARDS WITHOUT RESPECT TO CONTRACTS. USE ONLY THOSE DETAILS AS CALLED FOR ON PLANS, SPECIFIED OR AS REQUIRED TO ACCOMPLISH THE WORK.
2. TYPICAL BRACING SPACERS AS REQUIRED BY AISC CODE FOR COMPRESSION MEMBERS. SPACER LENGTH SHALL BE EQUAL TO FULL DEPTH OF BRACING MEMBER, AND THICKNESS SHALL EQUAL THAT OF BRACING GUSSETS.
3. ITEMS WHICH ARE TO BE FURNISHED AND INSTALLED BY SEPARATE CONTRACTS ARE IDENTIFIED AND LABELED FOR EACH CONTRACT.

BRACING CONNECTION SCHEDULE

CONNECTION DESIGNATION	"X" ROWS OF BOLTS	"Y" ROWS OF BOLTS	"Z" ROWS OF BOLTS	BOLT SIZE	GUSSET PLATE THICKNESS	WELD SIZE A	WELD LENGTH B	WELD SIZE C	WELD LENGTH D	WELD SIZE E	WELD LENGTH F
A	2	2	2	3/4	3/8						
B	2	2	2	3/4	3/4	1/4	7	1/4	7	1/4	7
C	3	2	4	3/4	3/4						
D											
E											
F											
G											
H											
I											
J											





NOTE:
USE THIS DETAIL FOR STIFFENERS AT ALL LOCATIONS ON DRAWINGS INDICATED AS "STIFF PL'S UNO

TYPICAL STIFFENER DETAIL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO

SIGNATURE:

DATE: 03/11/2009 LICENSE #46236

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	J. RUHDE	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

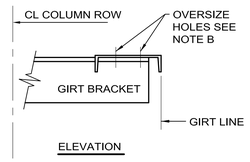
NOvA FAR DETECTOR BUILDING

STANDARD DETAILS - 2

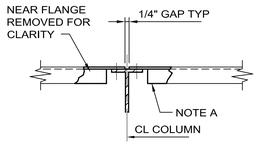
DRAWING NO. 15-1-3B SS-24 REV. 0

11 MAR, 2009

Z:\BMCDCAD\DETAILS\STRUC\BMC-S-DT-011.DWG 06-08-2007 9:37 K_SCHAMB

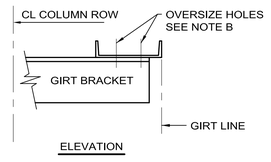


ELEVATION



ELEVATION

TYPICAL GIRT TO BRACKET CONNECTION DETAIL



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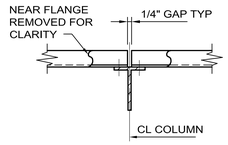
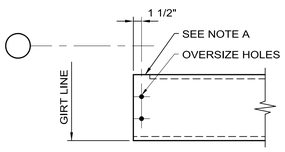


ELEVATION

TYPICAL GIRT TO BRACKET CONNECTION DETAIL

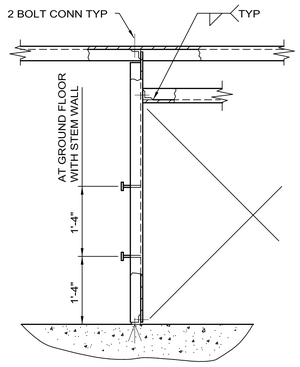
NOTES:

A. COPE INSIDE FLANGES OF GIRT CHANNEL AT EACH END AT SUPPORT BRACKET AS REQUIRED.
B. PROVIDE (4) OVERSIZE HOLES IN GIRT WEB FOR 3/4" DIA BOLTS.

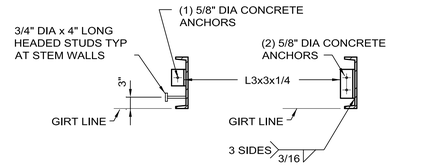


PLAN

GIRT FASTENING DETAIL



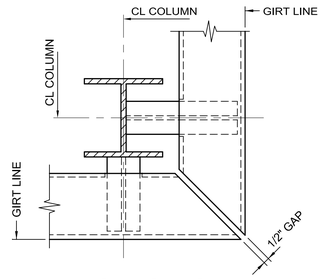
ELEVATION



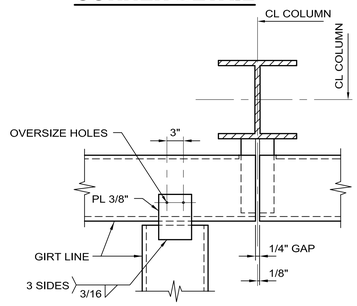
WITH STEM WALL WITHOUT STEM WALL

SECTION VIEW

TYPICAL DOOR OPENING DETAILS



TYPICAL OUTSIDE CORNER DETAIL



TYPICAL INSIDE CORNER GIRT CONNECTION DETAIL

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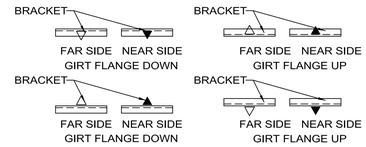
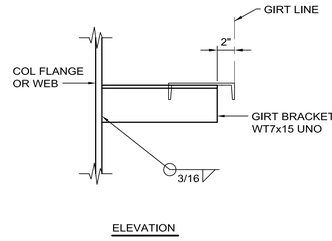
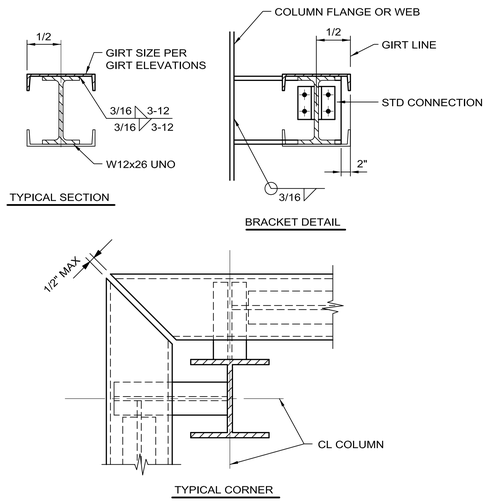
3. WHERE CONNECTING TO EXISTING STEEL, WELDS INDICATED SHALL BE FIELD WELDS.
4. GIRT BRACKETS INDICATED THUS ON GIRT ELEVATION DRAWINGS:



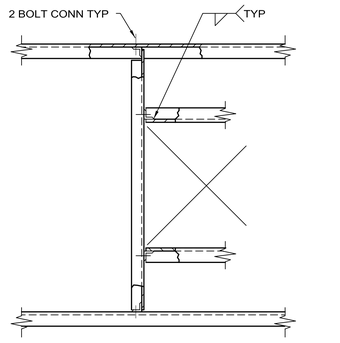


ELEVATION

TYPICAL GIRT BRACKET DETAILS



TYPICAL SUPPORT GIRT DETAILS



TYPICAL WALL OPENING DETAIL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: KEVIN V. COMO

SIGNATURE:

DATE: 03/11/2009 LICENSE #46236

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REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	J. RUHDE	03-11-09
DRAWN	L. DENHAM	03-11-09
CHECKED	P. TERRY	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

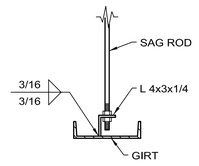
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

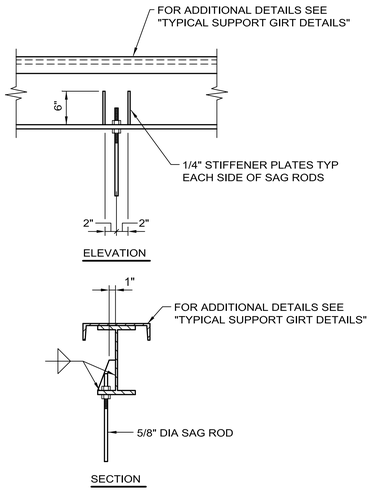
STANDARD DETAILS - 3

DRAWING NO. 15-1-3B SS-25 REV. 0

11 MAR, 2009



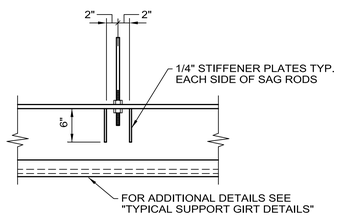
TYPICAL SAG ROD CONNECTION ABOVE WINDOWS / LOUVERS



TYPICAL SUPPORT GIRT SAG ROD CONNECTIONS #1

NOTE:

FOR ADDITIONAL SAG ROD DETAILS, SEE "TYPICAL SAG ROD CONNECTIONS".



TYPICAL SUPPORT GIRT SAG ROD CONNECTIONS #2

NOTE:

FOR ADDITIONAL SAG ROD DETAILS, SEE "TYPICAL SAG ROD CONNECTIONS".

GENERAL NOTES:

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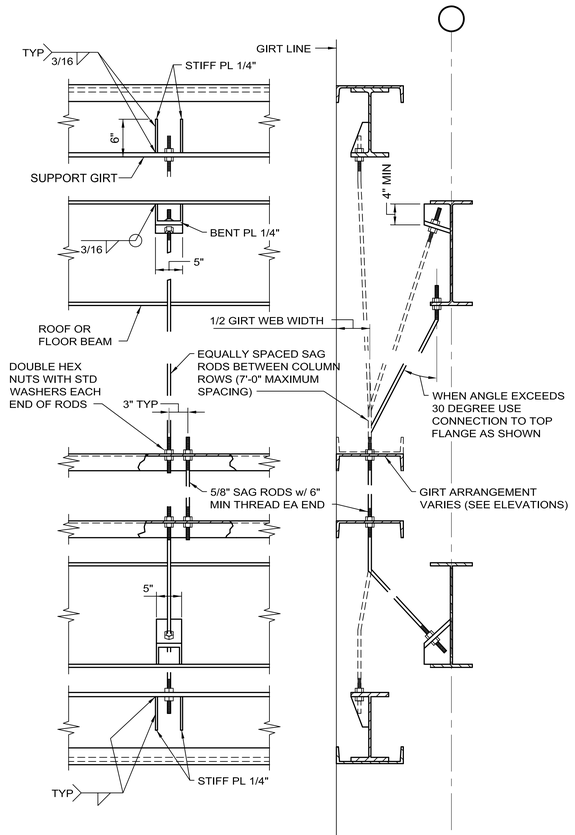

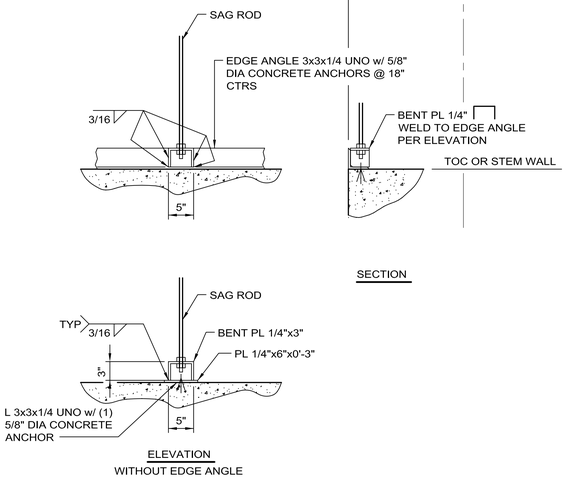

TYPICAL SAG ROD CONNECTIONS

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UNIVERSITY OF MINNESOTA | Hines

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

STANDARD DETAILS - 4

DRAWING NO. 15-1-3B SS-26 REV. 0

11 MAR, 2009

GENERAL NOTES:

1. LEGEND IS GENERAL IN NATURE AND MAY INDICATE MORE INFORMATION THAN IS APPLICABLE TO PROJECT. SEE DRAWINGS FOR SPECIFIC SYMBOLS AND ABBREVIATIONS.
2. PROVIDE ALL MATERIALS, VALVES, HANGERS, ETC. AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
3. WHERE PIPE SLEEVES ARE SHOWN, COORDINATE EXACT LOCATION WITH GENERAL CONTRACTOR. CORE DRILLING FOR PIPE SLEEVES IS LIMITED TO 3-INCH PIPING AND SMALLER.
4. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
5. THE DETECTOR SPACE CEILING IS CONSTRUCTED OF PRE-STRESSED CONCRETE BEAMS. C-CHANNEL STRUTS ARE EMBEDDED IN THE CONCRETE BEAMS. ALL EQUIPMENT SUSPENDED FROM THE CEILING SHALL UTILIZE THE EMBEDDED SUPPORTS. SEE STRUCTURAL DRAWING SC-35 FOR LOCATIONS.
6. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
7. MAINTAIN A MINIMUM OF 6'-8" CLEARANCE TO UNDERSIDE OF PIPES, CONDUITS, ETC., THROUGHOUT ACCESS ROUTES AND IN MECHANICAL ROOMS.
8. LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
9. VERIFY DIMENSIONS AND CONNECTION SIZE WITH FURNISHED EQUIPMENT
10. ALL ELEVATIONS ARE ABOVE FINISHED FLOOR TO BOTTOM OF DUCT, PIPE, OR PIPE INSULATION UNLESS NOTED OTHERWISE.

HVAC CONTROL DIAGRAM SYMBOLS

M	3-WAY CONTROL VALVE
M	2-WAY CONTROL VALVE
ADV M	AUTO DRAIN VALVE
T	SPACE THERMOSTAT
H	SPACE HUMIDISTAT
SP	STATIC PRESSURE SENSOR
H	HUMIDISTAT UNIT MOUNTED
DP	DEWPOINT SENSOR
SP	DUCT STATIC PRESSURE SENSOR
TX	TEMPERATURE SENSOR/TRANSMITTER
AMS	AIR FLOW MONITORING STATION
TX	OUTDOOR TEMPERATURE SENSOR/TRANSMITTER
SW	SUMMER/WINTER SWITCH
DP	DIFFERENTIAL PRESSURE GAUGE
SD	SMOKE DETECTOR
M	DAMPER MOTOR
MP	MINIMUM POSITION SET POINT
S	STARTER OR CONTACTOR
HOA	HAND-OFF-AUTOMATIC SWITCH
FS	FLOW SWITCH
LL	LOW LEVEL
HL	HIGH LEVEL
VFD	VARIABLE FREQUENCY DRIVE
S.A.T.	SUPPLY AIR TEMPERATURE
	PB DAMPER
	OB DAMPER
A	COOLING COIL
H / C	HEATING COIL
	FILTER
	FAN

DETAIL/SECTION TITLE

NUMBER = DETAIL DESIGNATOR
LETTER = SECTION DESIGNATOR

DETAIL — 1 / M-2 — DRAWING WHERE DETAIL/SECTION IS TAKEN

SECTION CUT SYMBOL

INDICATES PERSPECTIVE AND LIMITS OF SECTION

A / M-3 — SECTION DESIGNATOR; DRAWING WHERE SECTION IS SHOWN

DETAIL CALLOUT SYMBOL

INDICATES LIMITS OF DETAIL

1 / M-1 — DETAIL DESIGNATOR; DRAWING WHERE DETAIL IS SHOWN

AIR DISTRIBUTION DEVICE IDENTIFICATION

SPECIFICATION TYPE, SEE DEVICE SCHEDULE
NECK SIZE - INCHES (ROUND OR RECT.)
A 12X12
400 (2)
NUMBER OF DEVICES SHARING SAME CHARACTERISTICS (OPTIONAL)
DEVICE AIRFLOW RATE CFM

MECHANICAL ABBREVIATIONS

24x12	RECTANGULAR DUCT DIMENSION (INCHES)
24x12 OV	OVAL DUCT DIMENSION (INCHES)
12Ø	ROUND DUCT DIMENSION (INCHES)
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ARV	AIR RELEASE VALVE
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BW	BUTT WELD
CUH	CABINET UNIT HEATER
CONC	CONCENTRIC
CW	COOLING WATER
DH	DOOR HEATER
DN	DOWN
DSF	DESTRATIFICATION FAN
EBB	ELECTRIC BASEBOARD HEATER
EL	ELEVATION
ELL	ELBOW
EA	EXHAUST AIR
EF	EXHAUST FAN
EG	EXHAUST GRILLE
ER	EXHAUST REGISTER
EUH	ELECTRIC UNIT HEATER
EXIST	EXISTING
F	FAN
FF	FLAT FACED
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
HUM	HUMIDIFIER
INVT EL	INVERT ELEVATION
L	LOUVER
LR	LONG RADIUS
MAU	MAKEUP AIR UNIT
MJ	MECHANICAL JOINT
MA	MIXED AIR
N.C.	NORMALLY CLOSED (FAIL POSITION)
N.O.	NORMALLY OPEN (FAIL POSITION)
OA	OUTSIDE AIR
OB	OPPOSED BLADE
PTAC	PACKAGED TERMINAL AIR CONDITIONER
PB	PARALLEL BLADE
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE
RED	REDUCER-REDUCING
RMJ	RESTRAINED MECHANICAL JOINT
RA	RETURN AIR
RG	RETURN AIR GRILLE
RV	ROOF VENT
SCH	SCHEDULE
SR	SHORT RADIUS
SO	SLIP ON
SPF	STAIRWELL PRESSURIZATION FAN
STM	STEAM
ST	STEAM TRAP
SA	SUPPLY AIR
SRC	SPRING RETURN CLOSED
SR	SUPPLY REGISTER
SW	SOCKET WELD
TOC	TOP OF CONCRETE
TOD	TOP OF DUCT
TOP	TOP OF PIPE
TOS	TOP OF STEEL
UH	UNIT HEATER
VAV	VARIABLE AIR VOLUME
V	VENT
WE	WELD END
WN	WELD NECK

HVAC LEGEND

M	CONTROL DAMPER, MOTOR OPERATED
	MANUAL BALANCE DAMPER
BD	BACKDRAFT DAMPER
AD / AD	ACCESS DOOR (AD), ACCESS PANEL (AP)
AD	FIRE DAMPER: SHOW- VERTICAL (WALL) SHOW HORIZ. (FLOOR)
AD	DAMPERS: (SD) SMOKE- FIRE/SMOKE (F/SD)-
	HEAT STOP FOR FIRE RATED CELING
	FLEXIBLE DUCT CONNECTION
	RECTANGULAR ELBOW W/TURNING VANES
	TEE W/TURNING VANES
R	RISE IN RESPECT TO AIR-FLOW
D	DROP IN RESPECT TO AIR-FLOW
	SQUARE OR RECTANGULAR TO ROUND TRANSITION
	POINT OF CHANGE IN DUCT CONSTRUCTION (BY STATIC PRESSURE CLASS "N" SUPERSCRIPT INDICATES NEGATIVE PRESSURE.)
	SUPPLY OR OUTSIDE AIR DUCT SECTION
	RETURN AIR DUCT SECTION
	EXHAUST AIR DUCT SECTION
	ROUND FLEXIBLE DUCT (5'-0" MAX LENGTH)
	SQUARE OR RECT. DIFFUSER
	ROUND DIFFUSER
	LINEAR SLOT DIFFUSER
T	THERMOSTAT
H	HUMIDISTAT
DP	DEWPOINT SENSOR
(3'-0")	FINNED TUBE RADIATION. LENGTH OF ELEMENT SHOWN IN PARENTHESIS
36x24L	LOUVERS AND SCREEN
	UNIT HEATER, HORIZONTAL
	UNIT HEATER, DOWNBLAST

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PRINT NAME: THEODORE M. TIO
SIGNATURE:
DATE: 03/11/2009 LICENSE #41879

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REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

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DRAWN	T. TIO	03-11-09
CHECKED	D. WOLFE	03-11-09
APPROVED	J. STEENKEN	03-11-09

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
HVAC LEGEND & ABBREVIATIONS

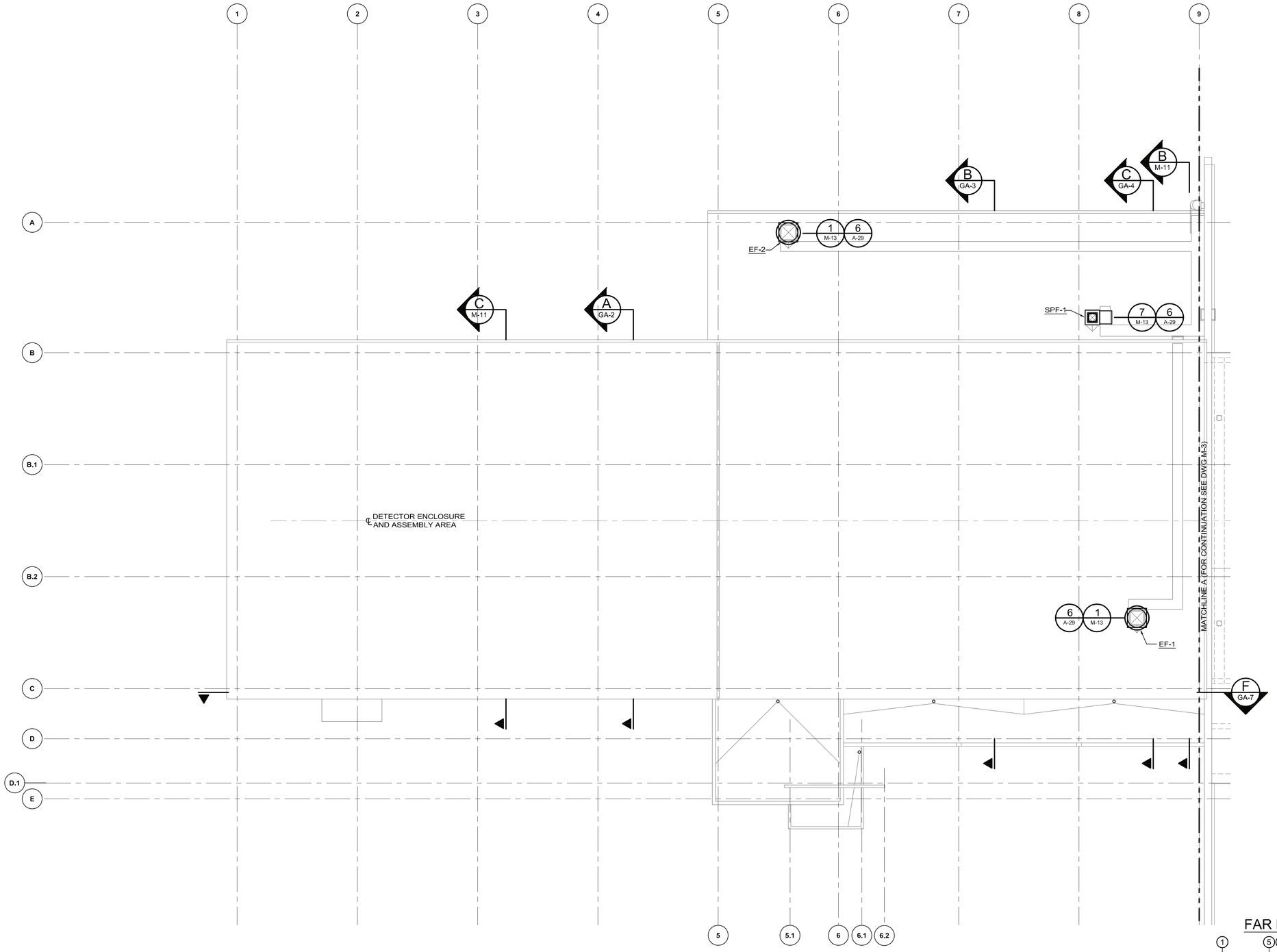
DRAWING NO. 15-1-3B M-1 REV. 0

11 MAR, 2009

M:\FERMILAB\49617\CAD\MECH\P-00.DWG 08-15-2008 12:44 RPEARSON

GENERAL NOTES:

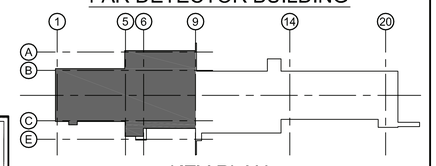
1. SEE DRAWING M-1 FOR GENERAL NOTES.
2. SEE M-12 DETAILS 1, 2, AND 4 FOR DUCT LAYOUT, ELBOW TURNING VANE AND HANGER ATTACHMENT INSTALLATIONS.
3. SEE M-13 DETAIL 3 FOR DUCT BRANCH TAKE-OFF INSTALLATION.



ROOF PLAN

SCALE:1/8"=1'0"

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

HVAC ROOF PLAN 1 OF 2

DRAWING NO. 15-1-3B M-2 REV. 0

11 MAR, 2009

GENERAL NOTES:

1. SEE DRAWING M-1 FOR GENERAL NOTES.
2. SEE M-12 DETAILS 1, 2, AND 4 FOR DUCT LAYOUT, ELBOW TURNING VANE AND HANGER ATTACHMENT INSTALLATIONS.
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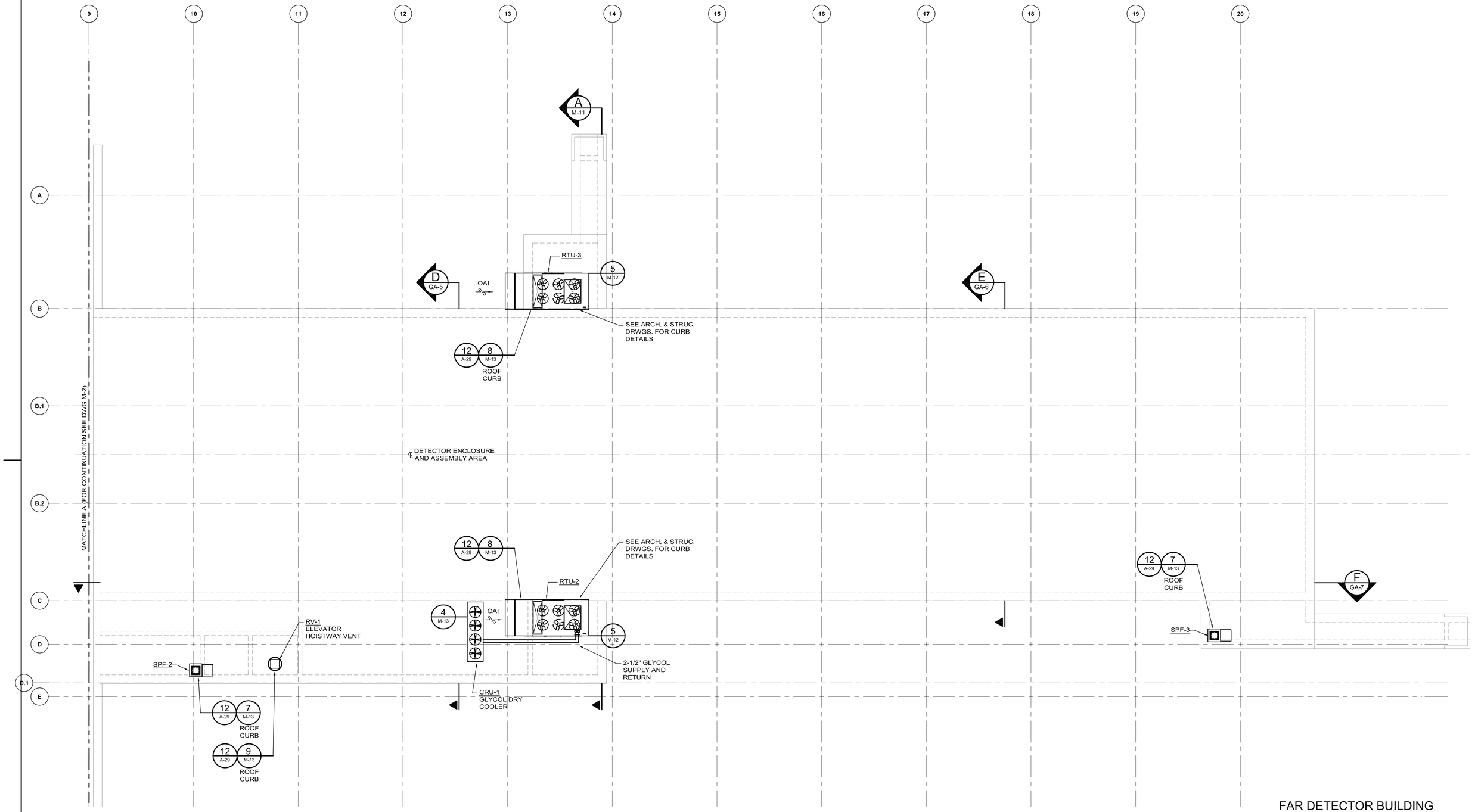
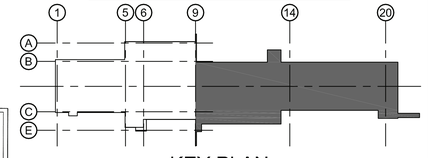


ROOF PLAN

SCALE:1/8"=1'0"

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:
1/8"=1'-0" 8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

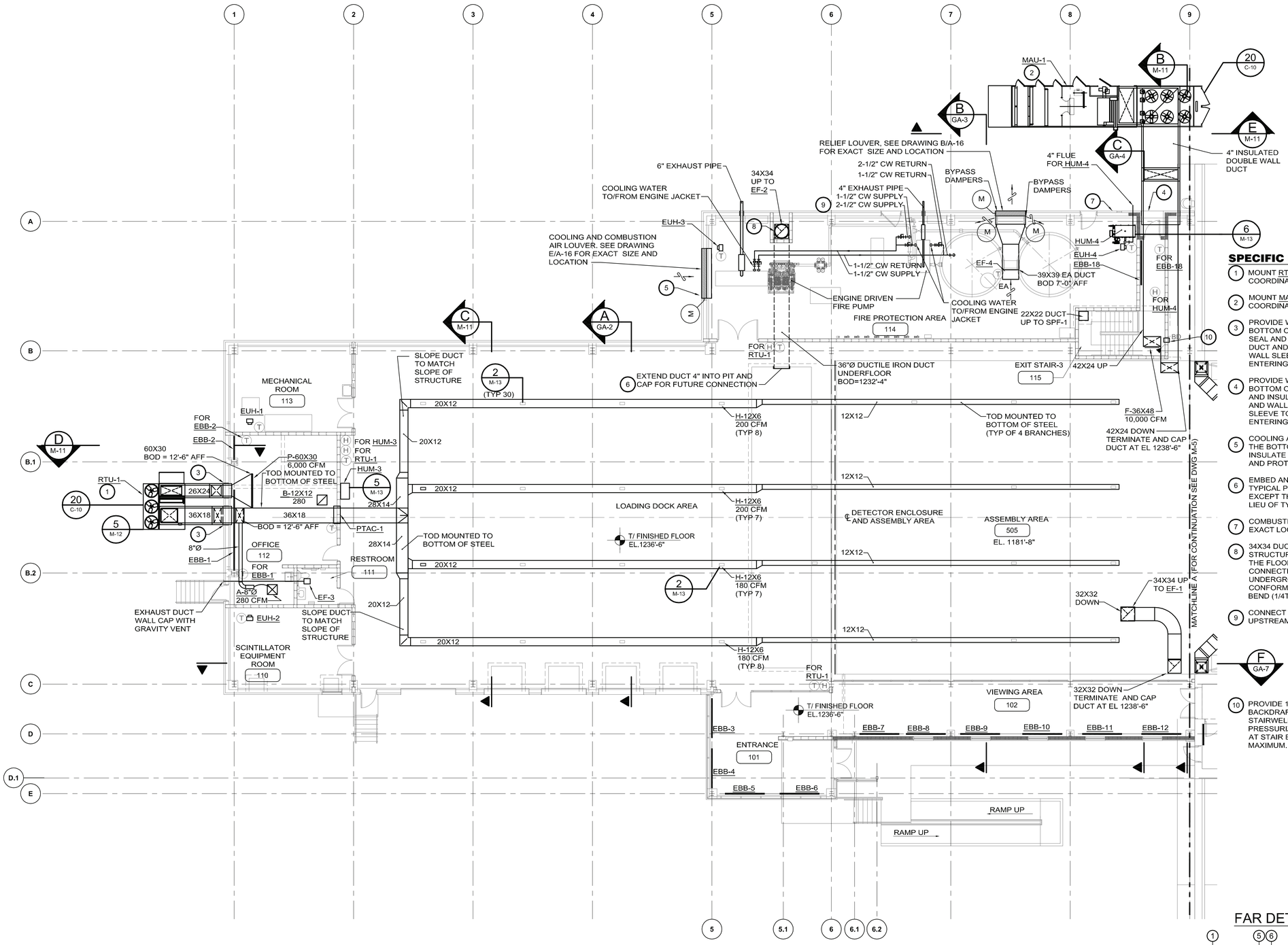
HVAC ROOF PLAN 2 OF 2

DRAWING NO. 15-1-3B M-3 REV. 0

11 MAR, 2009

GENERAL NOTES:

1. SEE DRAWING M-1 FOR GENERAL NOTES.
2. SEE M-12 DETAILS 1, 2, AND 4 FOR DUCT LAYOUT, ELBOW TURNING VANE AND HANGER ATTACHMENT INSTALLATIONS.
3. SEE M-13 DETAIL 3 FOR DUCT BRANCH TAKE-OFF INSTALLATION.



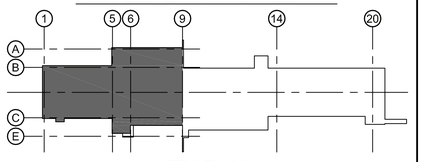
SPECIFIC NOTES:

1. MOUNT RTU-1 ON 40-INCH MANUFACTURER'S CURB. COORDINATE FOUNDATION SIZE WITH CIVIL DRAWINGS.
2. MOUNT MAU-1 ON 40-INCH MANUFACTURER'S CURB. COORDINATE FOUNDATION SIZE WITH CIVIL DRAWINGS.
3. PROVIDE WALL SLEEVE FOR DUCT PENETRATION. BOTTOM OF DUCT IS 12'-6" ABOVE FINISHED FLOOR. SEAL AND INSULATE SPACE BETWEEN DOUBLE WALL DUCT AND WALL SLEEVE. PROVIDE FLASHING FROM WALL SLEEVE TO DUCT TO PREVENT MOISTURE FROM ENTERING BUILDING AT THE PENETRATION, SEE 3/A-47.
4. PROVIDE WALL SLEEVE FOR DUCTWORK PENETRATION. BOTTOM OF DUCT IS 9'-8" ABOVE FINISHED FLOOR. SEAL AND INSULATE SPACE BETWEEN DOUBLE WALL DUCT AND WALL SLEEVE. PROVIDE FLASHING FROM WALL SLEEVE TO DUCTWORK TO PREVENT MOISTURE FROM ENTERING BUILDING AT THE PENETRATION, SEE 3/A-47.
5. COOLING AND COMBUSTION AIR LOUVER IS OPEN TO THE BOTTOM ONLY. BOTTOM OF PLENUM IS 3' AFF. INSULATE PLENUM WITH 2-INCHES OF RIGID INSULATION AND PROTECT WITH SHEET METAL JACKET.
6. EMBED AND BACKFILL DUCT IN ACCORDANCE WITH TYPICAL PIPE EMBEDMENT DETAIL ON DRAWING C-9, EXCEPT THAT DUCT SHALL BE EMBEDDED WITH SAND IN LIEU OF TYPE F GRANULAR BEDDING.
7. COMBUSTION AIR LOUVERS, SEE ELEVATION B/A-16 FOR EXACT LOCATION.
8. 34X34 DUCT TRANSITIONS TO 34"Ø 2-FEET BELOW STRUCTURAL STEEL. ENLARGE 34"Ø DUCT TO 36"Ø AT THE FLOOR AND PROVIDE 4-INCH WIDE FLEXIBLE CONNECTION. CONNECT TO 36"Ø DUCTILE IRON UNDERGROUND DUCT. DUCTILE IRON ELBOW SHALL CONFORM WITH AWWA DUCTILE IRON FITTINGS 90 DEG BEND (1/4TH). SEE DETAIL 3/M12.
9. CONNECT 2-1/2" CW TO FEED PUMP DISCHARGE UPSTREAM OF CHECK VALVE.
10. PROVIDE 10"X10" 2 HR RATED FIRE DAMPER AND 10"X10" BACKDRAFT DAMPER TO RELIEVE PRESSURE FROM THE STAIRWELL. BALANCE DAMPER AND ADJUST STAIR PRESSURIZATION FAN SPEED TO MAINTAIN PRESSURE AT STAIR EXIT DOORS BETWEEN CODE MINIMUM AND MAXIMUM. SEE MINNESOTA STATE BUILDING CODE.

FLOOR PLAN EL 1236'-6"

SCALE 1/8"=1'-0"

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" (8 0 8 16 SCALE FEET)

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

HVAC FLOOR PLAN EL 1236'-6" 1 of 2

DRAWING NO. 15-1-3B M-4 REV. 0

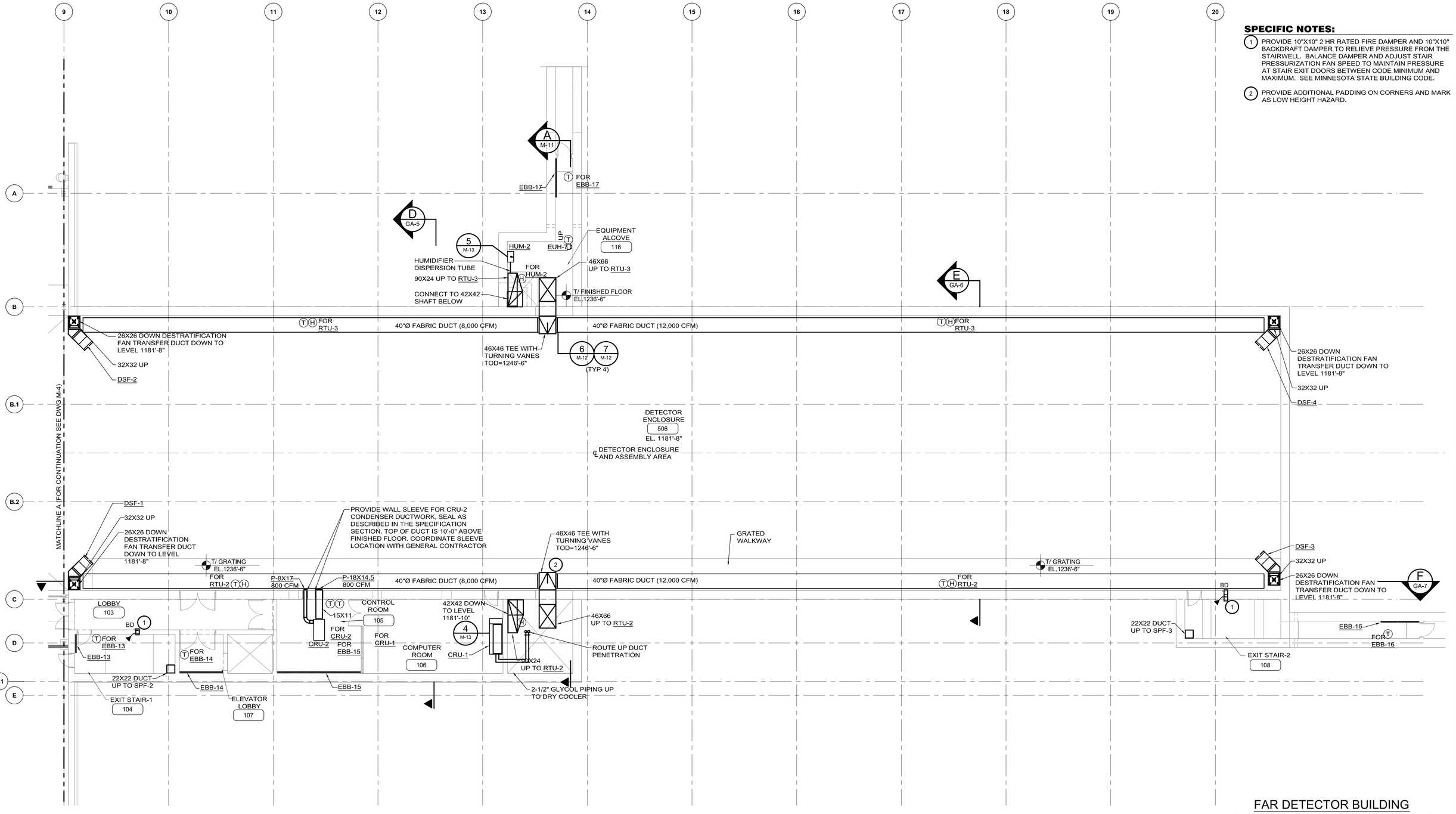
11 MAR, 2009

GENERAL NOTES:

1. SEE DRAWING M-1 FOR GENERAL NOTES.
2. SEE M-12 DETAILS 1, 2, AND 4 FOR DUCT LAYOUT, ELBOW TURNING VANE AND HANGER ATTACHMENT INSTALLATIONS.
3. SEE M-13 DETAIL 3 FOR DUCT BRANCH TAKE-OFF INSTALLATION.

SPECIFIC NOTES:

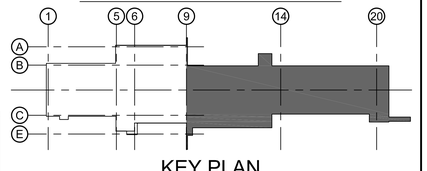
1. PROVIDE 10"X10" 2 HR RATED FIRE DAMPER AND 10"X10" BACKDRAFT DAMPER TO RELIEVE PRESSURE FROM THE STAIRWELL. BALANCE DAMPER AND ADJUST STAIR PRESSURIZATION FAN SPEED TO MAINTAIN PRESSURE AT STAIR EXIT DOORS BETWEEN CODE MINIMUM AND MAXIMUM. SEE MINNESOTA STATE BUILDING CODE.
2. PROVIDE ADDITIONAL PADDING ON CORNERS AND MARK AS LOW HEIGHT HAZARD.



FLOOR PLAN EL 1236'-6"

SCALE 1/8"=1'-0"

FAR DETECTOR BUILDING



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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

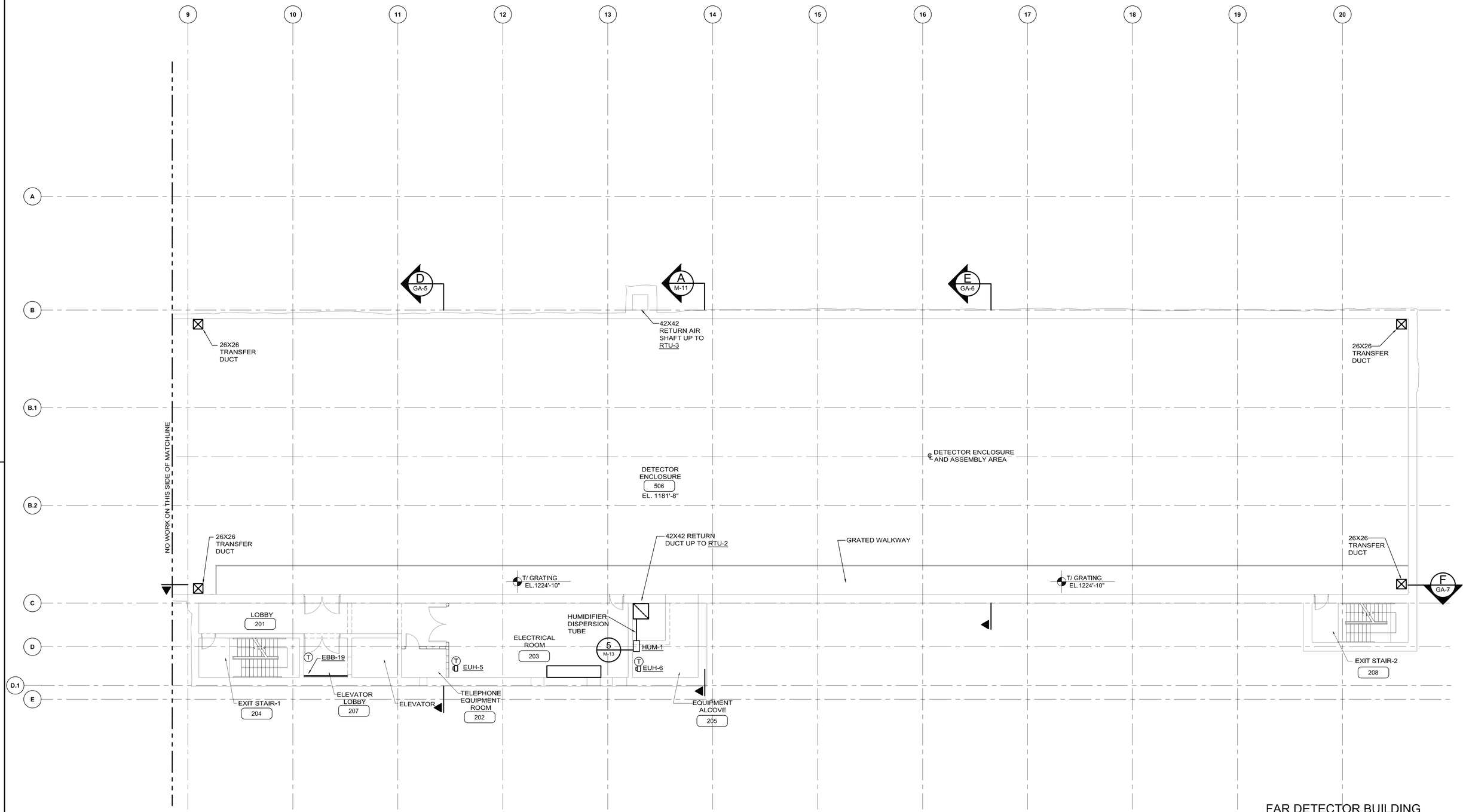
HVAC FLOOR PLAN EL 1236'-6" 2 OF 2

DRAWING NO. 15-1-3B M-5 REV. 0

11 MAR, 2009

GENERAL NOTES:

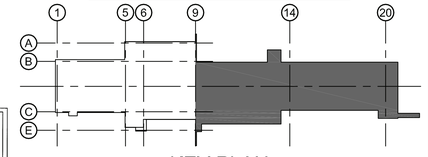
1. SEE DRAWING M-1 FOR GENERAL NOTES.
2. SEE M-12 DETAILS 1, 2, AND 4 FOR DUCT LAYOUT, ELBOW TURNING VANE AND HANGER ATTACHMENT INSTALLATIONS.
3. SEE M-13 DETAIL 3 FOR DUCT BRANCH TAKE-OFF INSTALLATION.



FLOOR PLAN EL 1224'-10"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

HVAC FLOOR PLAN EL 1224'-10"

DRAWING NO. 15-1-3B M-6 REV. 0

11 MAR, 2009

GENERAL NOTES:

1. SEE DRAWING M-1 FOR GENERAL NOTES.
2. SEE M-12 DETAILS 1, 2, AND 4 FOR DUCT LAYOUT, ELBOW TURNING VANE AND HANGER ATTACHMENT INSTALLATIONS.
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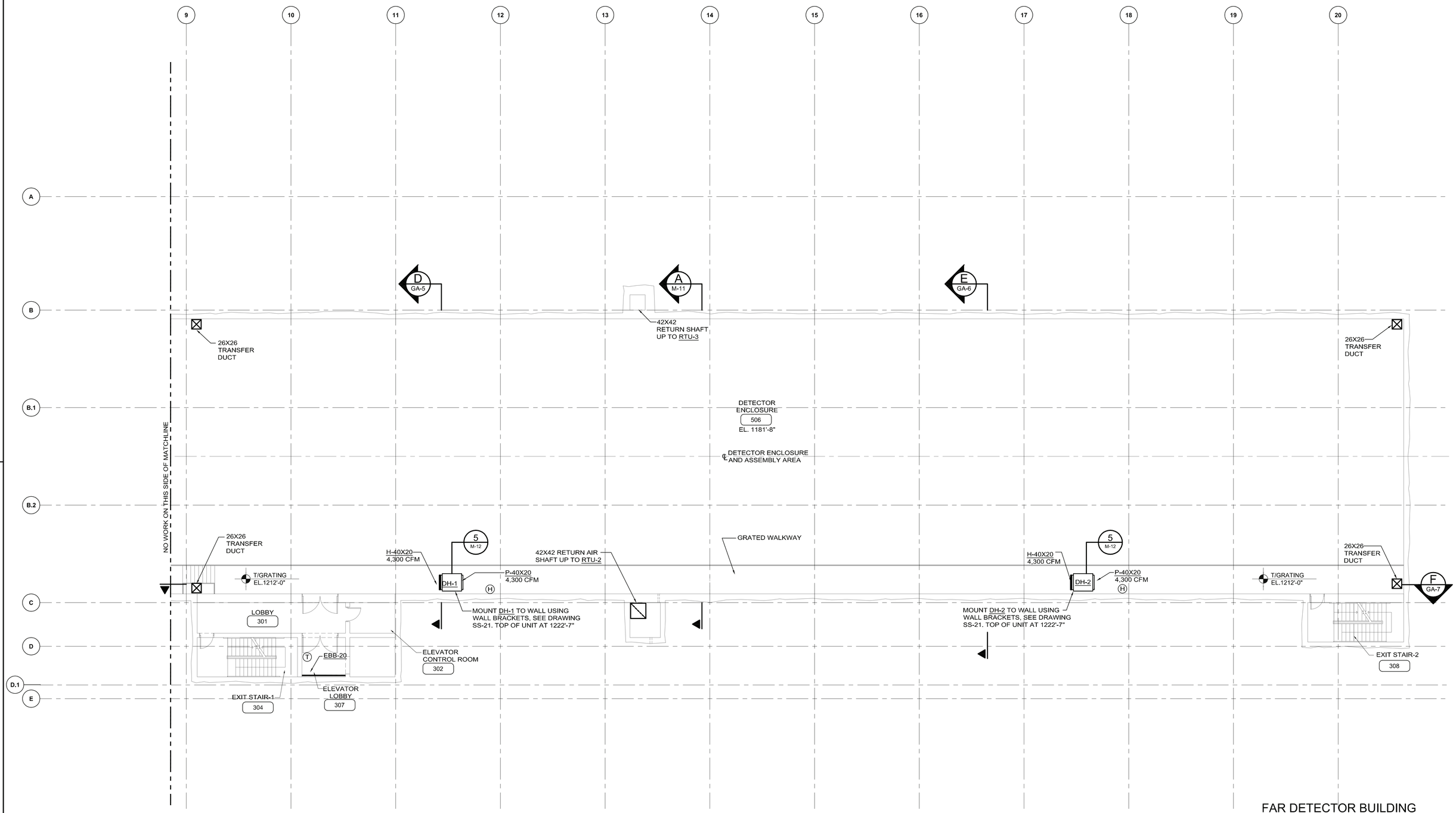
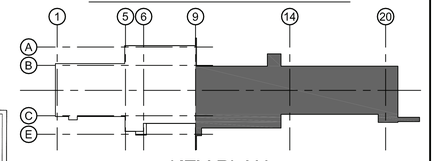


FLOOR PLAN EL 1212'-0"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

HVAC FLOOR PLAN 1212'-0"

DRAWING NO. 15-1-3B M-7 REV. 0

11 MAR, 2009

GENERAL NOTES:

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2. SEE M-12 DETAILS 1, 2, AND 4 FOR DUCT LAYOUT, ELBOW TURNING VANE AND HANGER ATTACHMENT INSTALLATIONS.
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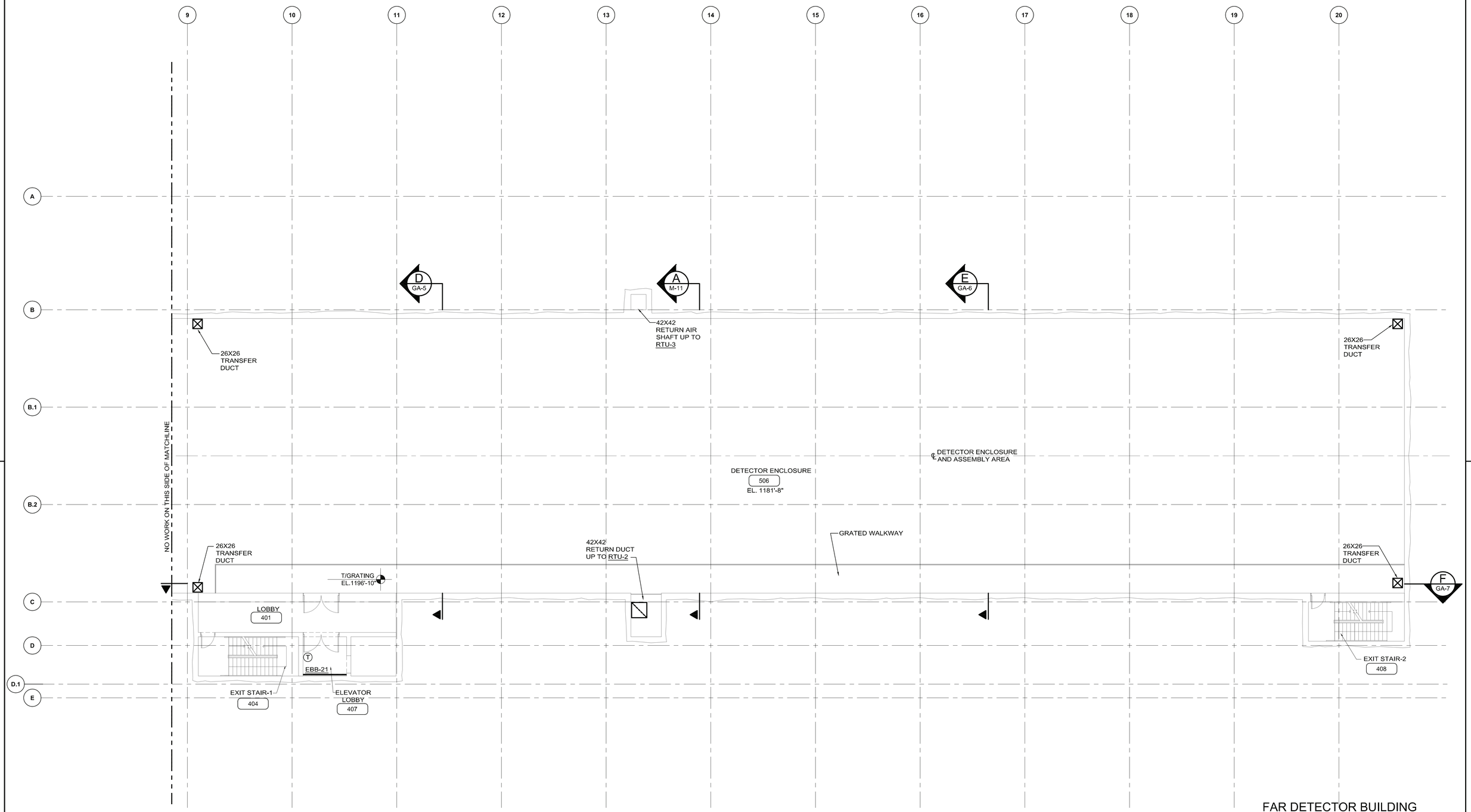
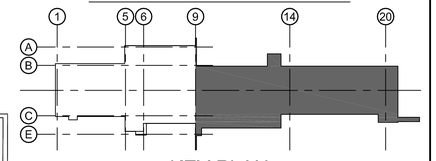


FLOOR PLAN EL 1196'-10"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

HVAC FLOOR PLAN EL 1196'-10"

DRAWING NO. 15-1-3B M-8 REV. 0

11 MAR, 2009

GENERAL NOTES:

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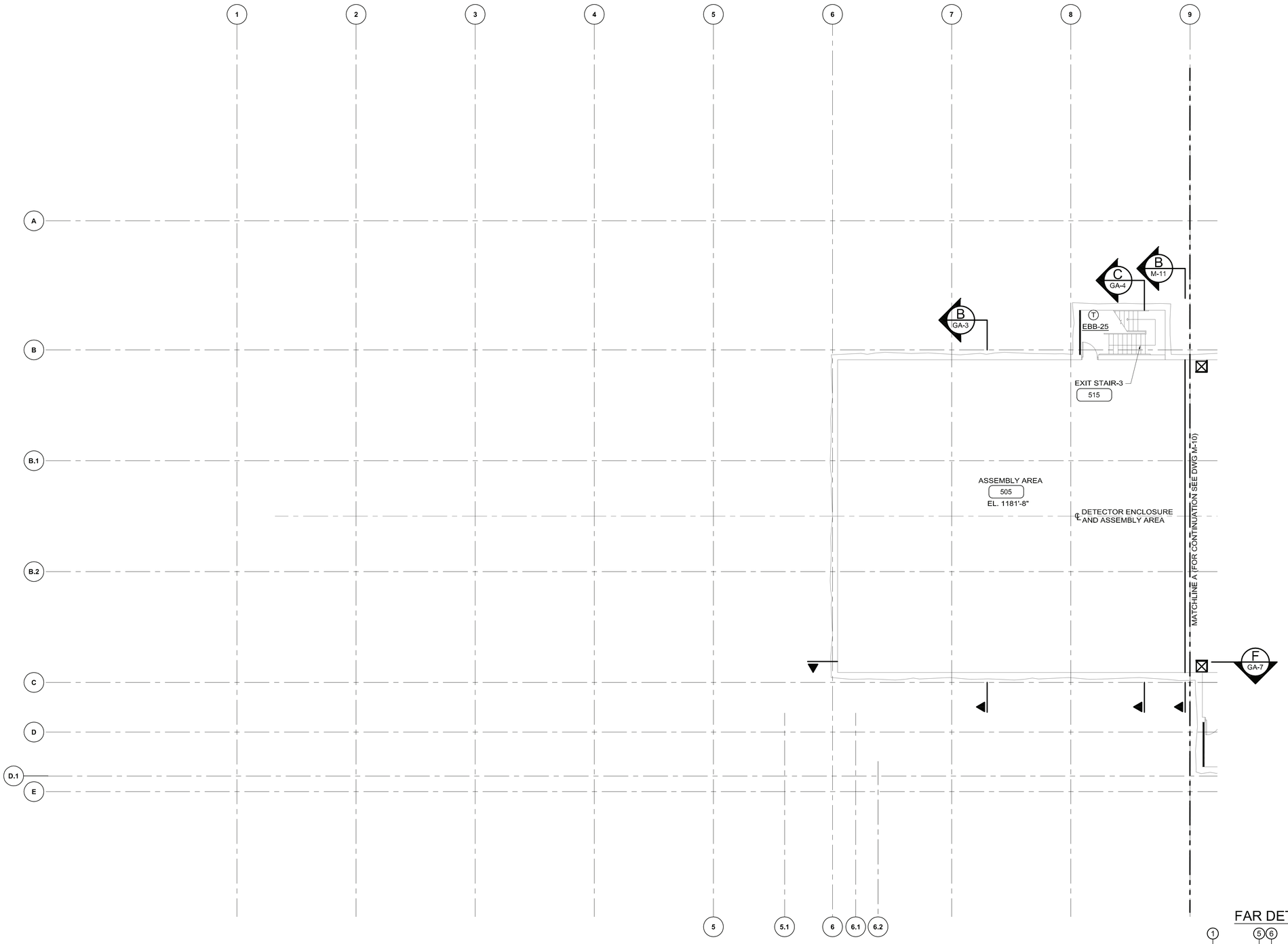
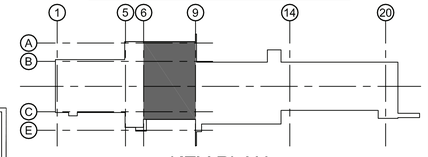


FLOOR PLAN EL 1181'-8"

SCALE:1/8"-1'0"

FAR DETECTOR BUILDING



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DESIGNED	T. TIO	03-11-09
DRAWN	T. TIO	03-11-09
CHECKED	D. WOLFE	03-11-09
APPROVED	J. STEENKEN	03-11-09

	OWNER / REPRESENTATIVE	DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/8"=1'-0" 8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

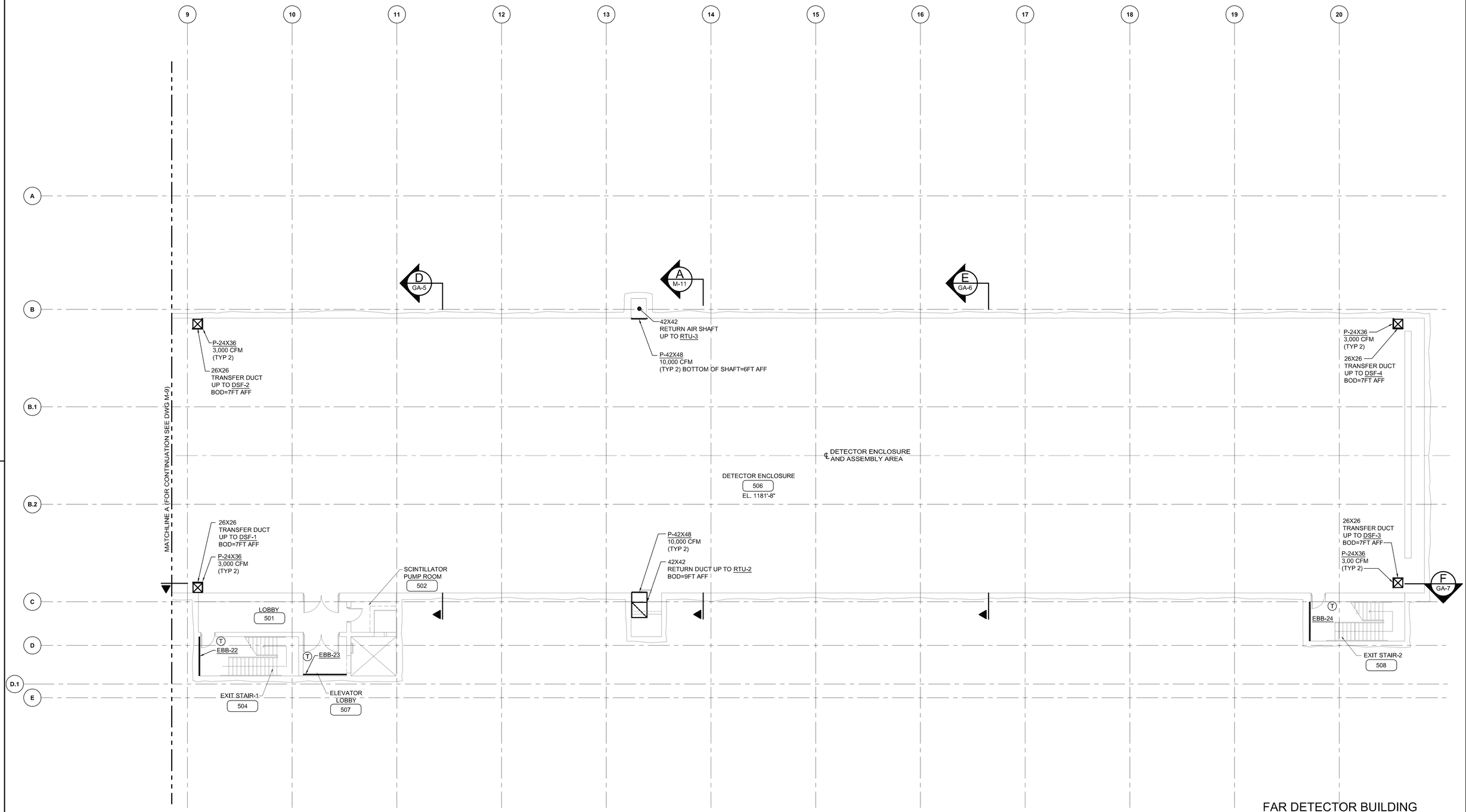
HVAC FLOOR PLAN EL 1181'-8" 1 OF 2

DRAWING NO. 15-1-3B M-9 REV. 0

11 MAR, 2009

GENERAL NOTES:

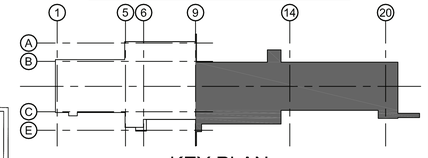
1. SEE DRAWING M-1 FOR GENERAL NOTES.
2. SEE M-12 DETAILS 1, 2, AND 4 FOR DUCT LAYOUT, ELBOW TURNING VANE AND HANGER ATTACHMENT INSTALLATIONS.
3. SEE M-13 DETAIL 3 FOR DUCT BRANCH TAKE-OFF INSTALLATION.



FLOOR PLAN EL 1181'-8"

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

FAR DETECTOR BUILDING



KEY PLAN

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: THEODORE M. TIO

SIGNATURE: *Theodore M. Tio*

DATE: 03/11/2009 LICENSE #41879

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell
SINCE 1898
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PROJECT NORTH

SCALE:
1/8"=1'-0" 8 0 8 16
SCALE FEET

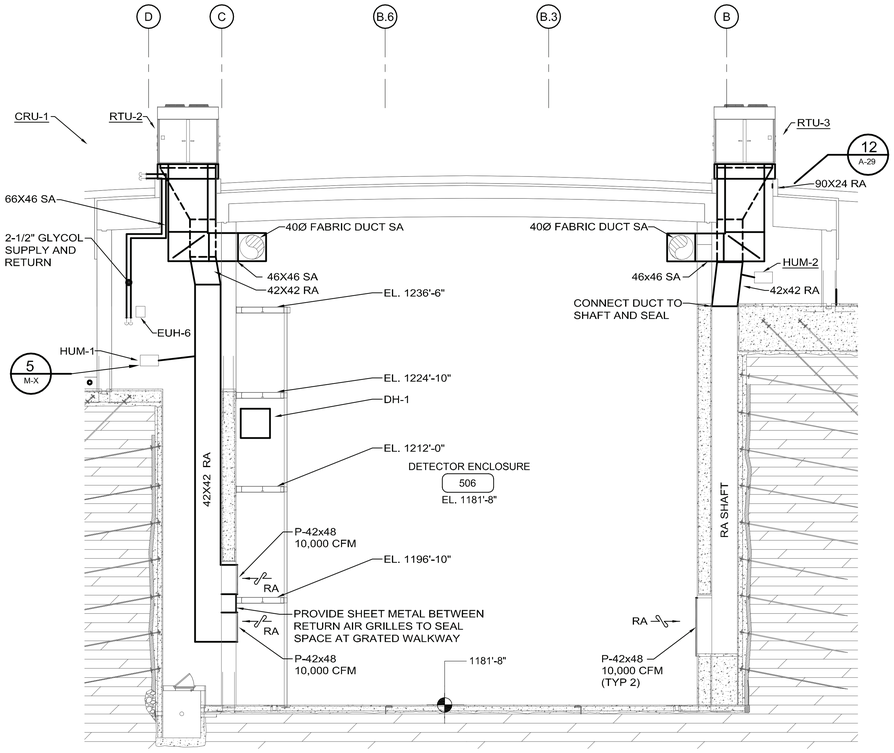
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

HVAC FLOOR PLAN EL 1181'-8" 2 OF 2

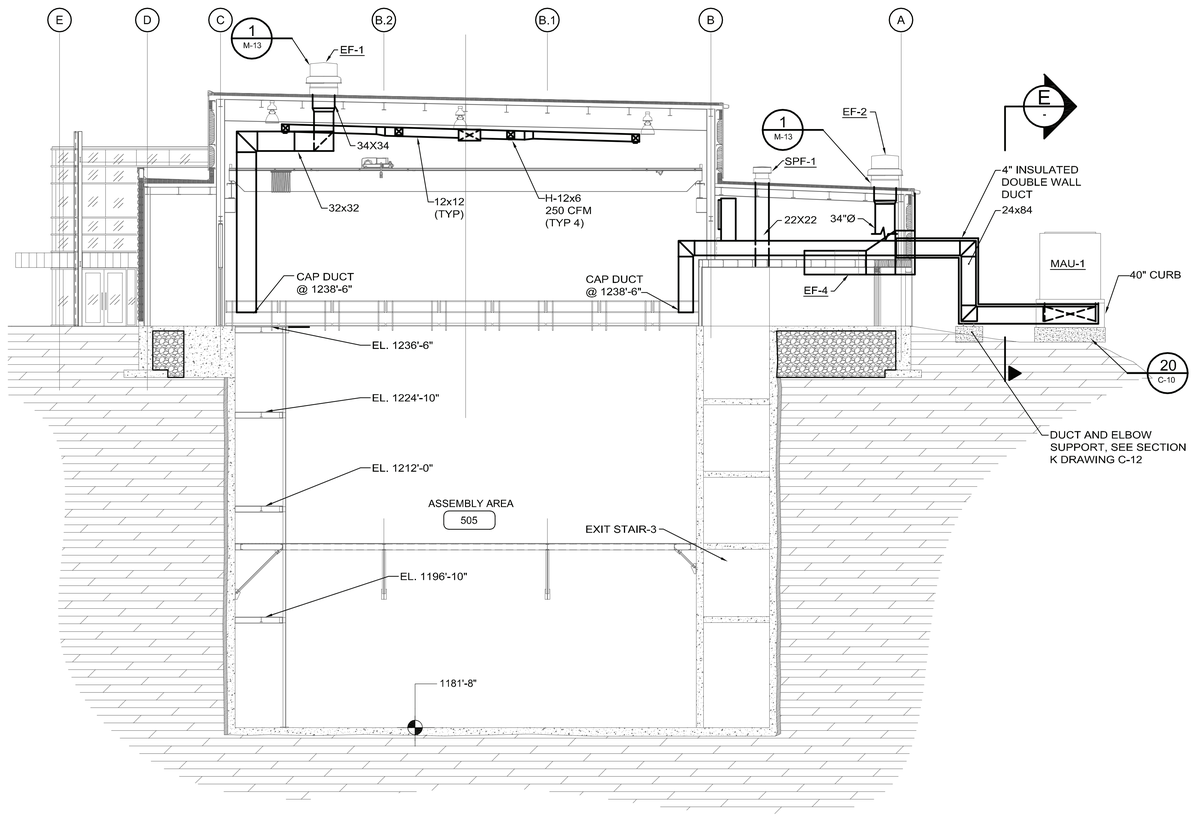
DRAWING NO. 15-1-3B M-10 REV. 0

11 MAR, 2009



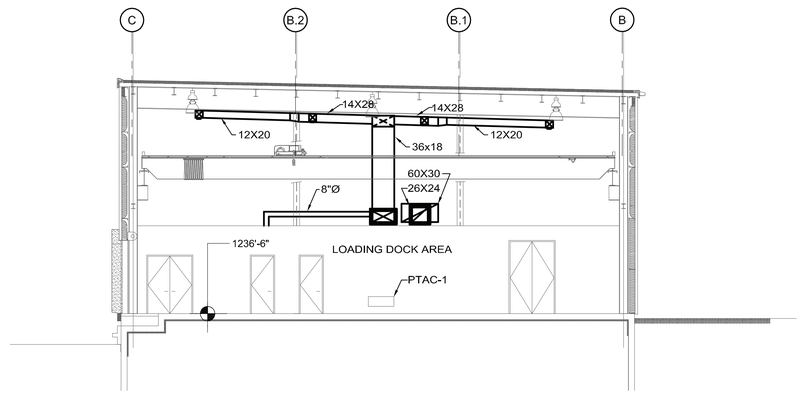
DETECTOR SPACE SECTION
1/8"=1'-0"

A
M-3
M-5
M-6
M-7
M-8
M-10



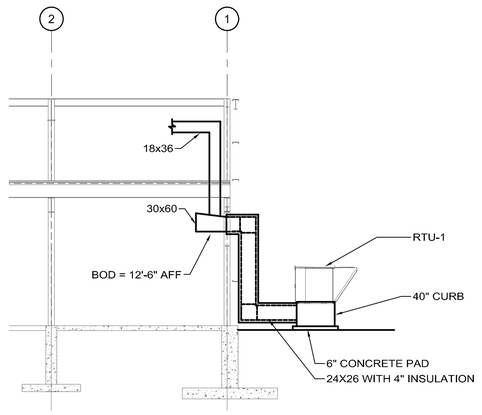
ASSEMBLY AREA SECTION
1/8"=1'-0"

B
M-4
M-9



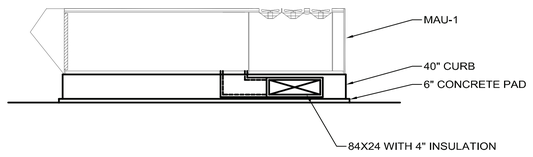
LOADING DOCK SECTION
1/8"=1'-0"

C
M-2
M-4



RTU-1 SECTION
1/8"=1'-0"

D
M-4



MAU-1 SECTION
1/8"=1'-0"

E
M-11

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SIGNATURE:

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:
1/8"=1'-0" 8 0 8 16
SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
MECHANICAL SECTIONS

DRAWING NO. 15-1-3B M-11 REV. 0

11 MAR, 2009

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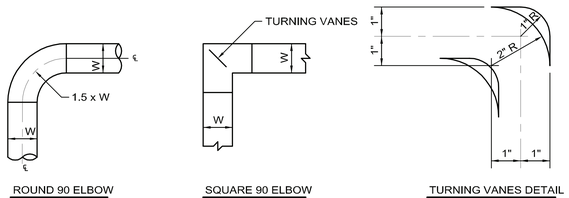
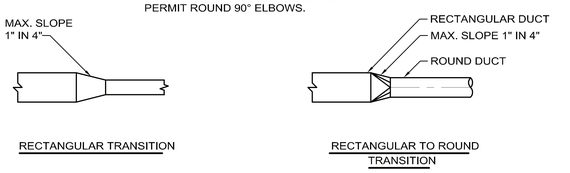


NOTE:

1. USE THIS DESIGN WHERE SQUARE 90° ELBOWS ARE SHOWN ON DRAWINGS OR IF SPACE DOES NOT PERMIT ROUND 90° ELBOWS.

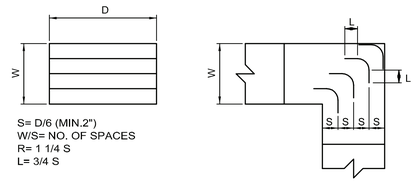


LOW VELOCITY DUCT LAYOUT

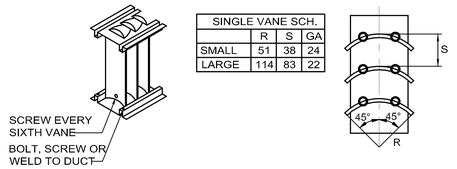
NOT TO SCALE

1 / M-2

M-3
M-4
M-5
M-6
M-7
M-8
M-9
M-10



BLADES IN TRANSITION ELBOWS SHALL BE DETERMINED ACCORDING TO SMALLEST WIDTH OF ELBOW.



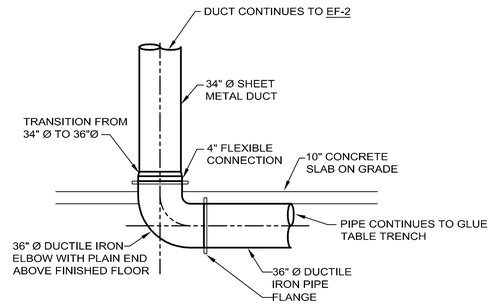
SINGLE VANE SCH.			
	R	S	GA
SMALL	51	38	24
LARGE	114	83	22

RECTANGULAR AIR DUCT ELBOW TURNING VANES

NOT TO SCALE

2 / M-2

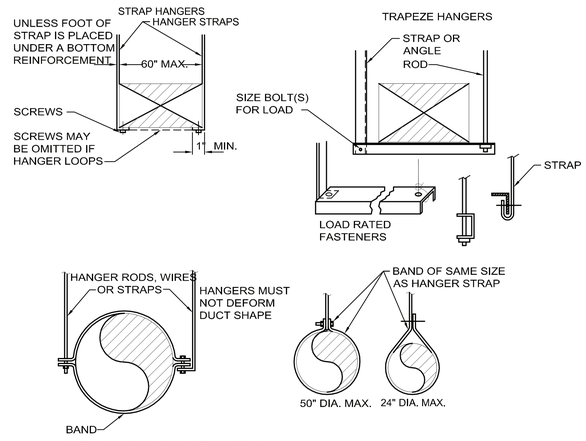
M-3
M-4
M-5
M-6
M-7
M-8
M-9
M-10



EF-2 SHEET METAL TO DUCTILE IRON

NOT TO SCALE

3 / M-4

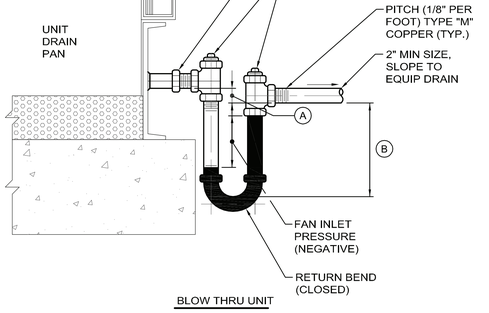


DUCT HANGER ATTACHMENT DETAIL

NOT TO SCALE

4 / M-2

M-3
M-4
M-5
M-6
M-7
M-8
M-9
M-10



BLOW THRU UNIT

NOTES:

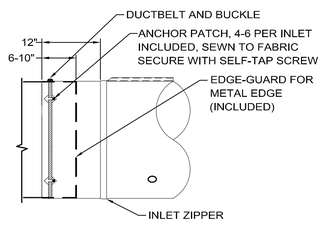
1. (A) DIMENSION EQUAL TO 1/2" (MIN.)
2. (B) DIMENSION EQUAL TO MAXIMUM FAN OUTLET PRESSURE +1/2" (MIN.)

HVAC CONDENSATE TRAP DETAIL

NOT TO SCALE

5 / M-3

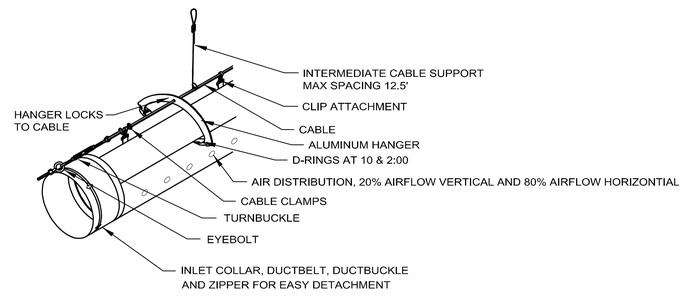
M-4
M-7



FABRIC TO METAL DUCT CONNECTION

NOT TO SCALE

6 / M-5



FABRIC DUCT SUSPENSION DETAIL

NOT TO SCALE

7 / M-5

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SCALE:

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

HVAC DETAILS-1

DRAWING NO. 15-1-3B M-12 REV. 0

11 MAR, 2009

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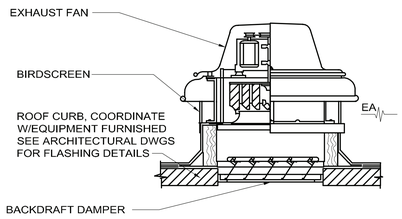
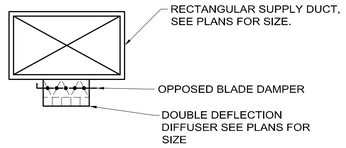
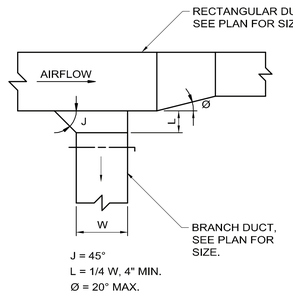


NOTE:
1. SEE ARCH. DRWGS. DET. 6/A-29

CENTRIFUGAL ROOF EXHAUST FAN (1)
NOT TO SCALE
M-2, M-3

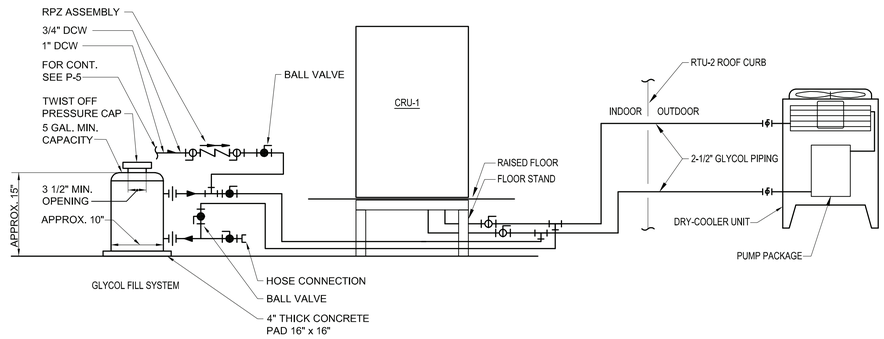


DUCTWORK DIFFUSER DETAIL (2)
NOT TO SCALE
M-4

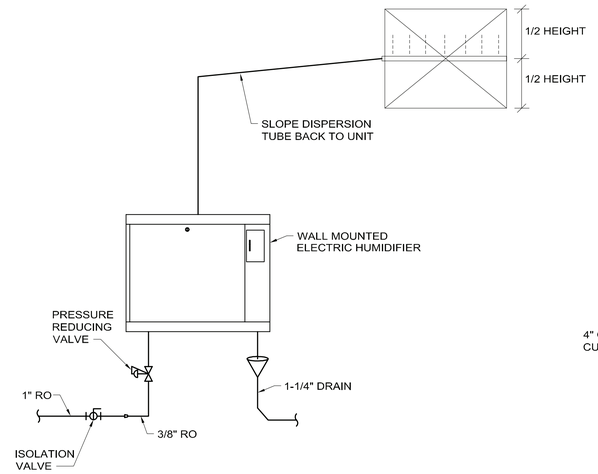


NOTES:
1. TAKEOFF ON BOTH SIDES OR SINGLE SIDE AS REQUIRED BY PLANS.
2. SEE SMACNA MANUAL FOR TAP-IN DETAILS.
3. WHEN FITTING HAS ONLY ONE SIDE SLOPED FOR A SINGLE SIDE TAKE-OFF, THE TAP-IN SHALL BE INSTALLED IN SLOPED SIDE.
4. CLINCH LOCK CONNECTION TO DUCT SHALL HAVE CORNER SEALS. (SEE SMACNA MANUAL).
5. EXTRACTORS, SCOOPS, DEFLECTORS OR DAMPERS THAT PROTRUDE INTO THE MAIN DUCT SHALL NOT BE USED. BALANCING DAMPERS SHALL BE LOCATED TO PREVENT PROTRUSION INTO THE MAIN DUCT AND TO PROVIDE STABLE AIR FLOW AND MINIMAL NOISE WHEN ADJUSTED.

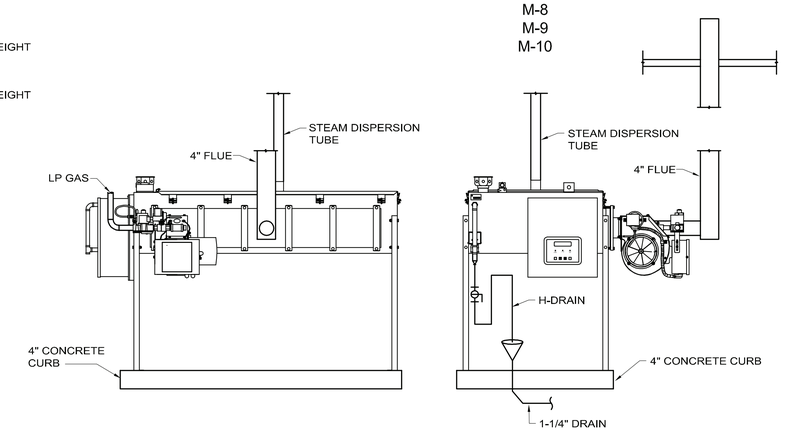
BRANCH DUCT TAKE-OFF (3)
NOT TO SCALE
M-2, M-3, M-4, M-5, M-6, M-7, M-8, M-9, M-10



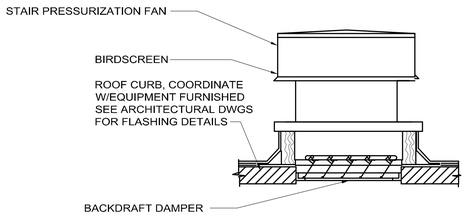
CRU-1 GLYCOL PIPING (4)
NOT TO SCALE
M-3, M-5



ELECTRIC HUMIDIFIER DETAIL (5)
NOT TO SCALE
M-4, M-5, M-6

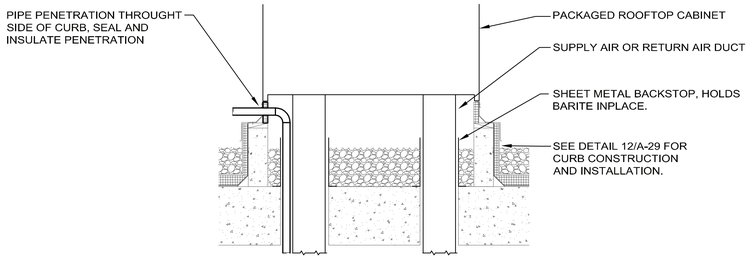


GAS-FIRE HUMIDIFIER (6)
NOT TO SCALE
M-4

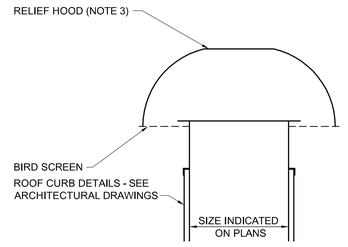


NOTE:
1. SEE ARCH. DRWGS. DET. 6/A-29

STAIR PRESSURIZATION FAN (7)
NOT TO SCALE
M-2, M-3



RTU CURB (8)
NOT TO SCALE
M-3



NOTES:
1. PROVIDE MOTORIZED CONTROL DAMPER OPPOSED BLADE AS SPECIFIED.

ELEVATOR HOISTWAY VENT (9)
NOT TO SCALE
M-3

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UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

HVAC DETAILS-2

DRAWING NO. 15-1-3B M-13 REV. 0

11 MAR, 2009

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COMPUTER ROOM UNIT SCHEDULE (PACKAGED) (CRU)				
EQUIPMENT NO. (TAG):	CRU-1		CRU-2	
ROOM SERVED	RM 106		RM 105	
FAN TYPE	TEFC		TEFC	
TOTAL AIR FLOW - CFM	11,000		600	
EXT. STATIC PRESS. - (IN. WC)	0.2		0.3	
TOTAL STATIC PRESS. (IN WC)	NOTE 3		NOTE 3	
FAN MOTOR HP	2 EA.	10	1	1/5
REFRIGERANT COOLING COIL				
MAX. FACE VELOCITY (FT/MIN)	500		300	
SENSIBLE CAPACITY - (BTUH X 1000)	203.1		10.9	
TOTAL CAPACITY - (BTUH X 1000)	242.8		12.3	
ENT. AIR TEMP. DB/WB - (F)	75.0	62.5	75.0	62.5
LVG. AIR TEMP. DB/WB - (F)	55.0	54.0	55.0	54
MIN ROWS/MAX FPI	3	14	3	
GLYCOL COOLING COIL	NOTE 7			
MAX. FACE VELOCITY (FT/MIN)	500		N/A	
SENSIBLE CAPACITY - (BTUH X 1000)	203.1		N/A	
TOTAL CAPACITY - (BTUH X 1000)	242.8		N/A	
ENT. AIR TEMP. DB/WB - (F)	75.0	62.5	N/A	
LVG. AIR TEMP. DB - (F)	55.0	54.0	N/A	
MIN ROWS/MAX FPI	3	14	N/A	
FLOW RATE - (GPM)	51.7		N/A	
ENT. WTR TEMP - (F)	45		N/A	
LVG. WRT TEMP - (F)	55		N/A	
HEATING COIL (ELECTRIC)				
NUMBER OF STAGES	3		1	
ENT. AIR TEMP. DB - (F)	55.0		55.0	
TOTAL KW (MBH)	25 (85.3)		3.6 (12.1)	
MAX. FACE VELOCITY (FT/MIN)	500		300	
HUMIDIFIER				
TYPE	INFRARED		N/A	
CAPACITY - LBS/HR	22		N/A	
PAN	STAINLESS		N/A	
FILTER TYPE	DISPOSABLE/ MERV 8		DISPOSABLE/ MERV 8	
CLEAN PRESS DROP (IN WC)	NOTE 3		NOTE 3	
DIRTY FILTER ALLOWANCE (IN WC)	NOTE 3		NOTE 3	
ELECTRICAL DATA - V/PH/HZ	460/3/60		208/3/60	
TOTAL ELECTRICAL LOAD (FLA)	64.4		27.5	
OPERATING WEIGHT - (LBS)	3280		265	
NOTES:	1,2,3,4,5,6,7,8,11		1,3,9,10	

NOTES:

1. MANUFACTURER SHALL PROVIDE STARTER AND DISCONNECT IN ACCORDANCE WITH DIVISION 16 SPECIFICATIONS.
2. UNIT SHALL BE FLOOR MOUNTED DOWNFLOW TYPE WITH 2-FOOT PLENUM EXTENSION TOP RETURN AIR OPENING.
3. PRESSURE DROPS ASSOCIATED WITH FILTERS, COILS, ETC. SHALL BE INCLUDED IN THE TOTAL INTERNAL STATIC CALCULATION BY THE UNIT MANUFACTURER.
4. PROVIDE WITH OUTDOOR LIQUID DRY COOLER OF CORRESPONDING CAPACITY EQUIPPED WITH 3/4 HP MOTORS, 3 FANS, AND AND ONE PUMP, 5.9 FLA AT 460/3/60. PROVIDE 12-INCH LEG EXTENSION AND MOUNT TO CONCRETE ROOF CURBS.
5. UNIT SHALL BE WIRED FOR TWO SINGLE POINT CONNECTIONS - ONE ON THE INDOOR UNIT, AND ONE ON THE OUTDOOR FAN CONDENSING UNIT.
6. PROVIDE WITH REFRIGERANT R-407C
7. PROVIDE GLYCOL COOLING COIL WITH 50% PROPYLENE GLYCOL
8. PROVIDE WITH SCROLL REFRIGERANT COMPRESSORS
9. PROVIDE WITH REFRIGERANT R-22
10. DUCT AIR COOLED CONDENSER TO DETECTOR SPACE
11. PROVIDE ADJUSTABLE 24" FLOOR STAND

DX MAKEUP AIR UNIT SCHEDULE (MAU)		
EQUIPMENT NO. (TAG):		MAU-1
SPACE SERVED		ASSEMBLY
ALTITUDE - (FT)		1,200
TOTAL CFM		20,000
SUPPLY FAN	EXTERNAL STATIC PRESSURE (IN WC)	1.00
	APPROX. INTERNAL STATIC PRESSURE (IN WC)	NOTE 4
	ESTIMATED TOTAL STATIC PRESSURE (IN WC)	2.49
	MAXIMUM BHP	13
	FAN RPM	886
	FAN WHEEL DIAMETER (IN)	39
MOTOR - SUPPLY FAN	MIN. MOTOR HORSEPOWER	15
	MOTOR RPM	1,750
	TYPE	TEFC
DX COOLING COIL (NOTE 8)	COIL AIR QUANTITY	20,000
	EAT-DB (°F) / EAT-WB (°F)	77.7/69.0
	LAT-DB (°F) / LAT-WB (°F)	48.4/48.4
	Total MBH (NOTE 7)	1,236
	SENSIBLE MBH (NOTE 7)	649
	MAXIMUN FACE VELOCITY (FT/MIN)	500
	MAX. AIR PRESSURE DROP (IN. WC)	NOTE 4
	MIN. ROWS / MAX. FPI	8/10
RE-HEAT COIL	CAPACTIY [MBH]	380
	EAT-DB (°F) / EAT-WB (°F)	52.4/52.2
	LAT-DB (°F) / LAT-WB (°F)	70.0/59.2
HEATING SECTION	COIL AIR QUANTITY (ACFM)	20,000
	HEATING TYPE	LP GAS
	FUEL INPUT (MBH)	2,500
	OUTPUT (MBH)	2,000
	EAT-DB (°F)	-22
	LAT-DB (°F)	71
	MAX. AIR PRESSURE DROP (IN. WC)	NOTE 4
Filter	CFM	20,000
	TYPE	THROWAWAY
	EFFICIENCY	4" MERV 8
	CLEAN PRESSURE DROP (IN WC)	0.13
DIRTY FILTER ALLOWANCE	TOTAL PRESSURE DROP (IN WC)	0.5
APPROXIMATE WEIGHT (LBS)		18,327
ELECTRICAL DATA (V / PH / HZ))		460/3/60
ELECTRICAL DATA MCA/MFS (AMPS)		202.9/250
NOTES		1,2,3,4,5,6,7,8,9

NOTES:

1. PROVIDE WITH MANUFACTURERS' 40" CURB
2. PROVIDE WITH SCROLL COMPRESSORS
3. PROVIDE WITH MODULATING GAS HEATING SECTION
4. PRESSURE DROPS ASSOCIATED WITH FILTERS, COILS, ETC. SHALL BE INCLUDED IN THE TOTAL INTERNAL STATIC CALCULATION BY THE UNIT MANUFACTURER.
5. PROVIDE WITH 110 V CONVENIENCE OUTLET
6. PROVIDE WITH HOT GAS BYPASS FOR LEAD COMPRESSOR
7. PROVIDE WITH MANUFACTURER'S MODULATING HOT GAS REHEAT
8. COOLING COIL SYSTEM SHALL HAVE TWO R-410A REFRIGERANT CIRCUITS.
9. PROVIDE WITH LIGHTS IN WALK-IN AREAS OF THE CABINET

DX ROOFTOP UNIT SCHEDULE (RTU)				
EQUIPMENT NO. (TAG):		RTU-1	RTU-2	RTU-3
SPACE SERVED		LOADING DOCK	WEST DETECTOR	EAST DETECTOR
ALTITUDE - (FT)		1,200	1,200	1,200
TOTAL CFM		6,000	20,000	20,000
Min. Outside Air ACFM:		400	1,000	1,000
Max.Outside Air ACFM:		5,500	19,000	19,000
SUPPLY FAN	EXTERNAL STATIC PRESSURE (IN WC)	0.5	0.80	0.8
	APPROX. INTERNAL STATIC PRESSURE (IN WC)	NOTE 4	NOTE 4	NOTE 4
	Estimated Total Static Pressure (in. w.g.)	1.9	2.74	2.74
	MAXIMUN BHP	2.81	6.8	6.8
	MAXIMUM OUTLET VELOCITY (FT/MIN)	1,639	2,212	2,212
	FAN RPM	975	1,103	1,103
	FAN TYPE / WHEEL DIAMETER (IN)	PLENUM 27"	2 PLENUM 30"	2 PLENUM 30"
MOTOR - SUPPLY FAN	MIN. MOTOR HP	5	7 1/2	7 1/2
	MOTOR RPM	1,170	1,170	1,170
	TYPE	TEFC	TEFC	TECF
EXHAUST FAN	EXTERNAL STATIC PRESSURE (IN WC)	0.26	0.1	0.1
	MAXIMUN BHP	1.76	1.05	1.05
	FAN RPM	1,326	1,067	1,067
	FAN TYPE / WHEEL DIAMETER (IN)	PLENUM 22"	(2) AXIAL 20"	(2) AXIAL 20"
MOTOR - EXHAUST FAN	MIN. MOTOR HP	2	2	2
	MOTOR RPM	1,170	1,170	1,170
	TYPE	ODP	ODP	ODP
DX COOLING COIL (NOTE 9)	COIL AIR QUANTITY	6,000	20,000	20,000
	EAT-DB (°F) / EAT-WB (°F)	76.2/64.3	75.3/60.5	75.3/60.5
	LAT-DB (°F) / LAT-WB (°F)	47.19/46.99	46.8/46.7	46.8/46.7
	Total MBH (NOTE 7)	186.6	718.6	718.6
	Sensible MBH (NOTE 7)	94.9	608.5	608.5
	MAXIMUM FACE VELOCITY (FT/MIN)	500	500	500
	MAX. AIR PRESSURE DROP (IN WC)	NOTE 4	NOTE 4	NOTE 4
	MIN. ROWS / MAX. FPI	4 / 14	4 / 14	4 / 14
RE-HEAT COIL	CAPACTIY [MBH]	161	460	460
	EAT-DB (°F) / EAT-WB (°F)	47.19/46.99	46.8/46.7	46.8/46.7
	LAT-DB (°F) / LAT-WB (°F)	72.0/57.5	68.1/55.9	68.1/55.9
HEATING SECTION	COIL AIR QUANTITY (ACFM)	6,000	20,000	20,000
	HEATING TYPE	LP GAS	LP GAS	LP GAS
	FUEL INPUT (MBH)	270	540	540
	OUTPUT (MBH)	219	432	432
	EAT-DB (°F)	68.0	68.1	68.1
	LAT-DB (°F)	101.8	80.0	80.0
	MAX. AIR PRESSURE DROP (IN WC)	NOTE 4	NOTE 4	NOTE 4
Filter	CFM	6,000	20,000	20,000
	Type	4" FLAT FILTER	4" FLAT FILTER	4" FLAT FILTER
	EFFICIENCY	MERV 8	MERV 8	MERV 8
	CLEAN PRESSURE DROP (IN WC)	0.09	0.19	0.19
	DIRTY PRESSURE DROP (IN WC)	0.35	0.35	0.35
ELECTRICAL DATA (V /PH / HZ)		460/3/60	460/3/60	460/3/60
ELECTRICAL DATA MCA / MFS (AMPS)		57/70	150/175	150/175
APPROXIMATE UNIT WEIGHT (LBS)		3,100	7,511	7,511
NOTES		1,3,4,5,6,7,8,9,10	2,3,4,5,6,7,8,9,10	2,3,4,5,6,7,8,9,10

NOTES:

1. PROVIDE WITH MANUFACTURERS' 40-INCH CURB
2. PROVIDE WITH MANUFACTURER'S 24-INCH INSULATED CURB
3. PROVIDE WITH DIGITAL SCROLL COMPRESSORS
4. PROVIDE WITH ECONOMIZER WITH UP TO 95% POWERED EXHAUST OF SUPPLY FAN AIRFLOW
5. PRESSURE DROPS ASSOCIATED WITH FILTERS, COILS, ETC. SHALL BE INCLUDED IN THE TOTAL INTERNAL STATIC CALCULATION BY THE UNIT MANUFACTURER.
6. PROVIDE WITH 110 V CONVENIENCE OUTLET
7. PROVIDE WITH HOT GAS BYPASS FOR LEAD COMPRESSOR
8. PROVIDE WITH MANUFACTURER'S MODULATING HOT GAS REHEAT
9 COOLING COIL SYSTEM SHALL HAVE TWO R-410A REFRIGERANT CIRCUITS.
10. PROVIDE WITH TWO STAGE PROPANE BURNER

PACKAGE TERMINAL AIR-CONDITIONER (PTAC)		
EQUIPMENT NO. (TAG):		PTAC-1
SPACE SERVED		OFFICE
ALTITUDE - (FT)		1200
TOTAL CFM		360
COOLING	TOTAL CAPACITY (BTUH)	11700.0
	SENSIBLE CAPACITY (BTUH)	8900.00
	EER	11.2
HEATING	TOTAL CAPACITY (BTUH)	10,700
	COP	2.95
ELECTRICAL	INDOOR (V /PH / HZ)	208/1/60
	INDOOR FULL LOAD AMPERES	5.82
	OUTDOOR (V /PH / HZ)	208/1/60
	OUTDOOR FULL LOAD AMPERES	5.1
NOTES		1,2,3,4

NOTES:

1. PROVIDE WITH MANUFACTURER'S 24V REMOTE 7-DAY PROGRAMABLE WALL THERMOSTAT
2. PROVIDE WITH MANUFACTURER'S CONDENSATE PUMP AND DIRECT DRAINS TO ADJACENT MECH RM
3. PROVIDE WITH SLOPE TOP
4. PROVIDE MOTORS WITH THERMAL OVERLOADS

DEHUMIDIFIER SCHEDULE (DH)		
EQUIPMENT NO. (TAG):	DH-1	DH-2
LOCATION	WEST DETECTOR	WEST DETECTOR
POSITION	SUSPEND	SUSPEND
TYPE	ELECTRIC	ELECTRIC
MOISTURE REMOVAL CAPACITY (LBS/HR)	18.5	18.5
TOTAL COOLING (MBH)	76.0	76.0
SENSIBLE (MBH)	56.7	56.7
AIR FLOW (CFM)	4300	4300
FAN MOTOR HP	1/2	1/2
ELECTRICAL DATA (V / PH / HZ)	480/3/60	480/3/60
ELECTRICAL DATA MCA/MFS (AMPS)	17/25	17/25
NOTES	1,2,3,4	1,2,3,4

NOTES:

1. DIRECT CONDENSATE DRAINS TO SUMP DRAINAGE SYSTEM
2. SUSPEND UNIT FROM WALL MOUNTED BRACKET
3. PROVIDE WITH 4" MERV 8 RATED AIR FILTERS
4. PROVIDE WITH REFRIGERENT R-410

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: THEODORE M. TIO

SIGNATURE: [signature]

DATE: 03/11/2009 LICENSE #41879

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	T. TIO	03-11-09
DRAWN	T. TIO	03-11-09
CHECKED	D. WOLFE	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

HVAC SCHEDULES-1

DRAWING NO. 15-1-3B M-14 REV. 0

11 MAR, 2009

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HVAC FAN SCHEDULE (EF, DSF, SPF)

UNIT TAG NUMBER	SERVICE USED FOR	TYPE	ALTITUDE FEET	AIR QUANTITY CFM	FAN SPEED RPM	SPEED CONTROL	EXTERNAL STATIC PRESSURE IN W.G.	SOUND LEVEL [LWA] NOTE 2 dba	ELECTRICAL DATA MIN. MOTOR HP	OPERATING B.H.P.	MOTOR TYPE	STARTER PROVIDED BY	DISCONNECT PROVIDED BY	V/PH/HZ	INTERLOCK WITH	DRIVE TYPE	FAN SUCTION DUCT PRESSURE CLASS. (IN. WC.)	NOTES	APPROXIMATE WEIGHT LBS.
EF-1	ASSEMBLY SPACE	DOWNBLAST- BI CNTFGL	1,200	10,000	549	CONSTANT	0.75	78.0	3	2.49	TEFC	DIV. 16	DIV. 15	460 / 3 / 60	MAU-1	BELT	-2.0	1,2,3,6,7,8,9,10,11	385
EF-2	GLUE TABLE EXHAUST	DOWNBLAST- BI CNTFGL	1,200	10,000	549	CONSTANT	0.75	78.0	3	2.49	TEFC	DIV. 16	DIV. 15	460 / 3 / 60	MAU-1	BELT	-2.0	1,2,3,6,7,8,9,10,11	385
EF-3	TOILET ROOM	CEILING EXHAUST	1,200	120	637	SOLID STATE	0.20	39.0	81 WATTS	-	TEFC	DIV. 16	DIV. 16	110 / 1 / 60	N/A	DIRECT	N/A	2,4,12	21
EF-4	FIRE PUMP ROOM	SIDEWALL PROPELLER	1,200	13,450	1432	CONSTANT	0.50	97.0	3	3.17	TEFC	DIV. 16	DIV. 15	208 / 3 / 60	FIRE PUMPS	BELT	N/A	2,3,5,6,7,8,11,14	140
DSF-1	DETECTOR DESTRATIFCATION	SIDEWALL PROPELLER	1,200	5,000	1172	CONSTANT	0.32	72.0	3/4	0.56	TEFC	DIV. 16	DIV. 15	460 / 3 / 60	N/A	BELT	N/A	2,3,5,6,7,8,11,14	70
DSF-2	DETECTOR DESTRATIFCATION	SIDEWALL PROPELLER	1,200	5,000	1172	CONSTANT	0.32	72.0	3/4	0.56	TEFC	DIV. 16	DIV. 15	460 / 3 / 60	N/A	BELT	N/A	2,3,5,6,7,8,11,14	70
DSF-3	DETECTOR DESTRATIFCATION	SIDEWALL PROPELLER	1,200	5,000	1172	CONSTANT	0.32	72.0	3/4	0.56	TEFC	DIV. 16	DIV. 15	460 / 3 / 60	N/A	BELT	N/A	2,3,5,6,7,8,11,14	70
DSF-4	DETECTOR DESTRATIFCATION	SIDEWALL PROPELLER	1,200	5,000	1172	CONSTANT	0.32	72.0	3/4	0.56	TEFC	DIV. 16	DIV. 15	460 / 3 / 60	N/A	BELT	N/A	2,3,5,6,7,8,11,14	70
SPF-1	STAIR-3	FC CENT SWSI	1,200	3,800	944	CONSTANT	0.41	86.0	1 1/2	1.49	TEFC	DIV. 16	DIV. 15	460 / 3 / 60	N/A	BELT	N/A	2,7,9,15,16,17,18,19	194
SPF-2	STAIR-1	FC CENT SWSI	1,200	3,800	944	CONSTANT	0.45	86.0	1 1/2	1.49	TEFC	DIV. 16	DIV. 15	460 / 3 / 60	N/A	BELT	N/A	2,7,9,15,16,17,18,19	194
SPF-3	STAIR-2	FC CENT SWSI	1,200	3,800	944	CONSTANT	0.45	86.0	1 1/2	1.49	TEFC	DIV. 16	DIV. 15	460 / 3 / 60	N/A	BELT	N/A	2,7,9,15,16,17,18,19	194

NOTES:

1. PROVIDE CLASS B, SPARK-PROOF FAN CONSTRUCTION IN ACCORDANCE WITH AMCA STANDARD 99-040'
2. LWA IS THE OVERALL (SINGLE VALUE) FAN SOUND POWER LEVEL, 'A' WEIGHTED.
3. PROVIDE AUXILIARY CONTACTS FOR ON/OFF STATUS MONITORING FROM THE DDC SYSTEM.
4. PROVIDE WITH MANUFACTURER'S SOLID STATE SPEED CONTROL
5. PROVIDE WITH ALUMINUM BLADES
6. PROVIDE WITH 9 FEET OF FLEXIBLE METAL CONDUIT PIGTAIL
7. PROVIDE MOTOR WITH THERMAL OVERLOADS
8. PROVIDE WITH NEMA RATED PREMIUM EFFICIENCY MOTOR
9. PROVIDE WITH 24-INCH MANUFACTURER'S INSULATED CURB
10. PROVIDE WITH MANUFACTURER'S INSULATED MOTOR OPERATED LOW LEAKAGE PARALLEL BLADE DAMPER
11. PROVIDE WITH NEMA-1 TOGGLE DISCONNECT, FACTORY WIRED AND MOUNTED
12. UL 507 RATED
13. PROVIDE MANUFACTURERS' FAN GUARD
14. PROVIDE WITH MANUFACTURER'S ASSEMBLED WALL COLLAR AND CLOSURE ANGLES FOR INSTALLATION INTO SHAFT WALL
15. PROVIDE WITH NEMA 4 TOGGLE DISCONNECT SWITCH, FACTORY WIRED AND MOUNTED
16. PROVIDE WITH 1-IN WASHABLE ALUMINUM FILTER
17. PROVIDE WITH UL-705 POWER VENTILATORS LABELED
18. PROVIDE WITH TWO PULLEYS AND TWO BELTS
19. PROVIDE WITH GRAVITY OPERATED DAMPER

ELECTRIC BASEBOARD SCHEDULE (EBB)

TAG NO.	LOCATION	POSITION	HEAT DENSITY (WATTS/FT.)	QUANTITY OF ELEMENTS	LENGTH (FT)	TOTAL CAPACITY (KW)	ELECTRICAL DATA (V / PH / HZ)	NOTES
EBB-1	RM 112	PEDESTAL	625	1	2.4	1.5	277/1/60	1,2,3,4
EBB-2	RM 112	PEDESTAL	250	1	6	1.5	277/1/60	1,2,3,4
EBB-3	RM 101	PEDESTAL	625	3	8	5.0	277/1/60	1,2,4,5
EBB-4	RM 101	PEDESTAL	625	3	8	5.0	277/1/60	1,2,4,5
EBB-5	RM 101	PEDESTAL	625	3	8	5.0	277/1/60	1,2,4,5
EBB-6	RM 101	PEDESTAL	625	3	8	5.0	277/1/60	1,2,4,5
EBB-7	RM 102	PEDESTAL	625	3	8	5.0	277/1/60	1,2,4,5
EBB-8	RM 102	PEDESTAL	625	3	8	5.0	277/1/60	1,2,4,5
EBB-9	RM 102	PEDESTAL	625	3	8	5.0	277/1/60	1,2,4,5
EBB-10	RM 102	PEDESTAL	625	3	8	5.0	277/1/60	1,2,4,5
EBB-11	RM 102	PEDESTAL	625	3	8	5.0	277/1/60	1,2,4,5
EBB-12	RM 102	PEDESTAL	625	3	8	5.0	277/1/60	1,2,4,5
EBB-13	RM 104	WALL MOUNTED	750	3	4	3.0	277/1/60	1,2,3,4
EBB-14	RM 107	WALL MOUNTED	500	2	6	3.0	277/1/60	1,2,3,4
EBB-15	RM 105	WALL MOUNTED	500	2	6	3.0	277/1/60	1,2,3,4
EBB-16	RM 104	WALL MOUNTED	500	2	6	3.0	277/1/60	1,2,3,4
EBB-17	RM 116	WALL MOUNTED	500	2	6	3.0	277/1/60	1,2,3,4
EBB-18	RM 115	WALL MOUNTED	500	2	6	3.0	277/1/60	1,2,3,4
EBB-19	RM 207	WALL MOUNTED	500	2	6	3.0	277/1/60	1,2,3,4
EBB-20	RM 307	WALL MOUNTED	500	2	6	3.0	277/1/60	1,2,3,4
EBB-21	RM 407	WALL MOUNTED	500	2	6	3.0	277/1/60	1,2,3,4
EBB-22	RM 504	WALL MOUNTED	625	3	8	5.0	277/1/60	1,2,3,4
EBB-23	RM 507	WALL MOUNTED	500	3	6	3.0	277/1/60	1,2,3,4
EBB-24	RM 508	WALL MOUNTED	625	3	8	5.0	277/1/60	1,2,3,4
EBB-25	RM 515	WALL MOUNTED	625	3	8	5.0	277/1/60	1,2,3,4

NOTES:

1. HEATING CAPACITY IS CORRECTED FOR SPACE TEMPERATURE AND ELEVATION ABOVE FINISHED FLOOR
2. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS
3. PROVIDE WALL MOUNTED UNITS WITH ENCLOSURE EXTENSIONS TO COVER ENTIRE WIDTH OF WALL THAT IT IS MOUNTED ON
4. PROVIDE MANUFACTURER'S DISCONNECT
5. PROVIDE WITH MANUFACTURER'S UNIT MOUNTED TWO STAGE LINE VOLTAGE THERMOSTAT

ELECTRIC UNIT HEATER SCHEDULE (EUH)

EQUIPMENT NO. (TAG):	EUH-1	EUH-2	EUH-3	EUH-4	EUH-5	EUH-6	EUH-7
LOCATION	MECH RM	SCINTILLATOR ROOM	FIRE PUMP	FIRE PUMP	ELECTRIC ROOM	WEST EQUIP ALCOVE	EAST EQUIP ALCOVE
POSITION	SUSPEND	SUSPEND	SUSPEND	SUSPEND	SUSPEND	SUSPEND	SUSPEND
TYPE	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC
HEAT CAPACITY (KW)	3	3	3	3	3	3	3
AIR FLOW (CFM)	350	350	350	350	350	350	350
AIR TEMPERATURE RISE (^{0}F)	27	27	27	27	27	27	27
FAN MOTOR HP	1/100	1/100	1/100	1/100	1/100	1/100	1/100
FAN MOTOR RPM	1600	1600	1600	1600	1600	1600	1600
ELECTRICAL DATA (V / PH / HZ)	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60
NOTES	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3

NOTES:

1. PROVIDE WITH MANUFACTURERS UNIT MOUNTED THERMOSTAT
2. PROVIDE MANUFACTURER'S INTEGRAL DISCONNECT
3. PROVIDE MANUFACTURER'S MOUNTING BRACKET

ELECTRIC HUMIDIFIER SCHEDULE (HUM)

EQUIPMENT NO. (TAG):	HUM-1	HUM-2	HUM-3
LOCATION	WEST DETECTOR	EAST DETECTOR	LOADING DOCK
POSITION	WALL	WALL	WALL
TYPE	ELECTRIC	ELECTRIC	ELECTRIC
HUMIDIFICATION LOAD (LBS/HR)	15.0	15.0	15.0
SUPPLY WATER	REVERSE OSMOSIS	REVERSE OSMOSIS	REVERSE OSMOSIS
INPUT POWER (KW)	5	5	5
ELECTRICAL DATA (V / PH / HZ)	480/3/60	480/3/60	480/3/60
NOTES	1,2,3,4,5,6	1,2,3,4,5,6	1,2,3,4,6

NOTES

1. PROVIDE WALL MOUNTED UNIT
2. PROVIDE MANUFACTURES 304 STAINLESS STEEL HEAT EXCHANGER
3. PROVIDE WITH MANUFACTURERS' SELF-ACTUATED DRAIN TEMPERING KIT
4. PROVIDE WITH MANUFACTURERS' LOW WATER CUTOUT
5. PROVIDE WITH MANUFACTURERS MULTIPLE TUBE DISPERSION TUBE ASSEMBLY
6. PROVIDE WITH FACTORY MOUNTED AND WIRED HUMIDIFIER MODULATION CONTROL PANEL

GAS-FIRED HUMIDIFIER (HUM)

EQUIPMENT NO. (TAG):	HUM-4
LOCATION	RM 114
POSITION	FLOOR
TYPE	PROPANE GAS
HUMIDIFICATION LOAD (LBS/HR)	300.0
SUPPLY WATER	REVERSE OSMOSIS
INPUT POWER (BTUH)	400,000
ELECTRICAL DATA (V / PH / HZ)	480/3/60
NOTES	1,2,3

NOTES

1. PEDESTAL MOUNTED
2. PROVIDE MANUFACTURERS' DISPERSION TUBE
3. INSTALL DISPERSION TUBE IN SUPPLY AIR DUCT MAU-1

DIFFUSER, REGISTER, AND GRILLE SCHEDULE (DRG)

REF	DESCRIPTION	KRUEGER	TITUS	PRICE	FACE TYPE: MOUNTING	FACE TYPE: THROW PATTERN	FACE TYPE: BLADE DEFLECTION	FACE TYPE: BLADE SPACING (in)	ACCESSORIES: CONTROL GRID	ACCESSORIES: OPPOSED BLADE DAMPER	ACCESSORIES: SQ TO RD ADAPTER	ACCESSORIES: SEPARATE PLASTER RING	ACCESSORIES: OTHER	MATERIAL: STEEL	MATERIAL: ALUMINUM	MATERIAL: OTHER	FINISH: BAKED ENAMEL	FINISH: LAQUER	FINISH: ANODIZED	COLOR: STANDARD GREY	COLOR: STANDARD OFF-WHITE	COLOR: MATCH T-BAR	COLOR: MATCH CEILING	REMARKS
A	24X24 SQUARE CEILING SUPPLY AIR DIFFUSER	1450	TMS SERIES	SCD	CEILING	4W,3W,2W	ADJ			X					X		X				X			
B	EGGCREATE RETURN AIR GRILLE	EGC5	50F	Series 80	DUCT	4W,2W	ADJ			X					X		X				X			NOT USED
F	RECTANGULAR SUPPLY AIR GRILLE	6880	120 SERIES	Series 300	DUCT		H-45	3		X				X			X				X			DOUBLE DEFLECTION
H	RECTANGULAR SUPPLY AIR GRILLE	6880	120 SERIES	Series 300	DUCT		H-S	3		X				X			X				X			SET AT 0o DEFLECTION
P	RECTANGULAR RETURN AIR GRILLE	S480	60FL	Series 90	DUCT		0	1/2						X			X				X			

NOTES

1 MODEL NUMBERS ARE FOR GENERAL IDENTIFICATION. SPECIFIC MODEL NUMBERS DEPEND ON APPLICABLE NOTES AND ARCHITECTURAL PLANS. VERIFY MOUNTING TYPE AND DIMENSIONS WITH ARCHITECTURAL WORK.

2. SEE DRAWING M-1 FOR DIFFUSER, REGISTER, AND GRILLE SYMBOLS AND DESIGNATORS.

ROOF VENT SCHEDULE

EQUIPMENT NO. (TAG):	RV-1
LOCATION	TOP OF ELEVATOR HOISTWAY, M-3
TYPE	GRAVITY RELIEF
THROAT SIZE (IN) DIAMETER	24 1/2
DAMPER SIZE (IN X IN)	24 X 24
ELECTRICAL DATA (V / PH / HZ)	110 / 1 / 60
NOTES	1,2,3

NOTES

1. PROVIDE MANUFACTURES 24-INCH INSULATED CURB
2. PROVIDE 110 VOLT MOTORIZED DAMPER
3. CONTROL DAMPER FROM FIREMAN SWITCH IN ELEVATOR CONTOL SYSTEM

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: THEODORE M. TIO

SIGNATURE:

DATE: 03/11/2009 LICENSE #41879

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE		OWNER / REPRESENTATIVE	DATE
DESIGNED	T. TIO	03-11-09	NOvA FESS SUBMITTED	S. DIXON	03-11-09
DRAWN	T. TIO	03-11-09	NOvA PROJECT MANAGER	J. COOPER	03-11-09
CHECKED	D. WOLFE	03-11-09	HINES SUBMITTED	C. McNABNEY	03-11-09
APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

HVAC SCHEDULES-2

DRAWING NO. 15-1-3B M-15 REV. 0

11 MAR, 2009

M:\FERMILAB\49617\CAD\MECH\P-00.DWG 08-15-2008 12:44 RPEARSON

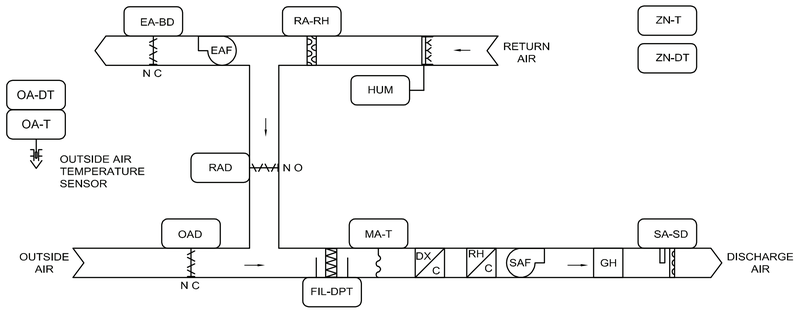
CONTROL SCHEMATIC SYMBOLS

- DAMPER WITH ACTUATOR (NORMALLY OPEN) — NO
- DAMPER WITH ACTUATOR (NORMALLY CLOSED) — NC
- DAMPER ONLY (NORMALLY OPEN) — NO
- DAMPER ONLY (NORMALLY CLOSED) — NC
- FILTER
- DUCT MOUNTED BULB TEMPERATURE SENSOR
- DUCT MOUNTED, AVERAGING TEMPERATURE SENSOR
- TEMPERATURE UNIT SWITCH, AVERAGING
- OA-T — OUTSIDE AIR TEMPERATURE SENSOR
- OA-DP — OUTSIDE AIR DEWPOINT TEMPERATURE SENSOR
- DUCT MOUNTED TEMPERATURE SENSOR
- DUCT MOUNTED SMOKE DETECTOR
- FILTER PRESSURE DROP
- DUCT MOUNTED PRESSURE SENSOR
- DUCT MOUNTED HUMIDITY SENSOR
- DUCT MOUNTED HUMIDITY AND TEMPERATURE SENSOR
- DUCT MOUNTED AIR QUALITY SENSOR
- WALL MOUNTED TEMPERATURE SENSOR
- HUMIDIFIER
- GH — GAS HEATING SECTION
- E/C — ELECTRIC HEATING COIL
- DX/C — DIRECT EXPANSION COIL
- RH/C — REFRIGERANT REHEAT COIL
- FAN
- FLOW DIRECTION ARROW
- PIPE/DUCT BREAK

ABBREVIATIONS

BA	BYPASS AIR
BAD	BYPASS AIR DAMPER
CO2	CO2 SENSOR
DA	DISCHARGE AIR
DA-P	DISCHARGE AIR PRESSURE
DA-T	DISCHARGE AIR TEMPERATURE
DA-VP	DISCHARGE AIR FLOW MEASURING STATION
DPR	DAMPER
EA-BD	EXHAUST AIR BAROMETRIC DAMPER
EAD	EXHAUST AIR DAMPER
EAF	EXHAUST AIR FAN
FIL-DPT	FILTER PRESSURE DROP
HUM	HUMIDIFIER
MA-T	MIXED AIR TEMPERATURE
OA	OUTSIDE AIR
OAD	OUTSIDE AIR DAMPER
OA-DT	OUTSIDE AIR DEWPOINT TEMPERATURE
OA-T	OUTSIDE AIR TEMPERATURE
OA-F	OUTSIDE AIR FLOW
RA	RETURN AIR
RAD	RETURN AIR DAMPER
RA-SD	RETURN AIR SMOKE DETECTOR
SAF	SUPPLY AIR FAN
ZN-DT	ZONE DEWPOINT TEMPERATURE
ZN-T	ZONE TEMPERATURE

DH-2 AND DH-2



RTU-1, RTU-2 AND RTU-3

SEQUENCE OF OPERATION
PACKAGED CONSTANT VOLUME DIRECT EXPANSION COOLING, CONDENSING REHEAT, AND LP GAS HEAT
RTU-1, RTU-2 AND RTU-3

GENERAL

THE HVAC SYSTEM SHALL HAVE THE FOLLOWING MODES OF OPERATION: OFF, ON. EACH RTU SHALL BE PROVIDED WITH AN H-O-A SWITCH.

OFF

IN THE OFF MODE THE RTU UNIT SHALL BE OFF, HUMIDIFIER HUM-1 HUM-2, HUM-3 SHALL BE OFF, THE OUTSIDE AIR DAMPER SHALL BE CLOSED, AND THE RETURN AIR DAMPER SHALL BE OPEN, AND THE EXHASUST AIR DAMPER SHALL BE CLOSED.

ON

THE SUPPLY AIR FAN SHALL BE ENERGIZED. THE OUTSIDE AIR, AND RETURN AIR DAMPERS SHALL OPEN TO THE MINIMUM OUTSIDE AIR POSITION.

COOLING
THE SPACE DEWPOINT TEMPERATURE SHALL CONTROL THE COOLING COIL AND MODULATE THE OPERATION OF COMPRESSORS.

REHEATING
THE SPACE COOLING DRY BULB TEMPERATURE SHALL CONTROL THE REHEAT COIL AND MODULATE THE OPERATION OF THE REHEAT CONTROL SYSTEM.

DE-HUMIDIFICATION
IF THE SPACE DEWPOINT TEMPERATURE EXCEEDS 50 DEG. F., ENABLE DE-HUMIDIFIERS DH-1 AND DH-2, OPERATE UNTIL THE DEWPOINT HAD BEEN REDUCED TO 48 DEG. F.

HEATING
THE SPACE HEATING TEMPERATURE SHALL CONTROL THE OPEARTION OF THE PROPANE GAS-FIRED HEATER. IT SHALL MODULATE THE BURNER CONTROL SYSTEM TO MAINTAIN THE SPACE HEATING TEMPERATURE.

HUMIDIFIER
THE RETURN AIR HUMIDIFIER SHALL OPEATE AND MAINTAIN THE SPACE RELATIVE HUMIDITY AT THE SETPOINT.

ECONOMIZER

THE ECONOMIZER MODE SHALL BE ENABLED WHEN THE OUTSIDE AIR DEWPOINT IS LESS THAN 45 DEG. F. IN THE ECONOMIZER MODE THE OUTSIDE AIR AND RETURN AIR DAMPERS SHALL MODULATE TO MAINTAIN THE SPACE COOLING DRY BULB AIR TEMPERATURE SET POINT. THE EXHAUST FAN SHALL OPERATE TO RELIEVE RETURN AIR IN PROPORTION TO THE OUTSIDE AIR. IF THE OUTSIDE AIR DAMPER IS FULLY OPEN AND THE SPACE COOLING DRY BULB AIR TEMPERATURE IS ABOVE SET POINT, THE COOLING FUNCTION SHALL BE ENGAGED TO MAINTAIN THE SPACE DEWPOINT AND DRY BULB TEMPERATURE. IF THE OUTSIDE AIR DEWPOINT TEMPERATURE EXCEEDS 48 DEGREES F., THE COOLING FUNCITION SHALL ENGAGE TO MAINTAIN SPACE DEWPOINT TEMPERATURE.

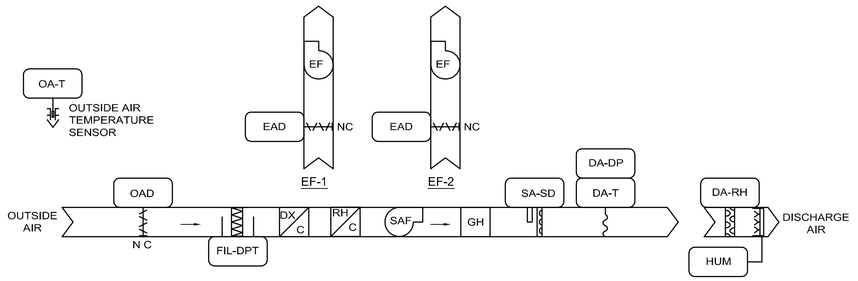
EMERGENCY SHUTDOWN

IF A SMOKE DETECTOR IS ACTIVATED THE AHU SHALL BE SHUT DOWN. THE RETURN AIR, OUTSIDE AIR, AND BYPASS AIR DAMPERS SHALL BE CLOSED. THE CONDENSING UNIT, AND ELECTRIC REHEAT COILS SHALL BE DE-ENERGIZED.

SET POINTS

SPACE COOLING DRY BULB	72 DEG. F.
SPACE DEWPOINT	50 DEG. F.
SPACE HEATING DRY BULB	68 DEG. F.
SPACE MINIMUM RELITIVE HUMIDITY	15%

THE SPACE COOLING DRY BULB, SPACE DEWPOINT, SPACE HEATING AND SPACE REALTIVE HUMIDITY SHALL BE SENCED BY A SINGLE VAISALA HM330 SENSOR. MULTIPLE SENSORS SHALL BE LOCATED IN THE SPACE, SEE DRAWINGS M-4, M-5 AND M-7 FOR LOCATIONS.



MAU-1

SEQUENCE OF OPERATION
CONSTANT VOLUME DIRECT EXPANSION COOLING, CONDENSING REHEAT, AND LP GAS HEAT
MAU-1

GENERAL

THE HVAC SYSTEM SHALL HAVE THE FOLLOWING MODES OF OPERATION: OFF, ON, THE UNIT SHALL BE PROVIDED WITH AN H-O-A SWITCH.

OFF

IN THE OFF MODE THE UNIT SHALL BE OFF, THE OUTSIDE AIR DAMPER SHALL BE CLOSED, AND THE HUMIDIFIER SHALL BE DISABLED. THE INTERLOCKED EXHAUST FANS EF-1 AND EF-2 SHALL BE OFF AND THE EXHAUST AIR DAMPERS CLOSED.

ON

THE SUPPLY AIR FAN SHALL BE ENERGIZED. THE OUTSIDE AIR DAMPER SHALL FULL OPEN. EXHAUST FANS EF-1 AND EF-2 DAMPERS SHALL OPEN, ENABLE HUM-4, AND THE FANS SHALL OPERATE CONTINOUSLY WHILE MAU-1 IS OPERATING.

DURING THE ON MODE OF OPERATION THE UNIT SHALL MAINTAIN THE SUPPLY AIR LEAVING TEMPERATURE AND DEWPOINT SET POINT UTILIZING THE COMPRESSOR OPERATION, MODULATE REFRIGERANT REHEATING FLOW, AND PROPANE BURNER OPERATION.

EMERGENCY SHUTDOWN

IF A SMOKE DETECTOR RELAY IS ACTIVATED THE AHU SHALL BE SHUT DOWN. THE RETURN AIR, OUTSIDE AIR, AND BYPASS AIR DAMPERS SHALL BE CLOSED. THE CONDENSING UNIT, AND ELECTRIC REHEAT COILS SHALL BE DE-ENERGIZED.

SET POINTS

DISCHARGE AIR DEWPOINT	50 DEG. F.
DISCHARGE AIR COOLING DRY BULB	72 DEG. F.
DISCHARGE AIR HEATING DRY BULB	68 DEG. F.
MINIMUM RELITIVE HUMIDITY	15%

THE UNIT DISCHARGE COOLING DRY BULB, DEWPOINT, HEATING AND REALTIVE HUMIDITY SHALL BE SENCED BY A SINGLE VAISALA HM330 SENSOR. MULTIPLE SENSORS SHALL BE LOCATED IN THE SPACE, SEE DRAWINGS M-4, M-5 AND M-7 FOR LOCATIONS.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

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SIGNATURE:
DATE: 03/11/2009 LICENSE #41879

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SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
HVAC CONTROL DIAGRAMS-1

DRAWING NO. 15-1-3B M-16 REV. 0

11 MAR, 2009

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CONTROL SCHEMATIC SYMBOLS

DAMPER WITH ACTUATOR (NORMALLY OPEN)

DAMPER WITH ACTUATOR (NORMALLY CLOSED)

DAMPER ONLY (NORMALLY OPEN)

DAMPER ONLY (NORMALLY CLOSED)

FILTER

DUCT MOUNTED BULB TEMPERATURE SENSOR

DUCT MOUNTED, AVERAGING TEMPERATURE SENSOR

TEMPERATURE UNIT SWITCH, AVERAGING

OUTSIDE AIR TEMPERATURE SENSOR

OUTSIDE AIR DEWPOINT TEMPERATURE SENSOR

DUCT MOUNTED TEMPERATURE SENSOR

DUCT MOUNTED SMOKE DETECTOR

FILTER PRESSURE DROP

DUCT MOUNTED PRESSURE SENSOR

DUCT MOUNTED HUMIDITY SENSOR

DUCT MOUNTED HUMIDITY AND TEMPERATURE SENSOR

DUCT MOUNTED AIR QUALITY SENSOR

WALL MOUNTED TEMPERATURE SENSOR

HUMIDIFIER

GAS HEATING SECTION

ELECTRIC HEATING COIL

DIRECT EXPANSION COIL

REFRIGERANT REHEAT COIL

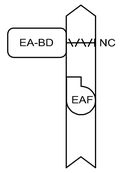
FAN

FLOW DIRECTION ARROW

PIPE/DUCT BREAK

ABBREVIATIONS

BA	BYPASS AIR
BAD	BYPASS AIR DAMPER
CO2	CO2 SENSOR
DA	DISCHARGE AIR
DA-P	DISCHARGE AIR PRESSURE
DA-T	DISCHARGE AIR TEMPERATURE
DA-VP	DISCHARGE AIR FLOW MEASURING STATION
DPR	DAMPER
DSF	DESTRATIFICATION FAN
EA-BD	EXHAUST AIR BAROMETRIC DAMPER
EAF	EXHAUST AIR FAN
FIL-DPT	FILTER PRESSURE DROP
MA-T	MIXED AIR TEMPERATURE
OA	OUTSIDE AIR
OAD	OUTSIDE AIR DAMPER
OA-T	OUTSIDE AIR TEMPERATURE
OA-F	OUTSIDE AIR FLOW
RA	RETURN AIR
RAD	RETURN AIR DAMPER
RA-SD	RETURN AIR SMOKE DETECTOR
SAF	SUPPLY AIR FAN
ZN-T	ZONE TEMPERATURE
ZN-RH	ZONE RELATIVE HUMIDITY



EF-1 AND -2

SEQUENCE OF OPERATION
EXHAUST FANS
EF-1 AND EF-2

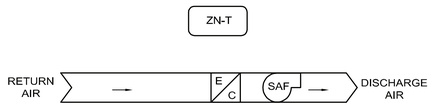
GENERAL

WHEN MAU-1 IS OPERATIONAL EXHAUST FANS EF-1, AND EF-2 SHALL BE ON, OPEN MOTORIZED DAMPER, THEN START EF-1 AND -2. WHEN MAU-1 IS OFF, STOP EF-1 AND -2, THEN CLOSE MOTORIZED DAMPER. SEE MAU-1 SEQUENCE OF OPERATION DRAWING M-16.

SEQUENCE OF OPERATION
EXHAUST FAN
EF-3

GENERAL

EXHAUST FAN SHALL BE CONTROLLED BY A WALL MOUNTED SWITHC IN ROOM 111 RESTROOM.



ELECTRIC UNIT HEATER (EUH)
(TYP ALL)

SEQUENCE OF OPERATION
ELECTRIC UNIT HEATER

GENERAL

THE HEATER SYSTEM SHALL HAVE THE FOLLOWING MODES OF OPERATION: OFF, AND AUTO. THE SYSTEM SHALL BE PROVIDED WITH AN O-A SWITCH.

OFF

IN THE OFF MODE THE UNIT SUPPLY FAN SHALL BE OFF, AND THE HEATING SHALL BE DE-ENERGIZED.

AUTO

THE SUPPLY FAN SHALL BE ENERGIZED, AND THE HEATING COIL SHALL OPERATE TO MAINTAIN THE SPACE TEMPERATURE SET POINT.

SET POINT

ROOM HEATING 68 DEG. F.

DSF-1, 2, 3 & 4

SEQUENCE OF OPERATION
DESTRATIFICATION FAN

GENERAL

THE FANS SHALL HAVE THE FOLLOWING MODES OF OPERATION: OFF, AND AUTO. THE SYSTEM SHALL BE PROVIDED WITH AN H-O-A SWITCH.

OFF

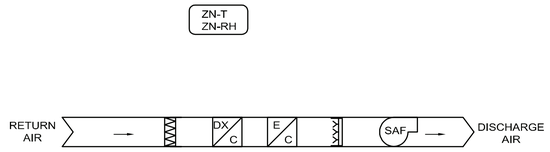
IN THE OFF MODE THE FAN SHALL BE OFF.

AUTO

THE FAN SHALL BE ENERGIZED.

SET POINT

ROOM HEATING NOT APPLICABLE



CRU-1

SEQUENCE OF OPERATION
CONSTANT VOLUME CRU-1

GENERAL

THE HVAC SYSTEM SHALL HAVE THE FOLLOWING MODES OF OPERATION: OFF, AND AUTO. THE SYSTEM SHALL BE PROVIDED WITH AN O-A SWITCH.

OFF

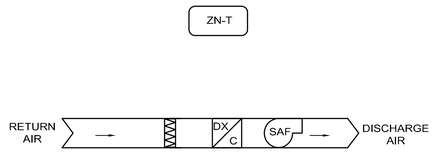
IN THE OFF MODE THE UNIT SUPPLY FAN, REMOTE DRY COOLER, AND HUMIDIFIER SHALL BE OFF, AND THE REFRIGERANT COMPRESSORS SHALL BE DE-ENERGIZED.

AUTO

THE SUPPLY FAN SHALL BE ENERGIZED. AND THE UNIT COMPRESSORS SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SET POINT. THE HUMIDIFIER SHALL OPERATE TO MAINTAIN THE MINIMUM RELATIVE HUMIDITY SETPOINT.

SET POINT

ROOM COOLING 75 DEG. F.
MINIMUM RELATIVE HUMIDITY 20%



CRU-2

SEQUENCE OF OPERATION
CONSTANT VOLUME CRU-2

GENERAL

THE HVAC SYSTEM SHALL HAVE THE FOLLOWING MODES OF OPERATION: OFF, AND AUTO. THE SYSTEM SHALL BE PROVIDED WITH AN O-A SWITCH.

OFF

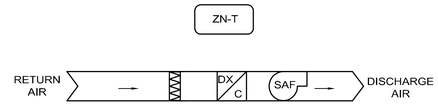
IN THE OFF MODE THE UNIT SUPPLY FAN SHALL BE OFF, AND THE REFRIGERANT COMPRESSOR SHALL BE DE-ENERGIZED.

AUTO

THE SUPPLY FAN SHALL BE ENERGIZED, AND THE COMPRESSORS UNIT SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SET POINT.

SET POINT

ROOM COOLING 75 DEG. F.



PTAC-1

SEQUENCE OF OPERATION
CONSTANT VOLUME PTAC-1

GENERAL

THE HVAC SYSTEM SHALL HAVE THE FOLLOWING MODES OF OPERATION: OFF, AND AUTO. THE SYSTEM SHALL BE PROVIDED WITH AN O-A SWITCH.

OFF

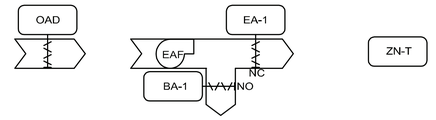
IN THE OFF MODE THE UNIT SUPPLY FAN SHALL BE OFF, AND THE REFRIGERANT COMPRESSOR SHALL BE DE-ENERGIZED.

AUTO

THE SUPPLY FAN SHALL BE ENERGIZED, AND THE COMPRESSORS UNIT SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SET POINT.

SET POINT

ROOM COOLING 78 DEG. F.



EF-4

SEQUENCE OF OPERATION
EXHAUST FANS
EF-4

GENERAL

WHEN ANY ENGINE-DRIVEN FIRE PUMP IS OPERATIONAL, OPEN OUTSIDE AIR DAMPER OAD AND EXHAUST FANS EF-4, SHALL BE ON.

MODULATE DAMPERS BA-1 AND EA-1 TO MAINTAIN SPACE TEMPERATURE ABOVE 50 DEGREES F AND BELOW 105 DEGREES F.

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NOνA FAR DETECTOR BUILDING

HVAC CONTROL DIAGRAMS-2

DRAWING NO. 15-1-3B M-17 REV. 0

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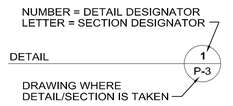
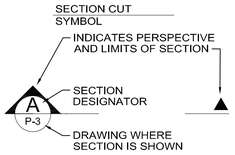
DETAIL/SECTION TITLE



SECTION CUT SYMBOL



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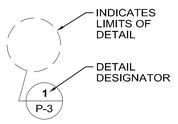


PLUMBING ABBREVIATIONS

AG	AIR GAP
AFF	ABOVE FINISHED FLOOR
AC	AIR COCK
ARV	AIR RELEASE VALVE
BLVD	BEVELED
BLE	BEVELED LARGE END
BE	BEVEL END
BF	BLIND FLANGE
BOP	BOTTOM OF PIPE
BW	BUTT WELD
CH OP	CHAIN WHEEL OPERATOR
CPVC	CHLORINATED POLYVINYLCHLORIDE
CONC	CONCENTRIC
CORP	CORPORATION STOP
STOP DN	DOWN
D	DRAIN
DI	DUCTILE IRON
ELL	ELBOW
EXIST	EXISTING
XH	EXTRA HEAVY
XS	EXTRA STRONG
FRP	FIBERGLASS REINFORCED PIPE FIELD
FW	WELD
FLGD	FLANGED
FCA	FLANGED COUPLING ADAPTER FLANGED
FE	END
FF	FLAT FACED
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FOS	FUEL OIL SUPPLY
FOV	FLOAT OPERATED VALVE
FD	FLOOR DRAIN
FI	FLOW INDICATOR
FM	FLOW METER
FS	FORGED STEEL
HD	HUB DRAIN
HUM	HUMIDIFIER
INVT EL.	INVERT ELEVATION
LC	LOCK CLOSED
LO	LOCK OPEN
LR	LONG RADIUS
MW	MANWAY
NPSH	NET POSITIVE SUCTION HEAD
NRS	NON-RISING STEM
NWL	NORMAL WATER LEVEL
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE
PVC	POLYVINYLCHLORIDE
RED	REDUCER-REDUCING
RCP	REMOTE COOLER PACKAGE
RO	REVERSE OSMOSIS
RS	RISING STEM
RD	ROOF DRAIN
RLP	RUBBER LINED PIPE
SCH	SCHEDULE
SCRD	SCREWED
SR	SHORT RADIUS
SWG NIPP	SWAGED NIPPLE
TSE	THREAD SMALL END
TOC	TOP OF CONCRETE
TOP	TOP OF PIPE
TOG	TOP OF GRATING
TOS	TOP OF STEEL
TD	TRENCH DRAIN
VTR	VENT THROUGH ROOF
VCP	VITRIFIED CLAY PIPE

RISER DIAGRAM LEGEND

CO	CLEANOUT (CO) IN RISER
CO	CLEANOUT (CO) IN FLOOR
	VENT THRU ROOF (VTR)
	FLOOR OR WALL PENETRATION
	PLUMBING FIXTURE TRAP
	FLOOR DRAIN/EQUIPMENT DRAIN
	PRESSURE GAUGE
WHA-A	WATER HAMMER ARRESTOR - SPEC. TYPE

PLUMBING SYMBOLS LEGEND

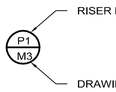
SK-1	SINK - SPEC. TYPE
SH-1	SHOWER - SPEC. TYPE
MB-1	MOP BASIN - SPEC. TYPE
EWC-1	ELECTRIC WATER COOLER - SPEC. TYPE
WF-1	CIRCULAR WASH FOUNTAIN - SPEC. TYPE
WH-1	WATER HEATER - SPEC. TYPE
	PRESSURE/TEMPERATURE RELIEF VALVE
WC-1	WATER CLOSET (FLOOR MOUNTED) - SPEC. TYPE
U-1	URINAL - SPEC. TYPE
LAV-1	LAVATORY (WALL HUNG) - SPEC. TYPE
4"FD-A	FLOOR DRAIN - SIZE - SPEC. TYPE
EEW	EMERGENCY EYEWASH
ES	EMERGENCY SHOWER
EEW/S	EMERGENCY EYEWASH/SHOWER

PIPE LINE DESIGNATIONS

?" V	VENT
	DOMESTIC COLD WATER (DCW)
	DOMESTIC HOT WATER (DHW)
	DOMESTIC HOT WATER RECIRCULATION (DHWR)
	SOIL OR WASTE (ABOVE GRADE)
	SOIL OR WASTE (BELOW GRADE)
?" RD	ROOF DRAIN (ABOVE GRADE)
?" RD	ROOF DRAIN (BELOW GRADE)
?" SAN	SANITARY DRAIN (ABOVE GRADE)
?" SAN	SANITARY DRAIN (BELOW GRADE)
?" S	STORM DRAIN (ABOVE GRADE)
?" S	STORM DRAIN (BELOW GRADE)
?" PW	PROCESS WASTE (ABOVE GRADE)
?" PW	PROCESS WASTE (BELOW GRADE)
?" LS	LAWN SPRINKLER SUPPLY
?" TWS (°F)	TEMPERED WATER SUPPLY (°F)
?" TP	TRAP PRIMER
?" FOS	FUEL OIL SUPPLY
?" RO	REVERSE OSMOSIS
?" GV	GAS VENT
?" CA	COMPRESSED AIR
?" LP	PROPANE GAS
BP	BACKFLOW PREVENTION ASSEMBLY
CO	CLEANOUT IN WALL OR RISER
CO	CLEANOUT IN FLOOR
WH	WALL HYDRANT
HB	HOSE BIBB
AC	AIR COCK

NOTE:
- QUESTION MARKS (?) WILL BE REPLACED BY A PIPE SIZE ON DRAWINGS.

PLUMBING RISER IDENTIFICATION



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PRINT NAME: THEODORE M. TIO

SIGNATURE:

DATE: 03/11/2009 LICENSE: #41878

REV.	DATE	DESCRIPTIONS
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REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

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DRAWN	T. TIO	03-11-09
CHECKED	D. WOLFE	03-11-09
APPROVED	J. STEENKEN	03-11-09

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

PLUMBING LEGEND & ABBREVIATIONS

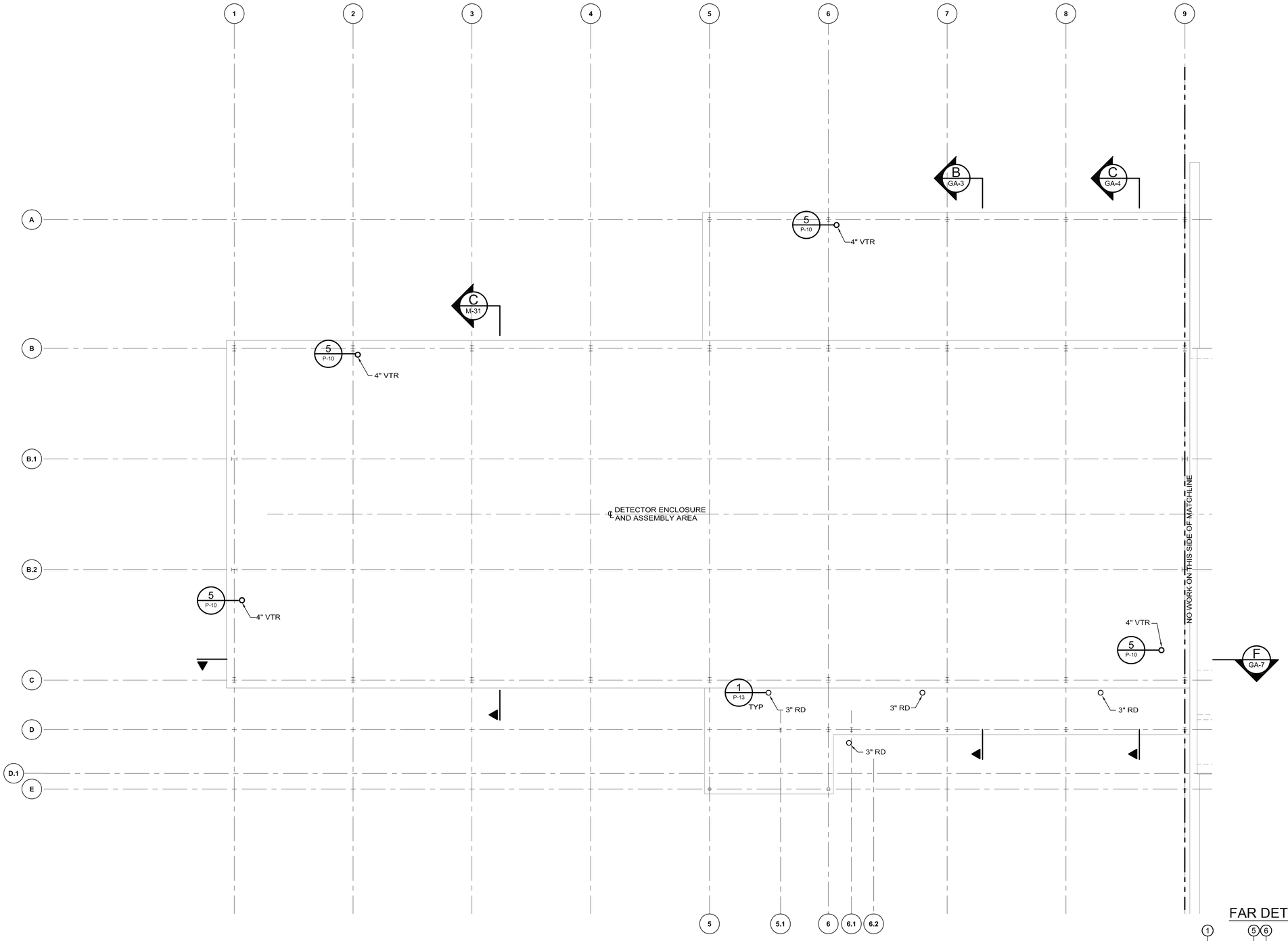
DRAWING NO. **15-1-3B** **P-1** REV. **0**

11 MAR, 2009

M:\FERMILAB\49617\CAD\MECH\P-00.DWG 08-15-2008 12:44 RPEARSON

GENERAL NOTES:

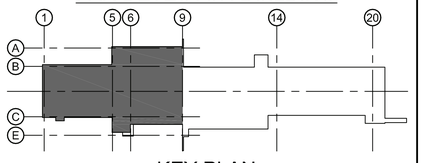
1. SEE DRAWING P-1 FOR GENERAL NOTES.
2. SEE P-10 DETAILS 1, AND 4 FOR CLEANOUT AND FLOOR DRAIN INSTALLATIONS.
3. SEE P-11 FOR PLUMBING RISER DIAGRAMS.
4. SEE P-11 FOR SUMP PUMP SCHEMATIC DIAGRAM.



ROOF PLAN

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

FAR DETECTOR BUILDING



KEY PLAN

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

PLUMBING ROOF PLAN

DRAWING NO. 15-1-3B P-2 REV. 0

11 MAR, 2009

GENERAL NOTES:

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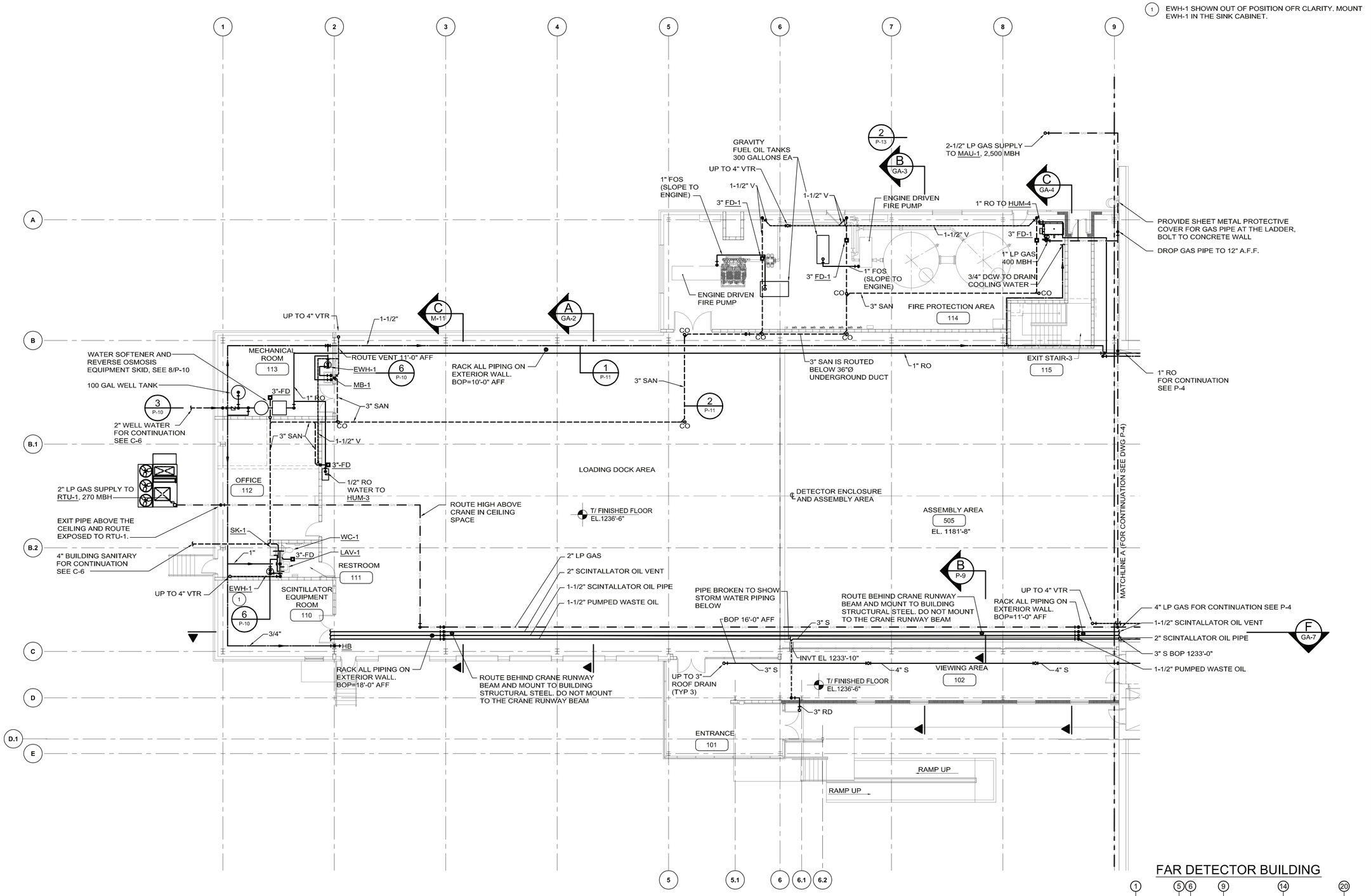
2. SEE P-10 DETAILS 1, AND 4 FOR CLEANOUT AND FLOOR DRAIN INSTALLATIONS.
3. SEE P-11 FOR PLUMBING RISER DIAGRAMS.
4. SEE P-11 FOR SUMP PUMP SCHEMATIC DIAGRAM.

SPECIFIC NOTES:

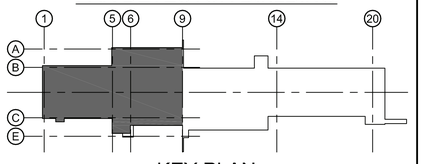
(1) EWH-1 SHOWN OUT OF POSITION OFR CLARITY. MOUNT EWH-1 IN THE SINK CABINET.



FLOOR PLAN EL 1236'-6"

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

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" (0 8 16 SCALE FEET)

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

PLUMBING FLOOR PLAN EL 1236'-6" 1 of 2

DRAWING NO. 15-1-3B P-3 REV. 0

11 MAR, 2009

GENERAL NOTES:

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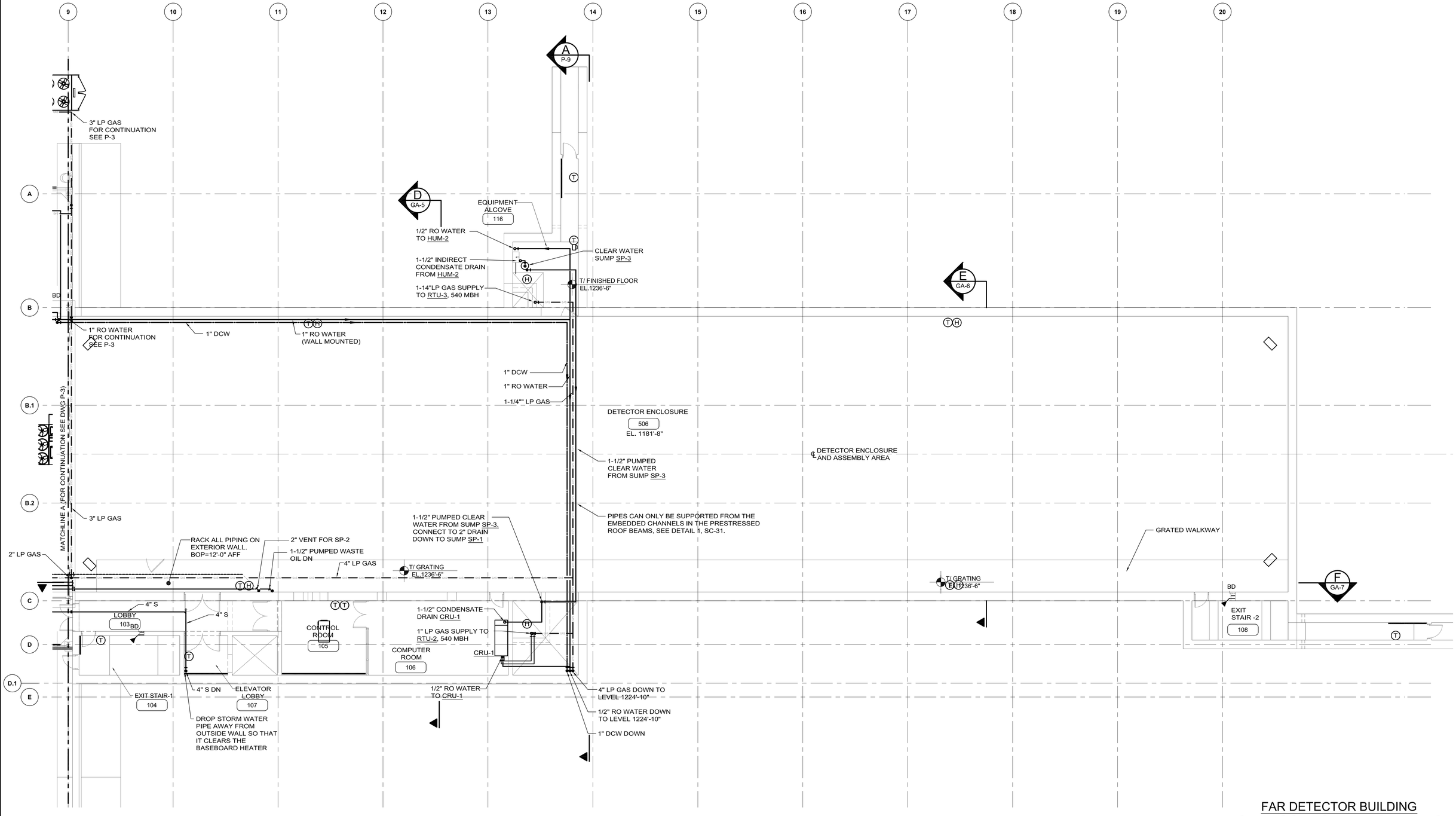
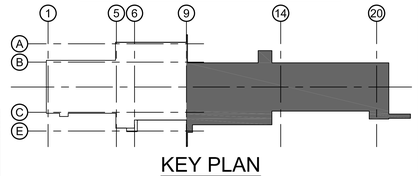
2. SEE P-10 DETAILS 1, AND 4 FOR CLEANOUT AND FLOOR DRAIN INSTALLATIONS.
3. SEE P-11 FOR PLUMBING RISER DIAGRAMS.
4. SEE P-11 FOR SUMP PUMP SCHEMATIC DIAGRAM.



FLOOR PLAN EL 1236'-6"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

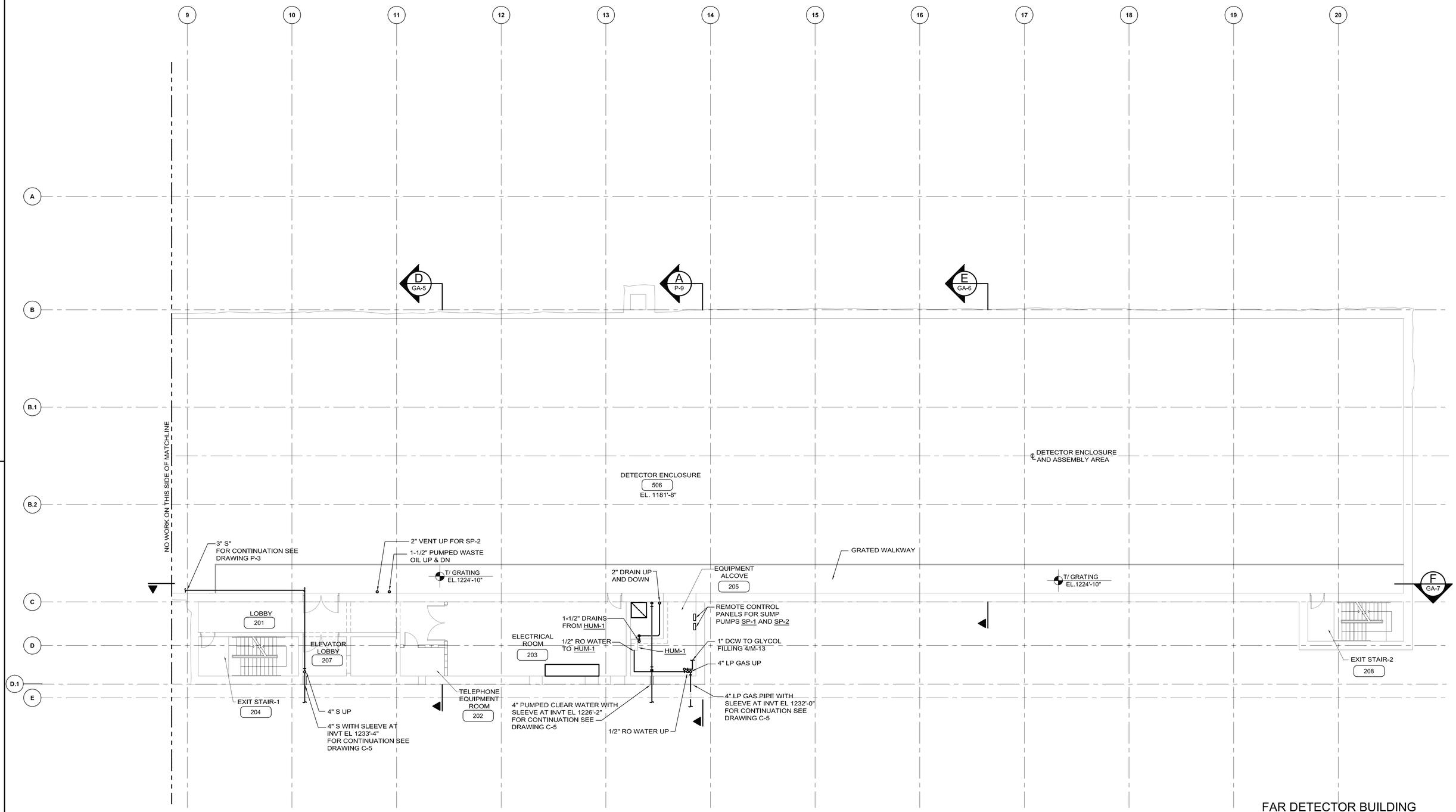
PLUMBING FLOOR PLAN EL 1236'-6" 2 OF 2

DRAWING NO. 15-1-3B P-4 REV. 0

11 MAR, 2009

GENERAL NOTES:

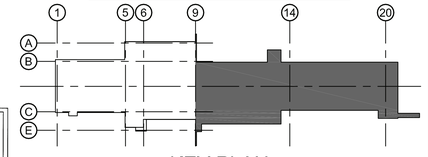
1. SEE DRAWING P-1 FOR GENERAL NOTES.
2. SEE P-10 DETAILS 1, AND 4 FOR CLEANOUT AND FLOOR DRAIN INSTALLATIONS.
3. SEE P-11 FOR PLUMBING RISER DIAGRAMS.
4. SEE P-11 FOR SUMP PUMP SCHEMATIC DIAGRAM.



FLOOR PLAN EL 1224'-10"

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

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

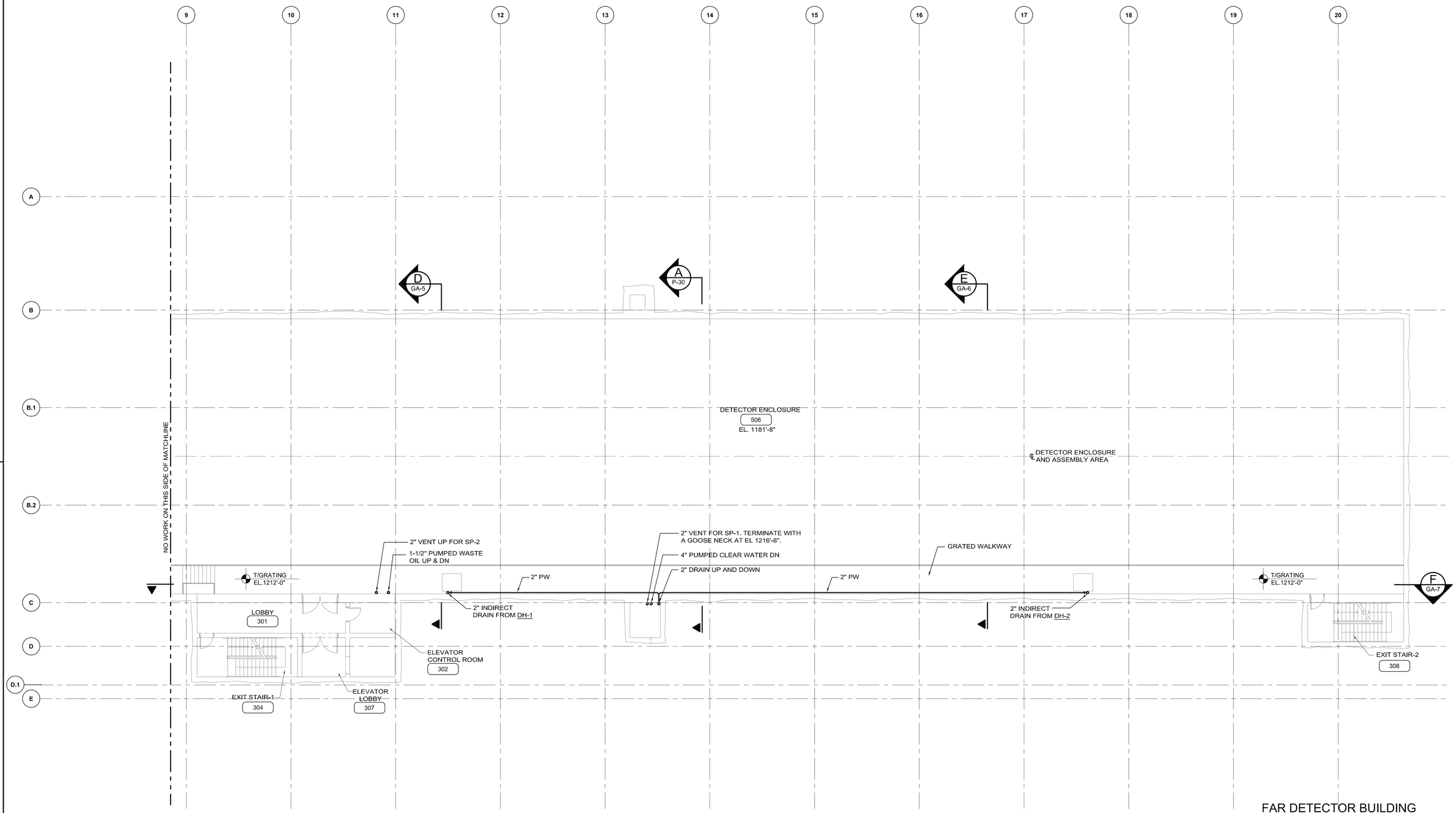
PLUMBING FLOOR PLAN EL 1224'-10"

DRAWING NO. 15-1-3B P-5 REV. 0

11 MAR, 2009

GENERAL NOTES:

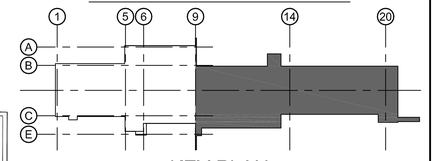
1. SEE DRAWING P-1 FOR GENERAL NOTES.
2. SEE P-10 DETAILS 1, AND 4 FOR CLEANOUT AND FLOOR DRAIN INSTALLATIONS.
3. SEE P-11 FOR PLUMBING RISER DIAGRAMS.
4. SEE P-11 FOR SUMP PUMP SCHEMATIC DIAGRAM.



FLOOR PLAN EL 1212'-0"

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

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

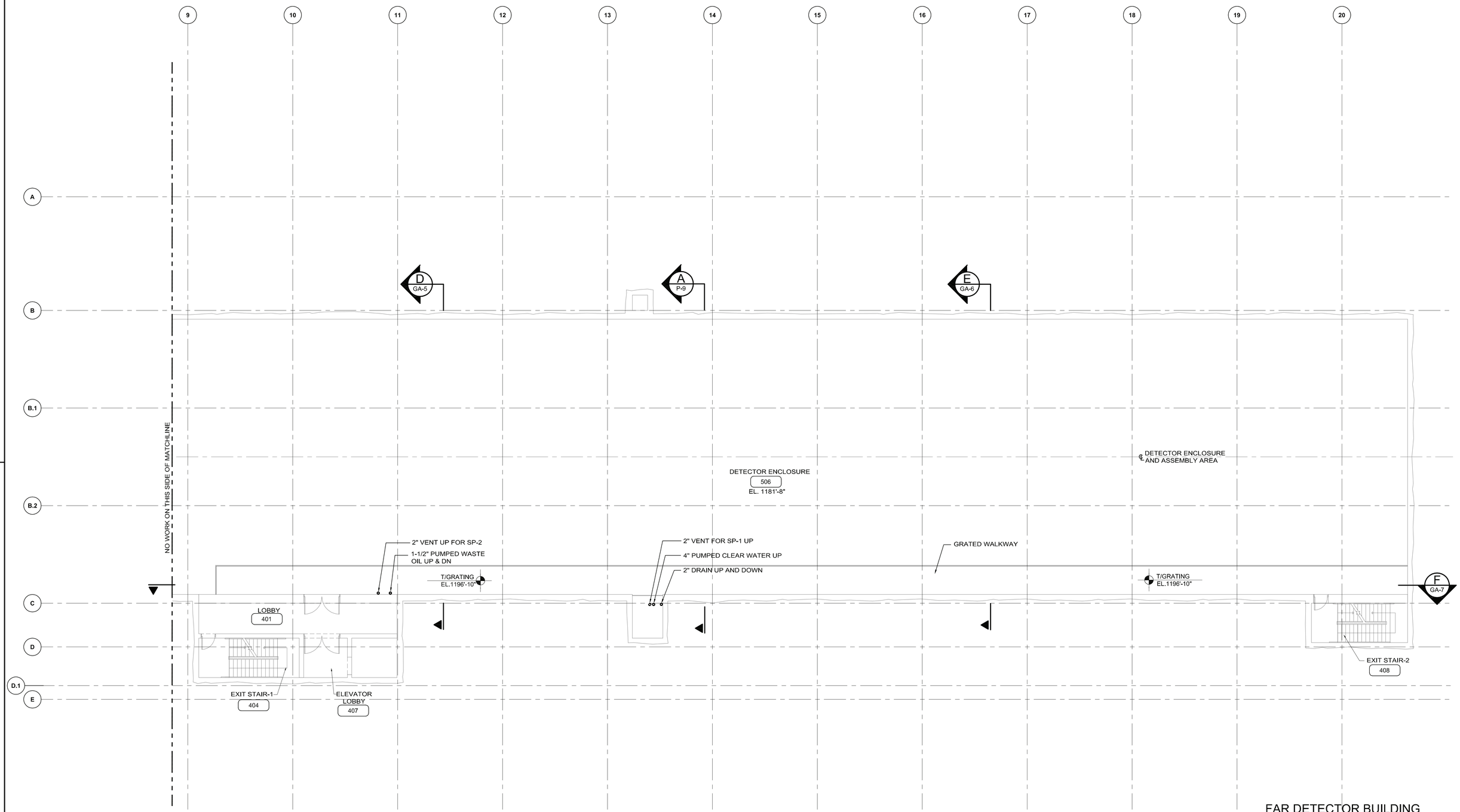
PLUMBING FLOOR PLAN EL 1212'-0"

DRAWING NO. 15-1-3B P-6 REV. 0

11 MAR, 2009

GENERAL NOTES:

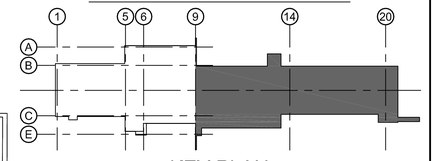
1. SEE DRAWING P-1 FOR GENERAL NOTES.
2. SEE P-10 DETAILS 1, AND 4 FOR CLEANOUT AND FLOOR DRAIN INSTALLATIONS.
3. SEE P-11 FOR PLUMBING RISER DIAGRAMS.
4. SEE P-11 FOR SUMP PUMP SCHEMATIC DIAGRAM.



FLOOR PLAN EL 1196'-10"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

PLUMBING FLOOR PLAN EL 1196'-10"

DRAWING NO. 15-1-3B P-7 REV. 0

11 MAR, 2009

GENERAL NOTES:

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2. SEE P-10 DETAILS 1, AND 4 FOR CLEANOUT AND FLOOR DRAIN INSTALLATIONS.
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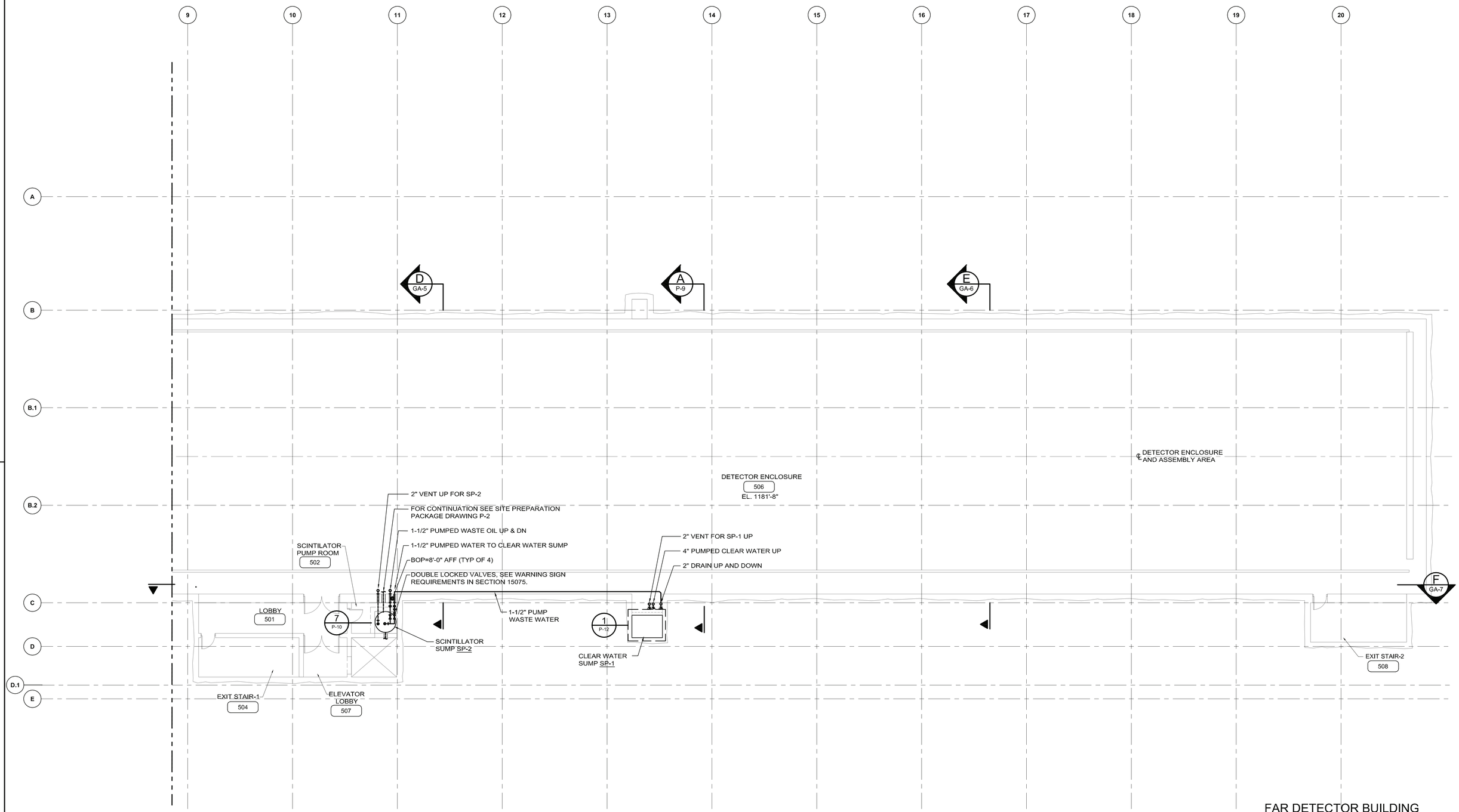
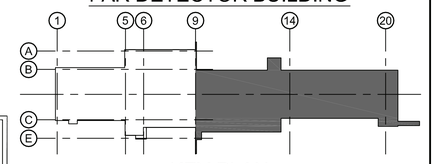


FLOOR PLAN EL 1181'-8"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

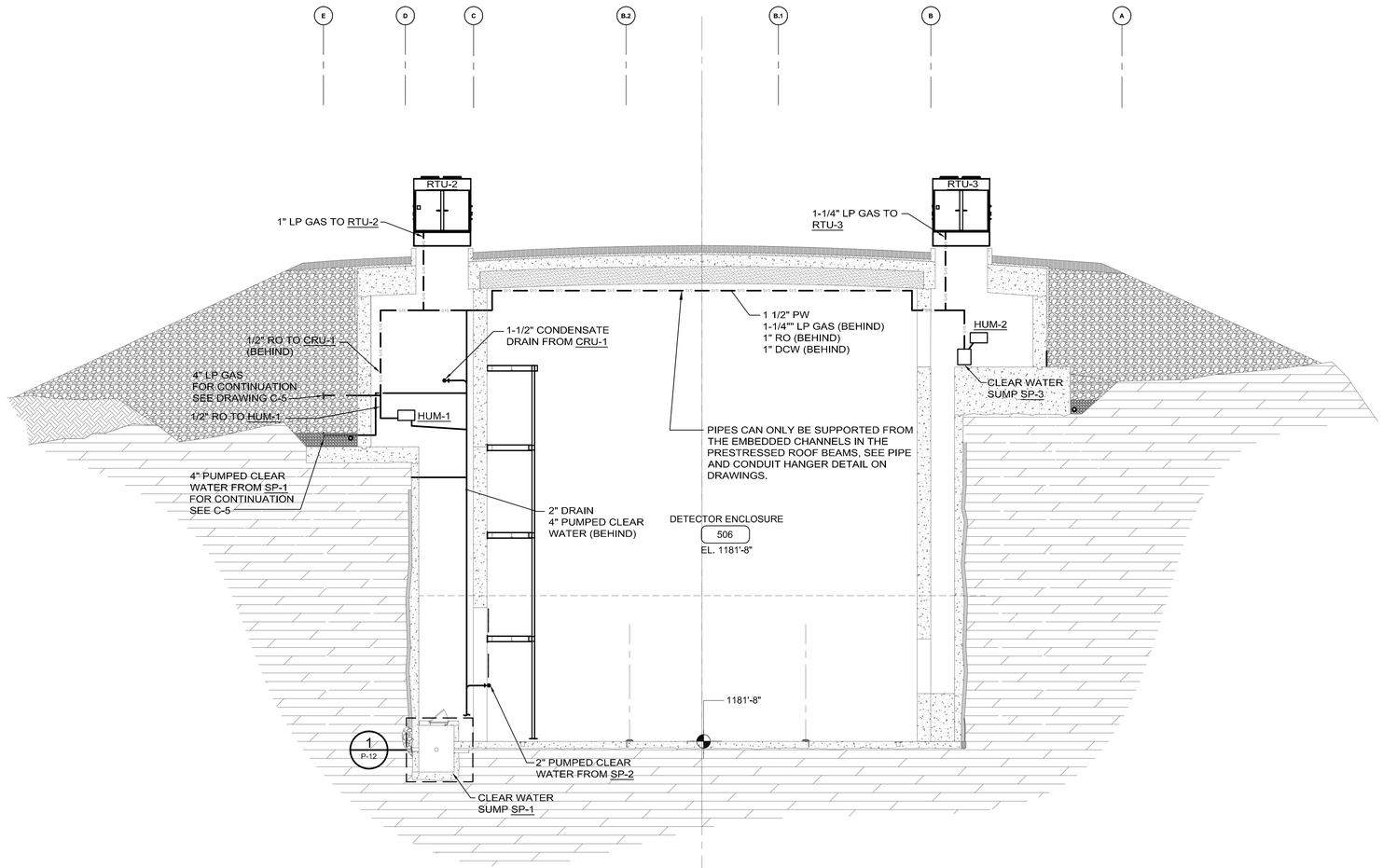
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

PLUMBING FLOOR PLAN EL 1181'-8"

DRAWING NO. 15-1-3B P-8 REV. 0

11 MAR, 2009

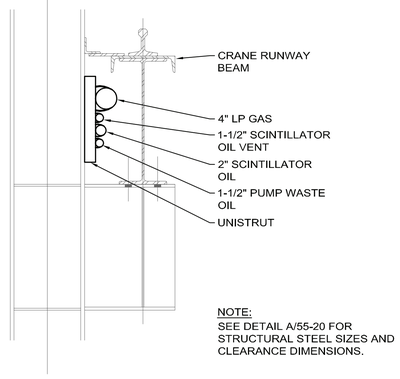


SECTION

1/8"=1'-0"

A P-4

P-5
P-6
P-7
P-8



NOTE:
SEE DETAIL A/55-20 FOR STRUCTURAL STEEL SIZES AND CLEARANCE DIMENSIONS.

PIPING AT CRANE RUNWAY BEAM

1/8"=1'-0"

B P-3

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SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

PLUMBING SECTIONS

DRAWING NO. 15-1-3B P-9 REV. 0

11 MAR, 2009

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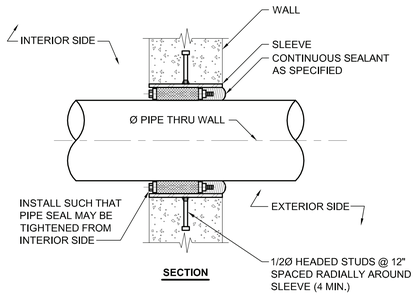
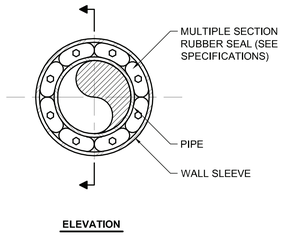
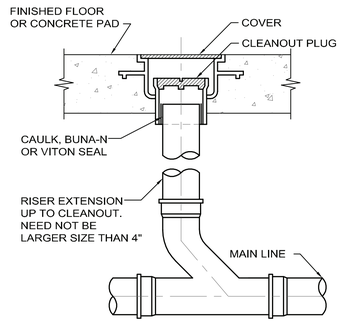




HYDROSTATIC SEAL FOR EXT WALLS

NOT TO SCALE

1 P-12

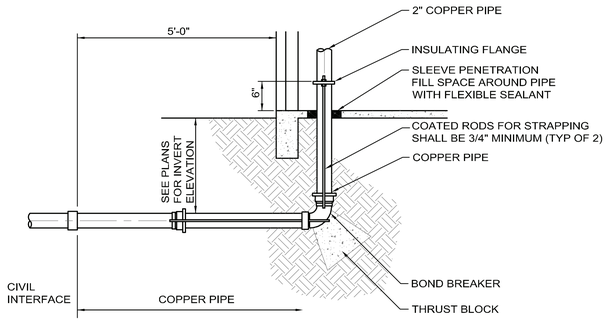


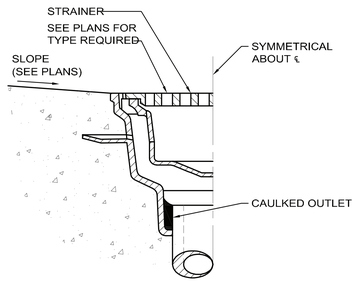
CLEANOUT DETAIL

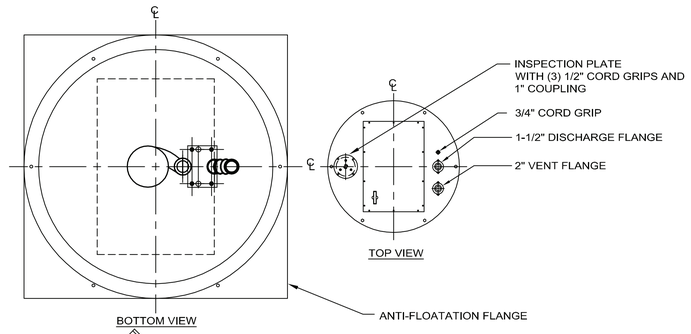
NOT TO SCALE

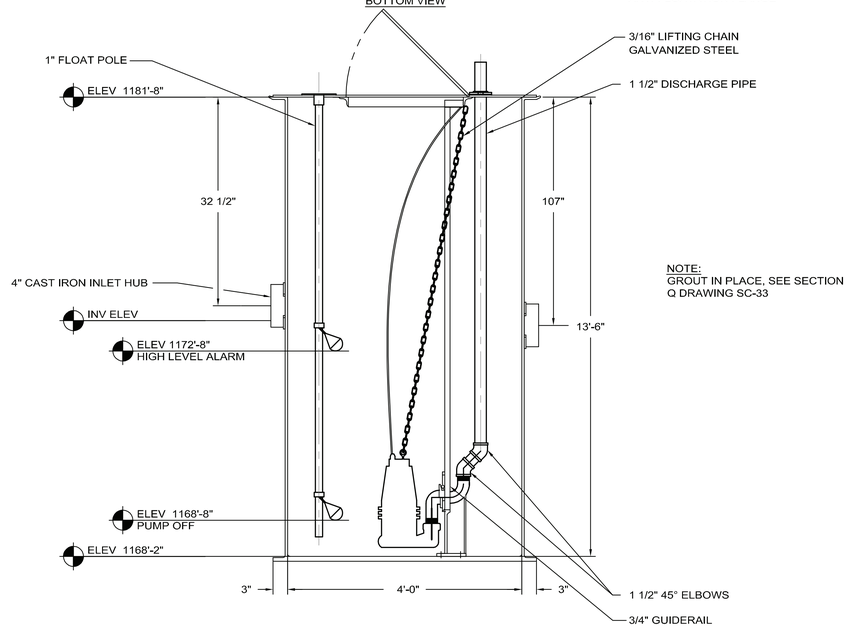
2 P-2

P-3
P-4
P-5
P-6
P-7
P-8









SCINTILLATOR OIL SUMP SP-2 DETAIL

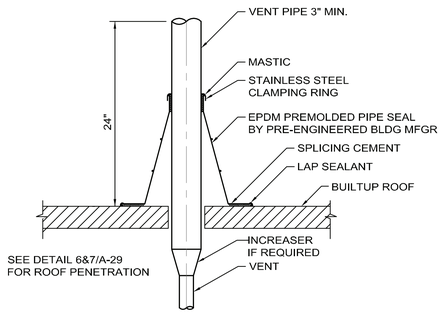
NOT TO SCALE

7 P-8

WATER SUPPLY CONNECTION

NOT TO SCALE

3 P-3



VENT PIPE FLASHING

NOT TO SCALE

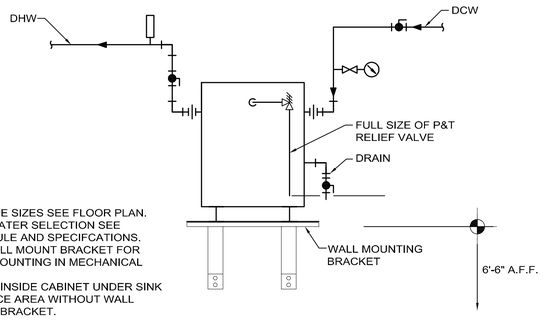
5 P-2

FLOOR DRAIN INSTALLED IN GROUND FLOOR

NOT TO SCALE

4 P-2

P-3
P-4
P-5
P-6
P-7
P-8



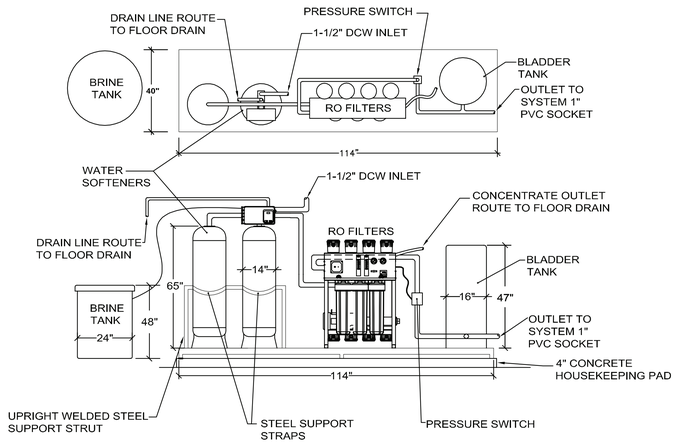
NOTES:

1. FOR PIPE SIZES SEE FLOOR PLAN.
2. FOR HEATER SELECTION SEE SCHEDULE AND SPECIFCATIONS.
3. USE WALL MOUNT BRACKET FOR WALL MOUNTING IN MECHANICAL ROOM.
4. MOUNT INSIDE CABINET UNDER SINK IN OFFICE AREA WITHOUT WALL MOUNT BRACKET.

ELECTRIC WATER HEATER PIPING DETAIL

NOT TO SCALE

6 P-3



REVERSE OSMOSIS EQUIPMENT

NOT TO SCALE

8 P-3

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: THEODORE M. TIO

SIGNATURE:

DATE: 03/11/2009 LICENSE #41879

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE
DESIGNED	T. TIO	03-11-09
DRAWN	T. TIO	03-11-09
CHECKED	D. WOLFE	03-11-09
APPROVED	J. STEENKEN	03-11-09

	OWNER / REPRESENTATIVE	DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

PLUMBING DETAILS

DRAWING NO. 15-1-3B P-10 REV. 0

11 MAR, 2009

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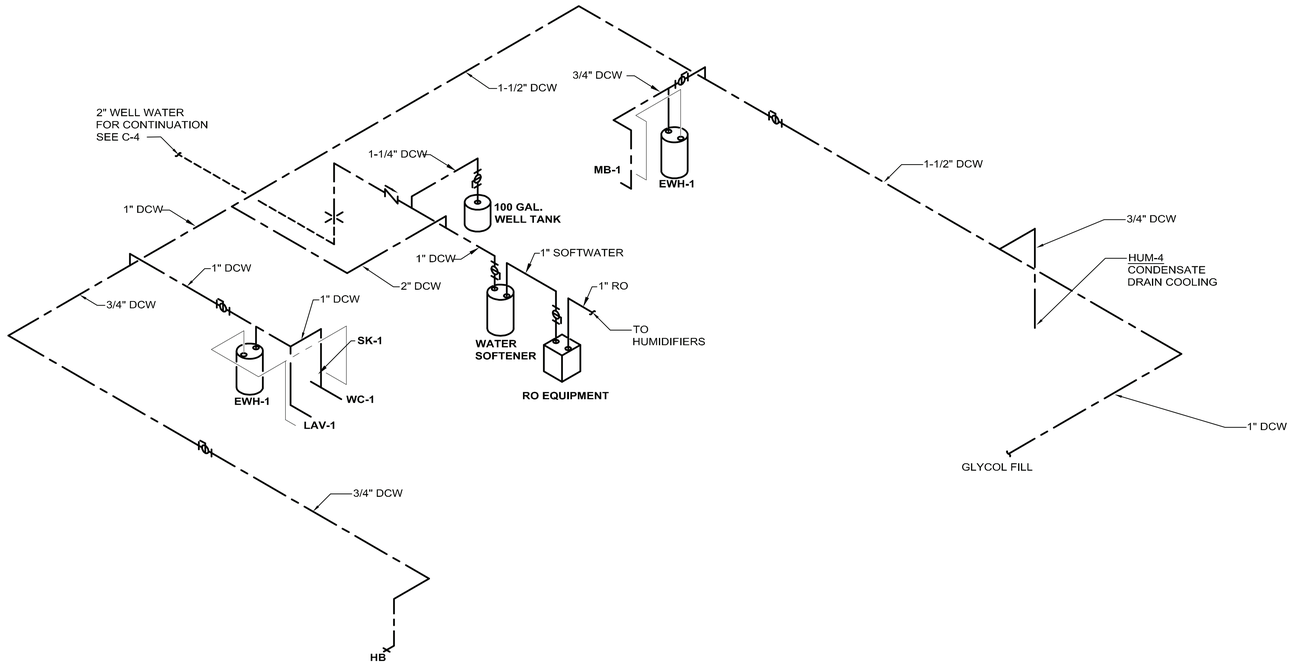
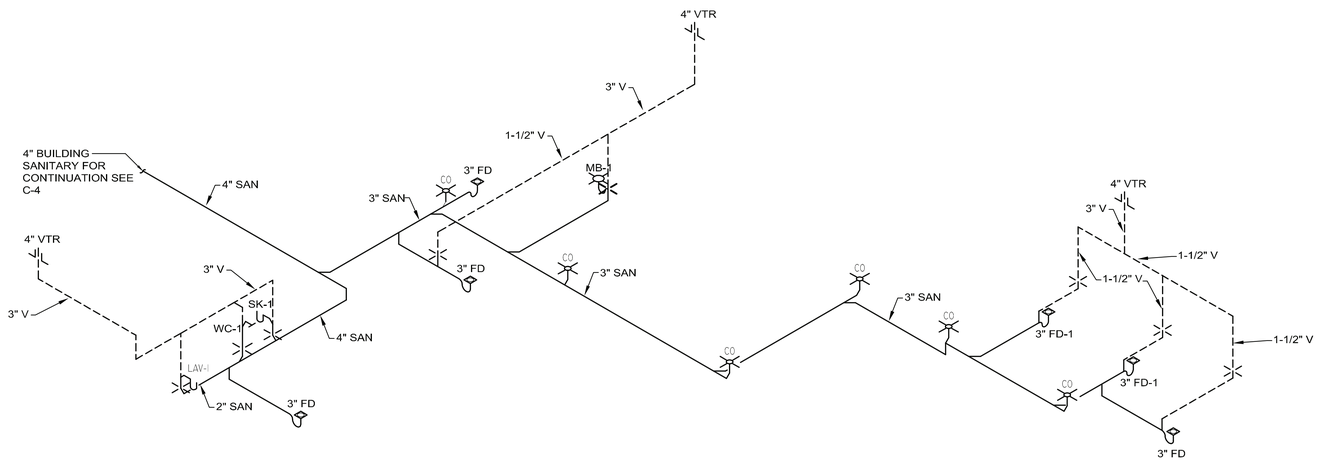


WATER SUPPLY RISER

NOT TO SCALE

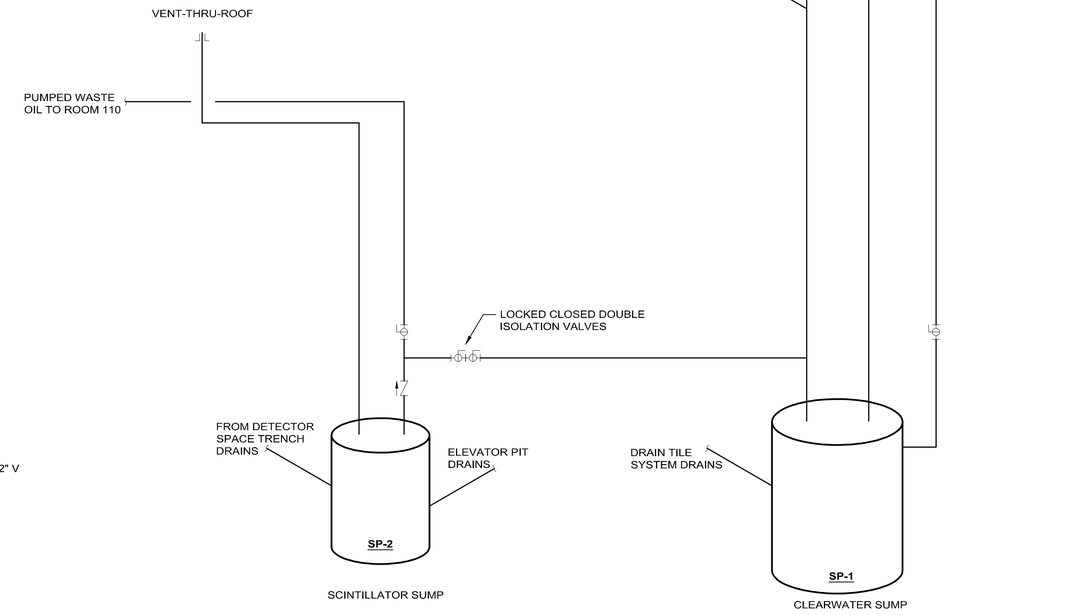
1 P-1
P-2
P-3
P-4
P-5
P-6
P-7
P-8



WASTE AND VENT RISER

NOT TO SCALE

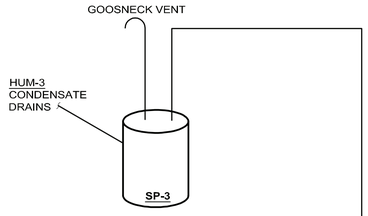
2 P-1
P-2
P-3
P-4
P-5
P-6
P-7
P-8



SUMP PUMP DIAGRAM

NOT TO SCALE

3 P-4
P-5
P-6
P-7
P-8



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UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

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PLUMBING RISERS

DRAWING NO. 15-1-3B P-11 REV. 0

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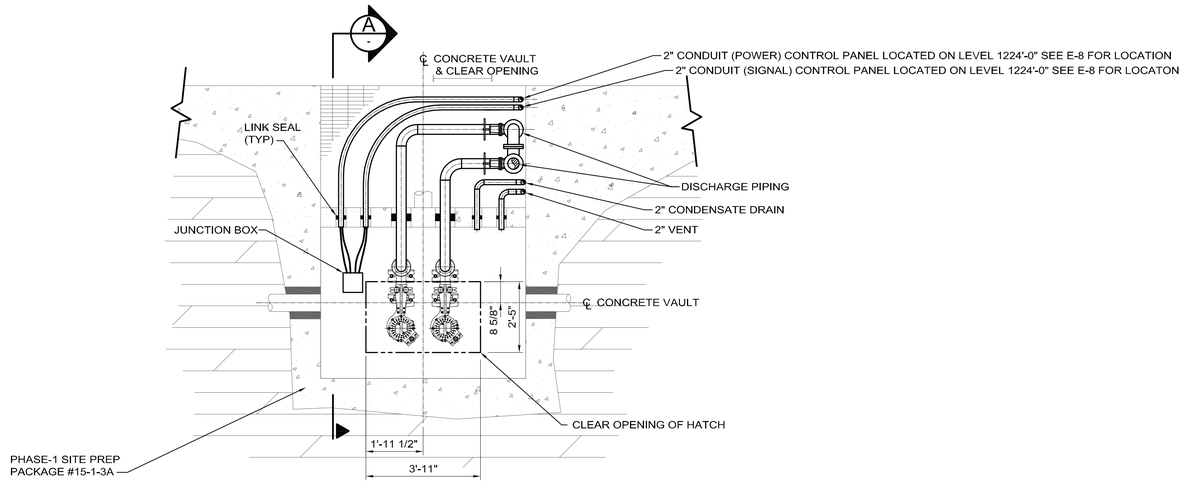
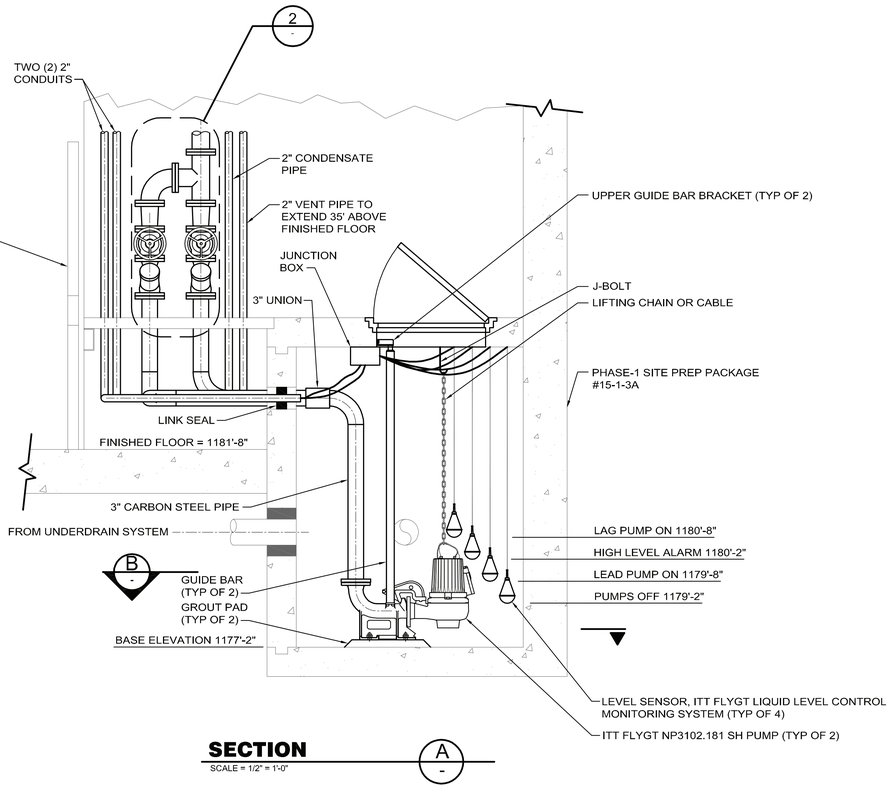


SUMP PIT PLAN

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

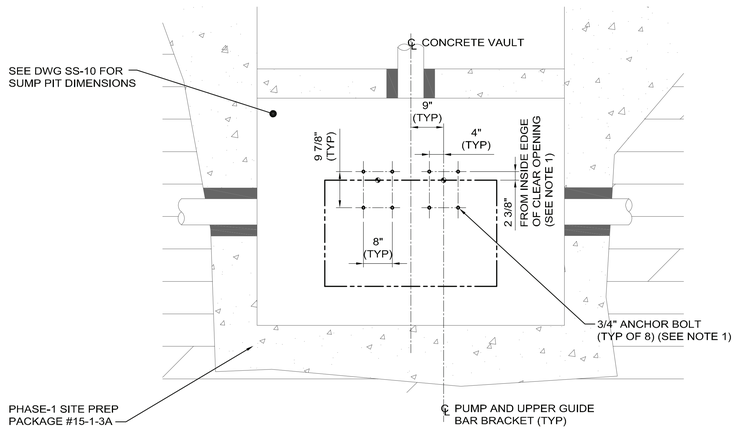
1 / P-8



SECTION

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

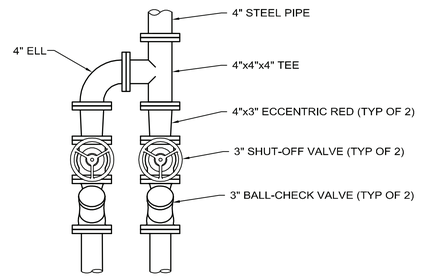
A



SECTION

SCALE = 3/4" = 1'-0"

B



DETAIL

SCALE : NONE

2

NOTE:

1. LOCATE ANCHOR BOLTS USING INSIDE EDGE OF CLEAR OPENING AND PUMP CENTERLINE AS REFERENCE POINT. BOLT LOCATIONS MUST BE HELD TO MAINTAIN EXACT POSITION OF PUMP TO CLEAR OPENING.

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Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE
DESIGNED	R. SMITH	03-11-09
DRAWN	J. HOLZINGER	03-11-09
CHECKED	J. STEENKEN	03-11-09
APPROVED	J. STEENKEN	03-11-09

	OWNER / REPRESENTATIVE	DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/2" = 1'-0" 0 1' 2' 4' SCALE IN FEET

3/4" = 1'-0" 0 1' 2' 3' SCALE IN FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

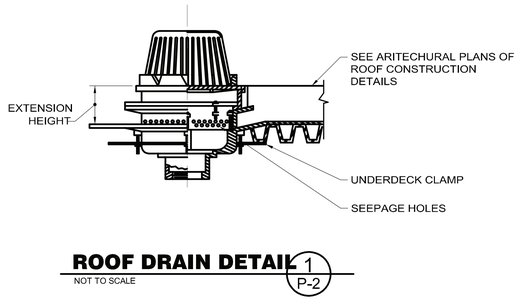
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

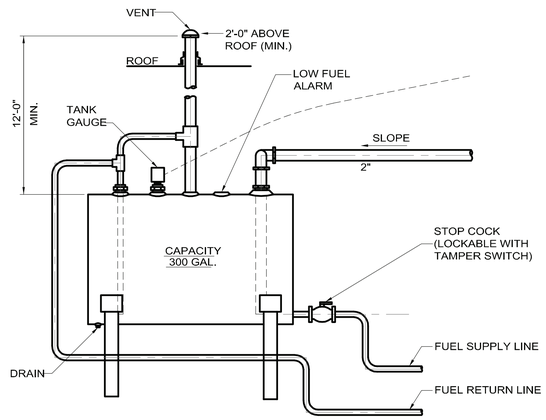
PUMP STATION ELEVATION AND SECTIONS

DRAWING NO. 15-13B P-12 REV. 0

11 MAR, 2009



ROOF DRAIN DETAIL 1 / P-2
NOT TO SCALE



FUEL TANK DETAIL 2 / P-3
NOT TO SCALE

NOTE:

1. INSTALL TANK IN ACCORDANCE WITH REQUIREMENTS OF LOCAL AUTHORITIES. LOCATE TANK OUTLET APPROX. 7'-4" ABOVE FINISHED FLOOR
2. FUEL SUPPLY AND RETURN PIPING SHALL BE SCHEDULE 40 BLACK ASTM A53 STEEL PIPE WITH THREADED ENDS, CAST IRON OR MALLEABLE IRON THREADED FITTINGS AND THREADED JOINTS. PROVIDE AND INSTALL VALVES AND SUPPORTS PER SPECIFICATION SECTION 15100 AND 15145. PROVIDE SUBMITTALS AS INDICATED IN REFERENCE SPECIFICATION SECTIONS AND PER SECTION 15050 AND DIVISION 1 REQUIREMENTS.

REVERSE OSMOSIS EQUIPMENT	
TAG NO.	**RO UNIT**
LOCATION	RM 113
PRODUCTION (GPD)	3,600
PRODUCTION TEMP (F)	46
MEMBRANES (TYPE)	TFC HF1
MEMBRANES QTY	4
FILTERS	
POLYPROPYLENE FILTER	5 MICRON
POLYPROPYLENE FILTER	1 MICRON
CARBON FILTER	10 MICRON
PUMP FLOW RATE (GPM)	10
PUMP MOTOR (HP)	1 1/2
ELECTRICAL DATA (V / PH / HZ)	460/3/60
ELECTRICAL DATA (AMPS)	5.0
NOTES	1,2,3,4,5,6

NOTES:
1. PROVIDE WITH LOW PRESSURE SWITCH TO PREVENT DRY PUMP OPERATION
2. PROVIDE WITH ON/OFF SOLENOID VALVE
3. PROVIDE WITH STAINLESS STEEL NEEDLE VALVE TO REGULATE FLOW
4. PROVIDE WITH PRODUCT AND WASTE FLOW METERS
5. PROVIDE WITH PANEL MOUNTED TDS METER
6. PROVIDE WITH 40 GALLON RO STORAGE TANK
7. SKID MOUNT WITH WATER SOFTENER
8. SAMPLE WELL WATER TO CONFIRM WATER QUALITY.

WATER SOFTENER	
LOCATION	RM 113
TYPE	CATION RESIN
RESIN QTY (CU. FT)	3
CAPACITY (GRAINS)	90,000
ENTERING HARDNESS	25
ELECTRICAL DATA (V / PH / HZ)	110/1/60
ELECTRICAL DATA (AMPS)	4.8
NOTES	1,2,3,4

NOTES:
1. PROVIDE TWIN ALTERNATING RESIN TANKS
2. PROVIDE AUTOMATIC REGENERATION BASED ON FLOW
3. PROVIDE WITH BRINE TANK
4. SKID MOUNT WITH RO UNIT, EXCEPT BRINE TANK
5. SAMPLE WELL WATER TO CONFIRM WATER QUALITY

PLUMBING PUMP SCHEDULE			
EQUIPMENT NO. (TAG):	**SP-1**	**SP-2**	**SP-3**
TYPE	SUBMERSIBLE	SUBMERSIBLE	SUBMERSIBLE
DRAWING LOCATION	D-13	Room 502	Room 116
SERVICE	CLEAR WATER	OIL	CLEAR WATER
CAPACITY (GPM)	100	20	19
HEAD (TDH)	63	74	17
DISCHARGE SIZE (IN.)	4.00	1 1/2	1 1/2
IMPELLER SIZE (IN.)	8.3		
PUMP EFFICIENCY - %	60	60	60
MOTOR - RPM	1800	3600	3000
MOTOR - HP	7 1/2	3/4	1/3
MOTOR OPERATING - BHP	6.9	0.54	0.2
MOTOR TYPE	SUBMERSIBLE	SUBMERSIBLE	SUBMERSIBLE
STARTER / DISCONNECT PROVIDED BY:	DIV. 16	DIV. 16	DIV. 16
ELECTRICAL DATA (V /PH / HZ)	460 / 3 / 60	460 / 3 / 60	110 / 1 /60
REMARKS:	1,2,3	1,2,3	1,2,3

NOTES:
1. DUPLEX PUMPING SYSTEM, FLOW RATE AND HEAD IS FOR EACH PUMP.
2. CONTROL PANEL LOCATED REMOTE IN LEVEL 1224'-10" ROOM 205.
3. SEE DRAWINGS E-7 AND E-8 FOR SEQUENCE OF OPERATION

PLUMBING FIXTURE SCHEDULE						
SYMBOL	FIXTURE	WATER		WASTE	VENT	MOUNTING HEIGHT
		COLD	HOT			
WC-1	WATER CLOSET	1/2"	-	4"	2"	RIM HT. - 17" AFF, FLOOR MOUNTED - ACCESSIBLE
LAV-1	LAVATORY	1/2"	1/2"	1 1/2"	1 1/2"	RIM HT. - 31" AFF WALL-MOUNTED - ACCESSIBLE
MB-1	MOP BASIN	1/2"	1/2"	3"	1 1/2"	24" X 24" X 10" FLOOR MOUNTED
WH	WALL HYDRANT	3/4"	-	-	-	FREEZE-PROOF
HB	HOSE BIBB	3/4"	-	-	-	36" AFF
SK-1	KITCHEN SINK	1/2"	1/2"	1 1/2"	1 1/2"	DOUBLE SS, HT. SET BY COUNTER TOP

NOTES:

ELECTRIC WATER HEATER SCHEDULE						
SYMBOL	TYPE	INPUT - KW	ELECTRIC AL/V/PH/HZ	TANK CAPACITY (GALLONS)	YRATE-GPH @ 100 DEG F RISE	REMARKS
EWH-1	ELECTRIC	5	110 / 1 / 60	6	8	1,2,3,4

NOTES:
1. STORE AT 120 DEG F
2. RECOVERY RATES ARE MINIMUM
3. MOUNT UNDERCABINET IN ROOM 112
4. MOUNT ON WALL BRACKET IN ROOM 113

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PRINT NAME: THEODORE M. TIO

SIGNATURE: [signature]

DATE: 03/11/2009 LICENSE #41879

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Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE		OWNER / REPRESENTATIVE	DATE
DESIGNED	**T. TIO**	**03-11-09**	NOvA FESS SUBMITTED	**S. DIXON**	**03-11-09**
DRAWN	**T. TIO**	**03-11-09**	NOvA PROJECT MANAGER	**J. COOPER**	**03-11-09**
CHECKED	**D. WOLFE**	**03-11-09**	HINES SUBMITTED	**C. McNABNEY**	**03-11-09**
APPROVED	**J. STEENKEN**	**03-11-09**	U of M SUBMITTED	**M. MARSHAK**	**03-11-09**

SCALE:

UNIVERSITY OF MINNESOTA | Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

PLUMBING SCHEDULES

DRAWING NO. **15-1-3B** **P-13** REV. **0**

11 MAR, 2009

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SYSTEM INPUTS		SYSTEM ACTIONS	FACP ANNUNCIATION						NOTIFICATION						REQUIRED FIRE SAFETY CONTROL						
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
			ACTIVATE COMMON ALARM SIGNAL	ACTIVATE COMMON AUDIBLE ALARM SIGNAL	ACTIVATE COMMON TROUBLE SIGNAL INDICATOR	ACTIVATE COMMON AUDIBLE TROUBLE SIGNAL	ACTIVATE COMMON SUPERVISORY SIGNAL INDICATOR	ACTIVATE COMMON AUDIBLE SUPERVISORY SIGNAL	ACTIVATE HORN CIRCUITS THROUGHOUT BUILDING	ACTIVATE STROBE CIRCUITS THROUGHOUT BUILDING	ACTIVATE THE APPROPRIATE FIRE PHONE NAC	SEND TROUBLE SIGNAL TO CENTRAL STATION	SEND SUPERVISORY SIGNAL TO CENTRAL STATION	SEND FIRE ALARM SIGNAL TO CENTRAL STATION	DISPLAY CHANGE OF STATUS AT FACP	DISPLAY CHANGE OF STATUS AT REMOTE ANNUNCIATOR	RECALL ELEVATORS TO PRIMARY FLOOR	DISCONNECT MAINLINE POWER TO ELEVATOR	SHUTDOWN RESPECTIVE AIR HANDLING UNIT	RECORD EVENT IN MEMORY	ACTIVATE STAIRWELL PRESSURIZATION FANS
1	MANUAL PULL STATION		X	X					X	X				X	X	X				X	
2	AREA SMOKE DETECTOR		X	X					X	X				X	X	X				X	
3	RELEASING PANEL ALARM		X	X					X	X				X	X	X				X	
4	RELEASING PANEL "OFF-NORMAL"				X	X						X			X	X				X	
5	AIR SAMPLING ALERT LEVEL						X	X					X		X	X				X	
6	AIR SAMPLING ACTION LEVEL						X	X					X		X	X				X	
7	AIR SAMPLING FIRE LEVEL 1		X	X					X	X				X	X	X				X	X
8	ELEVATOR MACHINE ROOM SMOKE DETECTOR		X	X					X	X				X	X	X	X			X	
9	ELEVATOR LOBBY SMOKE DETECTOR		X	X					X	X				X	X	X	X			X	
10	ELEVATOR MACHINE ROOM HEAT DETECTOR		X	X					X	X				X	X	X		X		X	
11	SMOKE DETECTORS OUTSIDE EXIT STAIRWELL DOORWAY		X	X					X	X				X	X	X				X	X
12	DUCT SMOKE DETECTOR						X	X					X		X	X			X	X	
13	WATERFLOW SWITCH		X	X					X	X				X	X	X				X	
14	FIRE PUMP VALVE SUPERVISORY SWITCH						X	X					X		X	X				X	
15	FIRE PUMP SUPERVISION MONITORING POINTS						X	X					X		X	X				X	
16	GENERATOR MONITORING POINT						X	X					X		X	X				X	
17	AUTOMATIC POWER TRANSFER MONITORING POINT						X	X					X		X	X				X	
18	ABNORMAL AC VOLTAGE CONDITION AT FACP				X	X						X			X	X				X	
19	ABNORMAL BATTERY CONDITION AT FACP				X	X						X			X	X				X	
20	ABNORMAL POSITION OF ANY FACP / VCP SWITCH				X	X						X			X	X				X	
21	OPEN CIRCUIT				X	X						X			X	X				X	
22	GROUND FAULT				X	X						X			X	X				X	
23	NAC SHORT CIRCUIT				X	X						X			X	X				X	
24	HANDSET PLUGGED INTO PHONE JACK										X				X	X				X	

SYSTEM OPERATIONS MATRIX FIRE ALARM SYSTEM

Linear Heat Input Zone	Zone 1	Activate Zone 2 Releasing Soleniod	Activate Zone 3 Releasing Soleniod	Activate Zone 4 Releasing Soleniod	Activate Zone 5 Releasing Soleniod	Activate Zone 6 Releasing Soleniod	Activate Zone 7 Releasing Soleniod	Activate Zone 8 Releasing Soleniod	Activate Zone 9 Releasing Soleniod	Activate Zone 1 Closing Soleniod	Activate Zone 2 Closing Soleniod	Activate Zone 3 Closing Soleniod	Activate Zone 4 Closing Soleniod	Activate Zone 5 Closing Soleniod	Activate Zone 6 Closing Soleniod	Activate Zone 7 Closing Soleniod	Activate Zone 8 Closing Soleniod	Activate Zone 9 Closing Soleniod
Zone 1																		
Zone 2		X	X															
Zone 3		X	X	X														
Zone 4			X	X	X													
Zone 5				X	X	X												
Zone 6					X	X	X											
Zone 7						X	X	X										
Zone 8							X	X	X									
Zone 9								X	X									
Valve Reset Button										X	X	X	X	X	X	X	X	X

RELEASING PANEL SYSTEM OPERATION MATRIX

FIRE ALARM SYSTEM NOTES:

1. PROVIDE A COMPLETE LOW VOLTAGE, POINT ADDRESSABLE FIRE ALARM SYSTEM IN ACCORDANCE WITH NFPA 70, NATIONAL ELECTRICAL CODE (NEC), 2005 EDITION AND NFPA 72, NATIONAL FIRE ALARM CODE, 2007 EDITION, INCLUDING BUT NOT LIMITED TO: FIRE ALARM CONTROL PANEL, REMOTE POWER SUPPLY PANELS, WIRING, CONDUIT, MANUAL PULL STATIONS, AREA SMOKE DETECTORS, COMBINATION HORN/STROBE APPLIANCES, STROBE APPLIANCES, ADDRESSABLE MONITOR MODULES AND CONTROL RELAYS.
2. FIRE ALARM SYSTEM SHALL BE MONITORED BY AN APPROVED CENTRAL STATION VIA DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT MODEM) AND A REDUNDANT DIGITAL ALARM RADIO TRANSMITTER.
3. THE CONTRACTOR SHALL FURNISH AND INSTALL CONDUIT AND CABLES FOR THE NEW FIRE ALARM SYSTEM. WIRE AND CONDUIT SHALL BE NEW AND CONTINUOUS AS REQUIRED BY NATIONAL ELECTRICAL CODE (NFPA 70), 2005 EDITION AND NFPA 72, NATIONAL FIRE ALARM CODE, 2007 EDITION.
4. ALL EQUIPMENT SHALL BE UL LISTED AND MANUFACTURED BY EITHER:
   A. SIEMENS-CERBERBUS (PYROTRONICS)
   B. FENWEL PROTECTION SYSTEMS
   C. SIMPLEX/GRINNELL
   D. EDWARDS SYSTEM TECHNOLOGY (EST)
   E. NOTIFIER
5. PROVIDE DESIGNATED RACEWAYS/CONDUITS FOR FIRE ALARM SYSTEM CIRCUITS. MINIMUM CONDUIT SIZE SHALL BE ¾" RIGID (IMC) WITH THREADED FITTINGS PAINTED "RED". ALL FIRE ALARM ELECTRICAL BOXES, INCLUDING DEVICE BACKBOXES, JUNCTION BOXES, ETC. SHALL BE WEATHERPROOF WITH GASKETED FITTINGS.
6. THE ADDRESSABLE DATA LOOP CIRCUITS AND NOTIFICATION APPLIANCE CIRCUITS SHALL BE WIRED CLASS B, AS DEFINED BY NFPA 72.
7. ADDRESSABLE DATA LOOP CIRCUITS AND NOTIFICATION APPLIANCE CIRCUITS MAY BE COMBINED INTO A COMMON RACEWAY IF PERMITTED BY THE SYSTEM MANUFACTURER.
8. CONDUCTORS SHALL BE INSULATED AND RATED FOR A MINIMUM OF 300 VOLT THHN SOLID COPPER, MINIMUM SIZE: 16 AWG FOR ADDRESSABLE DATA LOOP CIRCUITS AND 14 AWG FOR NOTIFICATION APPLIANCE CIRCUITS. 120 VAC POWER, NEUTRAL, AND GROUND CONDUCTORS SHALL BE A MINIMUM OF 300 VOLT THHN STRANDED COPPER, MINIMUM SIZE 12 AWG.
9. WIRING METHODS, INCLUDING GROUNDING & BONDING, CONDUIT, SUPPORTS, JUNCTION BOXES, TERMINAL BOXES, ETC. SHALL BE INSTALLED IN STRICT ACCORDANCE WITH NEC, 2005 EDITION.
10. ALL REMOTE POWER SUPPLIES FOR HORN/STROBE POWER SHALL BE MONITORED AND ACTIVATED INDIVIDUALLY. UTILIZING A SINGLE NOTIFICATION CIRCUIT OR CONTROL MODULE TO ACTIVATE AND MONITOR MULTIPLE POWER SUPPLIES IS PROHIBITED. ALL POWER SUPPLIES SHALL BE MONITORED FOR AC POWER LOSS, LOW BATTERY, AND ALL GENERAL TROUBLE CONDITIONS.
11. PROVIDE DUCT SMOKE DETECTORS ON RETURN AIR SIDES OF RTU-1, RTU-2, AND RTU-3.

AIR SAMPLING SMOKE DETECTION SYSTEM NOTES:

1. AIR SAMPLING SMOKE DETECTORS SHALL BE MANUFACTURED BY XTRALIS VESDA, FENWAL, OR APPROVED EQUAL.
2. AIR SAMPLING SMOKE DETECTORS SHALL BE INSTALLED AT THE LOCATIONS INDICATED ON THE DESIGN DRAWINGS.
3. AIR SAMPLING SMOKE DETECTORS SHALL BE POWERED BY 24 VDC SOURCE.
4. SAMPLING PIPING SHALL BE CPVC BLAZEMASTER (ORANGE) PIPING. PIPE JOINTS SHALL BE AIRTIGHT AND PERMANENTLY ATTACHED USING AN APPROVED SOLVENT CEMENT.
5. SAMPLING PORTS IN CPVC PIPING SHALL BE SIZED BY THE MANUFACTURER'S REPRESENTATIVE AND IDENTIFIED BY PLACEMENT OF A RED LABEL OR STICKER.
6. SAMPLING PIPE SYSTEM SHALL BE THE CLOSED END DESIGN.
7. AIR SAMPLING SYSTEMS SHALL BE CALCULATED AND PNEUMATICALLY BALANCED. SAMPLING RATE SHALL BE CONSISTENT, OR NOT LESS THAN 20% BETWEEN SAMPLING POINTS (HOLES).
8. AIR SAMPLING SMOKE DETECTORS SHALL BE PROVIDED WITH 7 SPDT RELAY OUTPUTS, INCLUDING ALERT, ACTION, FIRE1 & FIRE 2 CONDITIONS.
9. EACH AIR SAMPLING SMOKE DETECTOR SHALL BE MONITORED BY THE FACP FOR TROUBLE, ALERT, ACTION AND FIRE 1 CONDITIONS. EACH CONDITION SHALL BE ANNUNCIATED INDIVIDUALLY AT THE FACP.
10. ALL AIR SAMPLING SMOKE DETECTOR POWER SUPPLIES SHALL BE MONITORED FOR LOSS OF POWER AND GENERAL TROUBLE CONDITIONS.
11. SUPPORT THE AIR SAMPLING PIPE FROM EMBEDDED CHANNELS IN THE PRE-STRESSED ROOF BEAMS.
12. DRILLING ANCHORS INTO THE PRE-STRESSED ROOF BEAMS IS STRICTLY PROHIBITED.
13. ALL AIR SAMPLING PIPE TO BE FIELD VERIFIED. THE CONTRACTOR SHALL NOT OBSTRUCT THE EMBEDDED CHANNELS IN THE PRE-STRESSED ROOF BEAMS OR INTERFERE WITH THE OPERATION OF THE ROLLING PLATFORM.

LINEAR HEAT DETECTION SYSTEM NOTES:

1. LINEAR HEAT DETECTION SHALL BE PROTECTOWIRE FIBER SYSTEM 4000 SERIES FIBER OPTIC SENSOR CABLE, OR APPROVED EQUAL.
2. LINEAR HEAT DETECTION SYSTEM SHALL MEASURE TEMPERATURES BY MEANS OF OPTICAL FIBERS FUNCTIONING AS LINEAR SENSORS.
3. A SINGLE LENGTH OF SENSOR CABLE MUST BE ABLE TO BE DIVIDED INTO 20 DISTINCTIVE DETECTION ZONES.
4. ALL SENSOR CABLE SHALL BE WATERPROOF.

WATER MIST FIRE SUPPRESSION SYSTEM NOTES:

1. WATER MIST SYSTEMS SHALL BE ACTIVATED BY LINEAR HEAT DETECTION.
2. ALL WATER MIST FIRE PUMPS AND CONTROLLERS SHALL BE MONITORED BY THE FACP. ALL PUMPS AND CONTROLLERS ARE LOCATED IN THE FIRE PROTECTION ROOM.
3. ALL WATER FLOW DEVICES AND FIRE PROTECTION CONTROL VALVES SHALL BE MONITORED BY THE FACP.
4. THE WATER MIST SYSTEM RELEASING PANEL SHALL BE MONITORED BY THE FACP FOR TROUBLE, SUPERVISORY, AND FIRE ALARM CONDITIONS.

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PRINT NAME: T.G. PENNEL
SIGNATURE:
DATE: 03/11/2009 LICENSE #41173

UNIVERSITY OF MINNESOTA | Hines
PROJECT NUMBER 896-06-1711

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DRAWN	R. KEEFE	03-11-09
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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

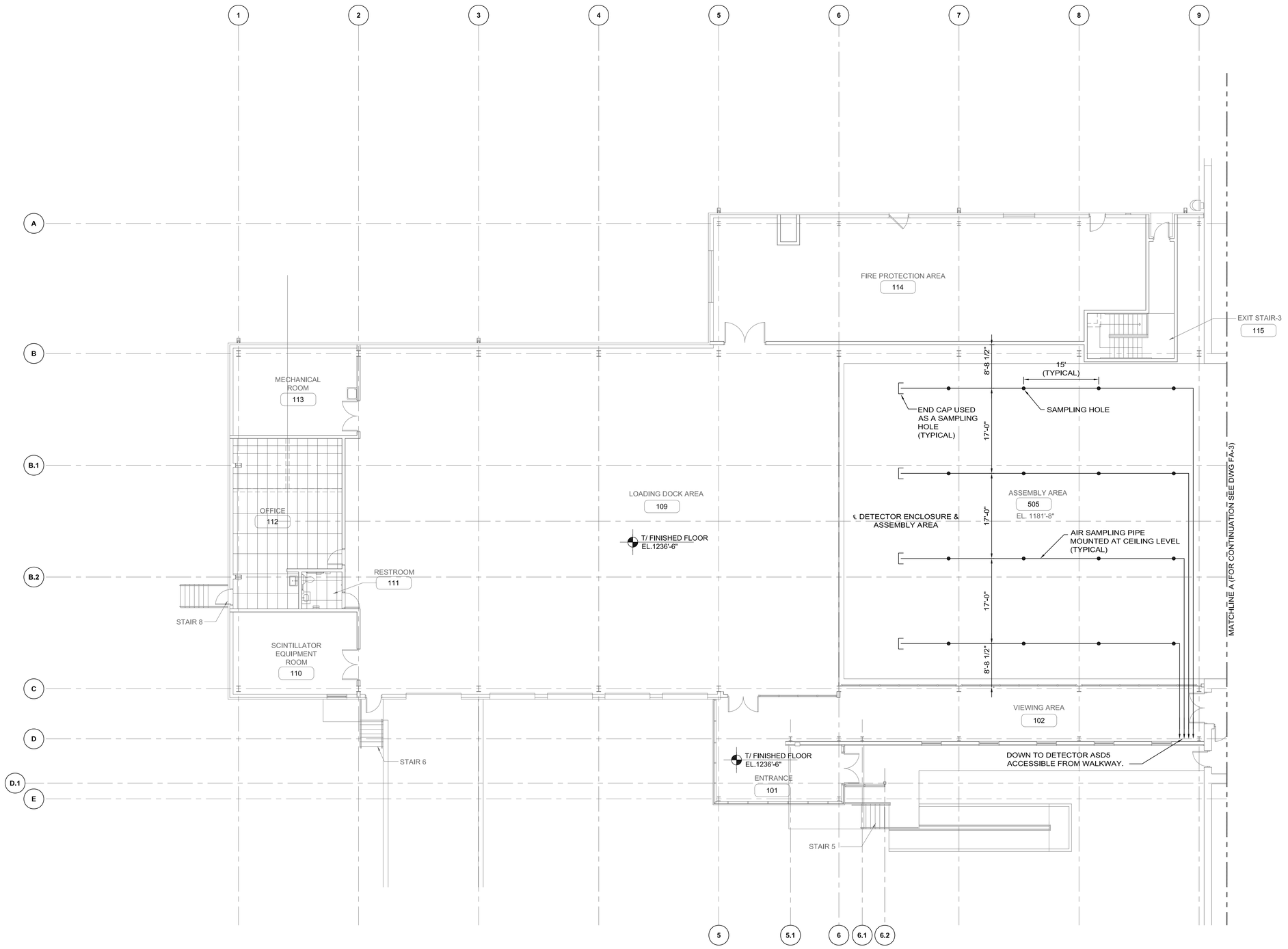
SCALE:

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
GENERAL NOTES & OPERATIONS MATRIX

DRAWING NO. 15-1-3B FA-1 REV. 0

11 MAR, 2009



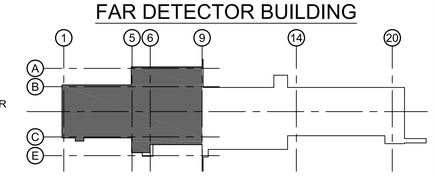
AIR SAMPLING SMOKE DETECTION SYSTEM PLAN EL 1236'-6"

SCALE 1/8"=1'-0"

LEGEND

F	MANUAL PULL STATION	J	4"x4" JUNCTION BOX
SD	AREA SMOKE DETECTOR	WSP	WATER MIST SYSTEM RELEASING PANEL
HSL	HORN/STROBE	FJ	FIRE FIGHTER'S PHONE JACK
L	STROBE	ASP	AIR SAMPLING SMOKE DETECTOR POWER SUPPLY
ASD	AIR SAMPLING SMOKE DETECTOR	MM	ADDRESSABLE MONITOR MODULE
FACP	FIRE ALARM CONTROL PANEL	CM	ADDRESSABLE CONTROL MODULE
RAA	REMOTE LCD ANNUNCIATOR	DD	DUCT SMOKE DETECTOR
RPS	REMOTE POWER SUPPLY PANEL	HD	HEAT DETECTOR
SC	SOLENOID CLOSING COIL BUTTON	●	AIR SAMPLING HOLE

FAR DETECTOR BUILDING



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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
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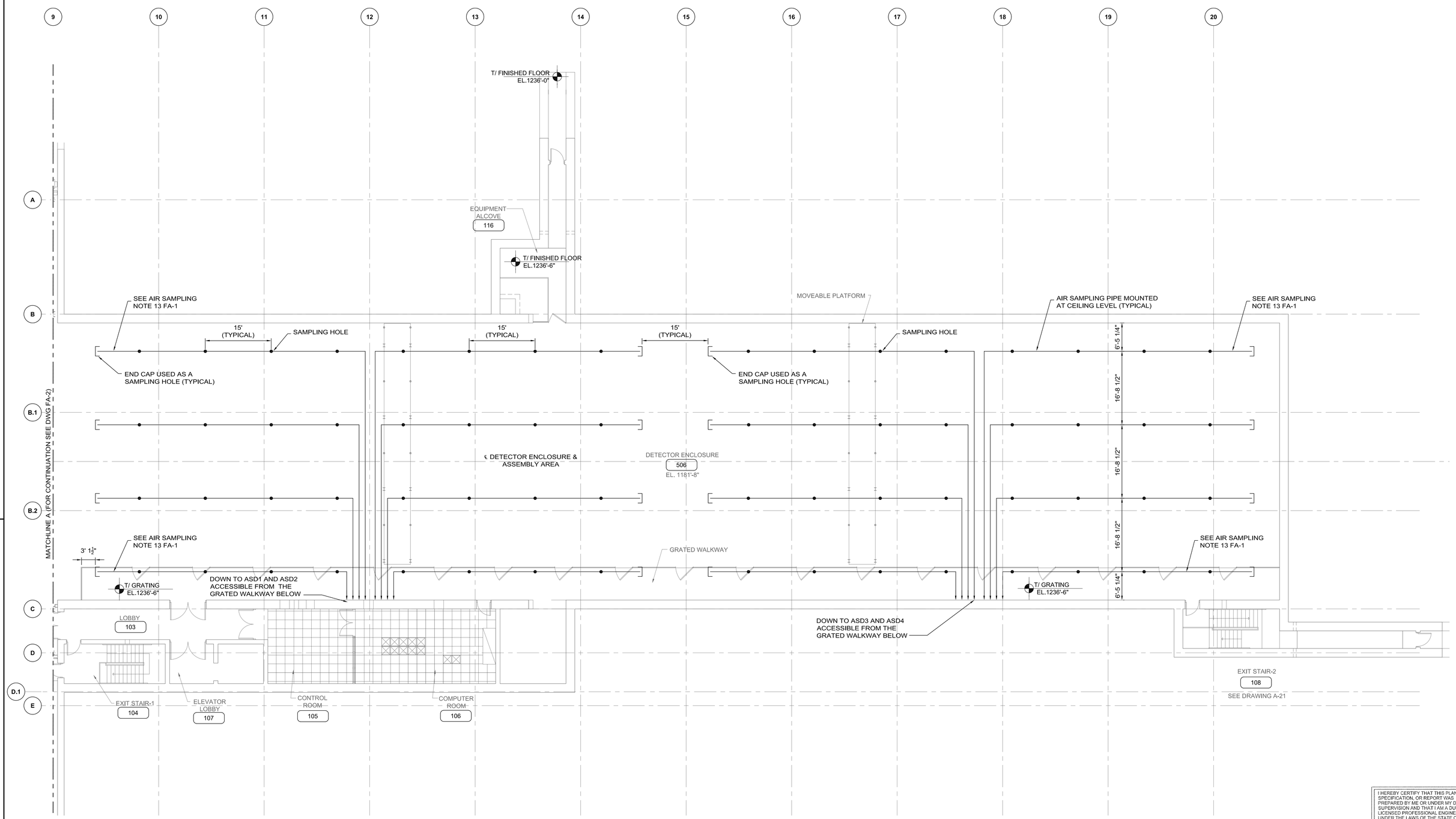
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
AIR SAMPLING SMOKE DETECTION SYSTEM PLAN EL 1236'-6"

DRAWING NO. 15-1-3B FA-2 REV. 0

11 MAR, 2009



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SCALE 1/8"=1'-0"

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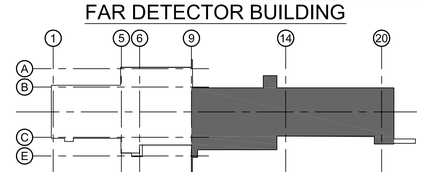
F	MANUAL PULL STATION	J	4"x4" JUNCTION BOX
SD	AREA SMOKE DETECTOR	WSP	WATER MIST SYSTEM RELEASING PANEL
HN	HORN/STROBE	FJ	FIRE FIGHTER'S PHONE JACK
L	STROBE	ASP	AIR SAMPLING SMOKE DETECTOR POWER SUPPLY
ASD	AIR SAMPLING SMOKE DETECTOR	MM	ADDRESSABLE MONITOR MODULE
FACP	FIRE ALARM CONTROL PANEL	CM	ADDRESSABLE CONTROL MODULE
RAA	REMOTE LCD ANNUNCIATOR	DD	DUCT SMOKE DETECTOR
RPS	REMOTE POWER SUPPLY PANEL	HD	HEAT DETECTOR
SC	SOLENOID CLOSING COIL BUTTON	●	AIR SAMPLING HOLE

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" (8 0 8 16 SCALE FEET)

UNIVERSITY OF MINNESOTA
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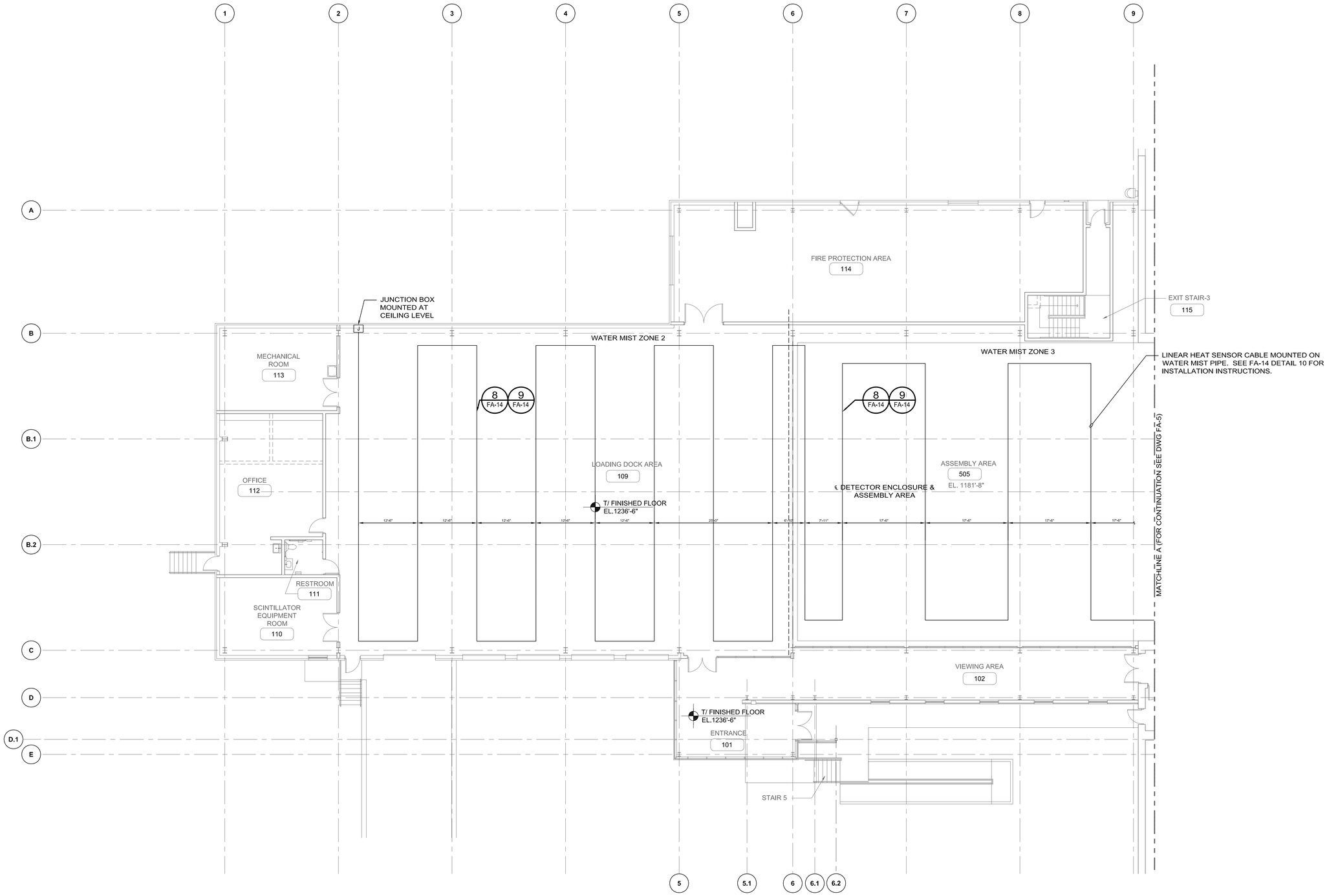
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
AIR SAMPLING SMOKE DETECTION SYSTEM PLAN EL 1236'-6"

DRAWING NO. 15-1-3B FA-3 REV. 0

11 MAR, 2009



LINEAR HEAT DETECTION SYSTEM PLAN EL 1236'-6"

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

LEGEND

F	MANUAL PULL STATION	J	4"x4" JUNCTION BOX
SD	AREA SMOKE DETECTOR	WSP	WATER MIST SYSTEM RELEASING PANEL
H/S	HORN/STROBE	FJ	FIRE FIGHTER'S PHONE JACK
L	STROBE	ASP	AIR SAMPLING SMOKE DETECTOR POWER SUPPLY
ASD	AIR SAMPLING SMOKE DETECTOR	MM	ADDRESSABLE MONITOR MODULE
FACP	FIRE ALARM CONTROL PANEL	CM	ADDRESSABLE CONTROL MODULE
RAA	REMOTE LCD ANNUNCIATOR	DD	DUCT SMOKE DETECTOR
RPS	REMOTE POWER SUPPLY PANEL	HD	HEAT DETECTOR
SC	SOLENOID CLOSING COIL BUTTON	●	AIR SAMPLING HOLE

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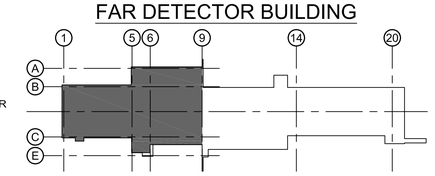
FAR DETECTOR BUILDING



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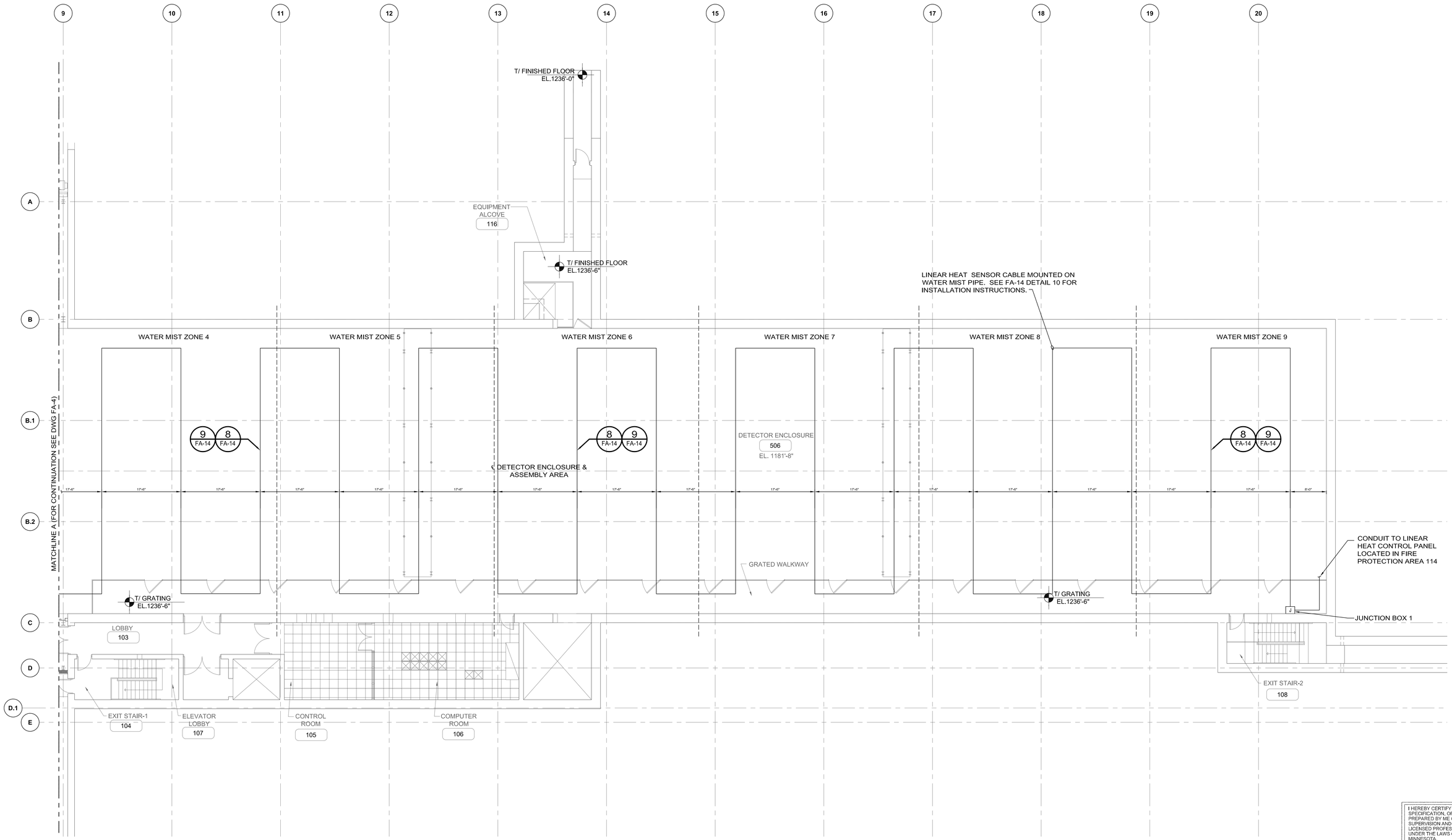
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
LINEAR HEAT DETECTION SYSTEM PLAN

DRAWING NO. 15-1-3B FA-4 REV. 0

11 MAR, 2009



LINEAR HEAT DETECTION SYSTEM PLAN EL 1236'-6"

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

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LEGEND

F	MANUAL PULL STATION	J	4"x4" JUNCTION BOX
SD	AREA SMOKE DETECTOR	WSP	WATER MIST SYSTEM RELEASING PANEL
H/L	HORN/STROBE	FJ	FIRE FIGHTER'S PHONE JACK
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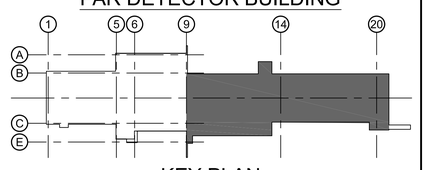
FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE: 1/8"=1'-0" (8 0 8 16 SCALE FEET)

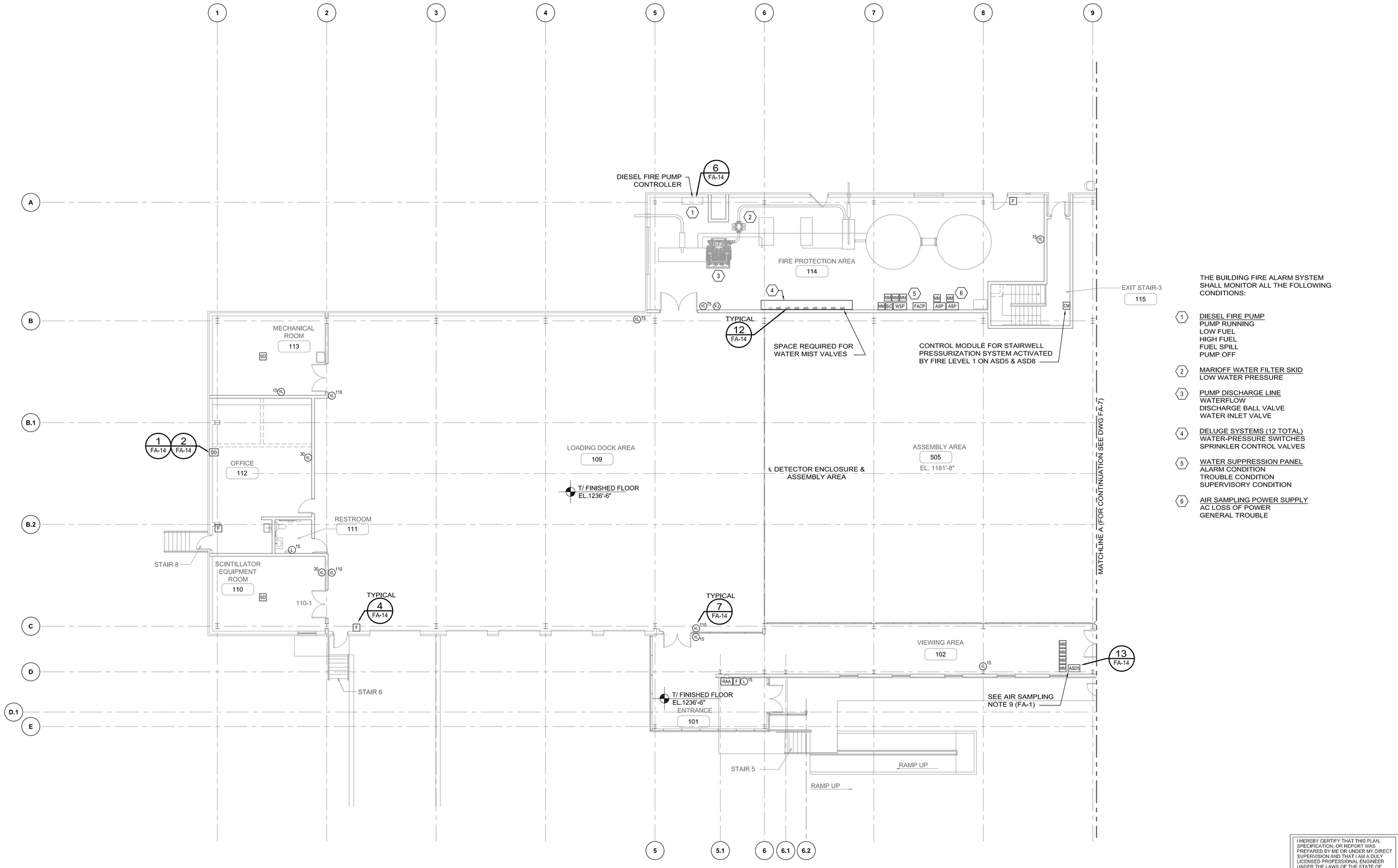
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

LINEAR HEAT DETECTION SYSTEM PLAN

DRAWING NO. 15-1-3B FA-5 REV. 0

11 MAR, 2009



THE BUILDING FIRE ALARM SYSTEM SHALL MONITOR ALL THE FOLLOWING CONDITIONS:

1. DIESEL FIRE PUMP
   PUMP RUNNING
   LOW FUEL
   HIGH FUEL
   FUEL SPILL
   PUMP OFF
2. MARIOFF WATER FILTER SKID
   LOW WATER PRESSURE
3. PUMP DISCHARGE LINE
   WATERFLOW
   DISCHARGE BALL VALVE
   WATER INLET VALVE
4. DELUGE SYSTEMS (12 TOTAL)
   WATER-PRESSURE SWITCHES
   SPRINKLER CONTROL VALVES
5. WATER SUPPRESSION PANEL
   ALARM CONDITION
   TROUBLE CONDITION
   SUPERVISORY CONDITION
6. AIR SAMPLING POWER SUPPLY
   AC LOSS OF POWER
   GENERAL TROUBLE

FIRE ALARM PLAN EL 1236'-6"

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

LEGEND

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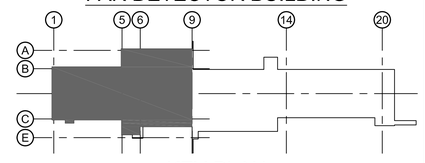

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PROJECT NORTH

SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

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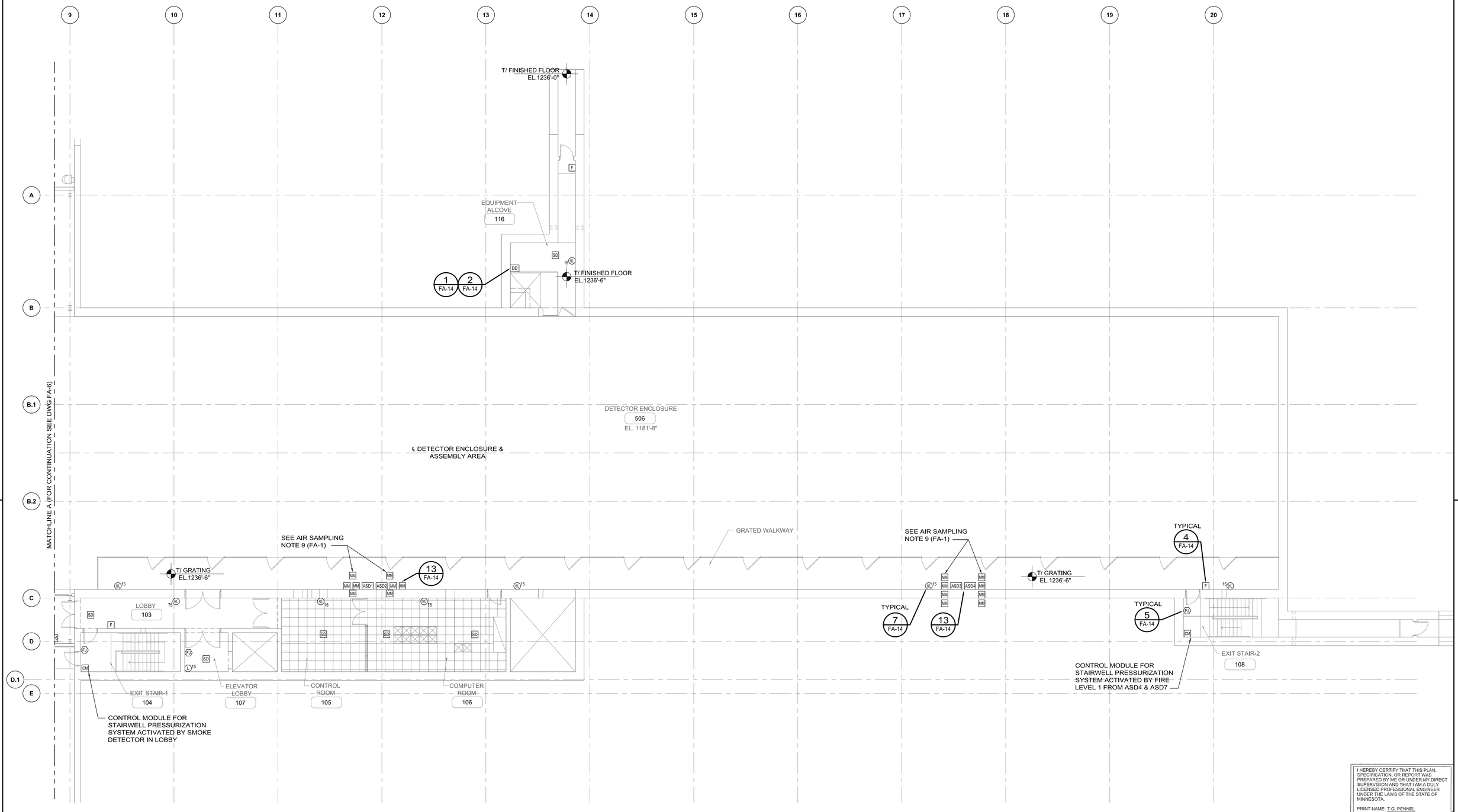
NOνA FAR DETECTOR BUILDING
FIRE ALARM PLAN EL 1236'-6"

DRAWING NO. 15-1-3B FA-6 REV. 0

11 MAR, 2009



FIRE ALARM PLAN EL 1236'-6"

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

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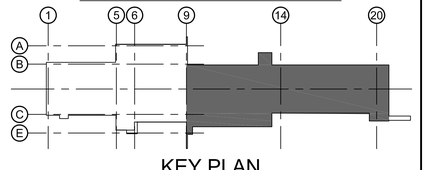
FAR DETECTOR BUILDING



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PRINT NAME: T.G. PENNEL

SIGNATURE:

DATE: 03/11/2009 LICENSE #41173

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

SCHIRMER ENGINEERING
1000 Milwaukee Avenue, 5th Floor
Glenview, IL 60025
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www.schirmereng.com
Fire Protection ■ Code Consulting ■ Process Safety ■ Security Consulting

Burns & McDonnell
SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	M. SUSKI	03-11-09
DRAWN	R. KEEFE	03-11-09
CHECKED	R. GLENN	03-11-09
APPROVED	G. PENNEL	03-11-09

OWNER / REPRESENTATIVE		DATE
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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

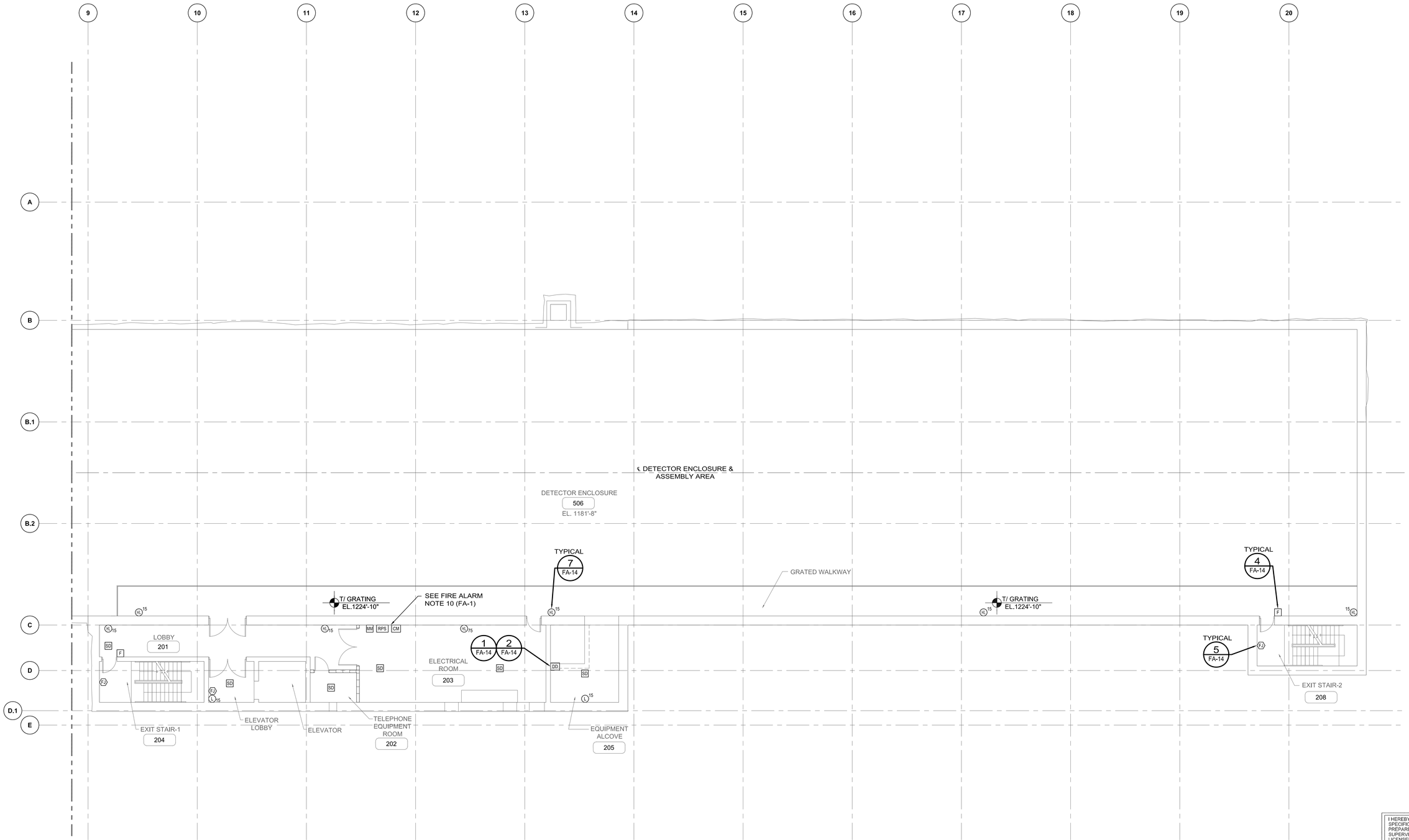
SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
FIRE ALARM PLAN EL 1236'-6"

DRAWING NO. 15-1-3B FA-7 REV. 0

11 MAR, 2009

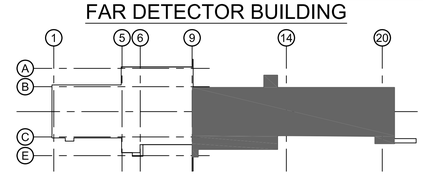


FIRE ALARM PLAN EL 1224'-10"

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

LEGEND

F	MANUAL PULL STATION	J	4"x4" JUNCTION BOX
SD	AREA SMOKE DETECTOR	WSP	WATER MIST SYSTEM RELEASING PANEL
HS	HORN/STROBE	FJ	FIRE FIGHTER'S PHONE JACK
L	STROBE	ASP	AIR SAMPLING SMOKE DETECTOR POWER SUPPLY
ASD	AIR SAMPLING SMOKE DETECTOR	MM	ADDRESSABLE MONITOR MODULE
FACP	FIRE ALARM CONTROL PANEL	CM	ADDRESSABLE CONTROL MODULE
RAA	REMOTE LCD ANNUNCIATOR	DD	DUCT SMOKE DETECTOR
RPS	REMOTE POWER SUPPLY PANEL	HD	HEAT DETECTOR
SC	SOLENOID CLOSING COIL BUTTON	●	AIR SAMPLING HOLE



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

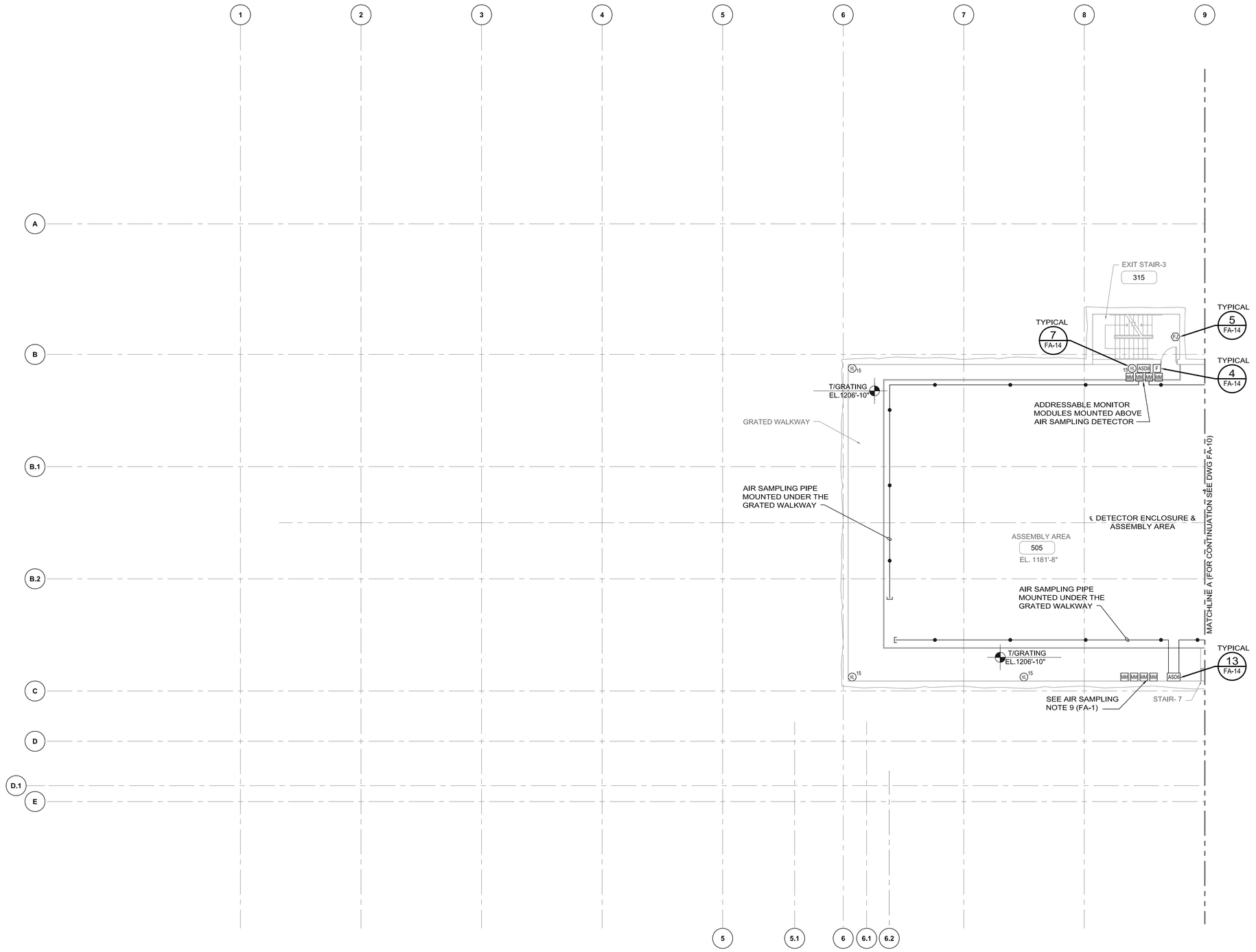
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

FIRE ALARM PLAN EL 1224'-10"

DRAWING NO. 15-1-3B FA-8 REV. 0

11 MAR, 2009



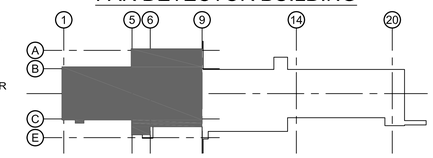
FIRE ALARM PLAN EL 1206'-10"

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

LEGEND

F	MANUAL PULL STATION	J	4"x4" JUNCTION BOX
SD	AREA SMOKE DETECTOR	WSP	WATER MIST SYSTEM RELEASING PANEL
H/S	HORN/STROBE	FJ	FIRE FIGHTER'S PHONE JACK
L	STROBE	ASP	AIR SAMPLING SMOKE DETECTOR POWER SUPPLY
ASD	AIR SAMPLING SMOKE DETECTOR	MM	ADDRESSABLE MONITOR MODULE
FACP	FIRE ALARM CONTROL PANEL	CM	ADDRESSABLE CONTROL MODULE
RAA	REMOTE LCD ANNUNCIATOR	DD	DUCT SMOKE DETECTOR
RPS	REMOTE POWER SUPPLY PANEL	HD	HEAT DETECTOR
SC	SOLENOID CLOSING COIL BUTTON	•	AIR SAMPLING HOLE

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/8"=1'-0" 8 0 8 16 SCALE FEET

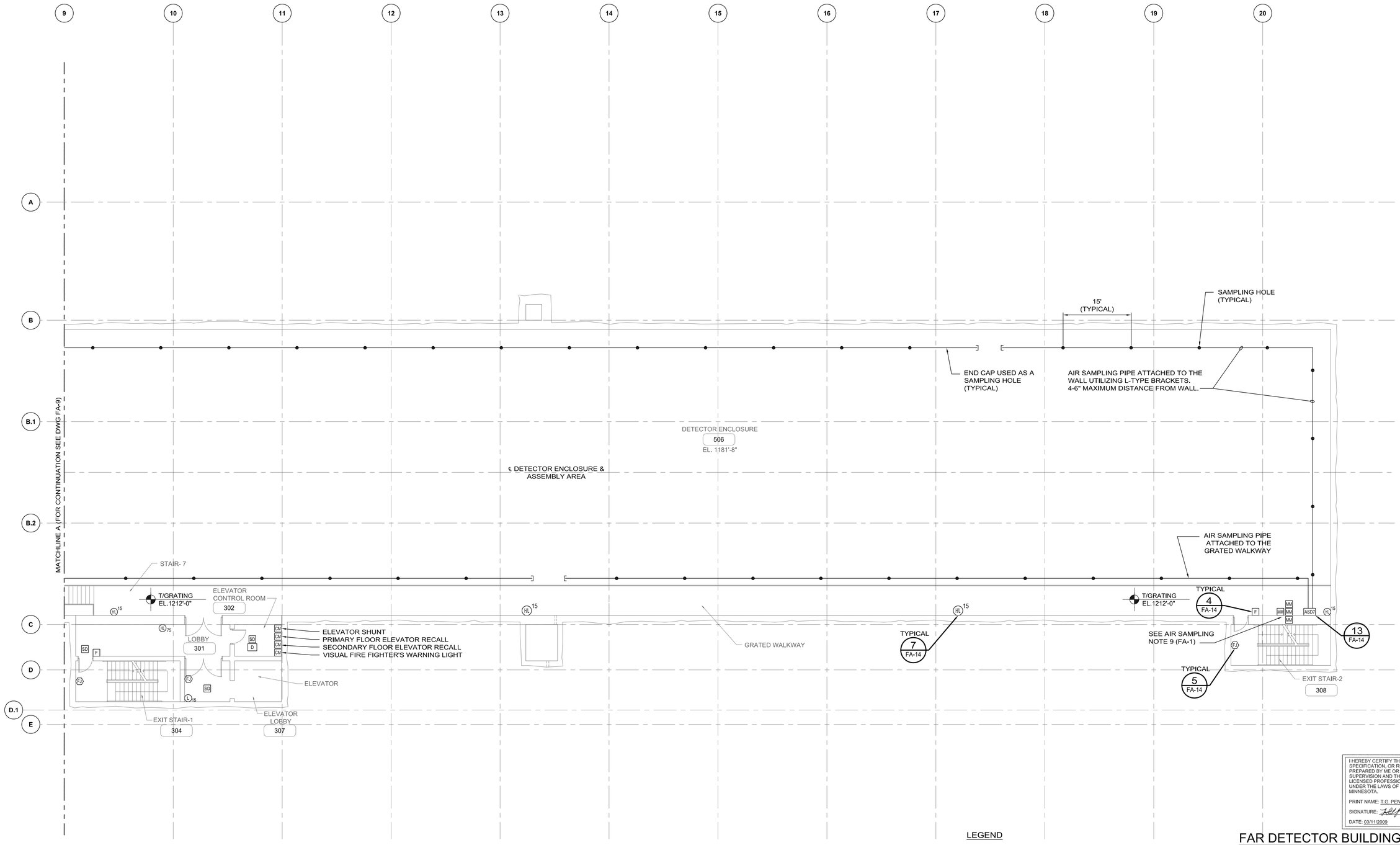
UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
FIRE ALARM PLAN EL 1206'-10"

DRAWING NO. 15-1-3B FA-9 REV. 0

11 MAR, 2009



FIRE ALARM PLAN EL 1212'-0"

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

LEGEND

F	MANUAL PULL STATION	J	4"x4" JUNCTION BOX
SD	AREA SMOKE DETECTOR	WSP	WATER MIST SYSTEM RELEASING PANEL
HL	HORN/STROBE	FJ	FIRE FIGHTER'S PHONE JACK
L	STROBE	ASP	AIR SAMPLING SMOKE DETECTOR POWER SUPPLY
ASD	AIR SAMPLING SMOKE DETECTOR	MM	ADDRESSABLE MONITOR MODULE
FACP	FIRE ALARM CONTROL PANEL	CM	ADDRESSABLE CONTROL MODULE
RAA	REMOTE LCD ANNUNCIATOR	DD	DUCT SMOKE DETECTOR
RPS	REMOTE POWER SUPPLY PANEL	HD	HEAT DETECTOR
SC	SOLENOID CLOSING COIL BUTTON	•	AIR SAMPLING HOLE

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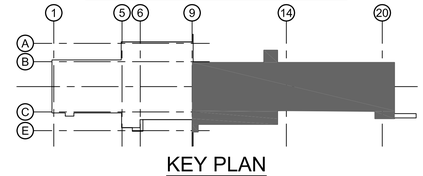
FAR DETECTOR BUILDING



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PROJECT NORTH

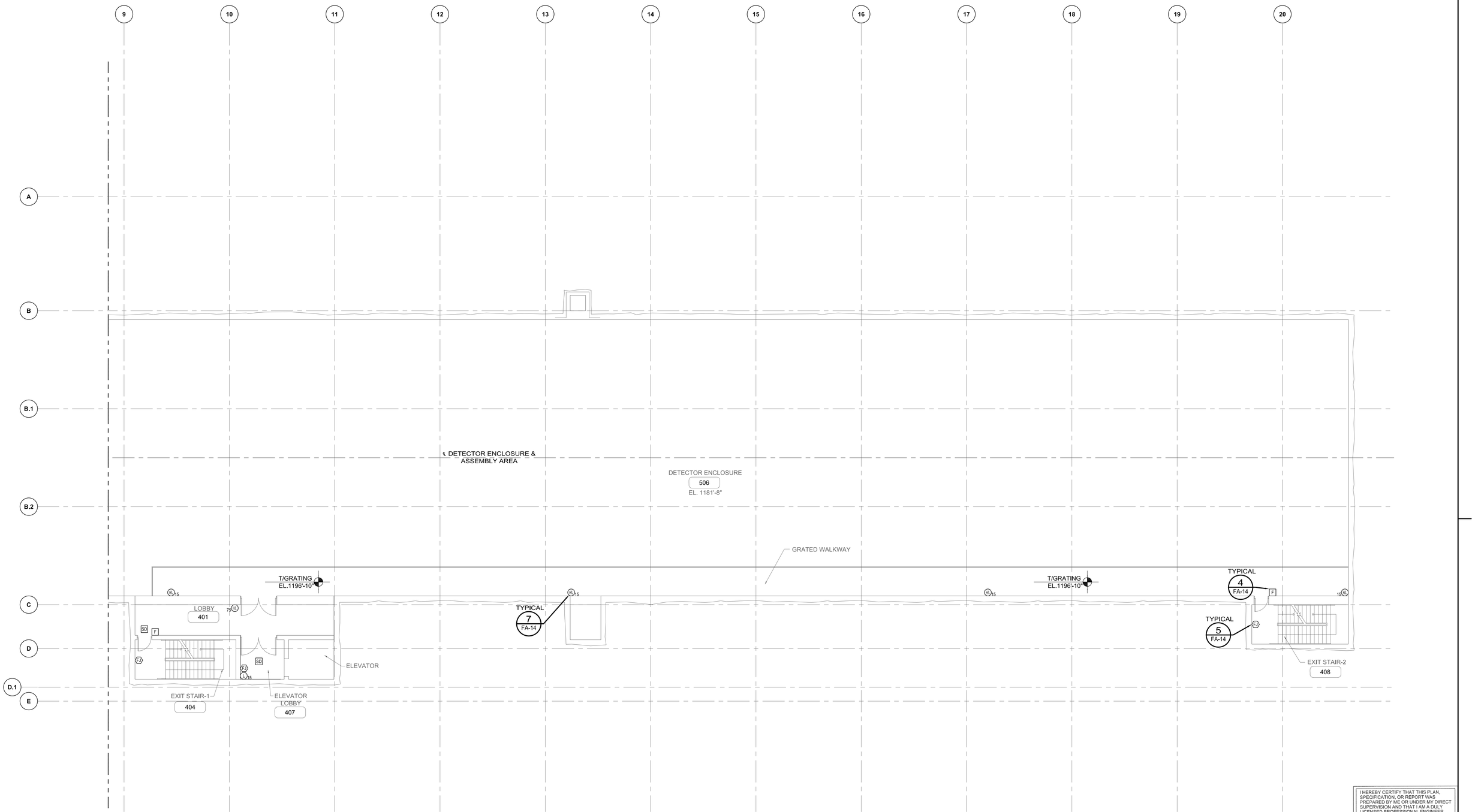
SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
FIRE ALARM PLAN EL 1212'-0"

DRAWING NO. 15-1-3B FA-10 REV. 0

11 MAR. 2009



FIRE ALARM PLAN EL 1196'-10"

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

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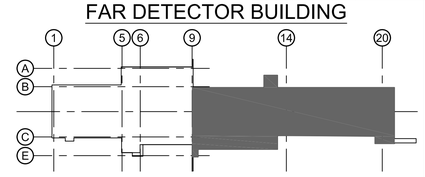
LEGEND

F	MANUAL PULL STATION	J	4"x4" JUNCTION BOX
SD	AREA SMOKE DETECTOR	WSP	WATER MIST SYSTEM RELEASING PANEL
H/L	HORN/STROBE	FJ	FIRE FIGHTER'S PHONE JACK
L	STROBE	ASP	AIR SAMPLING SMOKE DETECTOR POWER SUPPLY
ASD	AIR SAMPLING SMOKE DETECTOR	MM	ADDRESSABLE MONITOR MODULE
FACP	FIRE ALARM CONTROL PANEL	CM	ADDRESSABLE CONTROL MODULE
RAA	REMOTE LCD ANNUNCIATOR	DD	DUCT SMOKE DETECTOR
RPS	REMOTE POWER SUPPLY PANEL	HD	HEAT DETECTOR
SC	SOLENOID CLOSING COIL BUTTON	●	AIR SAMPLING HOLE

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:
1/8"= 1'-0"
8 0 8 16
SCALE FEET

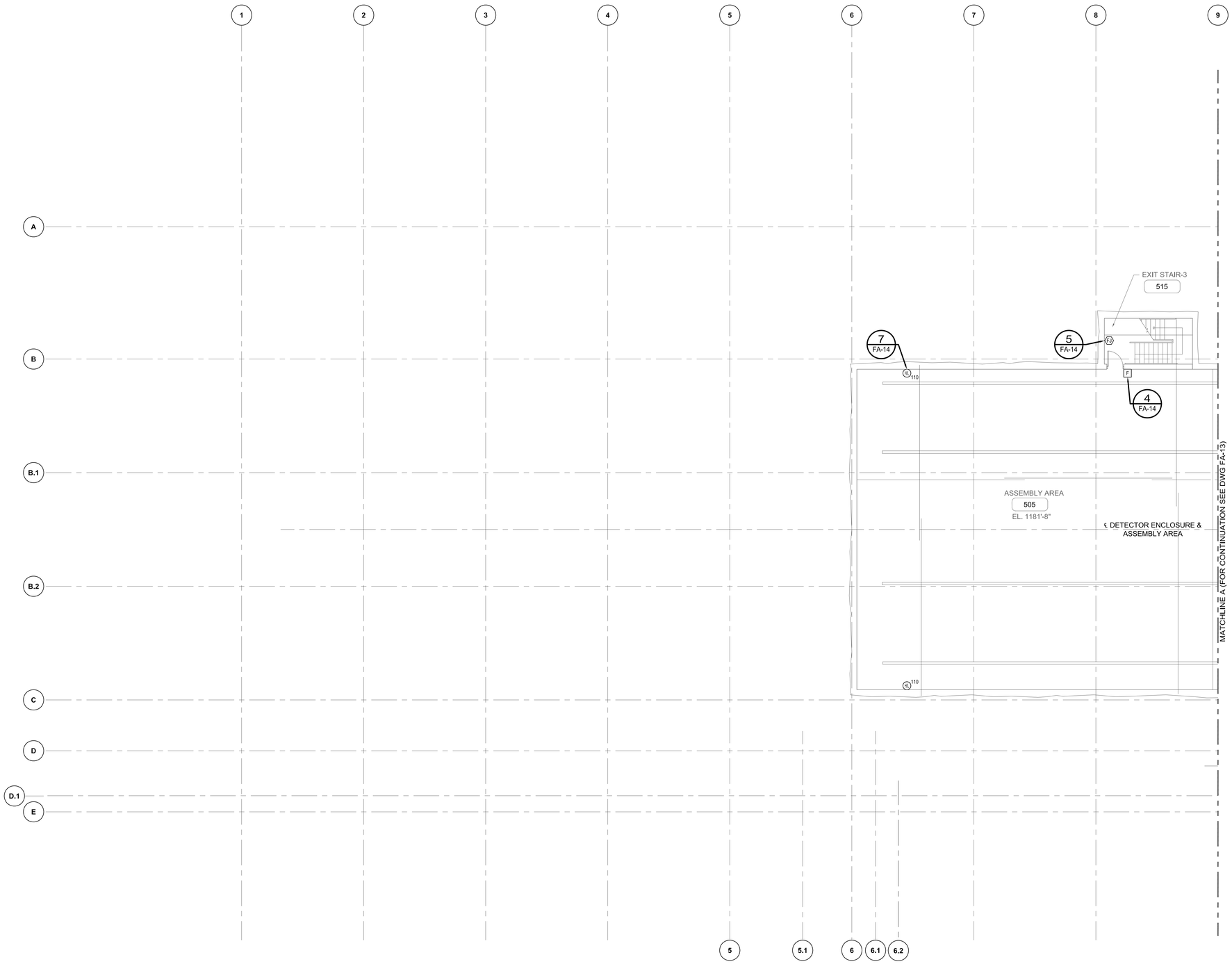
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

FIRE ALARM PLAN EL 1196'-10"

DRAWING NO. 15-1-3B FA-11 REV. 0

11 MAR, 2009



FIRE ALARM PLAN EL 1181'-8"

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

LEGEND

F	MANUAL PULL STATION
SD	AREA SMOKE DETECTOR
HL	HORN/STROBE
L	STROBE
ASD	AIR SAMPLING SMOKE DETECTOR
FACP	FIRE ALARM CONTROL PANEL
RAA	REMOTE LCD ANNUNCIATOR
RPS	REMOTE POWER SUPPLY PANEL
SC	SOLENOID CLOSING COIL BUTTON
J	4"x4" JUNCTION BOX
WSP	WATER MIST SYSTEM RELEASING PANEL
FJ	FIRE FIGHTER'S PHONE JACK
ASP	AIR SAMPLING SMOKE DETECTOR POWER SUPPLY
MM	ADDRESSABLE MONITOR MODULE
CM	ADDRESSABLE CONTROL MODULE
DD	DUCT SMOKE DETECTOR
HD	HEAT DETECTOR
●	AIR SAMPLING HOLE

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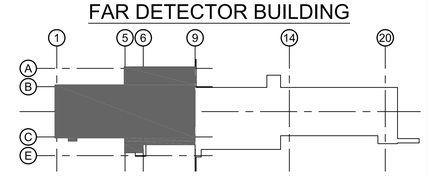

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PROJECT NORTH

SCALE:

1/8"=1'-0" SCALE 8 0 8 16 FEET

FERMI NATIONAL ACCELERATOR LABORATORY

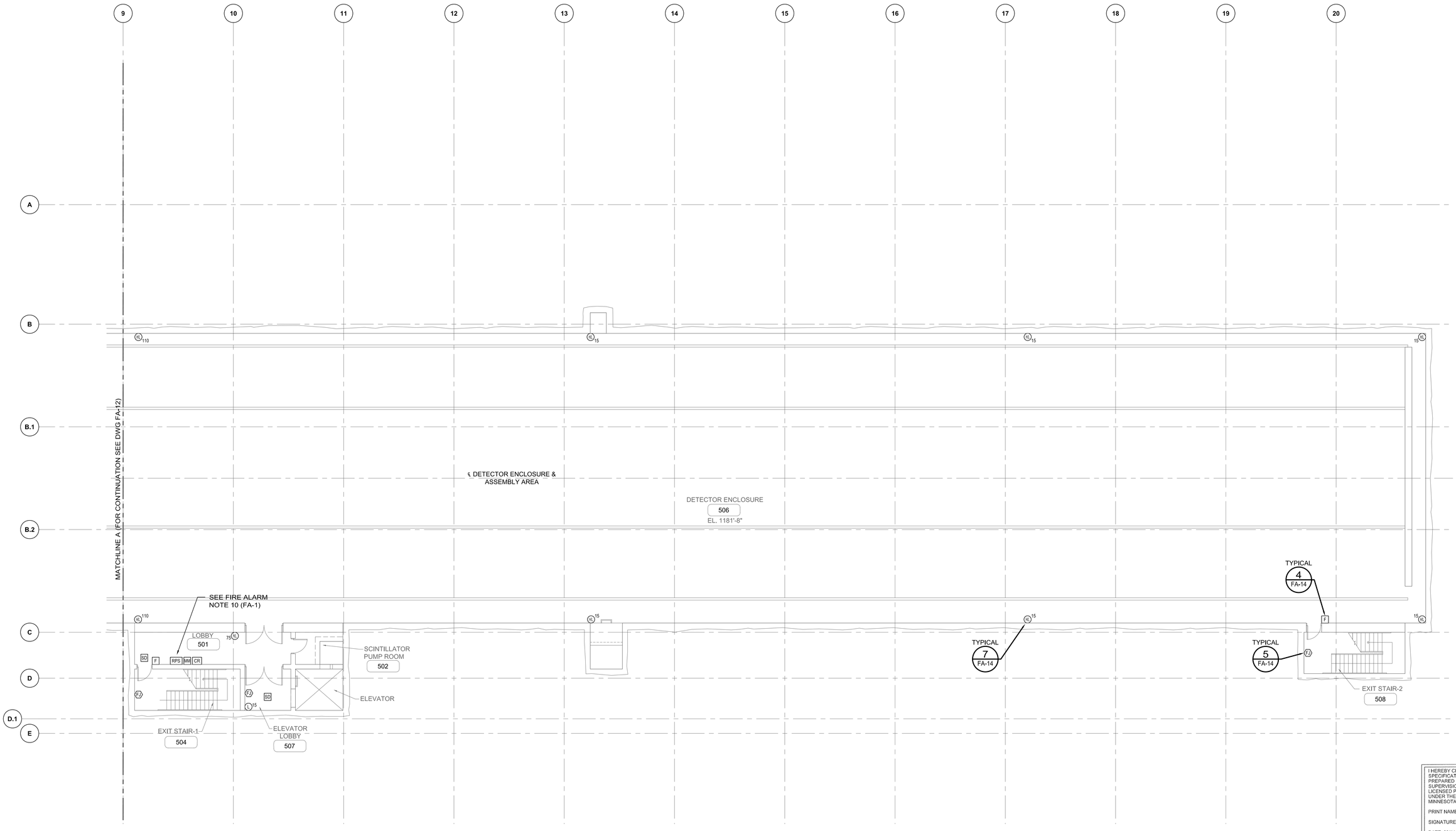
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

FIRE ALARM PLAN EL 1181'-8"

DRAWING NO. 15-1-3B FA-12 REV. 0

11 MAR, 2009



FIRE ALARM PLAN EL 1181'-8"

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

LEGEND

F	MANUAL PULL STATION
SD	AREA SMOKE DETECTOR
H/S	HORN/STROBE
L	STROBE
ASD	AIR SAMPLING SMOKE DETECTOR
FACP	FIRE ALARM CONTROL PANEL
RAA	REMOTE LCD ANNUNCIATOR
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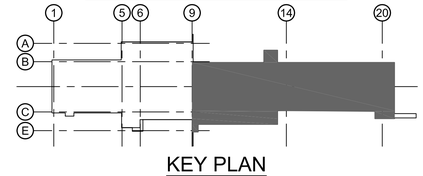

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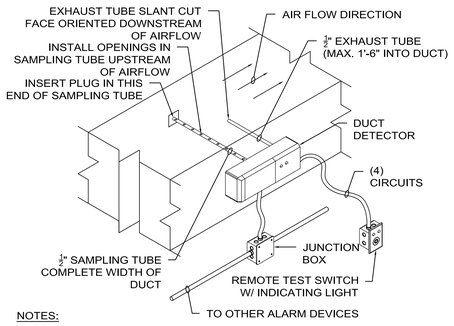
PROJECT NORTH

SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

NOνA FAR DETECTOR BUILDING
FIRE ALARM PLAN EL 1181'-8"

DRAWING NO. 15-1-3B FA-13 REV. 0

11 MAR. 2009



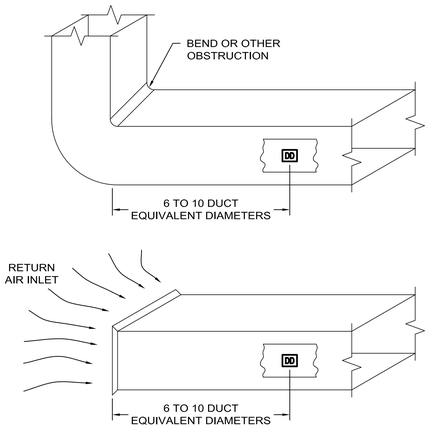
NOTES:

1. SAMPLING TUBES SHALL COVER THE ENTIRE WIDTH OF DUCT.
2. FIELD VERIFY ACTUAL DUCT SIZE.
3. DO NOT INSERT A PLUG IN THE EXHAUST TUBE.
4. FIRE ALARM CONTRACTOR SHALL LEAVE (2) CONTACTS FOR TIE IN OF ROOF TOP UNIT (RHU) DAMPER.
5. TUBE SUPPORT HOLE ONLY FOR DUCTS MORE THAN 0.9M (3 FT.) WIDE

AIR DUCT SMOKE MOUNTING W/ SAMPLING TUBE ORIENTATION (1)

SCALE: N.T.S.

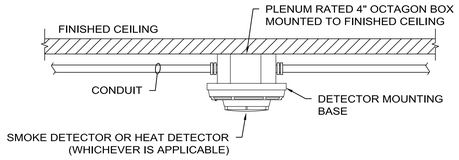
FA-6
FA-7 THRU FA-8



TYPICAL DUCT DETECTOR PLACEMENT (2)

SCALE: N.T.S.

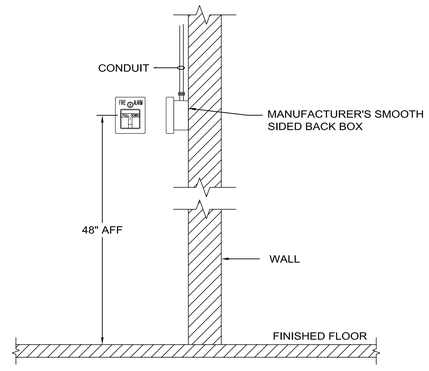
FA-6
FA-7 THRU FA-8



SURFACE CEILING MOUNTED SMOKE/HEAT DETECTOR (3)

SCALE: N.T.S.

FA-6
FA-7 THRU FA-8
FA-10
FA-11
FA-13



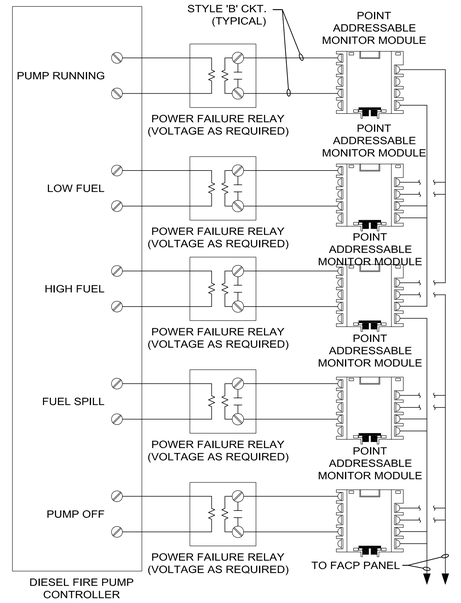
NOTES:

1. ALL MANUAL FIRE ALARM BOXES SHALL BE MOUNTED 4'-0" ABOVE FLOOR.

WALL MOUNTED MANUAL STATION (4)

SCALE: N.T.S.

FA-7
FA-8 THRU FA-13



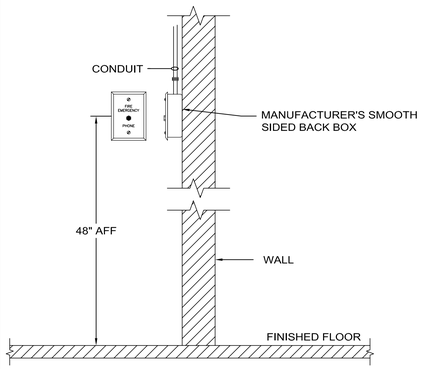
NOTES:

1. ALL WIRE TO BE U.L. LISTED FOR FIRE ALARM.
2. MOUNT POINT ADDRESSABLE MONITOR MODULES IN U.L. LISTED ENCLOSURES, PROVIDED BY ALARM SYSTEM MANUFACTURER.

DIESEL FIRE PUMP SUPERVISION WIRING DIAGRAM (5)

SCALE: N.T.S.

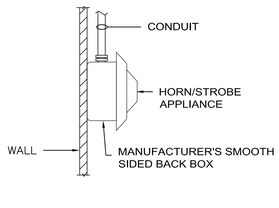
FA-6



WALL MOUNTED FIRE FIGHTER'S TELEPHONE JACK (6)

SCALE: N.T.S.

FA-6
FA-7 THRU FA-13



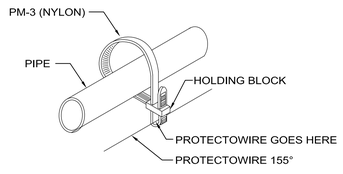
NOTE:

1. IF CEILING HEIGHTS ALLOW, AND UNLESS OTHERWISE PERMITTED WALL MOUNTED APPLIANCES SHALL BE MOUNTED SUCH THAT THE ENTIRE APPLIANCE IS NOT LESS THAN 80" AFF AND NOT GREATER THAN 96" AFF.

WALL MOUNTED FIRE FIGHTER'S TELEPHONE JACK (7)

SCALE: N.T.S.

FA-6
FA-7 THRU FA-13



DIRECTIONS FOR INSTALLING

1. WRAP STRAP AROUND PIPE WITH SERRATIONS ON THE INSIDE (NEXT TO THE PIPE).
2. PULL POINTED END OF STRAP THRU THE SLOT IN THE HOLDING BLOCK NEXT TO THE PIPE AND PULL UP LIGHT WITH YOUR FINGERS, ARRANGING THE STRAP HOLDER TO BE IN THE POSITION THE PROTECTOWIRE IS TO BE LOCATED.
3. PUT THE POINTED END OF THE STRAP BACK THRU THE HOLDING BLOCK IN THE OUTSIDE SLOT, PULL STRAP JUST TIGHT ENOUGH TO HOLD IN POSITION.
4. WHEN MOUNTING THE PROTECTOWIRE, PLACE IT THRU THE LOOP JUST MADE AND PULL THE STRAP TIGHT ENOUGH TO HOLD THE WIRE IN POSITION.
5. INSTALL PM-3 MOUNTING STRAPS AT 10 FOOT SPACINGS.

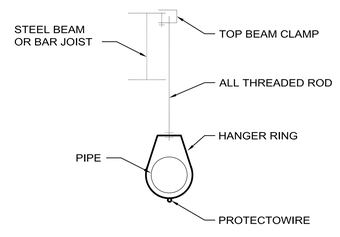
PM-3 SERIES:

CATALOG NO.	PIPE SIZE
PM-3A	¾" TO 2"
PM-3B	2" TO 3½"

PROTECTOWIRE WIRE PIPE MOUNTING STRAP MODEL NO. PM-3 (8)

SCALE: N.T.S.

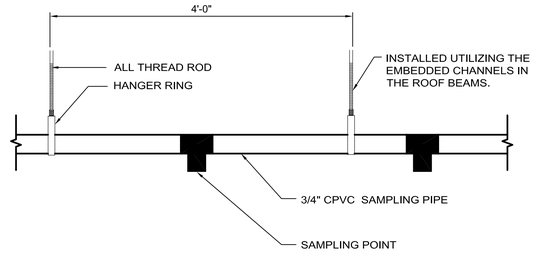
FA-4
FA-5



DETAIL SHOWING PROTECTOWIRE RELATION TO WATER MIST PIPES/HANGERS (9)

SCALE: N.T.S.

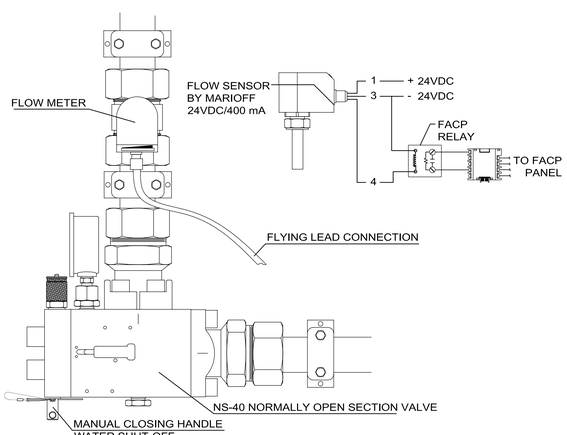
FA-4
FA-5



AIR SAMPLING PIPE MOUNTING DETAIL (10)

SCALE: N.T.S.

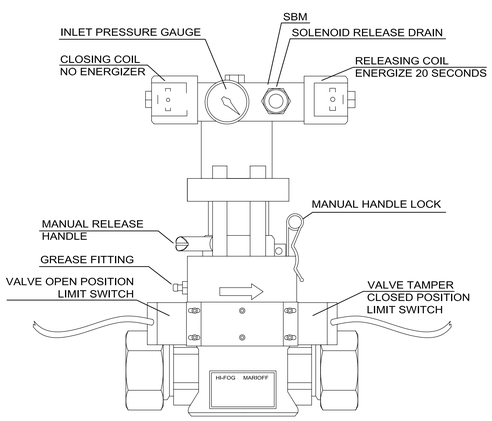
FA-2
FA-3



TYPICAL WET PIPE VALVE & WATFLOW SWITCH (11)

SCALE: N.T.S.

-



TYPICAL WATERMIST DELUGE VALVE (12)

SCALE: N.T.S.

FA-6

NOTES:

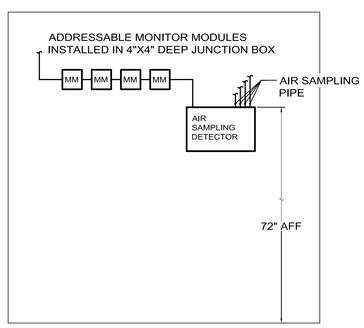
1. ELECTRICAL REQUIREMENTS:

   TO OPEN VALVE: 24VDC/1AMP SIGNAL HELD FOR 20 SECONDS ON RELEASING COIL WITH NO POWER ON CLOSING COIL. SOLENOIDS ARE CONTROLLED BY THE RELEASING PANEL.

   TO CLOSE VALVE: 24VDC/1AMP SIGNAL HELD FOR 20 SECONDS ON CLOSING COIL WITH NO POWER ON RELEASING COIL. SOLENOIDS ARE CONTROLLED BY THE RELEASING PANEL.

   POSITION LIMIT SWITCHES: THESE SWITCHES ARE FORM C CONTACT MOLDED SWITCHES WITH FLYING LEAD TYPE WIRES. THESE ARE NOT ABLE TO BE MONITORED USING A RESISTOR TO THE SWITCH DUE TO BEING A SELAED UNIT. A JUNCTION BOX MUST BE MOUNTED AS CLOSE TO THE SWITCH AS PRACTICAL AND WIRING MONITORED UP TO THE JUNCTION BOX.

2. THE VALVE OPEN POSITION LIMIT SWITCH SHALL BE MONITORED BY THE FACP. THIS SWITCH IS WIRED TO NORMALLY OPEN SET OF CONTACTS AND SHALL INITIATE A WATERFLOW OR DELUGE VALVE ACTIVATED SIGNAL TO THE FACP.



AIR SAMPLING DETECTOR MOUNTING DETAIL (13)

SCALE: 1" = 1'-0"

-

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

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Fire Protection ■ Code Consulting ■ Process Safety ■ Security Consulting

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	M. SUSKI	03-11-09
DRAWN	R. KEEFE	03-11-09
CHECKED	R. GLENN	03-11-09
APPROVED	G. PENNEL	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
DETAILS

DRAWING NO. 15-1-3B FA-14 REV. 0

11 MAR, 2009

GENERAL NOTES - WATER MIST SYSTEM:

1. DISTRIBUTION NETWORK

1.01 THE PIPING SYSTEM FEATURES A SINGLE LINE ARRANGEMENT.
1.02 ALL TUBING IS MADE OF CORROSION RESISTANT WELDED AISI316 OR 316L STAINLESS STEEL ACCORDING TO DIN 17458/DIN 2462 OR EQUAL.
1.03 THE FOLLOWING TUBE SIZES/WALL THICKNESS ARE USED:

O.D.	WALL THICKNESS
12mm	1.2mm
16mm	1.5mm
25mm	2mm
30mm	2.5mm
38mm	3mm
60.3mm	3.91mm

1.04 THE CONNECTIONS ARE FERRULE TYPE DIN 2353 JOINTS.
1.05 PIPE CLAMPS ARE EQUIPPED WITH STEEL BOTTOM AND COVER PLATES.THE DISTANCE BETWEEN CLAMPS IS TO BE AS FOLLOWS:

TUBE SIZE (mm)	DISTANCE OF CLAMPS (FEET)
12mm	4' ±12"
16mm	5' ±12"
25mm	6' ±12"
30mm	7' ±12"
38mm	7' ±12"
60mm	11' ±12"

1.06 STRENGTH CALCULATIONS OF TUBING ARE IN CONFORMANCE WITH NFPA 750
1.07 THE MAXIMUM OPERATION PRESSURE AT THE PUMP UNIT IS 140 BAR (2000 PSI) THE MINIMUM DESIGN PRESSURE AT THE SPRAY HEAD IS 70 BAR (1000 PSI).
1.08 SEE PRESSURE DROP CALCULATIONS ON SHEETS FP-19 AND FP-20 OF THIS DRAWING SET.

2. SOLENOID VALVES AND FLUSHING VALVES

2.01 DUAL COIL SOLENOID CONTROLLED BALL VALVES ARE USED TO RELEASE WATER MIST TO THE DELUGE ZONES
2.02 THE SOLENOID VALVES REQUIRE 24 VOLT/1 AMP SIGNALS BOTH TO OPEN AND TO CLOSE THE VALVE FROM SEPERATE MODULES
2.03 A NORMALLLY OPEN SECTION VALVE IS USED TO MONITOR THE WET PIPE SPRINKLER SYSTEM
2.04 A PISTON POSITION SWITCH IS USED TO IDENTIFY FLOW IN THE WET PIPE ZONE
2.05 FLUSHING VALVES ARE LOCATED ON THE LOWEST LEVELS IN THE STAIRWELLS FOR FLUSHING THE WET PIPE SYSTEM

3. WATER SUPPLY, FLUSHING AND SYSTEM FILTRATION

3.01 THE SYSTEM MUST BE PROPERLY CLEANED AND FLUSHED BEFORE IT IS COMMISSIONED. THE CLEANLINESS LEVEL MUST BE MAINTAINED AT ALL TIMES BY AN EFFICIENT FILTRATION ARRANGEMENT DESCRIBED IN SECTION 3.02.
3.02 WATER USED FOR THE HI-FOG SYSTEMS SHOULD BE THE EQUIVALENT OF A POTABLE SUPPLY. THE HI-FOG PUMP UNIT IS EQUIPPED WITH A SEPERATE MULTIPLE 100 MICRO FILTER SKID. THE CHLORIDE CONCENTRATION OF THE WATER BEING USED MUST NOT EXCEED 50 PPM (=50 mg/l).
3.03 UNDER NO CIRCUMSTANCES SHOULD SUPPRESSION ADDITIVES BE INTRODUCED INTO THE WATER SUPPLY.
3.04 THE SYSTEM IS SUPPLIED WITH FRESH WATER FROM WATER STORAGE TANKS TOTALLING 20, 000 GALLONS OF WATER WHICH IS BEING FED TO THE FILTER INLET AT A MINIMUM RATE OF 1600 LPM (415 GPM) AT 2.8 BAR (40 PSI) VIA A SEPARATE DIESEL FEED PUMP. FOR DETAILS OF DIESEL FEED PUMP SEE SPECIFICATION SECTION 13922.
3.05 AT THE PUMP, THE WATER INLET PRESSURE SHOULD BE AT A MAXIMUM OF 2 BAR (30 PSI).
3.06 THIS SYSTEM HAS BEEN CONFIGURED SO THAT A JOCKEY PUMP IS REQUIRED AND USES COMPRESSED AIR PRESSURE TO MAINTAIN THE STANDBY PRESSURE IN THE SYSTEM.
3.09 THE HI-FOG PUMP SKID IS EQUIPPED WITH FOUR (4) 100 MICRON FILTERS TO ENSURE CLEAN WATER AT THE REQUIRED FLOW RATE
3.10 EACH INDIVIDUAL SPRAY HEAD HAS A 300 MICRON STRAINER TO PREVENT ANY PARTICLES CARRIED TO THE DISCHARGE NETWORK FROM CLOGGING THE DISCHARGE ORIFICES.

4. ELECTRICAL AND CONTROL SYSTEMS

4.01 SYSTEM FUNCTIONS ARE MONITORED AT THE PUMP UNITS AND AT THE FIRE ALARM CONTROL PANEL (FACP) SEE SECTION 5 FOR PUMP UNIT CONTROLLER SYSTEM FUNCTIONS
4.02 THE SYSTEM IS CONTROLLED BY A PROGRAMMABLE LOGIC CONTROLLER (PLC) UNIT AT THE PUMP UNIT. THE PLC UNIT GIVES A START SIGNAL TO THE DIESEL PUMP UNITS.
4.03 THE SYSTEM REQUIRES AN ELECTRIC SUPPLY CAPABLE OF SUPPLYING 15 AMPS OF 110VAC/60 HZ TO EACH MOTOR CONTROLLER AND THE AIR COMPRESSOR.
4.04 THE 24 VDC CONTROL SYSTEM USES THE STARTING BATTERIES AS SYSTEM BACK UP FOR 24 HOURS OF OPERATION.
4.06 THE SYSTEM ALARM AND ACTIVATION SEQUENCE IS THE FOLLOWING:
4.06.01 THE HI-FOG DIESEL PUMP IS STARTED BY THE FACP TO BRING THE SYSTEM UP TO PRESSURE AS QUICKLY AS POSSIBLE PRIOR TO OPENING A DELUGE VALVE
4.06.02 AN OPENING OF A SPRINKLER HEAD IN THE WET PIPE SYSTEM WILL CAUSE A DROP IN SYSTEM PRESSURE WHICH WILL CAUSE THE DIESEL PUMP TO START IN 10 SECONDS.
4.06.03 IF THE WATER SUPPLY FAILS, A SIGNAL FROM THE WATER FLOW SWITCH IN THE MAIN FEED WILL STOP THE ENIGNE. WHEN WATER HAS RETURNED, THE PUMP WILL RESTART AUTOMATICALLY.
4.07 THE SYSTEM IS MONITORED BY A FIRE ALARM CONTROL PANEL (FACP) SUPPLIED BY FIRE ALARM CONTRACTOR.

5. DIESEL PUMP CONTROLLER

5.01 THE DIESEL PUMP CONTROLLER IS CUTLER HAMMER'S FD100 CONTROLLER AND SHALL BE DESIGNED TO MEET THE FOLLOWING REQUIREMENTS:
5.01.01 COMPLY WITH NFPA 20-2007 EXCEPT WHERE VARIANCES ARE PERMITTED BY THIS SPECIFICATION.
5.01.02 COMPLY WITH THE REQUIREMENTS FOR AN APPROVED DIESEL FIRE PUMP CONTROLLER IN CONFORMANCE WITH NFPA 20-2007.
5.01.03 THE DIESEL PUMP CONTROLLER ENCLOSURE SHALL BE DRIP-PROOF NEMA-2 BUILT TO MEET OR EXCEED THE REQUIREMENTS OF NFPA 20.
5.02 THE PUMP UNIT CONTROLLER ASSEMBLY SHALL BE UL LISTED, APPROVED BY FACTORY MUTUAL, AND SHALL INCLUDE THE FOLLOWING:
5.02.01 A COMMON ALARM HORN
5.02.02 MANUAL STOP PUSH BOTTON FOR EACH PUMP UNIT
5.02.03 MICROPROCESSOR CONTROL
5.02.04 LCD DISPLAY TO INDICATE BATTERY VOLTAGE AND CURRENT
5.02.05 ALARM & STATUS LED INDICATION
5.02.06 TWIN BATTERY CHARGERS PER NFPA 20 REQUIREMENTS

THE FOLLOWING VISUAL AND AUDIO ALARMS WILL BE PROVIDED:

5.02.07 STATUS INDICATION FOR SWITCH IN AUTO, ENGINE RUNNING
5.02.08 LOW OIL PRESSURE
5.02.09 ENGINE OVERSPEED
5.02.10 HIGH ENGINE TEMPERATURE
5.02.11 FAIL TO START
5.02.12 LOW FUEL
5.02.13 BATTERY BANK 1 FAILURE
5.02.14 BATTERY BANK 2 FAILURE
5.02.15 BATTERY CHARGER #1 FAILURE
5.02.16 BATTERY CHARGER #2 FAILURE

6. DIESEL PUMP UNIT

6.01 EACH DIESEL PUMP SHALL BE DRIVEN BY A NFPA 20 RATED ENGINE
6.02 ENGINES ARE DESIGNED TO MEET EPA CARB TIER2 & EC STAGE 3A
6.03 MAX ENGINE RPM IS 1760 RPM
6.04 DESIGN FOR USE IN FIRE PUMP APPLICATIONS
6.05 ENGINES ARE TWIN TURBOCHARGED WITH A 500 BKW (670 BHP) OUTPUT.
6.06 FUEL CONSUMPTION FOR ONE HOUR SHALL BE 32 GALLONS (146 LITERS).
6.07 THE ENGINE WILL DRIVE A PUMP SET OF 4 POSITIVE DISPLACEMENT PUMPS WITH AN OUTPUT OF 1600 LPM PER PUMP SET
6.08 PUMPS SHALL BE DRIVEN VIA A COMMON DRIVESHAFT AND BELT CONFIGURATION
6.09 AN UNLOADING VALVE SHALL BE USED ON THE OUTPUT TO EASE STARTUP AND CONTROL OUTPUT LINE PRESSURE.
6.10 UNLOADED WATER TO BE FED BACK INTO WATER STORAGE TANK.
6.11 WATER USED FOR COOLING JACKET TO BE FED INTO WATER STORAGE TANK

7. FIELD INSTALLATION

7.01 DISTRIBUTION NETWORK
7.01.01 SYSTEM DISTRIBUTION PIPING WILL BE ROUTED AND INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFIC DRAWINGS AND/OR INSTRUCTIONS PREPARED BY MARIOFF AS A PART OF THE PROJECT DOCUMENTATION.

7.01.02 CUTTING, BENDING, ATTACHMENT OF FITTINGS AND PIPE CLEANING WILL TAKE PLACE DURING FIELD INSTALLATION.

7.01.03 ALL SUCH WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE INSTRUCTIONS OF THE MARIOFF APPROVED PIPE AND FITTINGS SUPPLIER.

7.01.04 INSTALLERS SHALL BE TRAINED FOR THE INSTALLATION OF PARKER EO FITTINGS .

7.01.05 ALL TUBING, ONCE CUT TO LENGTH AND DEBURRED, SHALL BE THOROUGHLY CLEANED INTERNALLY PRIOR TO INSTALLATION.

7.01.06 CLEANING SHALL BE CARRIED OUT TO STANDARD NAS 1638, CLASS 9 OR ISO 4406 CLASS 18/15 .

7.01.07 ALL SUPPORT BRACKETS AND CLAMPS SHALL BE WELDED OR BOLTED SECURELY AND AT SPACING COMPLIANT WITH THE RECOMMENDATIONS LISTED IN 1.05.

7.01.08 IT SHALL BE ENSURED THAT ALL FITTINGS ARE TIGHTENED IN ACCORDANCE WITH THE MANUFACTURERS' INSTRUCTIONS AND ALL BRACKETS/CLAMPS ARE SECURE.

7.01.09 ON COMPLETION OF THE FIELD DISTRIBUTION NETWORK AND SPRINKLERS, AND PRIOR TO CONNECTION OF THE PUMP UNIT, A FULL PRESSURE TEST SHALL BE CARRIED OUT, UTILIZING A PRESSURE TESTING PUMP DEVICE.

7.01,10 HYDROSTATIC TESTING OF THE PIPING SYSTEM IS PERFORMED SEPARATELY FOR EACH SECTION. THE SECTIONS SHALL BE PRESSURIZED TO 210 BAR (3000 PSI) WITHOUT LOSS FOR A PERIOD OF 120 MINUTES OR AS OTHERWISE DETERMINED BY THE AUTHORITY HAVING JURISDICTION. NOTE: THE PRESSURE LOSS SHALL BE DETERMINED BY THE LOSS OF THE GAUGE PRESSURE AT A LOW POINT OF THE DISTRIBUTION NETWORK OR BY VISUAL EXAMINATION, AFTER TEMPERATURE STABILIZATION.

7.01.11 IN THE EVENT OF LEAKAGE, THE PRESSURE SHALL BE REMOVED FROM THE SYSTEM, APPROPRIATE CORRECTIVE ACTION TAKEN AND THE TEST PROCEDURE REPEATED.

7.01.12 THE PRESSURE TESTING IS TO BE CARRIED OUT IN THE PRESENCE OF THE OWNERS REP

7.01.13 SIGNS SHOWING THE SECTION VALVE SHALL BE FASTENED ON OR ADJACENT TO EACH SECTION VALVE.

7.02 SPRAY HEADS

7.02.01 INSTALL THE HI-FOG SPRAY HEADS VERIFYING THAT THE SPRAY HEADS AND SEALS ARE CORRECTLY POSITIONED ON THE SPRINKLER.

8. OPERATING INSTRUCTIONS

8.01 SYSTEM IN STAND-BY MODE.
8.01.01 IN NORMAL USE THE SYSTEM "MUST" BE IN THE STAND-BY MODE. THE SYSTEM IS IN THE STAND-BY MODE WHEN:
8.01.02.A THE DIESEL PUMP UNIT CONTROLLER SWITCHES ARE SET TO AUTO
8.01.02.B ALL VALVES FROM THE WATER MAIN ARE OPEN.
8.01.02.C THE SYSTEM PRESSURE IS WITHIN THE SET LIMITS.
8.01.02.D THE CONTROL SYSTEM IS OPERATIONAL AND THE PLC IS IN RUN MODE
8.01.02.E THE PIPING IS SOUND AND TIGHT (SEE INSTALLATION MANUAL).
8.02 AUTOMATIC START
8.02.01. THE DIESEL PUMPS WILL START UPON RECEIPT OF A START SIGNAL FROM THE FACP OR REMOTE FIRE PANEL IF IT IS A DELUGE ZONE
8.02.02 THE CORRESPONDING ZONE VALVES WILL OPEN UPON COMPLETION OF PUMPS STARTING
8.02.03 PUMP WILL START ON PRESSURE DROP FOR WET SPRINKLER PIPE ZONE.
8.03 MANUAL START - LOCAL
8.03.01 PUSH THE BATTERY CRANK SWITCH ON THE CONTROLLER TO START THE DIESEL ENGINE.
8.03.02 PUSH THE RED STOP BUTTON ON THE CONTROLLER TO STOP THE PUMP.
8.04 PUMP UNIT IN OPERATION
8.04.01 WHEN THE PUMP HAS RECEIVED A START SIGNAL (SEE 8.02 AND 8.03 ABOVE), A SIGNAL WILL BE SENT TO THE DIESEL FEED PUMP CONTROLLER TO START THE DIESEL FEED PUMP. AFTER A TEN (10) SECOND DELAY, THE WATER MIST PUMP WILL BE STARTED.
8.04.02 WHEN THE PUMP UNIT HAS RECEIVED A START SIGNAL IT WILL MAINTAIN THE REQUIRED PRESSURE AND FLOW IN THE SYSTEM UNTIL THE PUMP IS STOPPED OR THE PUMP RUNS OUT OF WATER.
8.04.03 THE NO WATER PRESSURE SWITCH IN THE MAIN LINE WILL PREVENT THE UNIT FROM STARTING, OR WILL STOP THE MOTORS TO PREVENT THEM FROM RUNNING DRY IN THE EVENT OF A LOSS OF WATER SUPPLY.
8.05 STOPPING AND RESETTING THE SYSTEM
8.05.01 MAKE SURE THAT THERE IS NO FIRE BEFORE STOPPING THE UNIT.
8.05.02 WITH MOTORS RUNNING,ENERGIZE THE SOLENOID COIL FOR CLOSING TO ACTIVATE SOLENOID CLOSURE,
8.05.03 THE SYSTEM WILL HAVE TO BE MANUALLY STOPPED ONCE THE VALVES HAVE CLOSED.
8.05.04 THE STABILIZATION VALVE WILL OPEN AND CLOSE WHEN THE PRESSURE IN THE SYSTEM DROPS TO 25-30 BAR. AFTER THAT, THE WATER MAIN PRESSURE WILL PLACE THE PUMP UNIT BACK INTO STANDBY MODE LEAVING THE SYSTEM AT APPROXIMATELY 25-30 BAR RESTART IS PREVENTED DURING THE STABILIZATION PERIOD WHEN THE RESET PHASE IS COMPLETED THE PUMP AUTOMATICALLY SWITCHES TO THE STAND-BY MODE.
8.05.05 THE WATER DISCHARGE FROM THE DIESEL PUMPS CAN ALSO BE STOPPED BY CLOSING THE BALL VALVE LOCATED AT EACH ZONE VALVE, BUT THIS IS ONLY RECOMMENDED IN THE CASE OF UNINTENTIONAL RELEASE. THIS ACTION WILL STOP THE FLOW OF WATER INTO THE ZONE BUT WILL REQUIRE MANUAL STOPPING OF THE DIESEL PUMPS.

9. SYSTEM COMMISSIONING

9.01 SUBJECT TO THE REQUIREMENTS OF THE CLIENT, CLIENT'S INSURERS OR THE AUTHORITY HAVING JURISDICTION, A FULL DISCHARGE TEST MAY FORM PART OF THE SYSTEM COMMISSIONING PROCEDURE, (NOTE: MARIOFF RECOMMENDS THAT A FUNCTIONAL TEST BE CARRIED OUT FOR EACH SYSTEM AT THE COMMISSIONING STAGE. AS AN ALTERNATIVE TO A DISCHARGE TO THE PROTECTED SPACE, A FUNCTIONAL DISCHARGE TEST MAY BE CARRIED OUT BY UTILIZING THE FLUSHING VALVE OR THE TEST HEADER ARRANGEMENT.
9.02 ON COMPLETION OF THE COMMISSIONING PROCEDURE, ENSURE THAT RECORDS ARE ESTABLISHED SIGNIFYING VERIFICATION OF THE FOLLOWING:
- DISTRIBUTION SYSTEM SECURELY INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFIC ROUTING AND SPRINKLER HEAD POSITIONING REQUIREMENTS.
- SPRINKLER MOUNTING ADAPTERS ARE CORRECTLY SELECTED AND LOCATED FOR COMPLIANCE WITH THE PROJECT SPECIFIC ARRANGEMENT AND GUIDELINES OF THE MANUAL.
- THE PUMP UNITS ARE SECURELY INSTALLED AND CONNECTED TO THE FIELD DISTRIBUTION TUBING NETWORK.
- CORRECT ELECTRICAL INTERFACE OF CONTROL,INDICATING AND MONITORING DEVICES.
- FUNCTIONAL DISCHARGE TEST SECTION OF THE REPORT COMPLETED, IF APPROPRIATE.

9.03 CONTRACTOR SHALL SUBMIT AS-BUILT DRAWINGS AT COMPLETION OF PROJECT.

LEGEND

- MARIOFF SPRAY HEAD PN-2N1MD6MC10RA (#C22140) FOR ZONE 1 ROOM 110, 113 AND 114
- MARIOFF SPRAY HEAD PN-1B1MC6MC100A (#C20020) FOR ZONE 1
- MARIOFF SPRAY HEAD PN-5S1MC8MC1000 (#C31250) FOR ZONES 2, 3, 4, 5, 6, 7, 8, AND 9
- TUBE CLAMP
- DISTRIBUTION BLOCK
- TEE
- BALL VALVE
- CHECK VALVE
- KOR REDUCER
- UNION
- VKA - PLUG
- 60mm(2-3/8") S.S. TUBE
- 38mm(1-1/2") S.S. TUBE
- 16mm(5/8") S.S. TUBE
- 12mm(1/2") S.S. TUBE

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: T.G. PENNEL
SIGNATURE:
DATE: 03/11/2009 LICENSE #41173

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

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Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	M. LINDSAY	03-11-09
DRAWN	R. ABEBE	03-11-09
CHECKED	B. MICHNA	03-11-09
APPROVED	G. PENNEL	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

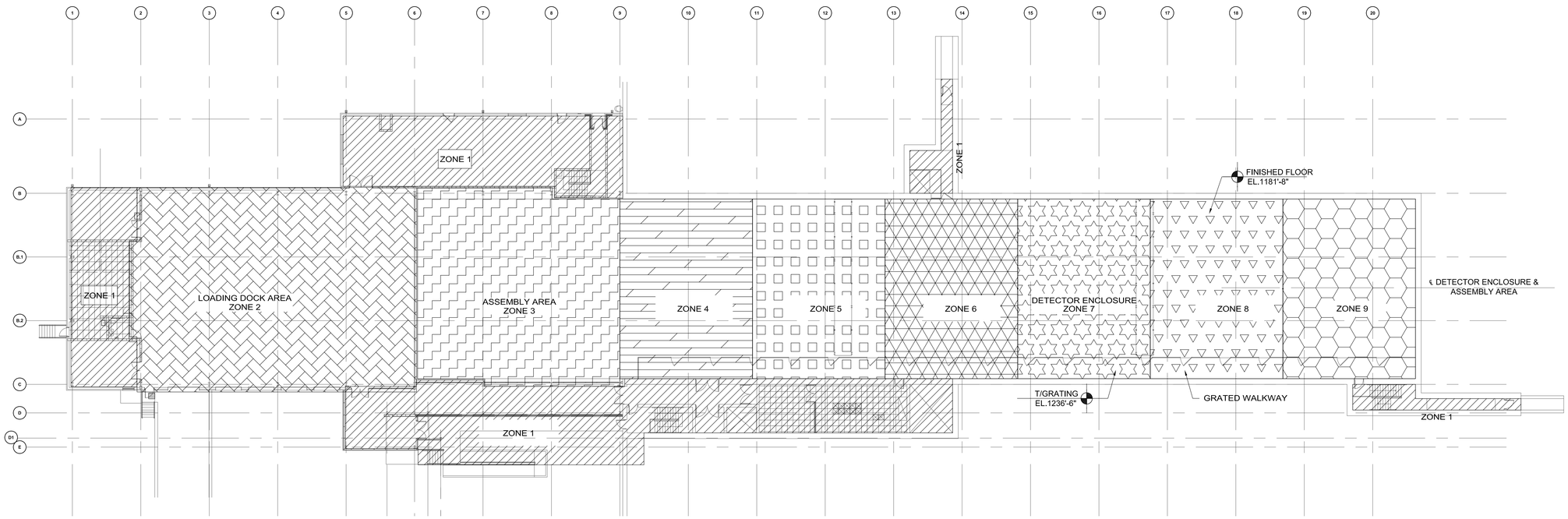
SCALE:

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
GENERAL NOTES

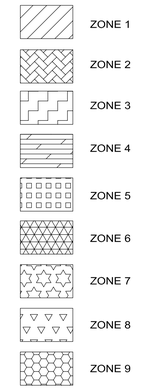
DRAWING NO. 15-1-3B FP-1 REV. 0

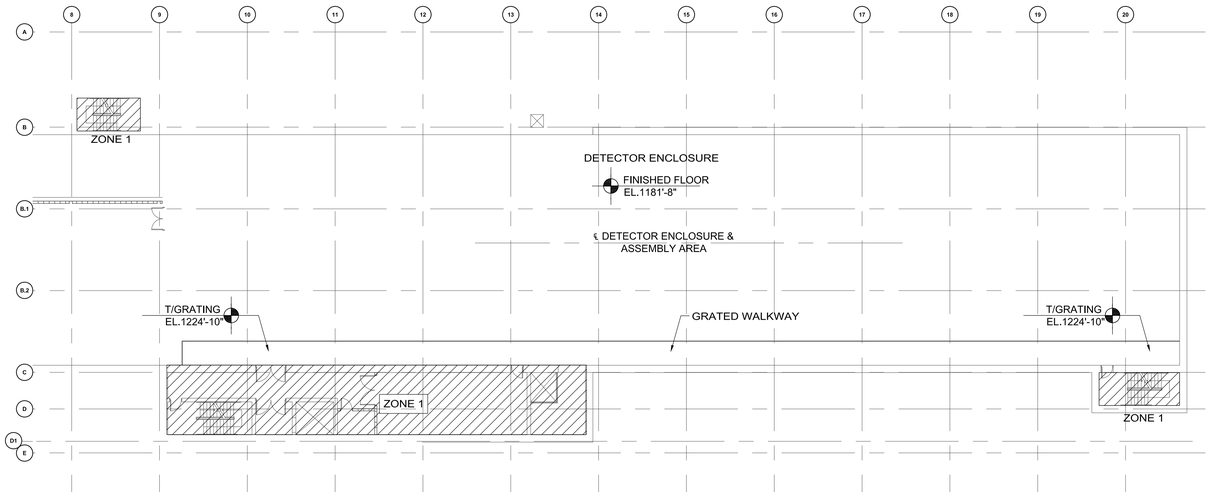
11 MAR, 2009



FLOOR PLAN EL 1236'-6"

SCALE: 1/16"=1'-0"

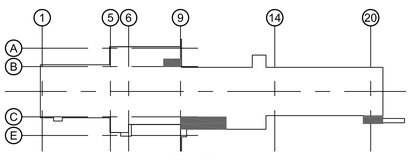




FLOOR PLAN EL 1224'-10"

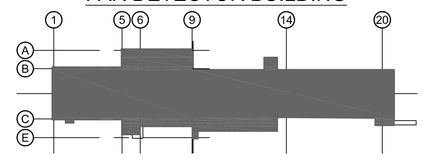
SCALE: 1/16"=1'-0"

LOCATION	HAZARD	ZONE DESCRIPTION	TYPE OF ZONE
ZONE 1	ORDINARY HAZARD	MAX 9 HEADS DESIGN AREA, ACTUAL CAPACITY IS 75 HEADS	WET PIPE / SPRINKLER
ZONE 2	CLASS IIIB LIQUID	48 HEAD DELUGE ZONE	DELUGE / SPRAY HEAD
ZONE 3	CLASS IIIB LIQUID	38 HEAD DELUGE ZONE	DELUGE / SPRAY HEAD
ZONES 4-9	CLASS IIIB LIQUID	INDIVIDUAL ZONES WITHIN THE DETECTOR AREA, MAX 3 ZONES OPENED SIMULTANEOUSLY (48 HEADS)	DELUGE / SPRAY HEAD



KEY PLAN

FAR DETECTOR BUILDING



KEY PLAN

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REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE
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DRAWN	R. ABEBE	03-11-09
CHECKED	B. MICHNA	03-11-09
APPROVED	G. PENNEL	03-11-09

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/16"=1'-0"

8 0 8 16 24 32 40
SCALE FEET

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

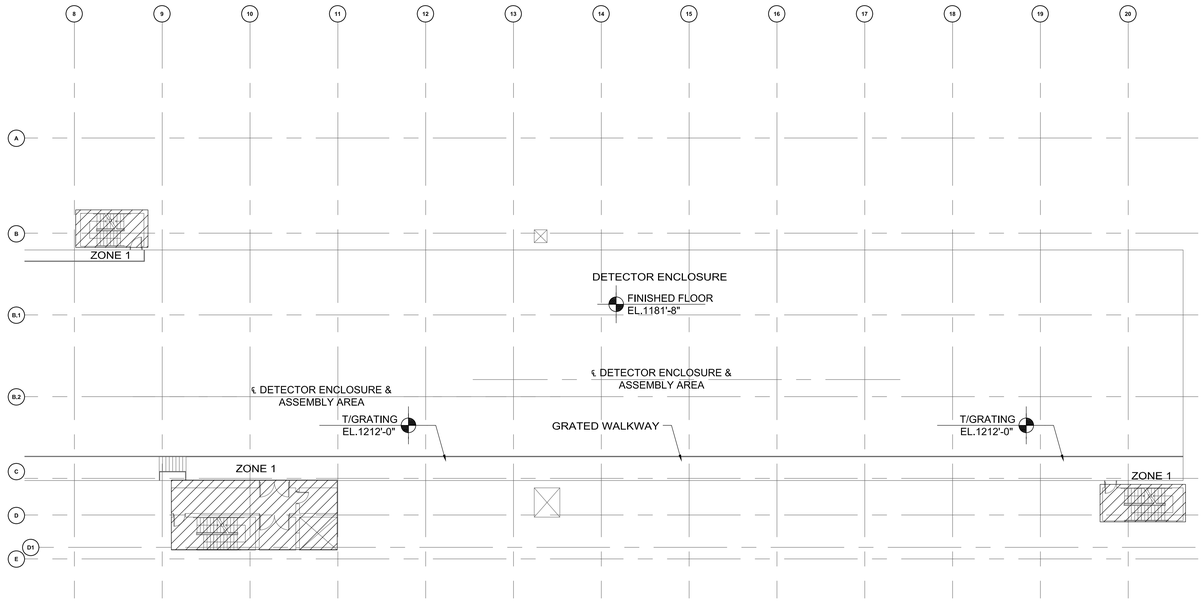
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

SYSTEM ZONING

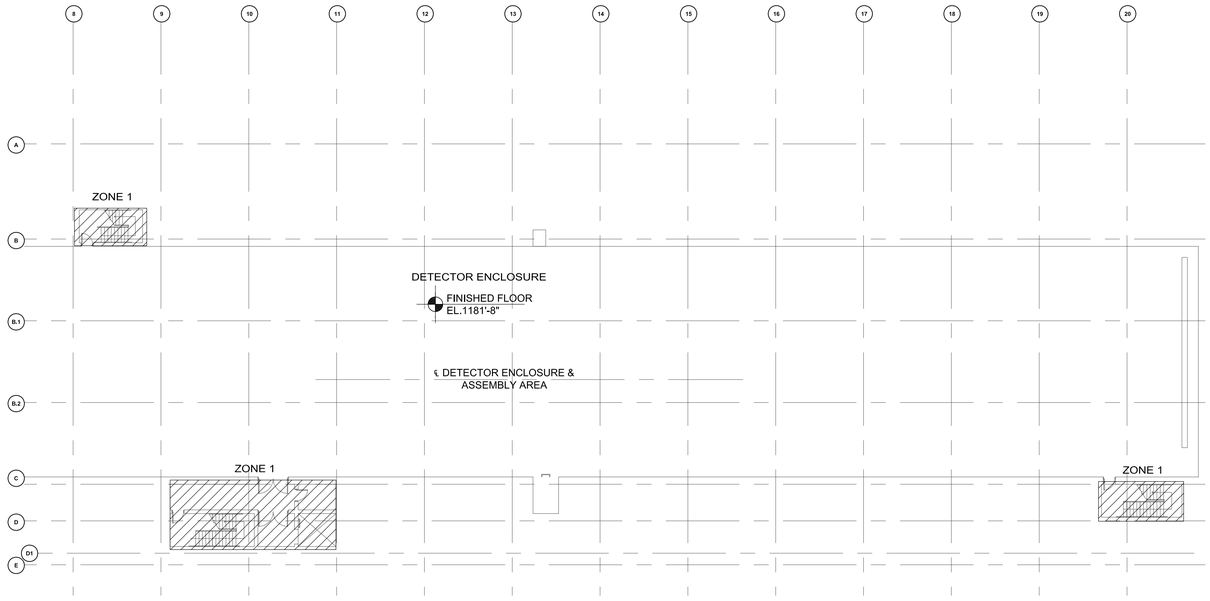
11 MAR, 2009

DRAWING NO. 15-1-3B FP-2 REV. 0



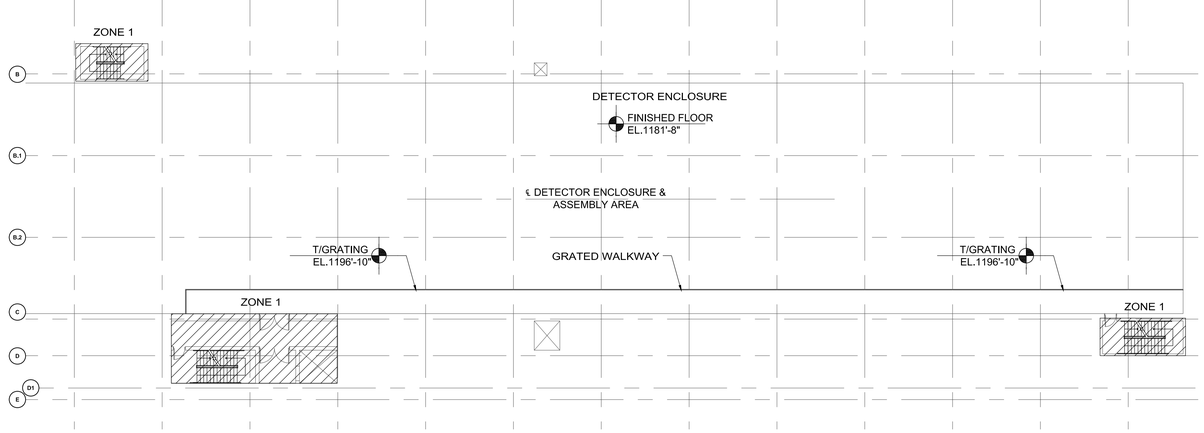
FLOOR PLAN EL 1212'-0"

SCALE: 1/16"=1'-0"



FLOOR PLAN EL 1181'-8"

SCALE: 1/16"=1'-0"



FLOOR PLAN EL 1196'-10"

SCALE: 1/16"=1'-0"

VALVES FOR EACH ZONES

- 1 SOLENOID BALL VALVE FOR ZONE 2.
- 7 SOLENOID BALLS VALVES FOR ZONES 3, 4, 5, 6, 7, 8, AND 9.
- 1 NORMALLY OPEN SECTION VALVE FOR ZONE 1.

FLOW FOR EACH ZONE

DESIGN PARAMETERS FOR MARIOFF SPRINKLER, PN-C22140:
- K-FACTOR OF SPRINKLER IS 3.3 lpm/bar(0.5)
- MAX SPACING OF SPRINKLER IS 9.8 FT. (3m)

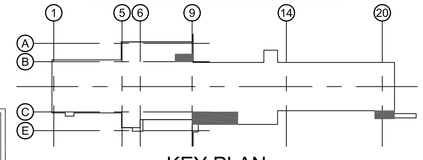
DESIGN PARAMETERS FOR MARIOFF SPRINKLER, PN-C20020:
- K-FACTOR OF SPRINKLER IS 2.5 lpm/bar(0.5)
- PROTECTION TO CEILING MAX HEIGHT OF 16.4 FT. (5m)
- MAX SPACING OF SPRINKLER IS 12.3 FT. (3.75m)

- TOTAL FLOW FOR ZONE 1 IS 49.8 GPM (188.3 L/M) FOR THE MOST DEMANDING 9 SPRINKLERS

DESIGN PARAMETERS FOR MARIOFF SPRAY HEAD, PN-C31250:
- K-FACTOR OF SPRAY HEAD IS 3.9 lpm/bar(0.5)
- PROTECTION TO CEILING MAX HEIGHT OF 36.1 FT. (11m)
- MAX SPACING OF SPRINKLER IS 13.1 FT. (4m)

- TOTAL FLOW FOR ZONE 2 IS 413.4 GPM (1564.8 L/M) AT 1015 PSI (70 BAR) OF PRESSURE, USABLE WATER OF 18,603 GALLONS FOR 45 MIN
- TOTAL FLOW FOR ZONE 3 IS 327.6 GPM (1240 L/M) AT 1015 PSI (70 BAR) OF PRESSURE
- BREAKING DOWN THE DETECTOR AREA INTO 6 SMALLER ZONES AND ALLOW FOR THREE SIMULTANEOUS DISCHARGES WITH A TOTAL FLOW 413.8 GPM (1566.24 L/M) AT 1015 PSI (70 BAR) OF PRESSURE.

FAR DETECTOR BUILDING



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PRINT NAME: T.G. PENNEL

SIGNATURE:

DATE: 03/11/2009 LICENSE #41173

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/16"=1'-0"

8 0 8 16 24 32 40

SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

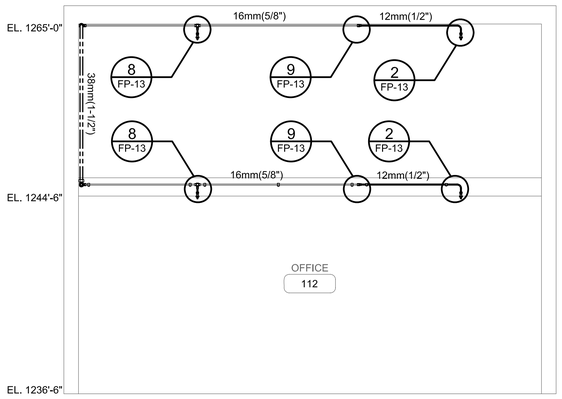
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

SYSTEM ZONING

DRAWING NO. 15-1-3B FP-3 REV. 0

11 MAR, 2009



SECTION D

SCALE: 3/8"=1'-0"

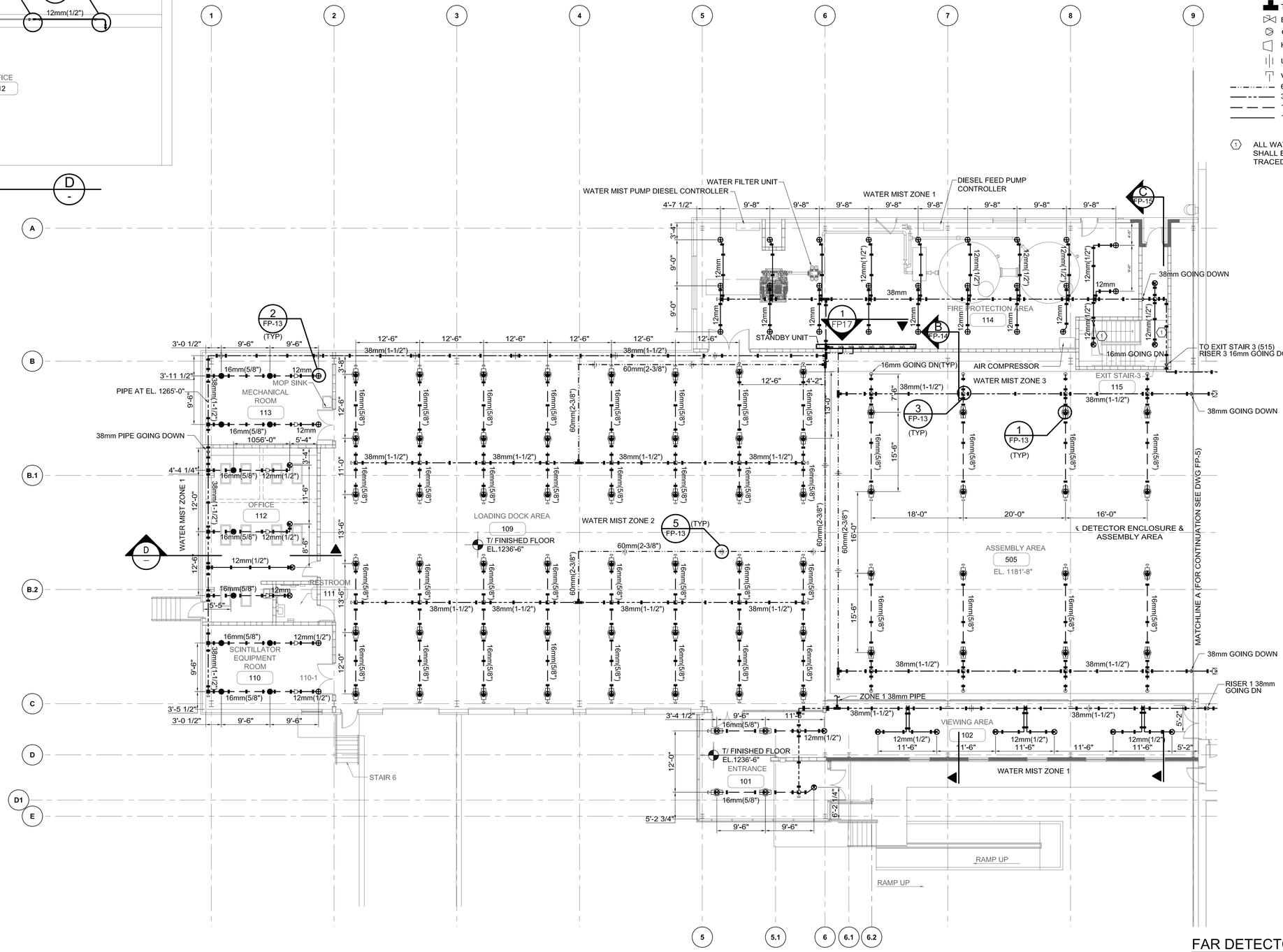
D

LEGEND

- MARIOFF SPRINKLER PN-2N1MD6MC10RA (#C22140) FOR ZONE 1 ROOM 110, 113 AND 114
- MARIOFF SPRINKLER PN-1B1MC6MC100A (#C20020) FOR ZONE 1
- MARIOFF SPRAY HEAD PN-5S1MC8MC1000 (#C31250) FOR ZONES 2, 3, 4, 5, 6, 7, 8, AND 9
- TUBE CLAMP
- DISTRIBUTION BLOCK
- TEE
- BALL VALVE
- CHECK VALVE
- KOR REDUCER
- UNION
- VKA - PLUG
- 60mm(2-3/8") S.S. TUBE
- 38mm(1-1/2") S.S. TUBE
- 16mm(5/8") S.S. TUBE
- 12mm(1/2") S.S. TUBE

SHEET NOTE

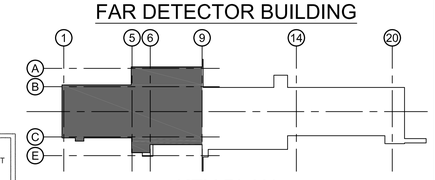
1. ALL WATER MIST PIPING IN STAIRWAYS SHALL BE INSULATED AND HEAT TRACED. SEE SHEETS E-6 & E-7.



WATER MIST SYSTEM PLAN EL 1236'-6"

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

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

3/8"=1'-0" 1 0 1 2 3 4 5 6 7 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

WATER MIST SYSTEM PLAN EL 1236'-6"

DRAWING NO. 15-1-3B FP-4 REV. 0

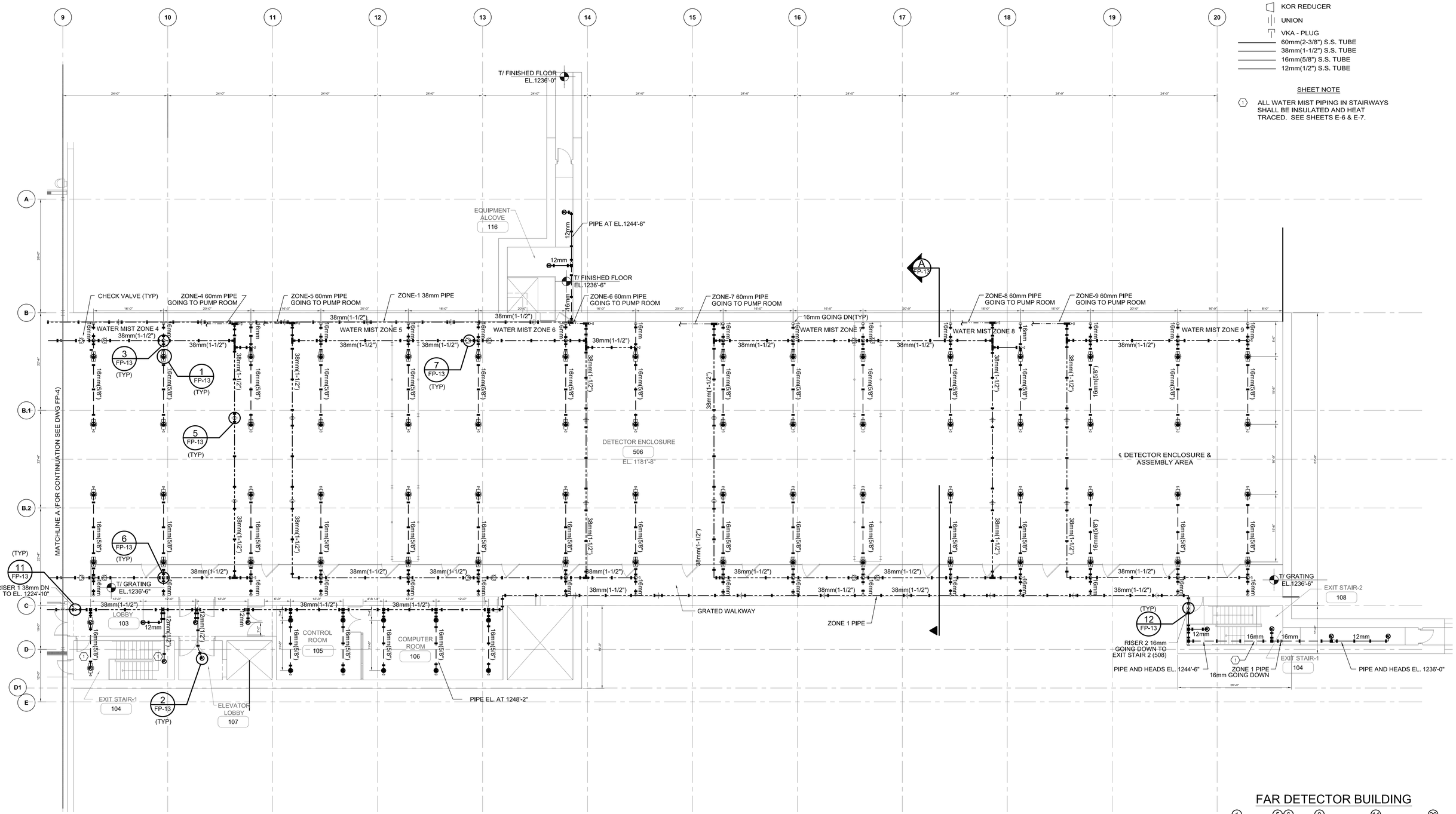
11 MAR, 2009

LEGEND

- MARIOFF SPRAY HEAD PN-1B1MC6MC100A (#C20020) FOR ZONE 1
- MARIOFF SPRAY HEAD PN-5S1MC8MC1000 (#C31250) FOR ZONES 2, 3, 4, 5, 6, 7, 8, AND 9
- TUBE CLAMP
- DISTRIBUTION BLOCK
- TEE
- BALL VALVE
- CHECK VALVE
- KOR REDUCER
- UNION
- VKA - PLUG
- 60mm(2-3/8") S.S. TUBE
- 38mm(1-1/2") S.S. TUBE
- 16mm(5/8") S.S. TUBE
- 12mm(1/2") S.S. TUBE

SHEET NOTE

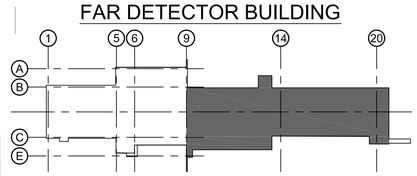
1. ALL WATER MIST PIPING IN STAIRWAYS SHALL BE INSULATED AND HEAT TRACED. SEE SHEETS E-6 & E-7.



WATER MIST SYSTEM PLAN EL 1236'-6"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE: 1/8"=1'-0" — 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

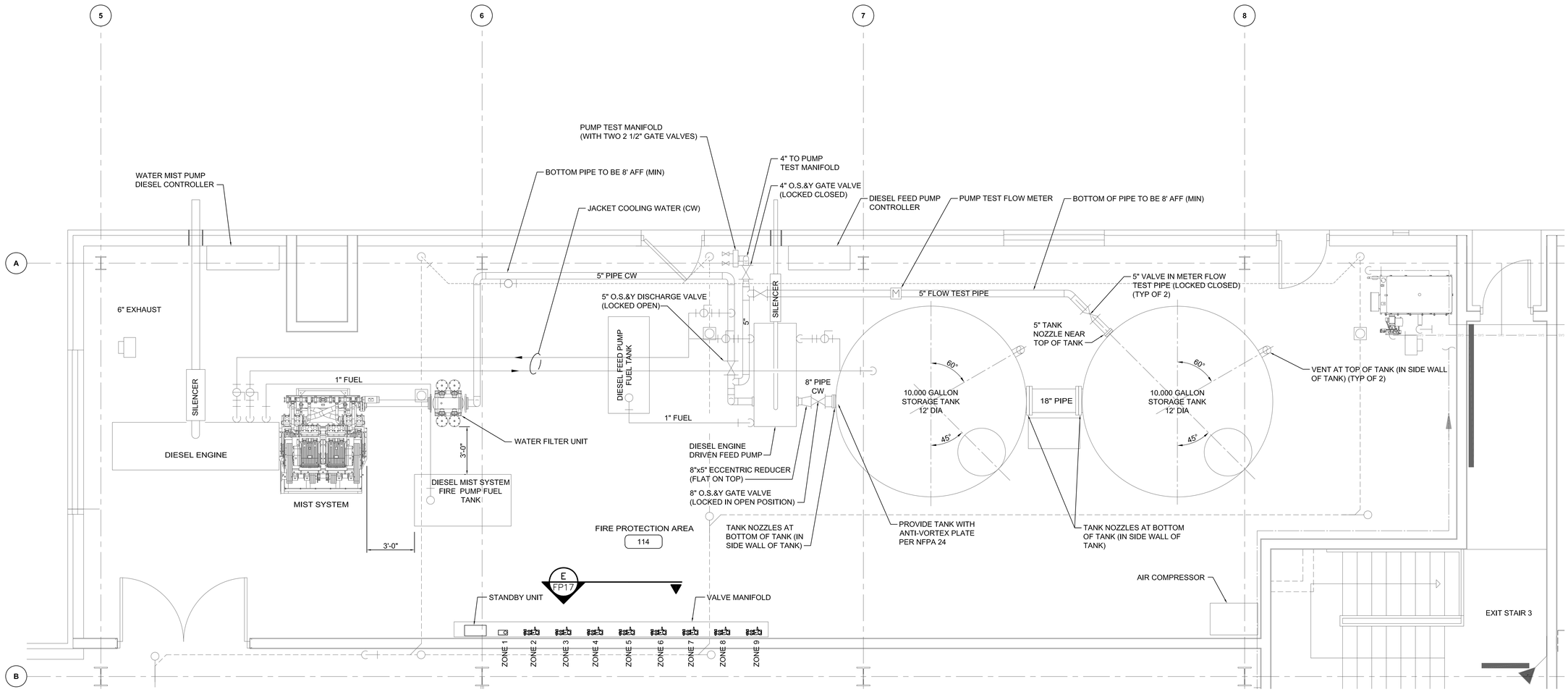
NOνA FAR DETECTOR BUILDING
WATER MIST SYSTEM PLAN EL 1236'-6"

DRAWING NO. 15-1-3B FP-5 REV. 0

11 MAR, 2009

NOTES:

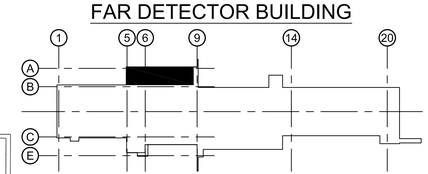
1. FOR ENGINE JACKET COOLING WATER (CW) PIPING, SEE DWG M-4.
2. FOR DIESEL FUEL PIPING TO ENGINES, SEE DWG P-4.



WATER MIST FIRE PROTECTION ROOM EL 1236'-6"

SCALE: 3/8"=1'-0"

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE: 3/8"=1'-0" 1 0 1 2 3 4 5 6 7 SCALE FEET

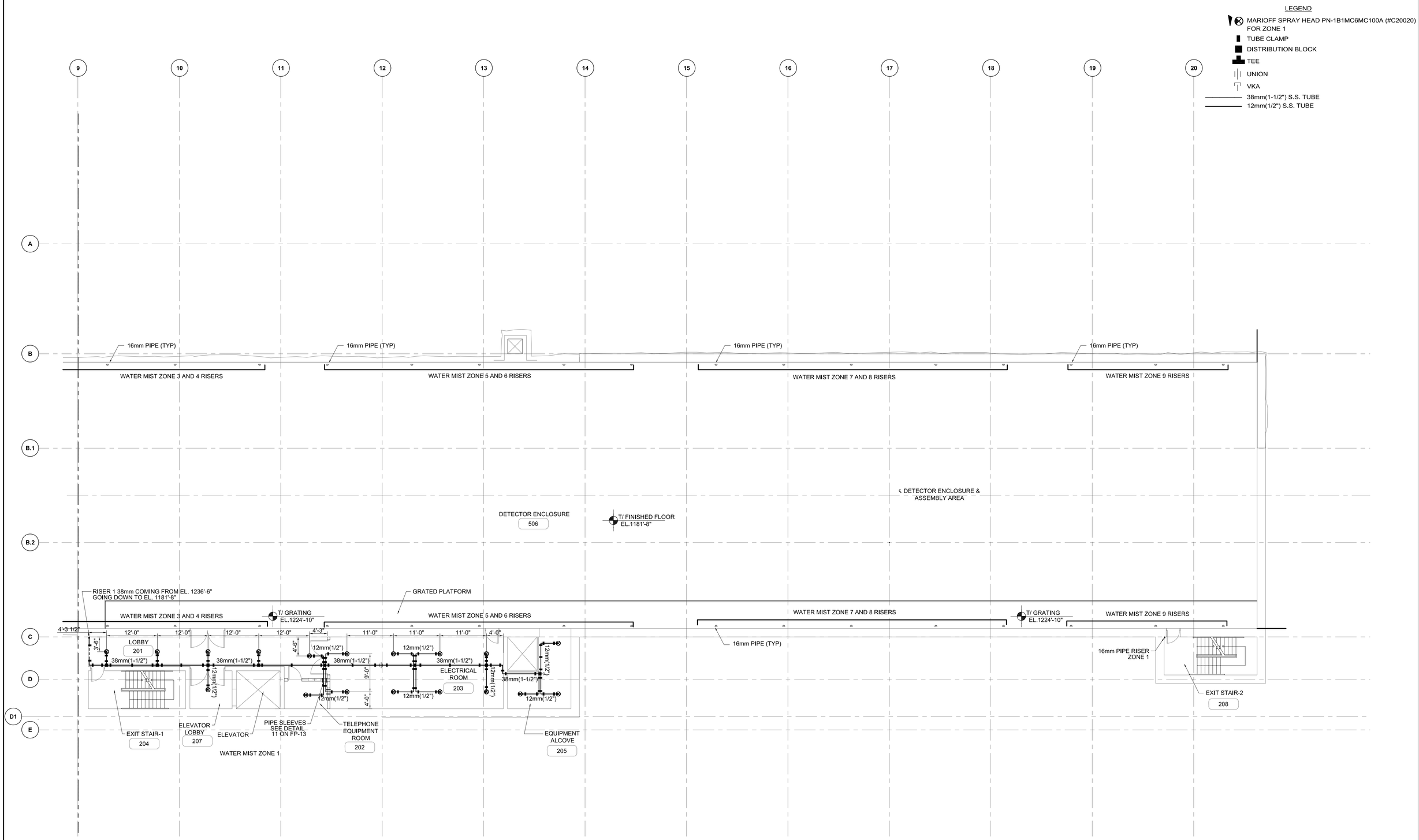
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

FIRE PROTECTION ROOM EL 1236'-6"

DRAWING NO. 15-1-3B FP-6 REV. 0

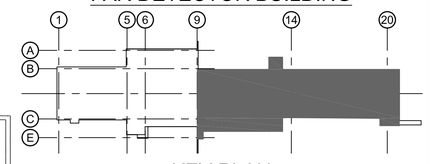
11 MAR, 2009



WATER MIST SYSTEM PLAN EL 1224'-10"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

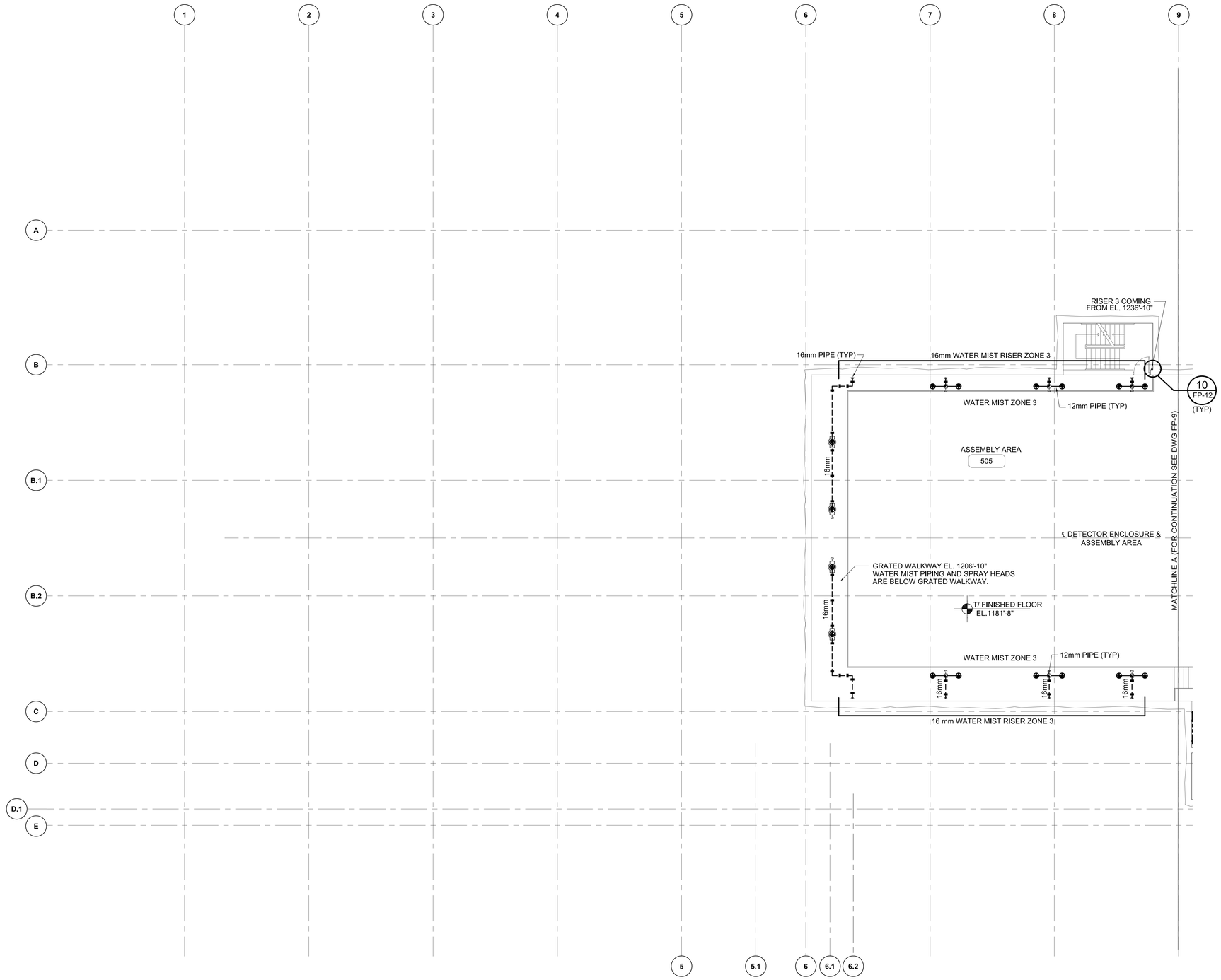
NOνA FAR DETECTOR BUILDING
WATER MIST SYSTEM PLAN EL 1224'-10"

DRAWING NO. 15-1-3B FP-7 REV. 0

11 MAR, 2009

LEGEND

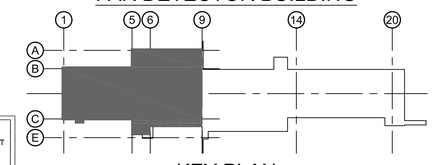
- MARIOFF SPRAY HEAD PN-5S1MC8MC1000 (#C31250) FOR ZONES 2, 3, 4, 5, 6, 7, 8, AND 9
- TUBE CLAMP
- DISTRIBUTION BLOCK
- VKA
- 16mm(5/8") S.S. TUBE
- 12mm(1/2") S.S. TUBE



WATER MIST SYSTEM PLAN EL 1206'-10"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

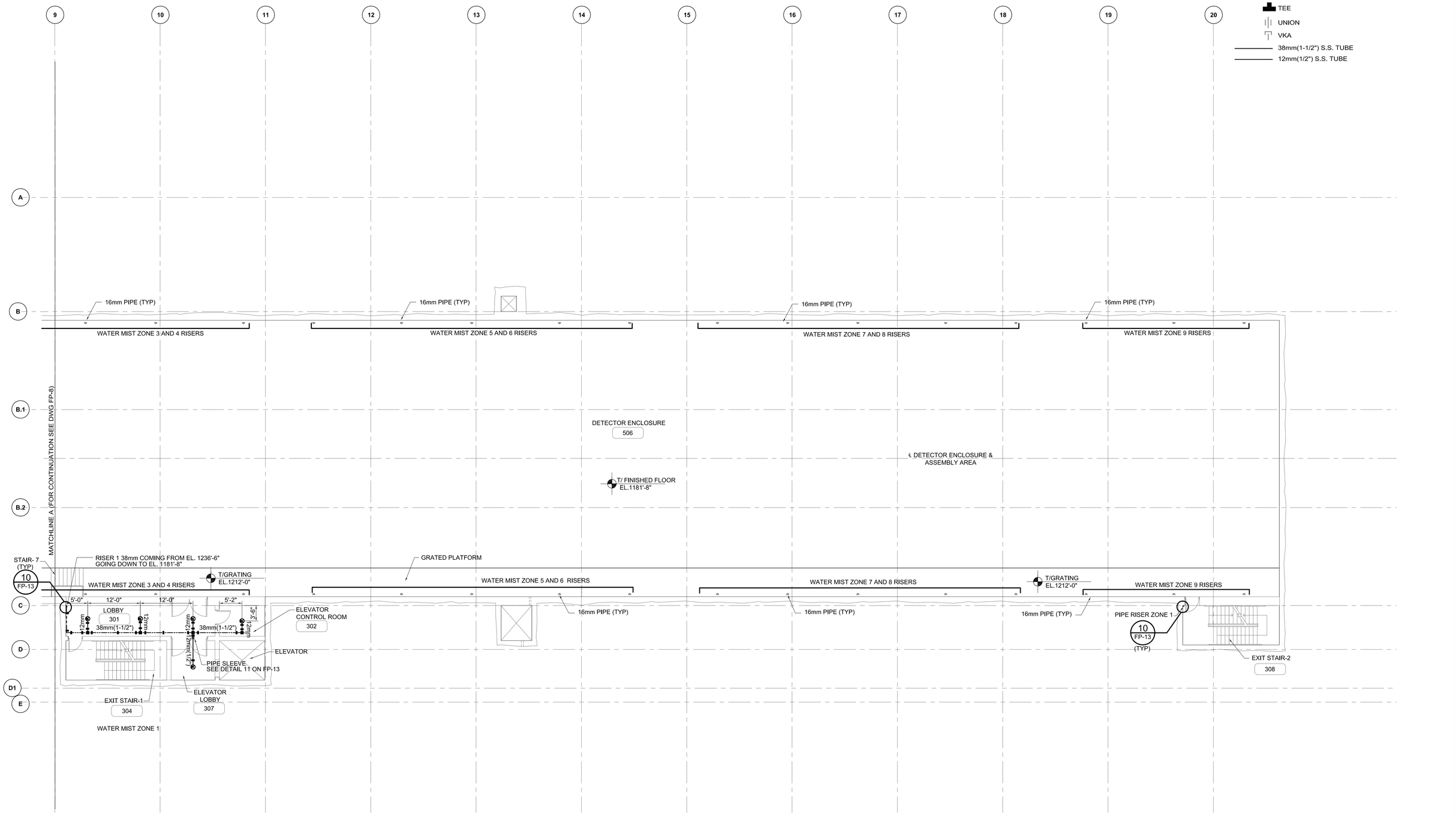
WATER MIST SYSTEM PLAN EL 1206'-10"

DRAWING NO. 15-1-3B FP-8 REV. 0

11 MAR, 2009

LEGEND

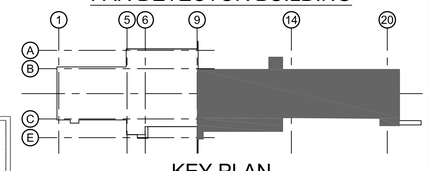
- MARIOFF SPRAY HEAD PN-1B1MC6MC100A (#C20020) FOR ZONE 1
- TUBE CLAMP
- DISTRIBUTION BLOCK
- TEE
- UNION
- VKA
- 38mm(1-1/2") S.S. TUBE
- 12mm(1/2") S.S. TUBE



WATER MIST SYSTEM PLAN EL 1212'-0"

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

FAR DETECTOR BUILDING



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OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

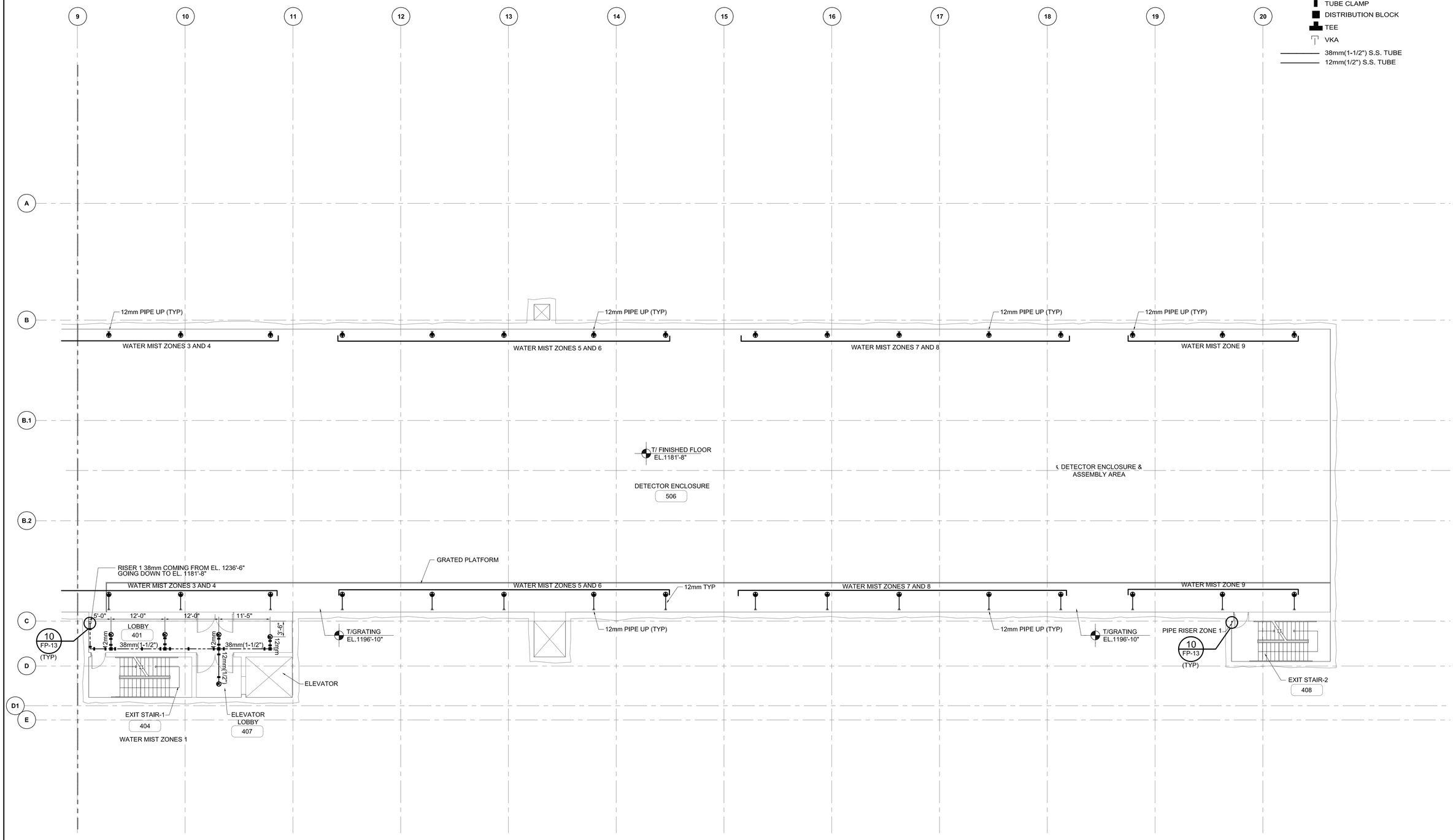
WATER MIST SYSTEM PLAN EL 1212'-0"

DRAWING NO. 15-1-3B FP-9 REV. 0

11 MAR. 2009

LEGEND

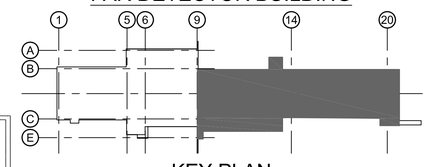
- MARIOFF SPRAY HEAD PN-1B1MC6MC100A (#C20020) FOR ZONE 1
- MARIOFF SPRAY HEAD PN-5S1MC8MC1000 (#C31250) FOR ZONES 2, 3, 4, 5, 6, 7, 8, AND 9
- TUBE CLAMP
- DISTRIBUTION BLOCK
- TEE
- VKA
- 38mm(1-1/2") S.S. TUBE
- 12mm(1/2") S.S. TUBE



WATER MIST SYSTEM PLAN EL 1196'-10"

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

FAR DETECTOR BUILDING



KEY PLAN

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: T.G. PENNEL

SIGNATURE:

DATE: 03/11/2009 LICENSE #41173

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

SCHIRMER ENGINEERING
1000 Milwaukee Avenue, 5th Floor
Glenview, IL 60025
Phone (847) 953-7700 Fax (847) 953-7793
www.schirmereng.com
Fire Protection ■ Code Consulting ■ Process Safety ■ Security Consulting

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	M. LINDSAY	03-11-09
DRAWN	R. ABEBE	03-11-09
CHECKED	B. MICHNA	03-11-09
APPROVED	G. PENNEL	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

WATER MIST SYSTEM PLAN EL 1196'-10"

DRAWING NO. 15-1-3B FP-10 REV. 0

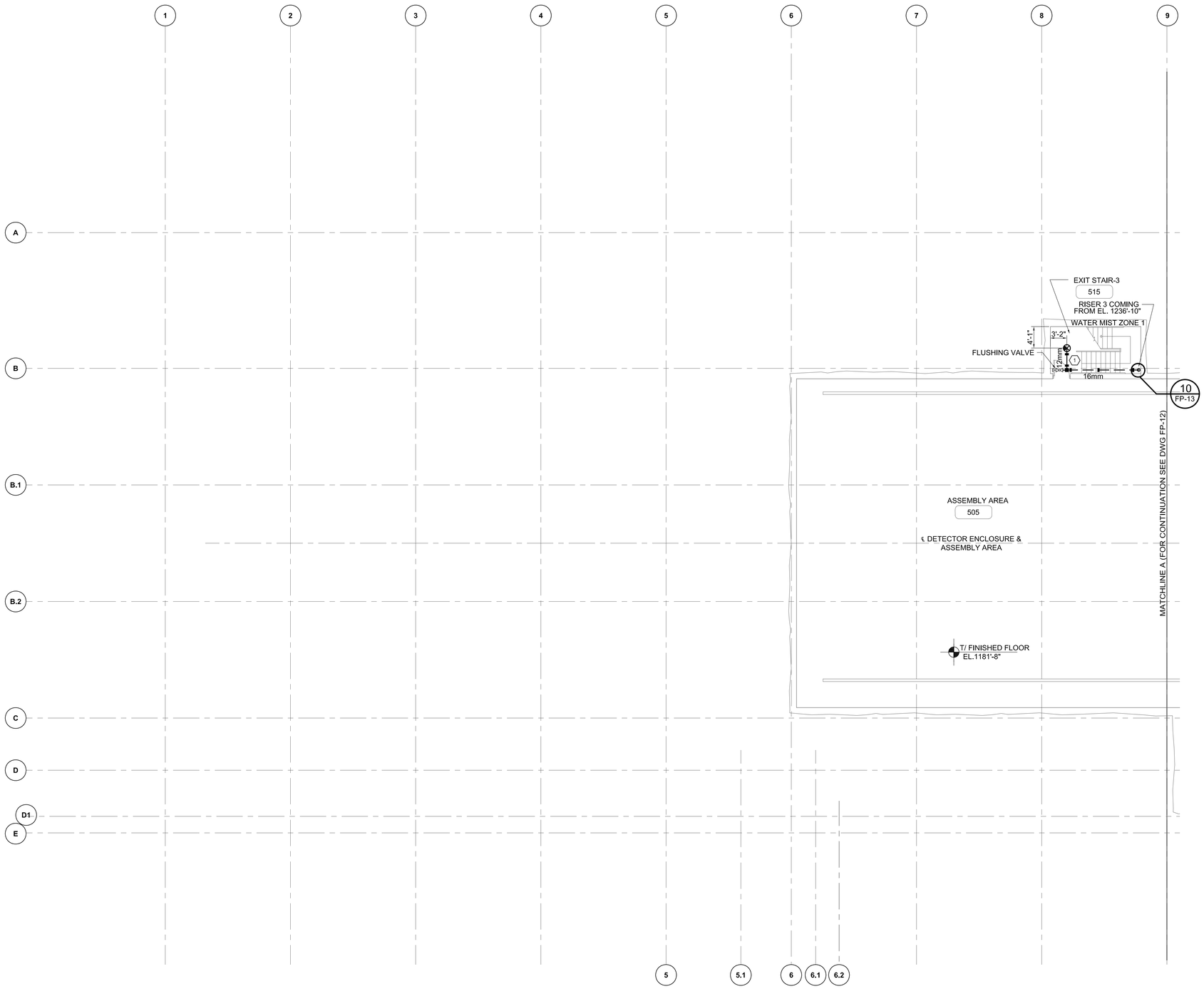
11 MAR, 2009

LEGEND

- MARIOFF SPRAY HEAD PN-1B1MC6MC100A (#C20020) FOR ZONE 1
- TUBE CLAMP
- DISTRIBUTION BLOCK
- BALL VALVE
- VKA
- 16mm(5/8") S.S. TUBE
- 12mm(1/2") S.S. TUBE

SHEET NOTE

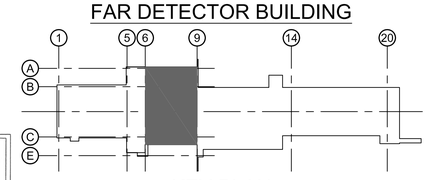
1. ALL WATER MIST PIPING IN STAIRWAYS SHALL BE INSULATED AND HEAT TRACED. SEE SHEETS E-6 & E-7.



WATER MIST SYSTEM PLAN EL 1181'-8"

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

FAR DETECTOR BUILDING



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SIGNATURE:

DATE: 03/11/2009 LICENSE #41173

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

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CHECKED	B. MICHNA	03-11-09
APPROVED	G. PENNEL	03-11-09

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" — 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

WATER MIST SYSTEM PLAN EL 1181'-8"

DRAWING NO. 15-1-3B FP-11 REV. 0

11 MAR. 2009

LEGEND

- MARIOFF SPRAY HEAD PN-1B1MC6MC100A (#C20020) FOR ZONE 1
- TUBE CLAMP
- DISTRIBUTION BLOCK
- BALL VALVE
- VKA
- 38mm(1-1/2") S.S. TUBE
- 16mm(5/8") S.S. TUBE
- 12mm(1/2") S.S. TUBE

SHEET NOTE

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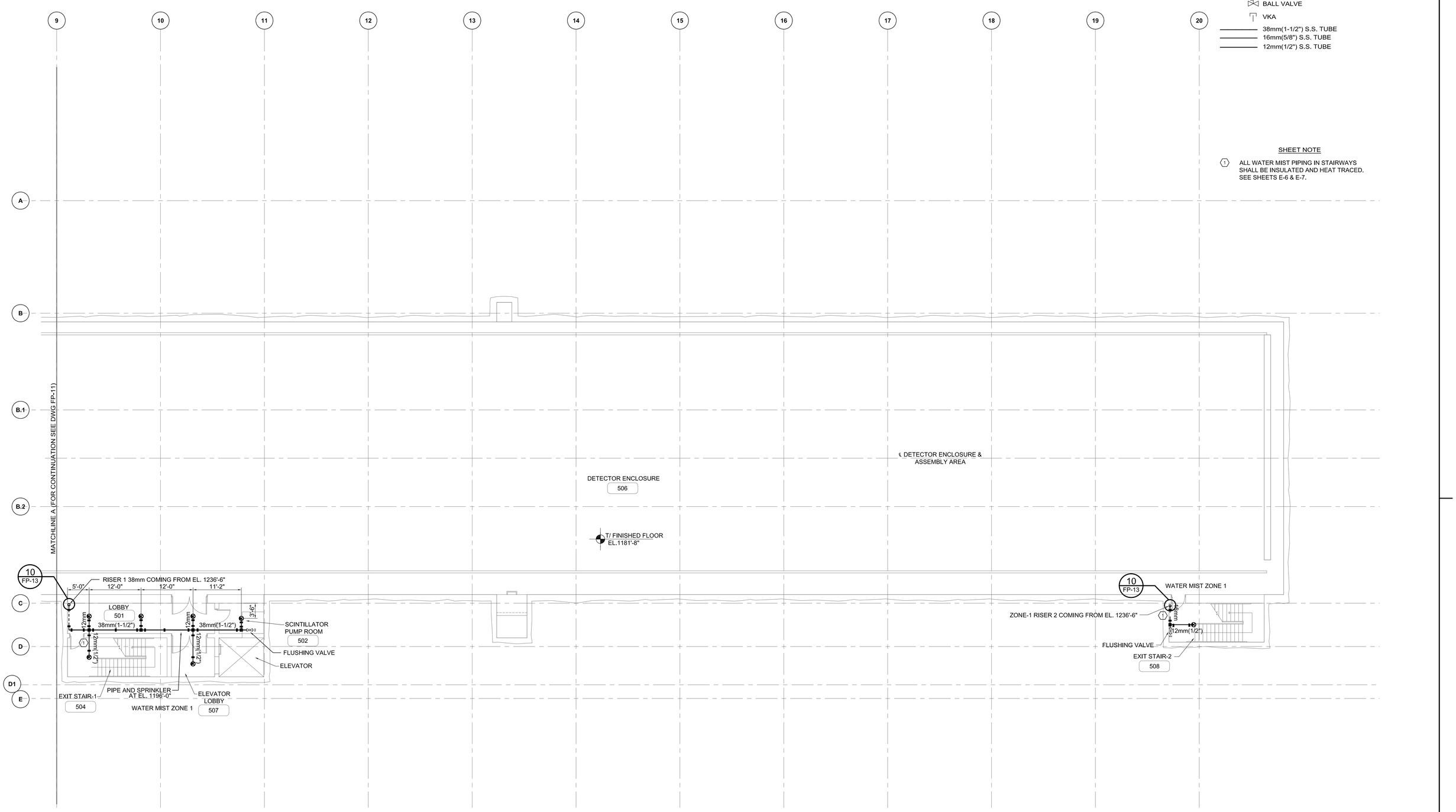
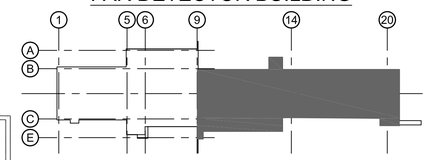


WATER MIST SYSTEM PLAN EL 1181'-8"

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

FAR DETECTOR BUILDING



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SIGNATURE:

DATE: 03/11/2009 LICENSE #41173

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

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CHECKED	B. MICHNA	03-11-09
APPROVED	G. PENNEL	03-11-09

OWNER / REPRESENTATIVE		DATE
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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" 0 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

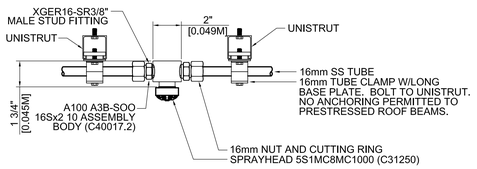
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

WATER MIST SYSTEM PLAN EL 1181'-8"

DRAWING NO. 15-1-3B FP-12 REV. 0

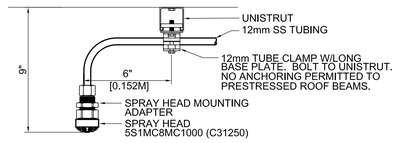
11 MAR, 2009



PENDENT MOUNTING SPRAY HEAD

SCALE: 3"=1'-0"

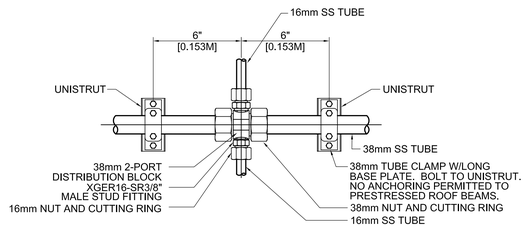
1 FP-4 / 1 FP-5



PENDENT MOUNTING SPRAYHEAD

SCALE: 3"=1'-0"

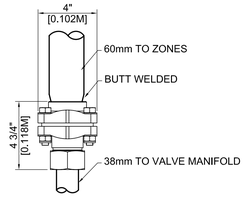
2 FP-4 / 2 FP-5



2-PORT DISTRIBUTION BLOCK

SCALE: 3"=1'-0"

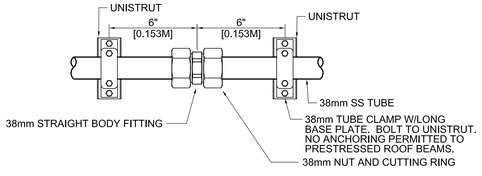
3 FP-4 / 3 FP-5



60mm WELD TO 38mm

SCALE: 3"=1'-0"

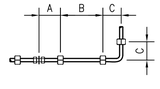
4 FP-16



STRAIGHT FITTING BODY DETAIL

SCALE: 3"=1'-0"

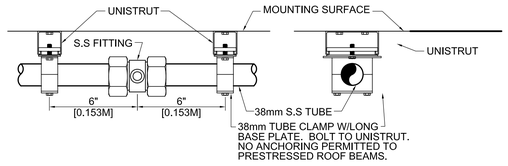
5 FP-4 / 5 FP-5



RECOMMENDED TUBE CLAMP SPACING			
TUBE O.D.	A	B	C
12	4"	4'-0"	8"
16	4"	5'-0"	8"
25	4"	6'-0"	8"
30	6"	7'-0"	12"
38			

TUBE CLAMP SPACING

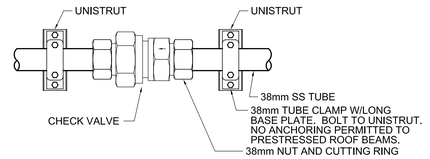
SCALE: NOT TO SCALE



TUBE CLAMPING DETAIL WITH FITTING

SCALE: 3"=1'-0"

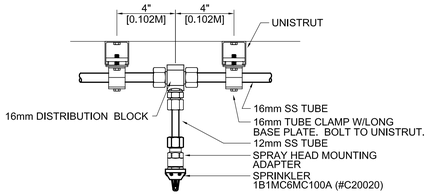
6 FP-5



CHECK VALVE DETAIL

SCALE: 3"=1'-0"

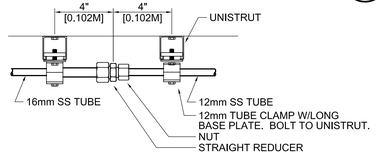
7 FP-5



PENDENT MOUNTING SPRINKLERS

SCALE: 3"=1'-0"

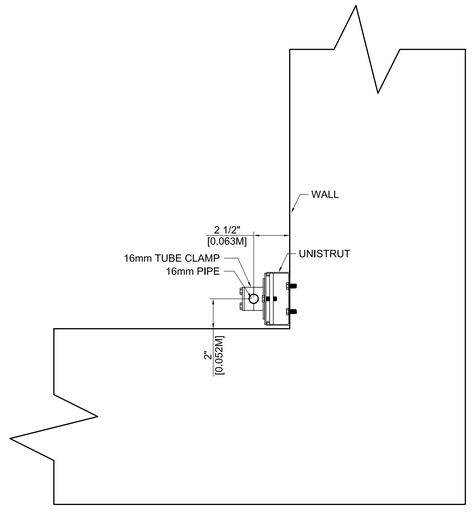
8 FP-4



16mm TO 12mm STRAIGHT REDUCER

SCALE: 3"=1'-0"

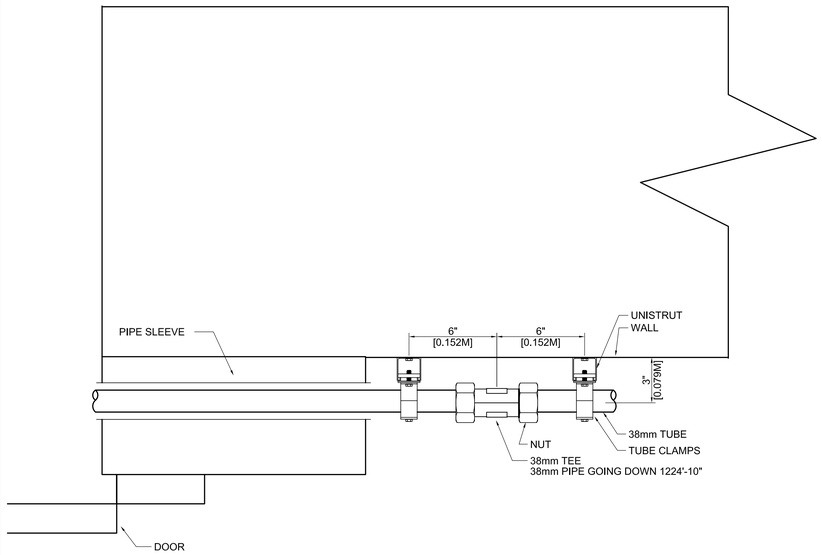
9 FP-4



PIPE RISER LOCATION

SCALE: 3"=1'-0"

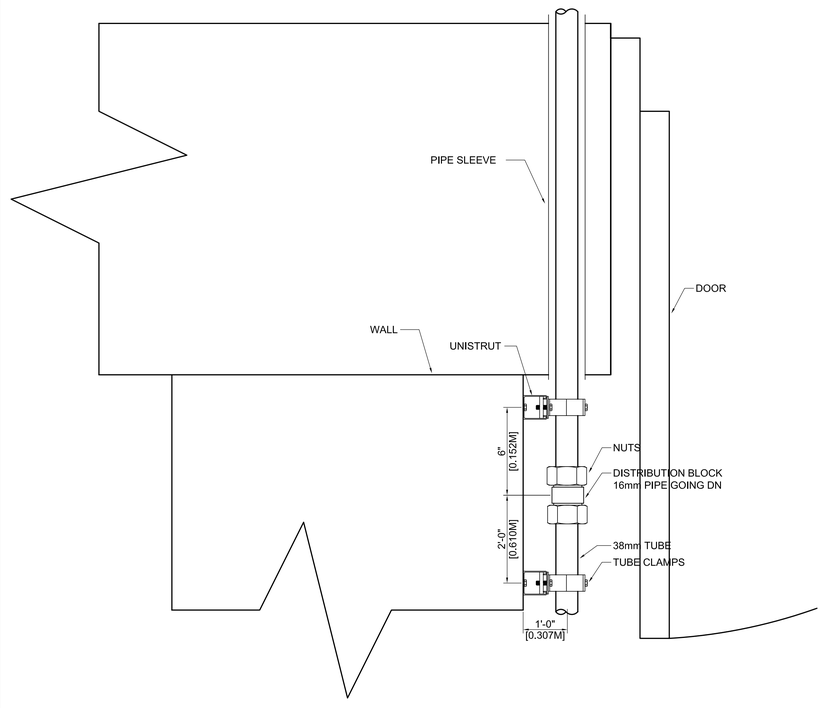
10 FP-11 / 10 FP-12



38mm PIPE DROP LOCATION

SCALE: 3"=1'-0"

11 FP-5



16mm PIPE DROP LOCATION

SCALE: 3"=1'-0"

12 FP-5

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PRINT NAME: T.G. PENNEL

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UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

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Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

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DRAWN	R. ABEBE	03-11-09
CHECKED	B. MICHNA	03-11-09
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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

3"=1'-0" 0 1

SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

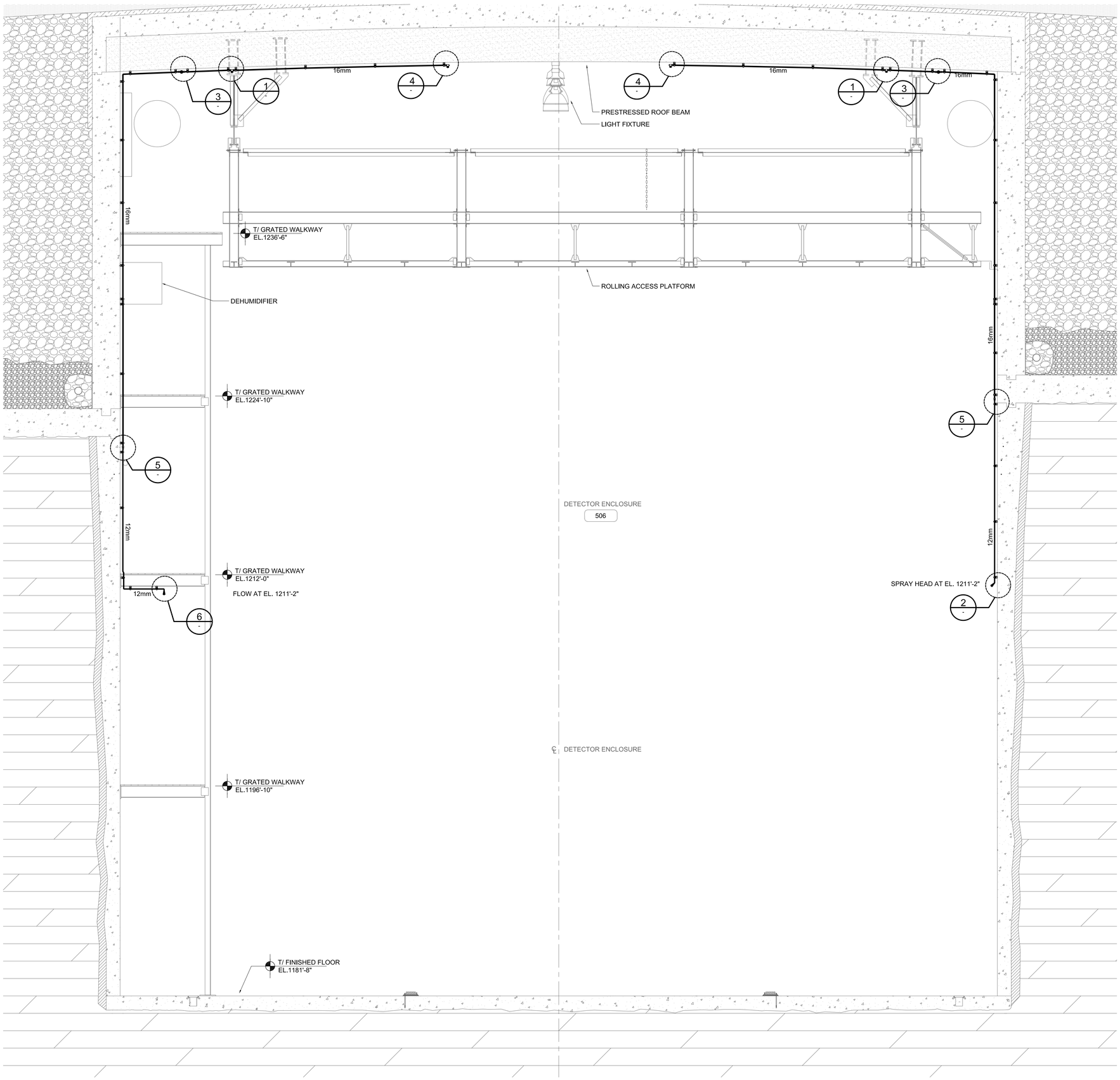
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

DETAILS

DRAWING NO. 15-1-3B FP-13 REV. 0

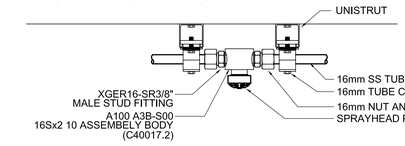
11 MAR, 2009



SECTION

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

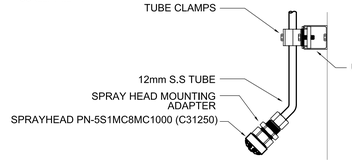
A
FP-5



MOUNTING SPRAYHEAD DETAIL

SCALE: 1-1/2"=1'

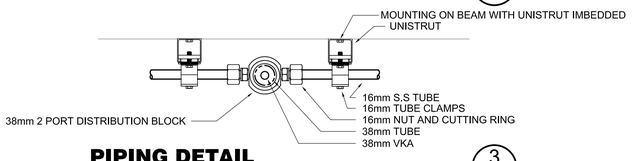
1
-



MOUNTING SPRAYHEAD DETAIL

SCALE:3"=1'

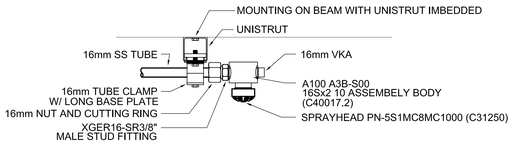
2
-



PIPING DETAIL

SCALE: 3"=1'

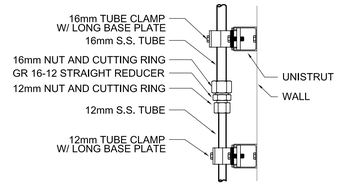
3
-



MOUNTING SPRAYHEAD DETAIL

SCALE: 3"=1'

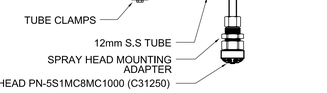
4
-



STRAIGHT REDUCER DETAIL

SCALE: 3"=1'

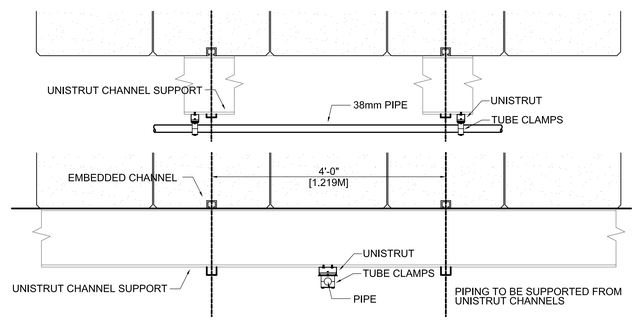
5
-



MOUNTING SPRAYHEAD DETAIL

SCALE:3"=1'

6
-



PIPE SUPPORT DETAIL

SCALE: 3"=1'-0"

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APPROVED	G. PENNEL	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

3"=1'-0" 0 1 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

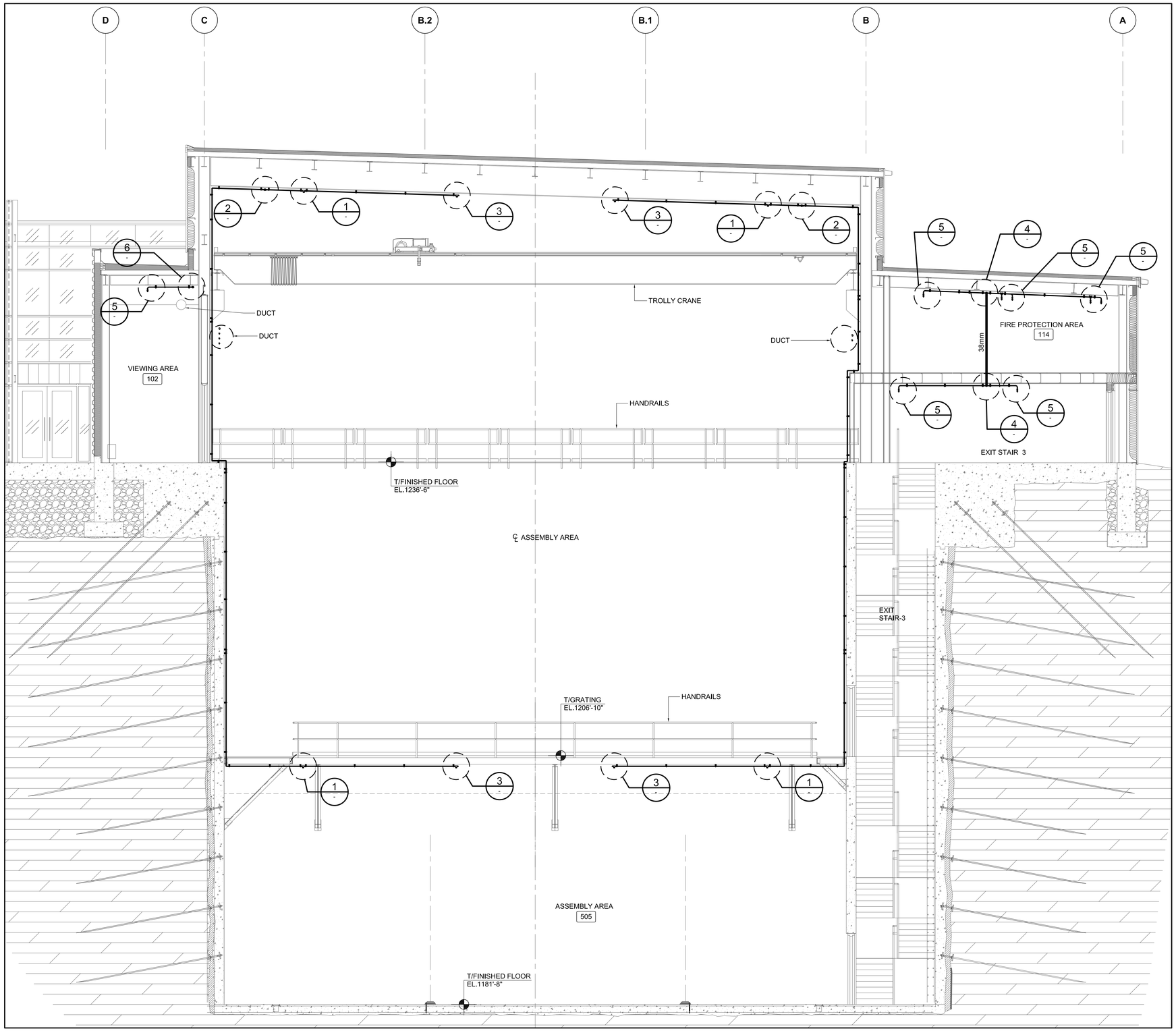
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

SECTION & DETAILS

DRAWING NO. 15-1-3B FP-14 REV. 0

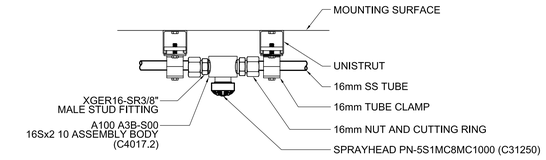
11 MAR, 2009



SECTION 7

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

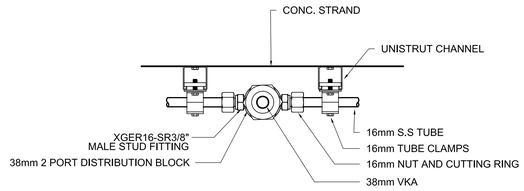
B
FP-4



MOUNTING SPRAYHEAD DETAIL

SCALE: 3"=1'

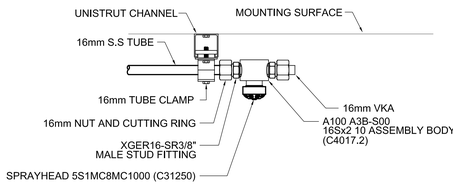
1
-



PIPING DETAIL

SCALE: 3"=1'

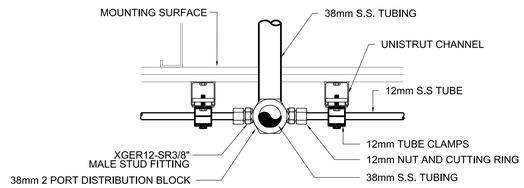
2
-



MOUNTING SPRAYHEAD DETAIL

SCALE: 3"=1'

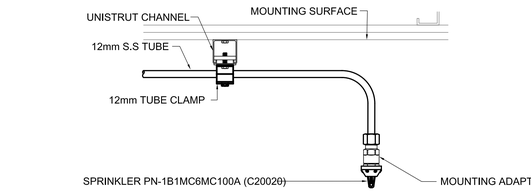
3
-



PIPING DETAIL

SCALE: 3"=1'

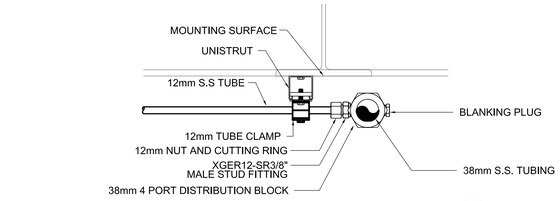
4
-



MOUNTING SPRAYHEAD DETAIL

SCALE: 3"=1'

5
-



PIPING DETAIL

SCALE: 3"=1'

6
-

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PRINT NAME: T.G. PENNEL

SIGNATURE:

DATE: 03/11/2009 LICENSE #41173

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

SCHIRMER ENGINEERING
1000 Milwaukee Avenue, 5th Floor
Glenview, IL 60025
Phone (847) 953-7700 Fax (847) 953-7793
www.schirmereng.com
Fire Protection ■ Code Consulting ■ Process Safety ■ Security Consulting

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	M. LINDSAY	03-11-09
DRAWN	R. ABEBE	03-11-09
CHECKED	B. MICHNA	03-11-09
APPROVED	G. PENNEL	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE: AS NOTED

1/4"=1'-0" 4 0 4 8 SCALE FEET

3"=1'-0" 0 1 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

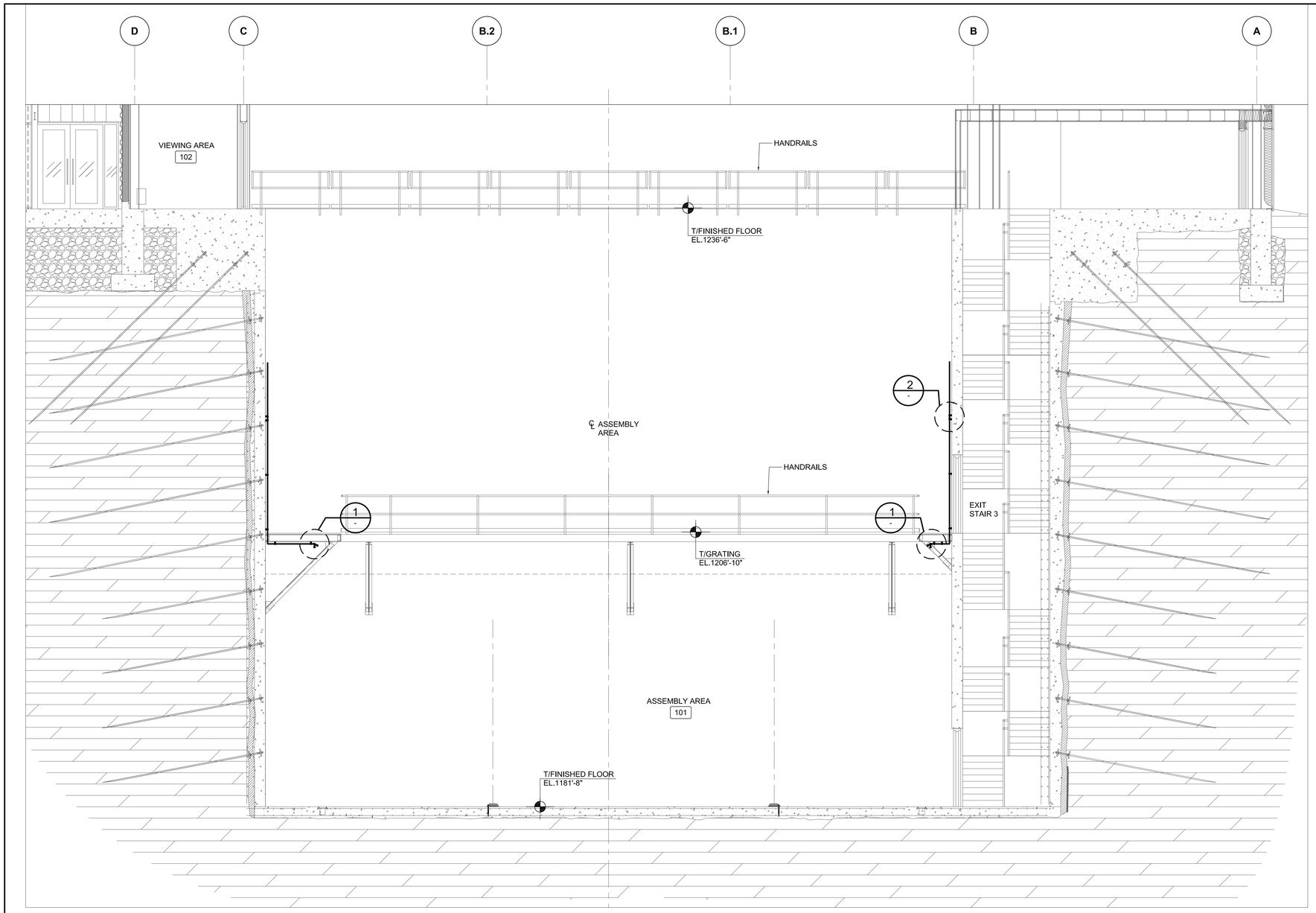
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

SECTION & DETAILS

DRAWING NO. 15-1-3B FP-15 REV. 0

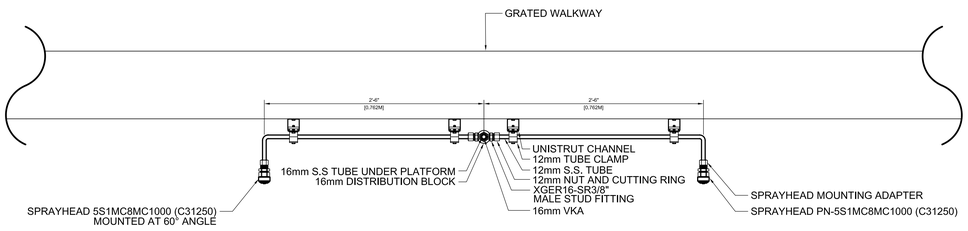
11 MAR, 2009



SECTION 9

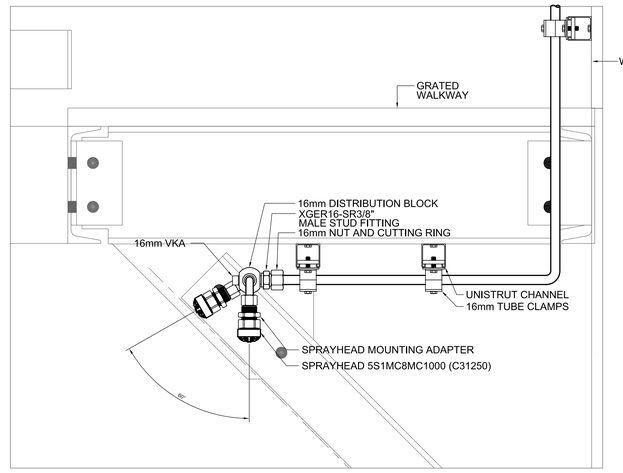
SCALE: 1/4"=1'-0"

C
FP-4



FRONT VIEW OF THE PLATFORM

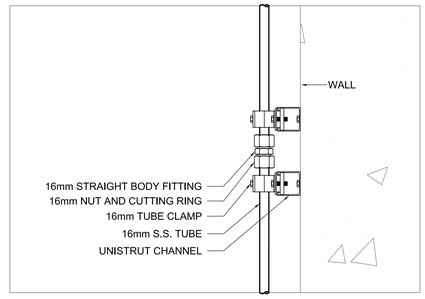
SCALE: 3"=1'-0"



SIDEVIEW OF THE PLATFORM

SCALE: 3"=1'

1
-



STRAIGHT BODY FITTINGS

SCALE: 3"=1'

2
-

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U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE: AS NOTED

1/4"=1'-0" 4 0 4 8 SCALE FEET

3"=1'-0" 0 1 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

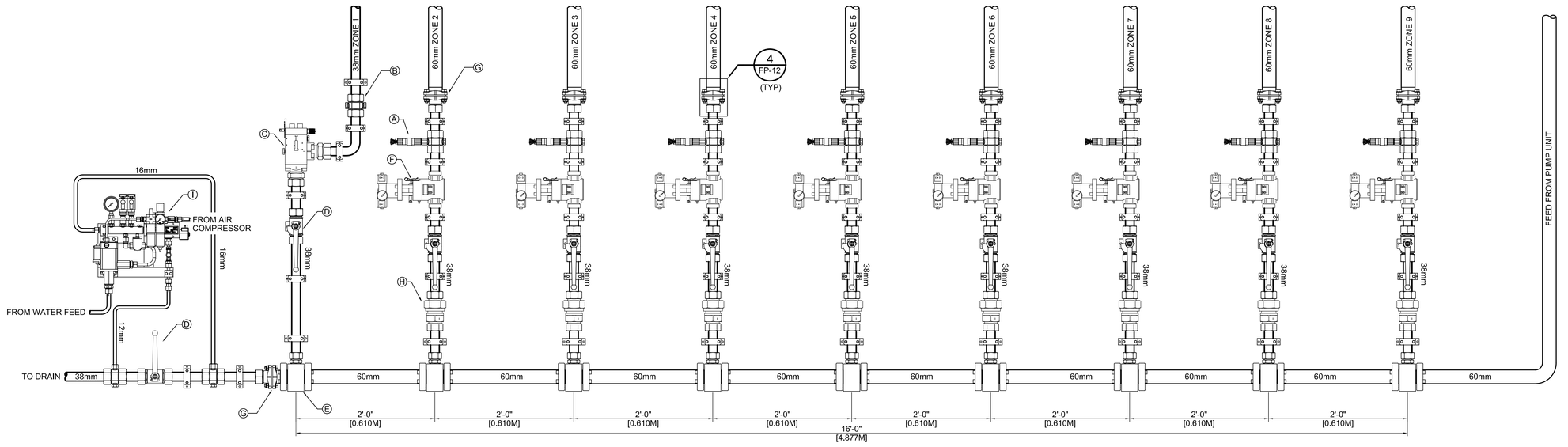
SECTION & DETAILS

DRAWING NO. 15-1-3B FP-16 REV. 0

11 MAR. 2009

SPECIFIC NOTES:

- (A) AIR PRESSURE MONITORING SWITCH ASSEMBLEY (TO FIRE ALARM PANEL)
  PRESSURE SWITCH (#MU1265)
  3/8" MALE BSPP x 1/4" FEMALE BSPP ADAPTER (#BU1245)
  3/8" BONDED SEAL WASHER (#G11020)
- (B) 38mm 2 PORT DISTRIBUTION BLOCK (#B03345)
- (C) SVA NS-40 SECTION VALVE 38/38 (#D01060)
- (D) 38mm BALL VALVE WITH LIMIT SWITCH (#D30030.1)
- (E) FLARE T-JOINT ASSEMBLY TYPE 60/38-S/60 (B04205)
- (F) SOLENOID BALL VALVE (SBM) 38/38 (#D07105)
- (G) 60mm WELD TO 38mm COMPRESSION FITTING
- (H) CHECK VALVE (D30145)
- (I) STANDBY UNIT



VALVE MANIFOLD DETAIL

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

E
FP-6

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UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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U of M SUBMITTED	M. MARSHAK	03-11-09

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

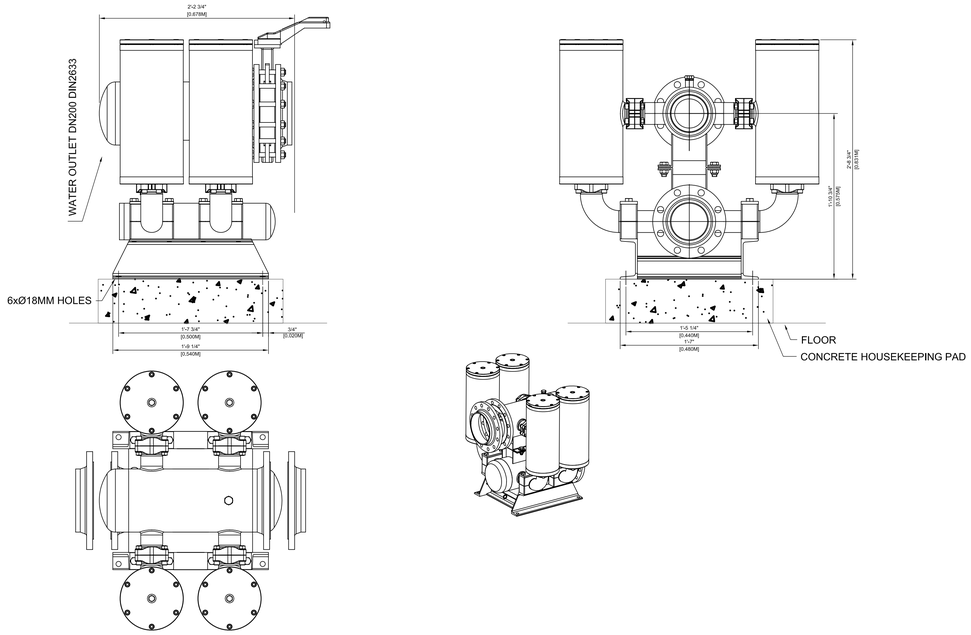
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

VALVE MANIFOLD DETAIL

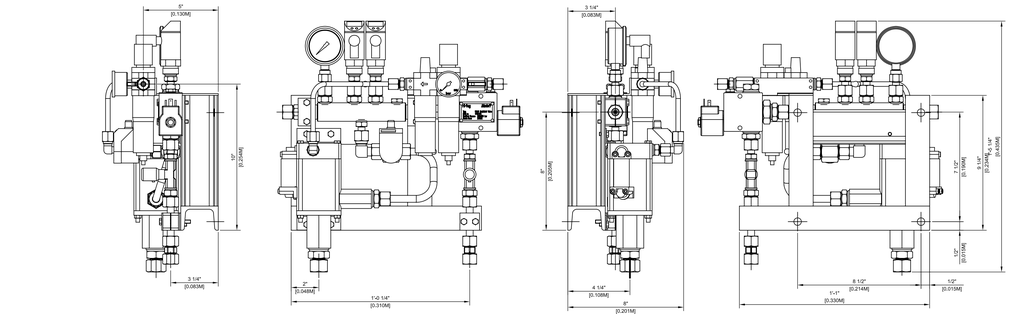
DRAWING NO. 15-1-3B FP-17 REV. 0

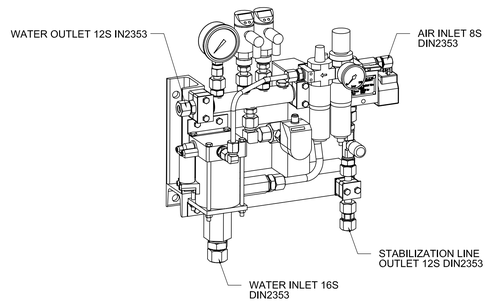
11 MAR, 2009



WATER FILTER UNIT

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





STANDBY UNIT

SCALE: 3"=1'-0"

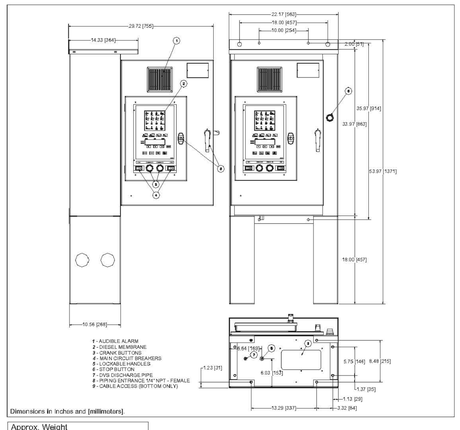
E·T·N | Cutler-Hammer

December 2006

Diesel Engine Fire Pump Controllers
Dimensions

FD100 Diesel Engine Controller

Dimensions
Standard Enclosure - Type NEMA 2, 12



Dimensions in inches and [millimeters]

Approx. Weight Lbs. (Kg)
105 (48)

NOTES:
1. All enclosures finished in FirePump red.
2. Cable Entrance bottom only.
3. Standard Enclosure type NEMA 2, 12.
4. Enclosure made from #14 Gauge (0.78) HR Steel.

MD0605073K

For more information visit: **www.chfire.com**

DIESEL CONTROLLER

SCALE: 1"=1'-0"

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Burns & McDonnell SINCE 1898

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SCALE:

1"=1'-0" 1 0 1 2 SCALE FEET

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

3"=1'-0" 0 1 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

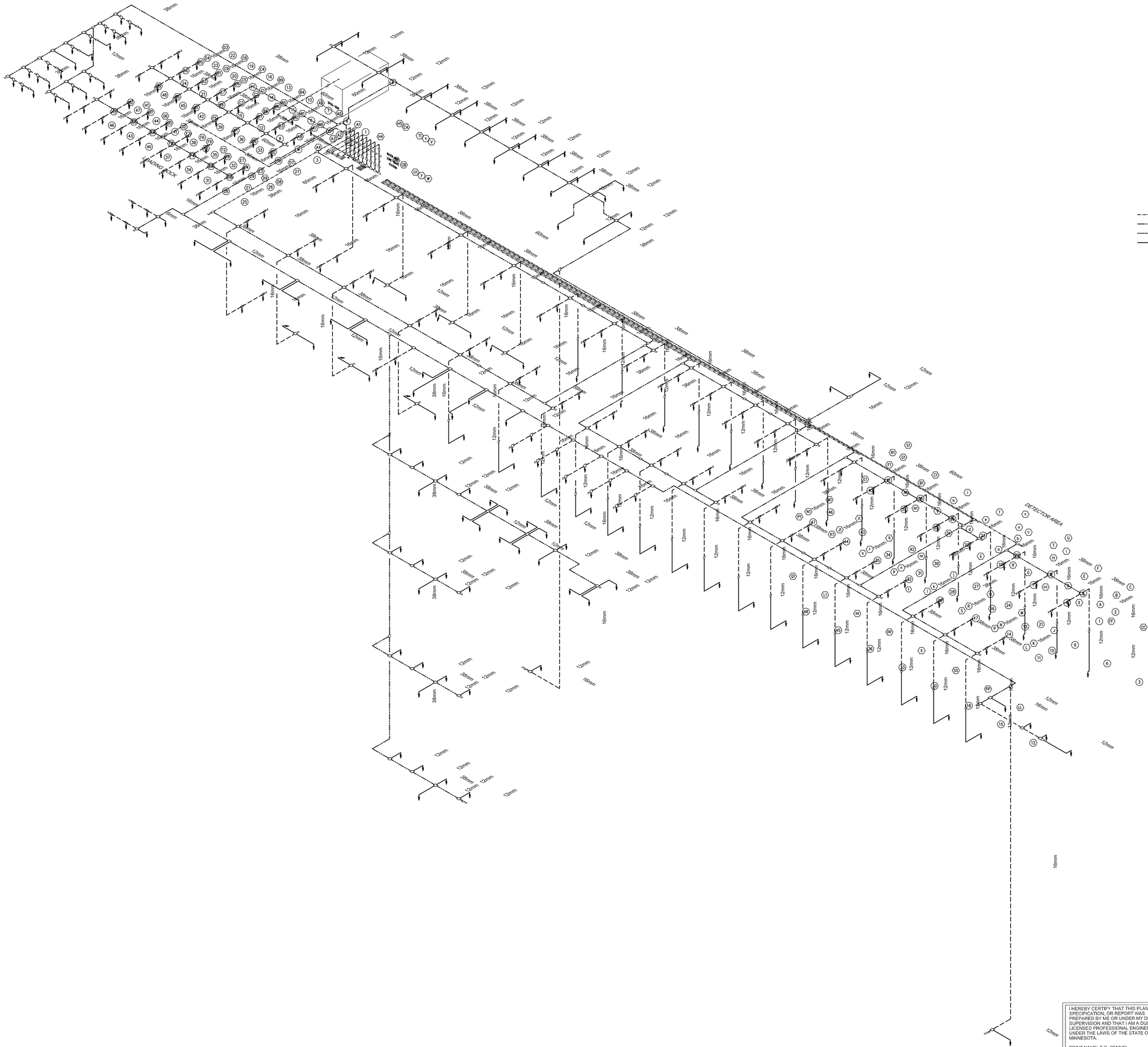
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

DETAILS

DRAWING NO. **15-1-3B** **FP-18** REV. **0**

11 MAR, 2009



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PRINT NAME: T.G. PENNEL

SIGNATURE:

DATE: 03/11/2009 LICENSE #41173

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE: NOT TO SCALE

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ISOMETRIC

DRAWING NO. **15-1-3B** **FP-19** REV. **0**

11 MAR, 2009

Marioff, Inc.
611-M N. Hammonds Ferry Road
Linthicum, MD 21090

1.9
70.0
15.9

FRICTION LOSS CALCULATIONS

Darcy Weisbach Method

Nozzle Pressure: 70

Pipe material:	SS	(Stainless = SS, Copper = CU)		
Pipe roughness (e)	0.045			
Flow factor:	1.00	(GPU = 1.8, MAU = 1.3, SPU = 1)		
Water temperature (T)	4.0	°C	39.2	°F
Density of fluid (ρ)	999.9	Kg/m³	62.46	lf/ft³
Absolute viscosity (μ)	1.5	Centipoise		

$$\Delta p_m = 2.252 \frac{f L \rho Q^2}{d^5}$$

$$Re = 21.22 \frac{Q \rho}{d \mu}$$

Relative Roughness = $\frac{\varepsilon}{d}$

$P_{hydrostatic} = \rho \, L \, g$

Project No. ____________

Customer: PHOENIX FIRE SYSTEMS
Project: NOvA - DETECTOR ENCLOSURE
Revision No. ____________

Branch Point	Pipe Section Node to Node	Flow L / min Q'	K Factor K	Node Pressure bar g P	Factored Flow L / min Q	Tube O.D. mm d'	Valves NS-12	Valves NS-20	Valves NS-40	Valves Ball Valves	Distribution Blocks To 12 mm	Distribution Blocks To 16 mm	Tees & Elbows	Bends	Reducers	Length m L	Pressure Loss for Devices Δp	Tube I.D. mm d	Friction Loss bar gauge Δp_m	UP: 1 DN: -1	Hydro-static pr. Ps	Node pressure ΣP_m	Flow Velocity m / sec
	→ Nozzle No.		1	70.0																			
	1-A	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	A-B	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	2-B	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	B-C	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	3-CC	32.6	3.90	**70.00**	32.6	12								1		4.0	0.28	9.6	4.01	-1	-0.392	73.61	7.5
	CC-C	32.6	3.80	73.61	32.6	16								1	1	9.0	0.18	13.0	1.90	-1	-0.882	74.64	4.1
	C-F	97.8	11.25	75.51	97.8	38						2				5.0	0.21	32.0	0.30			75.81	2.0
	4-D	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	D-E	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	5-E	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	E-F	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	6-FF	32.6	3.90	**70.00**	32.6	12								1		4.0	0.28	9.6	4.01	-1	-0.392	73.61	7.5
	FF-F	32.6	3.80	73.61	32.6	16								1	1	9.0	0.18	13.0	1.90	-1	-0.882	74.64	4.1
	F-I	195.6	22.46	75.81	195.6	38						2				6.1	0.80	32.0	1.19			77.01	4.0
	7-G	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	G-H	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	8-H	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	H-I	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	9-II	32.6	3.90	**70.00**	32.6	12								1		4.0	0.28	9.6	4.01	-1	-0.392	73.61	7.5
	II-I	32.6	3.80	73.61	32.6	16								1	1	9.0	0.18	13.0	1.90	-1	-0.882	74.64	4.1
	I-T	293.4	33.43	77.01	293.4	38						2				2.0	1.75	32.0	2.03			79.04	6.1
	10-J	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	J-K	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	11-K	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	K-L	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	12-LL	32.6	3.90	**70.00**	32.6	12								2		4.0	0.57	9.6	4.29			74.29	7.5
	LL-L	32.6	3.78	74.29	32.6	16								1	1	9.5	0.18	13.0	2.00	-1	-0.931	75.36	4.1
	L-P	97.8	11.27	75.36	97.8	38						2				5.0	0.21	32.0	0.30			75.66	2.0
	13-M	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	M-N	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	14-N	32.6	3.90	**70.00**	32.6	12								1		0.1	0.28	9.6	0.38			70.38	7.5
	N-P	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	15-PP	32.6	3.90	**70.00**	32.6	12								2		4.0	0.57	9.6	4.29			74.29	7.5
	PP-P	32.6	3.78	74.29	32.6	16								1	1	9.5	0.18	13.0	2.00	-1	-0.931	75.36	4.1

PRESS. CALCS 1.3 DETECTION.xls

Page 1 of 3
2/25/2009

Branch Point	Pipe Section Node to Node	Flow L / min Q'	K Factor K	Node Pressure bar g P	Factored Flow L / min Q	Tube O.D. mm d'	Valves NS-12	Valves NS-20	Valves NS-40	Valves Ball Valves	Distribution Blocks To 12 mm	Distribution Blocks To 16 mm	Tees & Elbows	Bends	Reducers	Length m L	Pressure Loss for Devices Δp	Tube I.D. mm d	Friction Loss bar gauge Δp_m	UP: 1 DN: -1	Hydro-static pr. Ps	Node pressure ΣP_m	Flow Velocity m / sec
	P-S	195.6	22.49	75.66	195.6	38						2				6.1	0.80	32.0	1.19			76.86	4.0
	16-Q	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	Q-R	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	17-R	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	R-S	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	18-SS	32.6	3.90	**70.00**	32.6	12								2		4.0	0.57	9.6	4.29			74.29	7.5
	SS-S	32.6	3.78	74.29	32.6	16								1	1	9.5	0.18	13.0	2.00	-1	-0.931	75.36	4.1
	S-T	293.4	33.47	76.86	293.4	38						2		1		18.3	1.88	32.0	4.49			81.35	6.1
	T-U	586.8	65.06	81.35	586.8	38							1			1.2	1.92	32.0	2.61			83.96	12.1
	U-V	586.8	64.04	83.96	586.8	60							1	2		91.6	0.27	52.5	4.20			88.16	4.5
	V-W	586.8	62.50	88.16	586.8	38				2					1	1.5	1.92	32.0	2.78			90.94	12.1
	19-a	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	a-b	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	20-b	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	b-c	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	21-cc	32.6	3.90	**70.00**	32.6	12								1		4.0	0.28	9.6	4.01	-1	-0.392	73.61	7.5
	cc-c	32.6	3.80	73.61	32.6	16								1	1	9.0	0.18	13.0	1.90	-1	-0.882	74.64	4.1
	c-u	97.8	11.25	75.51	97.8	38						2	1			1.8	0.27	32.0	0.31			75.82	2.0
	22-d	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	d-e	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	23-e	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	e-f	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	24-ff	32.6	3.90	**70.00**	32.6	12								1		4.0	0.28	9.6	4.01	-1	-0.392	73.61	7.5
	ff-f	32.6	3.80	73.61	32.6	16								1	1	9.0	0.18	13.0	1.90	-1	-0.882	74.64	4.1
	25-g	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	g-h	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	26-h	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	h-i	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	27-ii	32.6	3.90	**70.00**	32.6	12								1		4.0	0.28	9.6	4.01	-1	-0.392	73.61	7.5
	ii-i	32.6	3.80	73.61	32.6	16								1	1	9.0	0.18	13.0	1.90	-1	-0.882	74.64	4.1
	i-f	97.8	11.25	75.51	97.8	38						2				6.1	0.21	32.0	0.32			75.83	2.0
	f-u	195.6	22.46	75.83	195.6	38						2				3.6	0.80	32.0	1.03			76.86	4.0
	28-j	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	j-k	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	29-k	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	k-l	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	30-ll	32.6	3.90	**70.00**	32.6	12								2		4.0	0.57	9.6	4.29	-1	-0.392	73.90	7.5
	ll-l	32.6	3.79	73.90	32.6	16								1	1	9.5	0.18	13.0	2.00	-1	-0.931	74.97	4.1
	l-t	97.8	11.25	75.51	97.8	38						2				1.8	0.21	32.0	0.25			75.76	2.0
	31-m	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	m-n	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	32-n	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	n-p	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	33-pp	32.6	3.90	**70.00**	32.6	12								2		4.0	0.57	9.6	4.29	-1	-0.392	73.90	7.5
	pp-p	32.6	3.79	73.90	32.6	16								1	1	9.5	0.18	13.0	2.00	-1	-0.931	74.97	4.1
	34-q	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	q-r	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	35-r	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5

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Branch Point	Pipe Section Node to Node	Flow L / min Q'	K Factor K	Node Pressure bar g P	Factored Flow L / min Q	Tube O.D. mm d'	Valves NS-12	Valves NS-20	Valves NS-40	Valves Ball Valves	Distribution Blocks To 12 mm	Distribution Blocks To 16 mm	Tees & Elbows	Bends	Reducers	Length m L	Pressure Loss for Devices Δp	Tube I.D. mm d	Friction Loss bar gauge Δp_m	UP: 1 DN: -1	Hydro-static pr. Ps	Node pressure ΣP_m	Flow Velocity m / sec
	r-s	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	36-ss	32.6	3.90	**70.00**	32.6	12								2		4.0	0.57	9.6	4.29	-1	-0.392	73.90	7.5
	ss-s	32.6	3.79	73.90	32.6	16								1	1	9.5	0.18	13.0	2.00	-1	-0.931	74.97	4.1
	s-p	97.8	11.25	75.51	97.8	38						2				6.1	0.21	32.0	0.32			75.83	2.0
	p-t	195.6	22.46	75.83	195.6	38						2				1.8	0.80	32.0	0.91			76.75	4.0
	t-u	293.4	33.49	76.75	293.4	38							1			16.6	0.48	32.0	2.86			79.60	6.1
	u-v	586.8	65.77	79.60	586.8	38							1			1.2	1.92	32.0	2.61			82.21	12.1
	v-x	586.8	64.72	82.21	586.8	60							1	2		85.9	0.27	52.5	3.96			86.16	4.5
	x-y	586.8	63.22	86.16	586.8	38				2					1	1.5	1.92	32.0	2.78			88.94	12.1
	37-A1	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	A1-B1	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	38-B1	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	B1-C1	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	39-D1	32.6	3.90	**70.00**	32.6	12								1		4.0	0.28	9.6	4.01	-1	-0.392	73.61	7.5
	D1-C1	32.6	3.80	73.61	32.6	16									1	9.0	0.12	13.0	1.85	-1	-0.882	74.58	4.1
	C1-G1	97.8	11.25	75.51	97.8	38						2				5.0	0.21	32.0	0.30			75.81	2.0
	40-E1	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	E1-F1	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	41-F1	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	F1-G1	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	42-H1	32.6	3.90	**70.00**	32.6	12								1		4.0	0.28	9.6	4.01	-1	-0.392	73.61	7.5
	H1-G1	32.6	3.80	73.61	32.6	16								1	1	9.0	0.18	13.0	1.90	-1	-0.882	74.64	4.1
	G1-R1	195.6	22.46	75.81	195.6	38						2				1.0	0.80	32.0	0.86			76.67	4.0
	43-I1	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	I1-J1	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	44-J1	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	J1-K1	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	45-L1	32.6	3.90	**70.00**	32.6	12								2		4.0	0.57	9.6	4.29	-1	-0.392	73.90	7.5
	L1-K1	32.6	3.79	73.90	32.6	16								1	1	9.5	0.18	13.0	2.00	-1	-0.931	74.97	4.1
	K1-P1	97.8	11.25	75.51	97.8	38						2				5.0	0.21	32.0	0.30			75.81	2.0
	46-M1	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	M1-N1	32.6	3.89	70.09	32.6	16					1					4.7	0.76	13.0	1.66			71.76	4.1
	47-N1	32.6	3.90	**70.00**	32.6	12										0.1		9.6	0.09			70.09	7.5
	N1-P1	65.2	7.70	71.76	65.2	16					1					1.2	2.88	13.0	3.75			75.51	8.2
	48-Q1	32.6	3.90	**70.00**	32.6	12								2		4.0	0.57	9.6	4.29	-1	-0.392	73.90	7.5
	Q1-P1	32.6	3.79	73.90	32.6	16								1	1	9.5	0.18	13.0	2.00	-1	-0.931	74.97	4.1
	P1-R1	195.6	22.46	75.81	195.6	38						2		1		18.3	0.86	32.0	2.05			77.86	4.0
	R1-S1	391.2	44.33	77.86	391.2	38							1			1.0	0.85	32.0	1.11			78.97	8.1
	S1-T1	391.2	44.02	78.97	391.2	60							1	2		66.6	0.12	52.5	1.39			80.36	3.0
	T1-U1	391.2	43.64	80.36	391.2	38				2					1	1.5	0.85	32.0	1.23			81.60	8.1
	U1-y	391.2	43.31	81.60	391.2	60							1		1	0.5	0.11	52.5	0.12			81.72	3.0
	y-W	978.0	103.70	88.94	978.0	60							1			0.5	0.52	52.5	0.58			89.52	7.5
	W-Z	1,564.8	164.09	90.94	1564.8	60							1	2		3.5	1.95	52.5	3.02			93.95	12.0

PRESS. CALCS 1.3 DETECTION.xls

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Marioff, Inc.
611-M N. Hammonds Ferry Road
Linthicum, MD 21090

1.9
70.0
15.9

FRICTION LOSS CALCULATIONS

Darcy Weisbach Method

Nozzle Pressure: 70

Pipe material:	SS	(Stainless = SS, Copper = CU)		
Pipe roughness (e)	0.045			
Flow factor:	1.00	(GPU = 1.8, MAU = 1.3, SPU = 1)		
Water temperature (T)	4.0	°C	39.2	°F
Density of fluid (ρ)	999.9	Kg/m³	62.46	lf/ft³
Absolute viscosity (μ)	1.5	Centipoise		

$$\Delta p_m = 2.252 \frac{f L \rho Q^2}{d^5}$$

$$Re = 21.22 \frac{Q \rho}{d \mu}$$

Relative Roughness = $\frac{\varepsilon}{d}$

$P_{hydrostatic} = \rho \, L \, g$

Project No. ____________

Customer: PHOENIX FIRE SYSTEMS
Project: NOVA LOADING DOCK
Revision No. ____________

Branch Point	Pipe Section Node to Node	Flow L / min Q'	K Factor K	Node Pressure bar g P	Factored Flow L / min Q	Tube O.D. mm d'	Valves NS-12	Valves NS-20	Valves NS-40	Valves Ball Valves	Distribution Blocks To 12 mm	Distribution Blocks To 16 mm	Tees & Elbows	Bends	Reducers	Length m L	Pressure Loss for Devices Δp	Tube I.D. mm d	Friction Loss bar gauge Δp_m	UP: 1 DN: -1	Hydro-static pr. Ps	Node pressure ΣP_m	Flow Velocity m / sec
	→ Nozzle No.		1	70.0																			
	1-A1	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	A1-A2	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	2-A2	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	A2-A3	60.4	7.15	71.40	60.4	16					1					1.3	2.49	13.0	3.30			74.71	7.6
	3-A4	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	A4-A3	30.2	3.61	70.08	30.2	16					1					2.4	0.68	13.0	1.08			71.16	3.8
	A3-A7	90.6	10.48	74.71	90.6	38						2				3.8	0.19	32.0	0.24			74.95	1.9
	4-A5	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	A5-A6	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	5-A6	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	A6-A7	60.4	7.15	71.40	60.4	16					1					1.3	2.49	13.0	3.30			74.71	7.6
	6-A8	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	A8-A7	30.2	3.61	70.08	30.2	16					1					2.4	0.68	13.0	1.08			71.16	3.8
	A7-B2	181.2	20.93	74.95	181.2	38						2				3.8	0.69	32.0	0.91			75.86	3.7
	7-A9	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	A9-B1	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	8-B1	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	B1-B2	60.4	7.15	71.40	60.4	16					1					1.3	2.49	13.0	3.30			74.71	7.6
	9-B3	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	B3-B2	30.2	3.61	70.08	30.2	16					1					2.4	0.68	13.0	1.08			71.16	3.8
	B2-B6	271.8	31.21	75.86	271.8	38						2				3.8	1.50	32.0	1.95			77.82	5.6
	10-B4	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	B4-B5	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	11-B5	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	B5-B6	60.4	7.15	71.40	60.4	16					1					1.3	2.49	13.0	3.30			74.71	7.6
	12-B7	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	B7-B6	30.2	3.61	70.08	30.2	16					1					2.4	0.68	13.0	1.08			71.16	3.8
	B6-B8	362.4	41.08	77.82	362.4	38						2				2.0	2.66	32.0	3.10			80.92	7.5
	24-D6	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	D6-D5	30.2	3.61	70.08	30.2	16					1					2.4	0.68	13.0	1.08			71.16	3.8
	22-D3	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	D3-D4	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	23-D4	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9

PRESS. CALCS 1.3 LOADING DOCK AREA.xls

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Branch Point	Pipe Section Node to Node	Flow L / min Q'	K Factor K	Node Pressure bar g P	Factored Flow L / min Q	Tube O.D. mm d'	Valves NS-12	Valves NS-20	Valves NS-40	Valves Ball Valves	Distribution Blocks To 12 mm	Distribution Blocks To 16 mm	Tees & Elbows	Bends	Reducers	Length m L	Pressure Loss for Devices Δp	Tube I.D. mm d	Friction Loss bar gauge Δp_m	UP: 1 DN: -1	Hydro-static pr. Ps	Node pressure ΣP_m	Flow Velocity m / sec
	D4-D5	60.4	7.15	71.40	60.4	16					1					1.3	2.49	13.0	3.30			74.71	7.6
	D5-D1	90.6	10.48	74.71	90.6	38						2				3.8	0.19	32.0	0.24			74.95	1.9
	21-D2	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	D2-D1	30.2	3.61	70.08	30.2	16					1					2.4	0.68	13.0	1.08			71.16	3.8
	19-C8	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	C8-C9	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	20-C9	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	C9-D1	60.4	7.15	71.40	60.4	16					1					1.3	2.49	13.0	3.30			74.71	7.6
	D1-C6	181.2	20.93	74.95	181.2	38						2				3.8	0.69	32.0	0.91			75.86	3.7
	18-C7	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	C7-C6	30.2	3.61	70.08	30.2	16					1					2.4	0.68	13.0	1.08			71.16	3.8
	16-C4	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	C4-C5	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	17-C5	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	C5-C6	60.4	7.15	71.40	60.4	16					1					1.3	2.49	13.0	3.30			74.71	7.6
	C6-C2	271.8	31.21	75.86	271.8	38						2				3.8	1.50	32.0	1.96			77.82	5.6
	15-C3	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	C3-C2	30.2	3.61	70.08	30.2	16					1					2.4	0.68	13.0	1.08			71.16	3.8
	13-B9	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	B9-C1	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	14-C1	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	C1-C2	60.4	7.15	71.40	60.4	16					1					1.3	2.49	13.0	3.30			74.71	7.6
	C2-B8	362.4	41.08	77.82	362.4	38						2				1.8	2.66	32.0	3.06			80.88	7.5
	B8-H4	724.8	80.57	80.92	724.8	60							1	1		20.4	0.35	52.5	1.69			82.61	5.6
	27-D7	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	D7-D8	30.2	3.61	70.08	30.2	16					1					2.2	0.68	13.0	1.05			71.13	3.8
	25-E1	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	E1-D9	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	26-D9	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	D9-D8	60.4	7.15	71.40	60.4	16					1					1.7	2.49	13.0	3.55			74.96	7.6
	D8-E3	90.6	10.46	74.96	90.6	38						2				3.8	0.19	32.0	0.24			75.20	1.9
	30-E2	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	E2-E3	30.2	3.61	70.08	30.2	16					1					2.2	0.68	13.0	1.05			71.13	3.8
	28-E5	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	E5-E4	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	29-E4	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	E4-E3	60.4	7.15	71.40	60.4	16					1					1.7	2.49	13.0	3.55			74.96	7.6
	E3-E7	181.2	20.90	75.20	181.2	38						2				3.8	0.69	32.0	0.91			76.11	3.7
	33-E6	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	E6-E7	30.2	3.61	70.08	30.2	16					1					2.2	0.68	13.0	1.05			71.13	3.8
	31-E9	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	E9-E8	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	32-E8	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	E8-E7	60.4	7.15	71.40	60.4	16					1					1.7	2.49	13.0	3.55			74.96	7.6
	E7-F2	271.8	31.16	76.11	271.8	38						2				3.8	1.50	32.0	1.96			78.07	5.6
	36-F1	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	F1-F2	30.2	3.61	70.08	30.2	16					1					2.2	0.68	13.0	1.05			71.13	3.8
	34-F4	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9

PRESS. CALCS 1.3 LOADING DOCK AREA.xls

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1/8/2009

Branch Point	Pipe Section Node to Node	Flow L / min Q'	K Factor K	Node Pressure bar g P	Factored Flow L / min Q	Tube O.D. mm d'	Valves NS-12	Valves NS-20	Valves NS-40	Valves Ball Valves	Distribution Blocks To 12 mm	Distribution Blocks To 16 mm	Tees & Elbows	Bends	Reducers	Length m L	Pressure Loss for Devices Δp	Tube I.D. mm d	Friction Loss bar gauge Δp_m	UP: 1 DN: -1	Hydro-static pr. Ps	Node pressure ΣP_m	Flow Velocity m / sec
	F4-F3	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	35-F3	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	F3-F2	60.4	7.15	71.40	60.4	16					1					1.7	2.49	13.0	3.55			74.96	7.6
	F2-F9	362.4	41.02	78.07	362.4	38						2				2.0	2.66	32.0	3.10			81.17	7.5
	46-H3	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	H3-H2	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	47-H2	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	H2-H1	60.4	7.15	71.40	60.4	16					1					1.7	2.49	13.0	3.55			74.96	7.6
	48-G9	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	G9-H1	30.2	3.61	70.08	30.2	16					1					2.2	0.68	13.0	1.05			71.13	3.8
	H1-G6	90.6	10.46	74.96	90.6	38						2				3.8	0.19	32.0	0.24			75.20	1.9
	43-G8	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	G8-G7	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	44-G7	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	G7-G6	60.4	7.15	71.40	60.4	16					1					1.7	2.49	13.0	3.55			74.96	7.6
	45-G5	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	G5-G6	30.2	3.61	70.08	30.2	16					1					2.2	0.68	13.0	1.05			71.13	3.8
	G6-G2	181.2	20.90	75.20	181.2	38						2				3.8	0.69	32.0	0.91			76.11	3.7
	40-G4	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	G4-G3	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	41-G3	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	G3-G2	60.4	7.15	71.40	60.4	16					1					1.7	2.49	13.0	3.55			74.96	7.6
	42-G1	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	G1-G2	30.2	3.61	70.08	30.2	16					1					2.2	0.68	13.0	1.05			71.13	3.8
	G2-F6	271.8	31.16	76.11	271.8	38						2				3.8	1.50	32.0	1.96			78.07	5.6
	37-F8	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	F8-F7	30.2	3.61	70.08	30.2	16					1					3.8	0.68	13.0	1.32			71.40	3.8
	38-F7	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	F7-F6	60.4	7.15	71.40	60.4	16					1					1.7	2.49	13.0	3.55			74.96	7.6
	39-F5	30.2	3.61	**70.00**	30.2	12										0.1		9.6	0.08			70.08	6.9
	F5-F6	30.2	3.61	70.08	30.2	16					1					2.2	0.68	13.0	1.05			71.13	3.8
	F6-F9	362.4	41.02	78.07	362.4	38						2				1.8	2.66	32.0	3.06			81.13	7.5
	F9-H4	724.8	80.45	81.17	724.8	60							1	2		28.5	0.42	52.5	2.28			83.45	5.6
	H4-H5	1,449.6	158.68	83.45	1449.6	60							1	3		1.6	1.94	52.5	2.35			85.81	11.2
	H5-H6	1,449.6	156.49	85.81	1449.6	38				2				1	1	1.0	14.91	32.0	18.40			104.21	30.0
	H6-Z	1,449.6	142.00	104.21	1449.6	60							1	2		7.0	1.67	52.5	3.50			107.71	11.2

PRESS. CALCS 1.3 LOADING DOCK AREA.xls

Page 3 of 3
1/8/2009

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PRINT NAME: T.G. PENNEL
SIGNATURE: TG Pennel
DATE: 03/11/2009 LICENSE #41173

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

SCHIRMER ENGINEERING
1000 Milwaukee Avenue, 5th Floor
Glenview, IL 60025
Phone (847) 953-7700 Fax (847) 953-7793
www.schirmereng.com

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Burns & McDonnell
SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE		OWNER / REPRESENTATIVE	DATE
DESIGNED	**M. LINDSAY**	**03-11-09**	NOvA FESS SUBMITTED	**S. DIXON**	**03-11-09**
DRAWN	**R. ABEBE**	**03-11-09**	NOvA PROJECT MANAGER	**J. COOPER**	**03-11-09**
CHECKED	**B. MICHNA**	**03-11-09**	HINES SUBMITTED	**C. McNABNEY**	**03-11-09**
APPROVED	**G. PENNEL**	**03-11-09**	U of M SUBMITTED	**M. MARSHAK**	**03-11-09**

SCALE: **NOT TO SCALE**

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

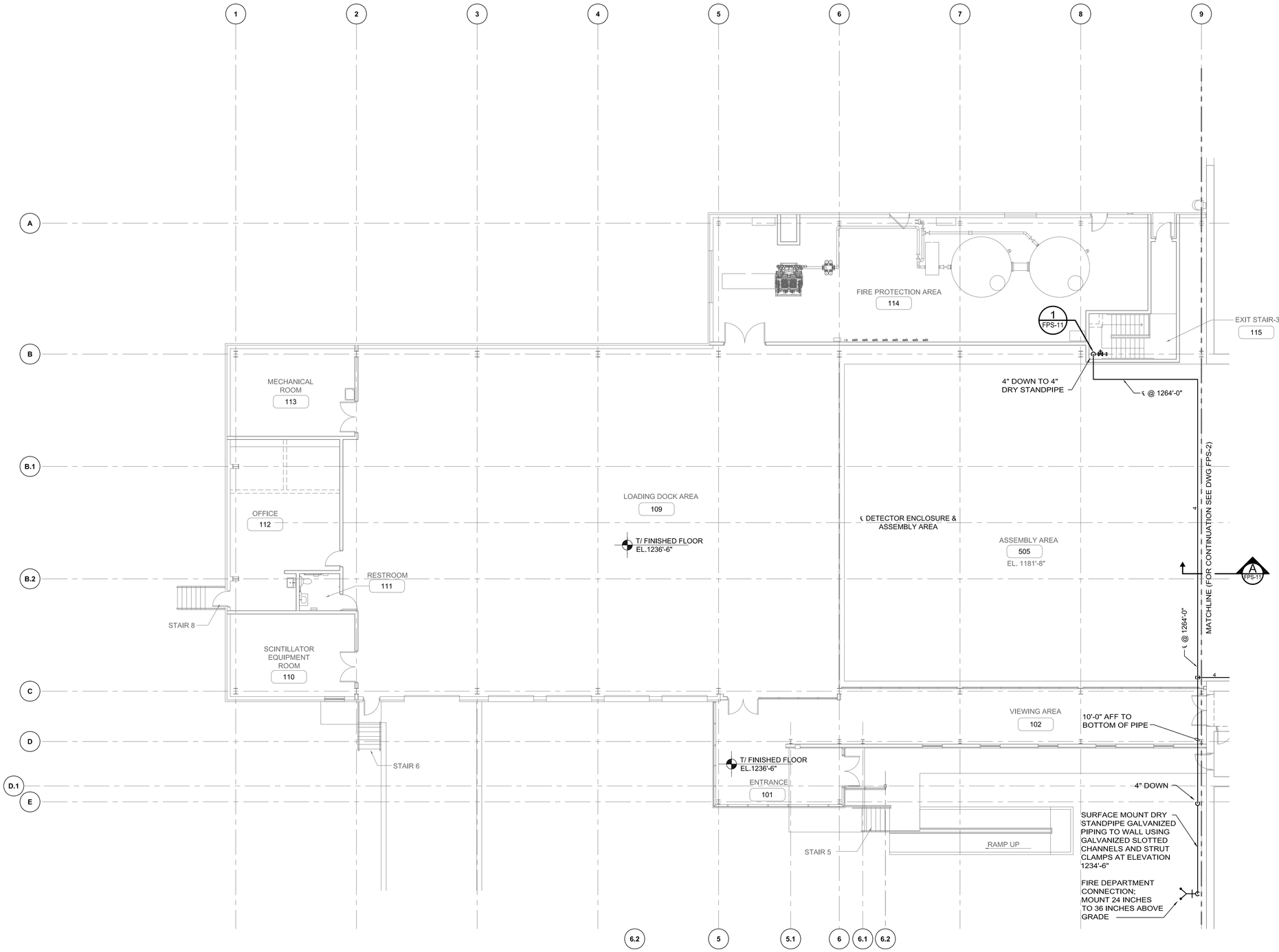
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

HYDRAULIC CALCULATION

DRAWING NO. **15-1-3B** **FP-20** REV. **0**

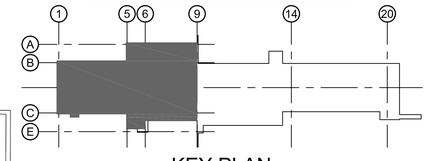
11 MAR, 2009



DRY STANDPIPE PLAN EL 1236'-6"

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

FAR DETECTOR BUILDING



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UNIVERSITY OF MINNESOTA
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www.schirmereng.com

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Burns & McDonnell
SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	R. GLENN	03-11-09
DRAWN	R. KEEFE	03-11-09
CHECKED	G. PENNEL	03-11-09
APPROVED	G. PENNEL	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:
1/8"=1'-0"
8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

DRY STANDPIPE PLAN EL 1236'-6"

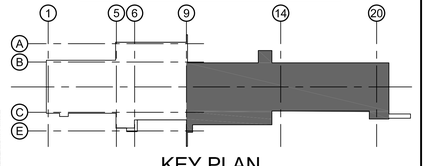
DRAWING NO. 15-1-3B FPS-1 REV. 0

11 MAR, 2009

DRY STANDPIPE PLAN EL 1236'-6"

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

FAR DETECTOR BUILDING



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DRAWN	R. KEEFE	03-11-09
CHECKED	G. PENNEL	03-11-09
APPROVED	G. PENNEL	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

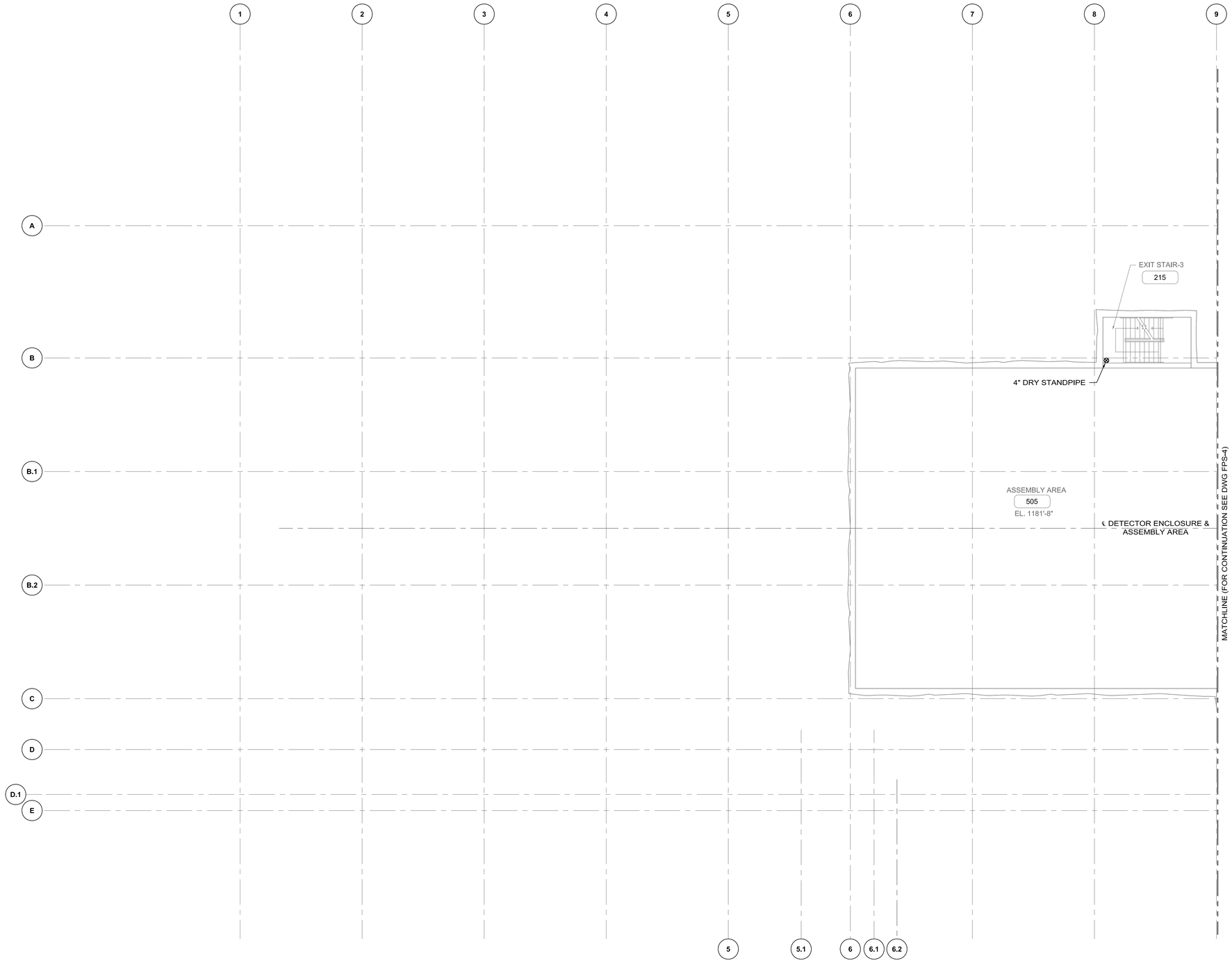
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

DRY STANDPIPE PLAN EL 1236'-6"

DRAWING NO. 15-1-3B FPS-2 REV. 0

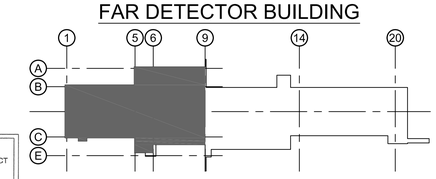
11 MAR, 2009



DRY STANDPIPE PLAN EL 1224'-10"

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

FAR DETECTOR BUILDING



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NOvA FESS SUBMITTED	S. DIXON	03-11-09
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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" — 8 0 8 16 — SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

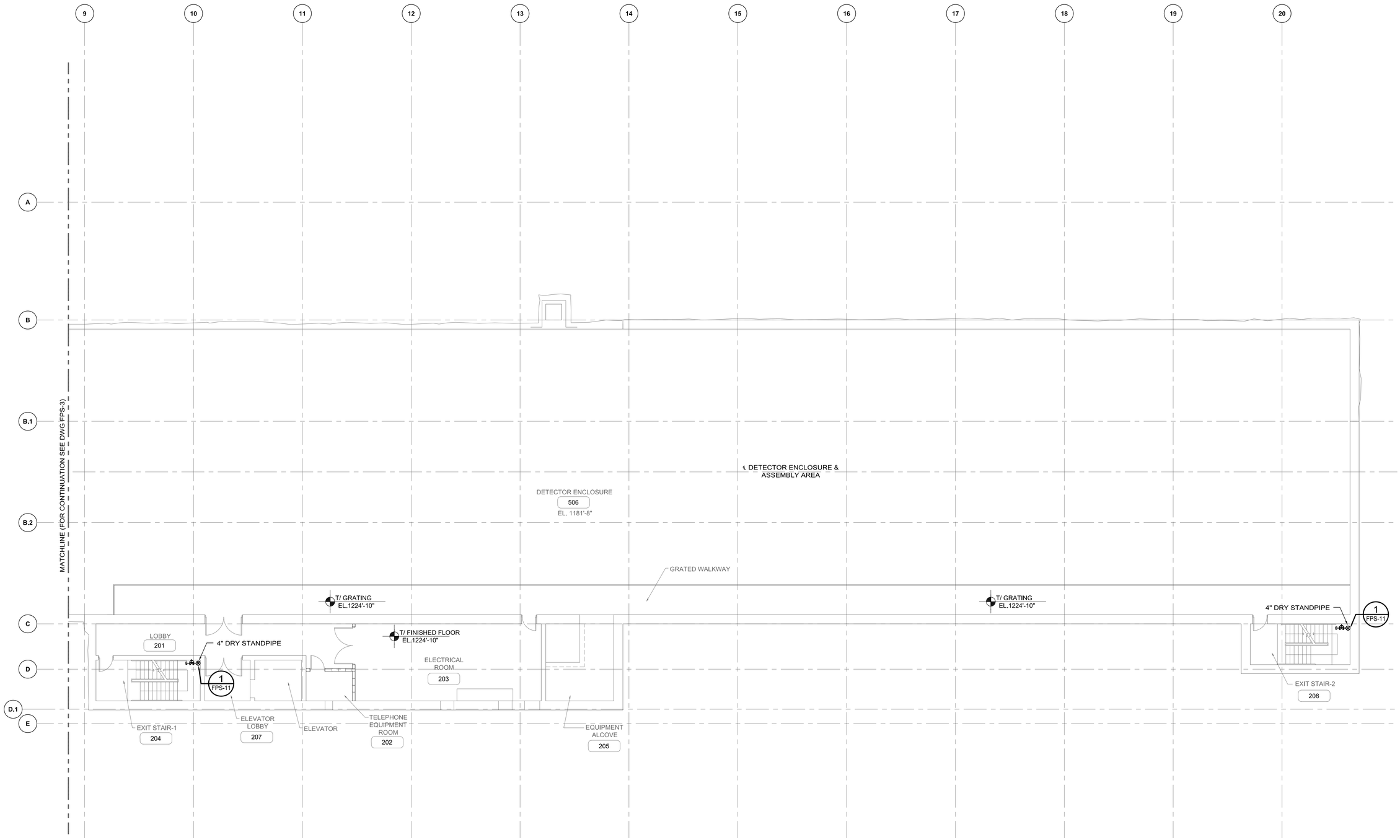
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

DRY STANDPIPE PLAN EL 1224'-10"

DRAWING NO. 15-1-3B FPS-3 REV. 0

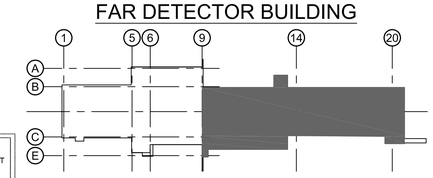
11 MAR, 2009



DRY STANDPIPE PLAN EL 1224'-10"

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

FAR DETECTOR BUILDING



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DRAWN	R. KEEFE	03-11-09	NOvA PROJECT MANAGER	J. COOPER	03-11-09
CHECKED	G. PENNEL	03-11-09	HINES SUBMITTED	C. McNABNEY	03-11-09
APPROVED	G. PENNEL	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" — 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

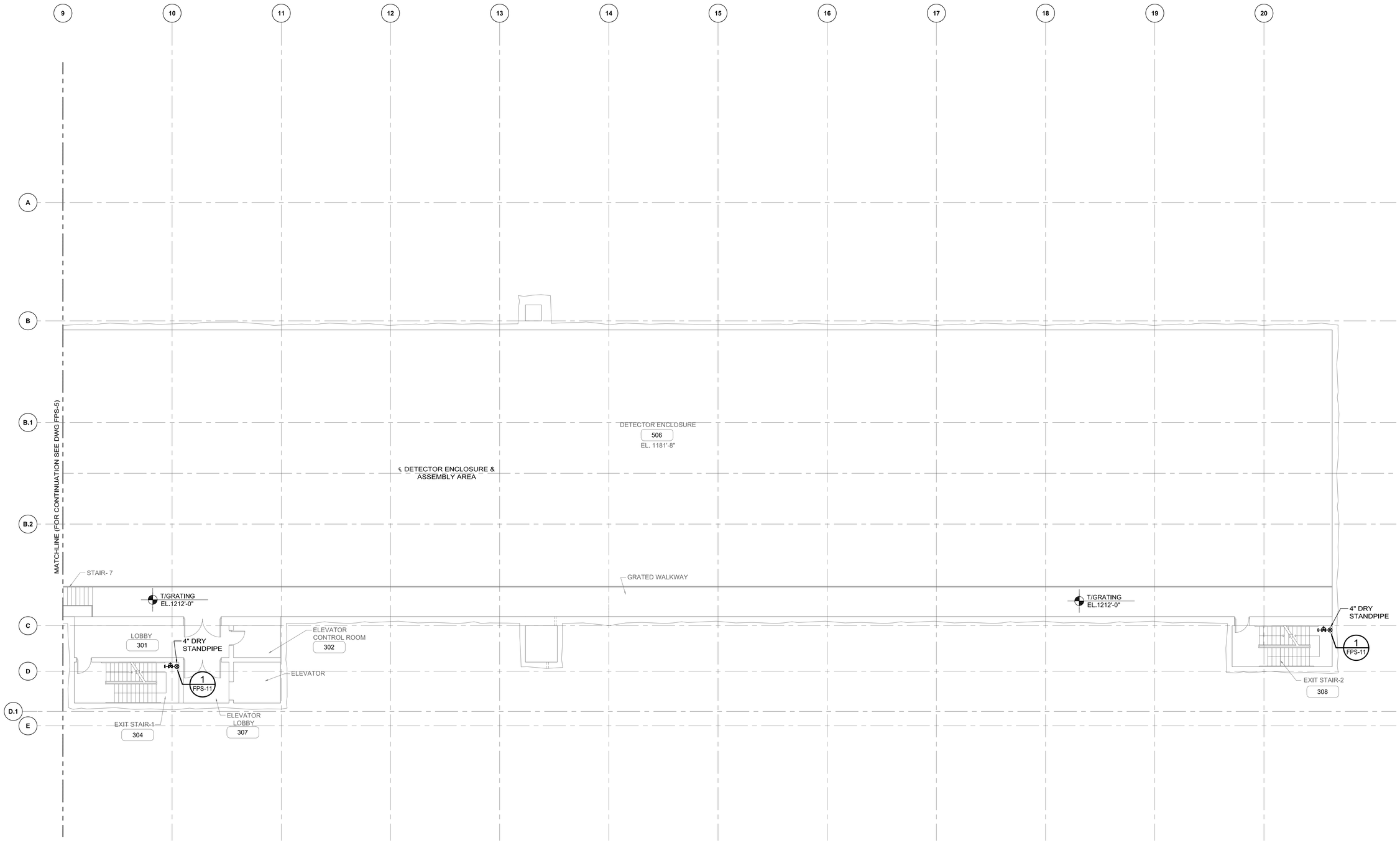
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

DRY STANDPIPE PLAN EL 1224'-10"

DRAWING NO. **15-1-3B** **FPS-4** REV. **0**

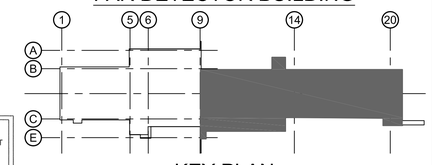
11 MAR, 2009



DRY STANDPIPE PLAN EL 1212'-0"

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

FAR DETECTOR BUILDING



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PRINT NAME: T.G. PENNEL

SIGNATURE:

DATE: 03/11/2009 LICENSE #41173

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

SCHIRMER ENGINEERING
1000 Milwaukee Avenue, 5th Floor
Glenview, IL 60025
Phone (847) 953-7700 Fax (847) 953-7793
www.schirmereng.com
Fire Protection ■ Code Consulting ■ Process Safety ■ Security Consulting

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE		OWNER / REPRESENTATIVE	DATE
DESIGNED	R. GLENN	03-11-09	NOvA FESS SUBMITTED	S. DIXON	03-11-09
DRAWN	R. KEEFE	03-11-09	NOvA PROJECT MANAGER	J. COOPER	03-11-09
CHECKED	G. PENNEL	03-11-09	HINES SUBMITTED	C. McNABNEY	03-11-09
APPROVED	G. PENNEL	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0"

6 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

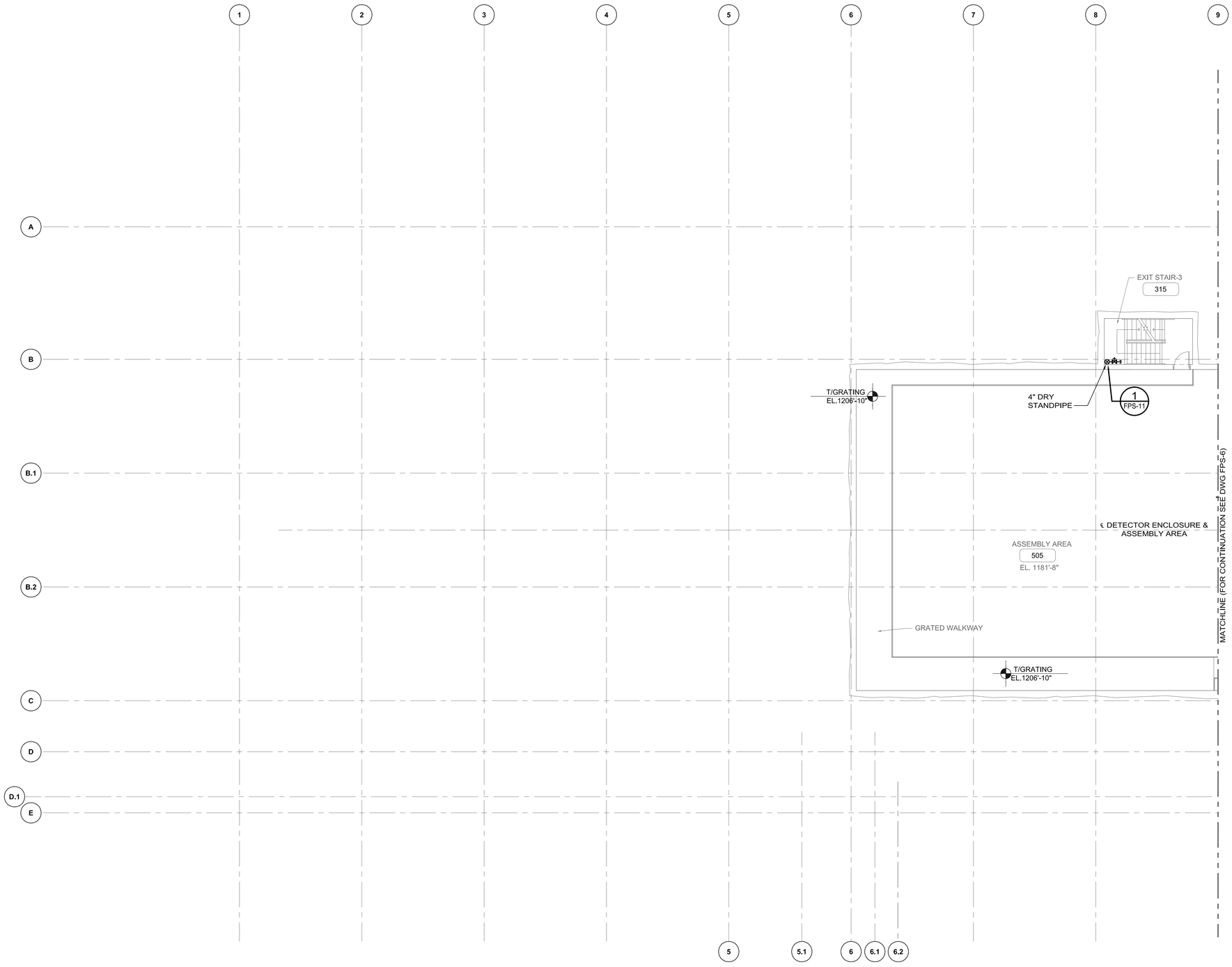
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

DRY STANDPIPE PLAN EL 1212'-0"

DRAWING NO. 15-1-3B FPS-5 REV. 0

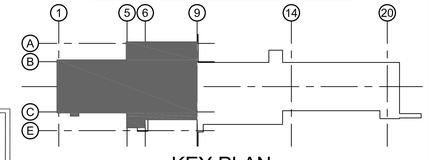
11 MAR, 2009



DRY STANDPIPE PLAN EL 1206'-10"

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

FAR DETECTOR BUILDING



KEY PLAN

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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

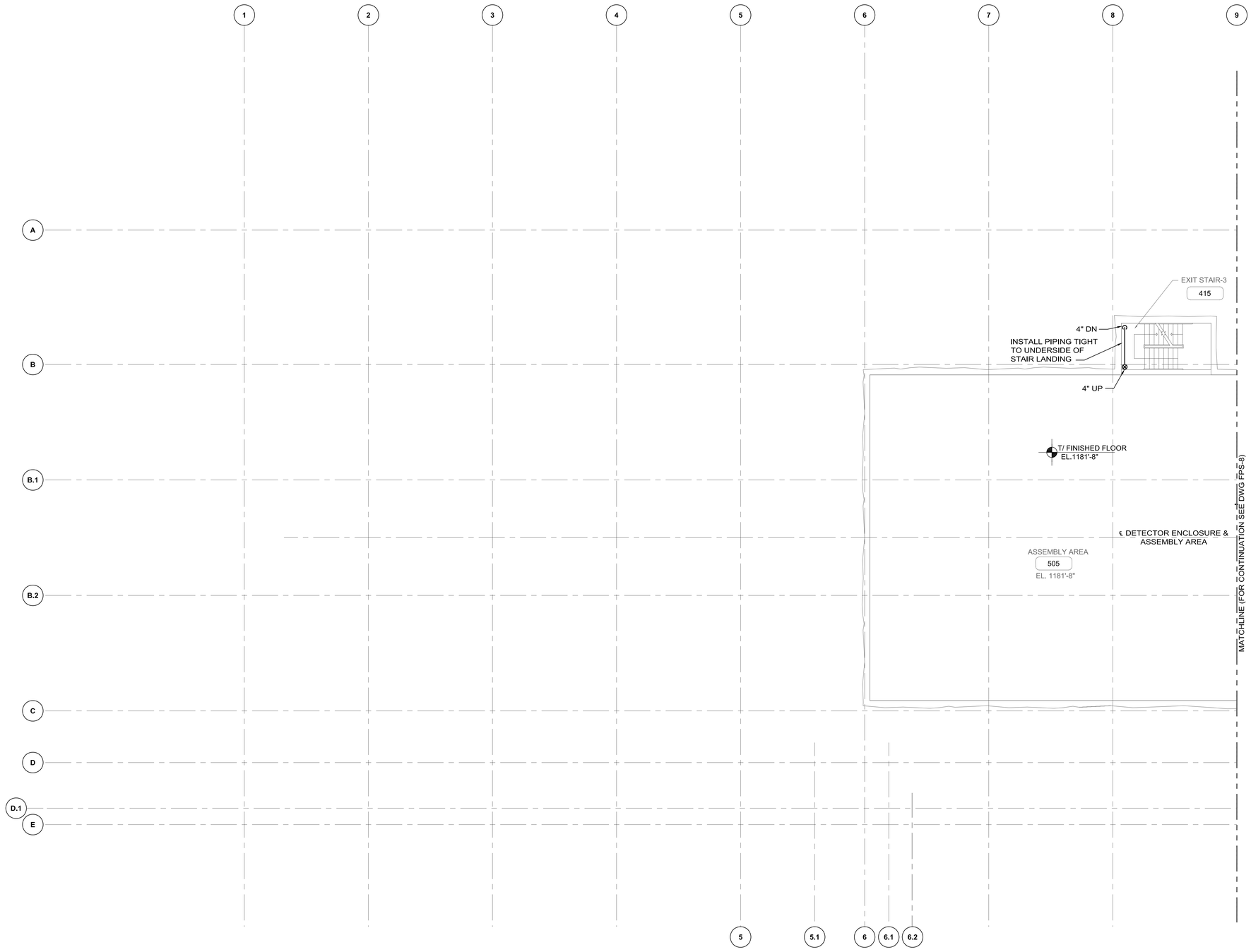
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

DRY STANDPIPE PLAN EL 1206'-10"

DRAWING NO. 15-1-3B FPS-6 REV. 0

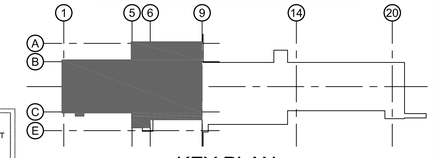
11 MAR, 2009



DRY STANDPIPE PLAN EL 1196'-10"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

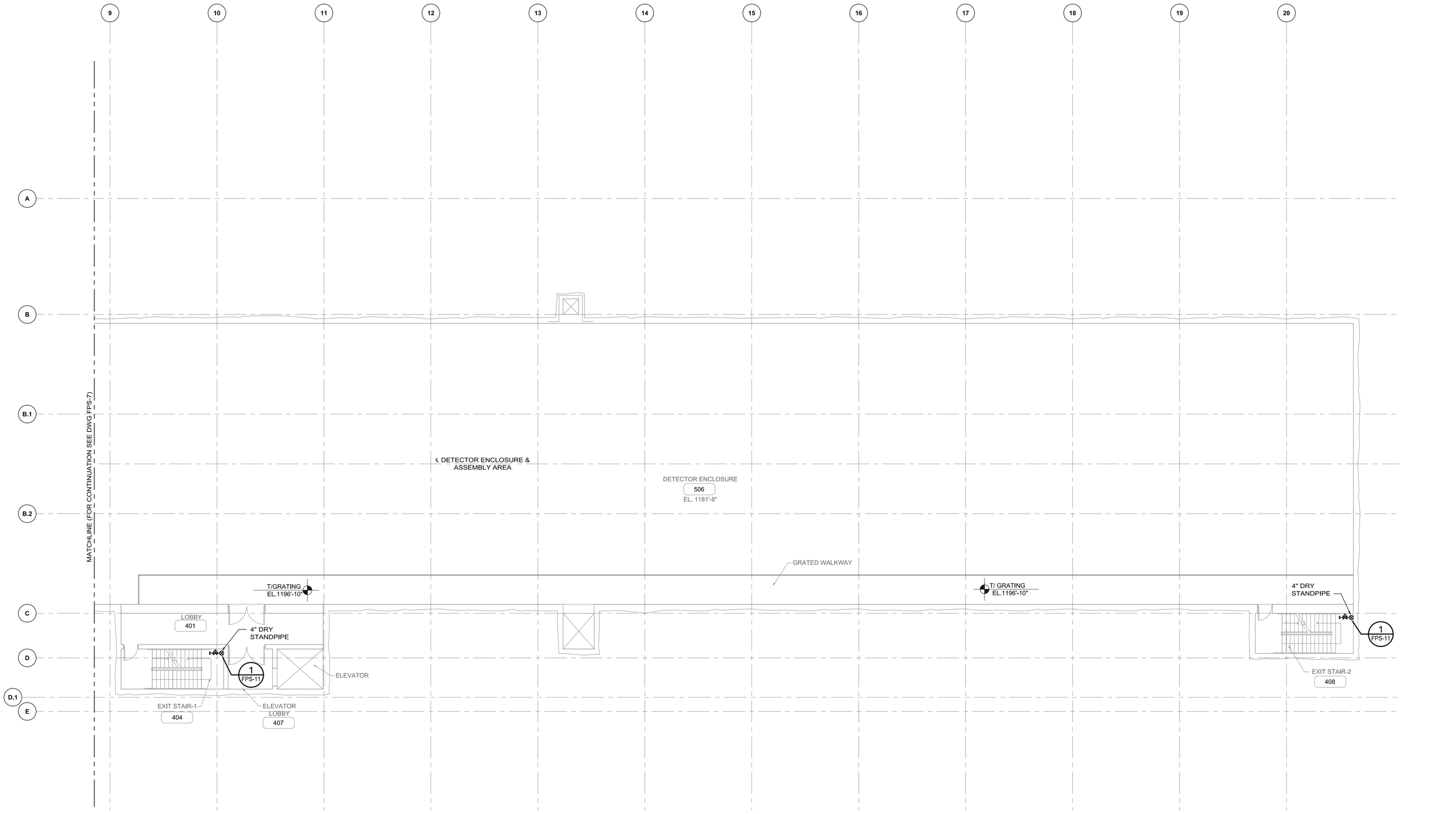
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

DRY STANDPIPE PLAN EL 1196'-10"

DRAWING NO. 15-1-3B FPS-7 REV. 0

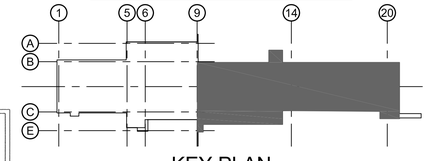
11 MAR, 2009



DRY STANDPIPE PLAN EL 1196'-10"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

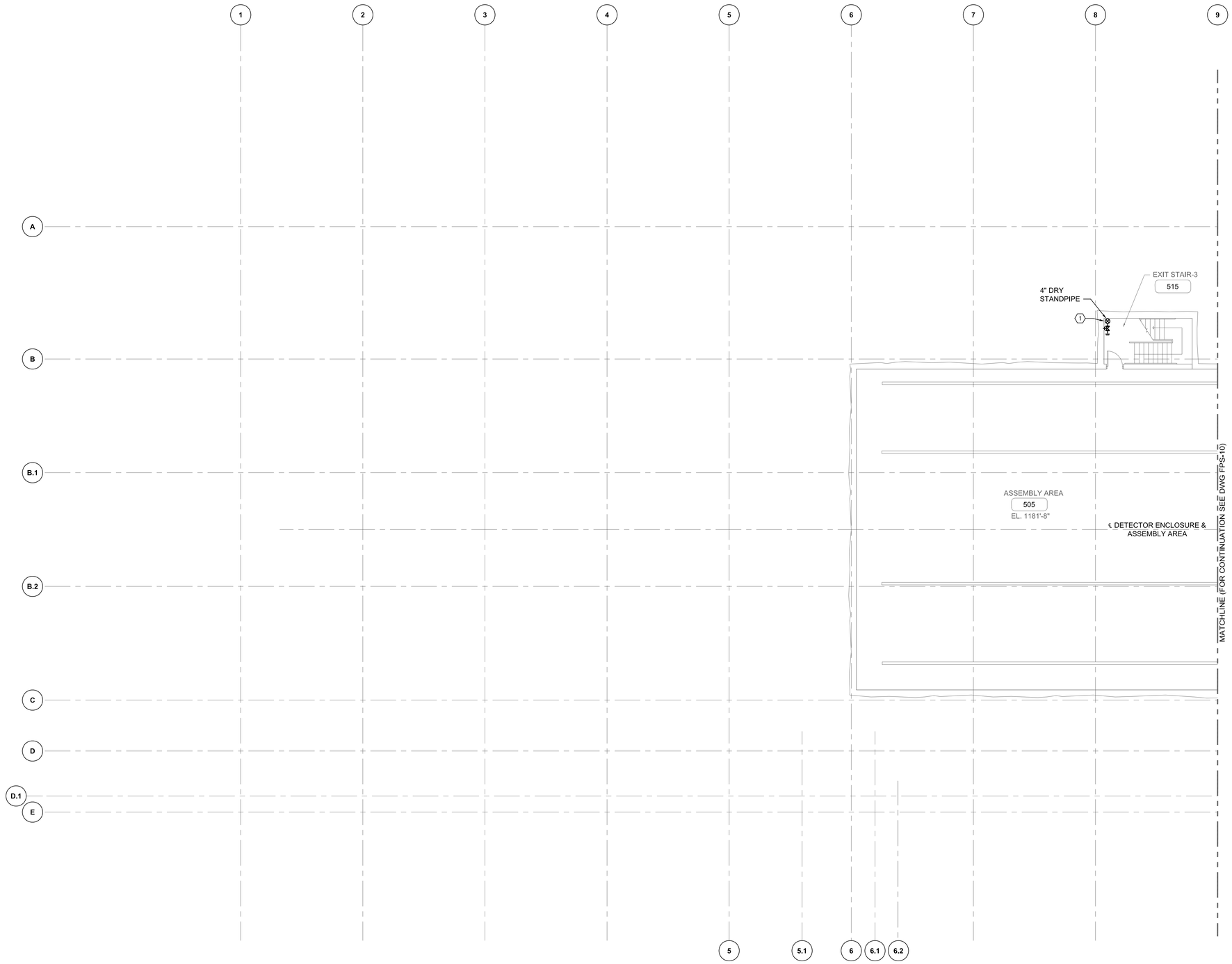
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

DRY STANDPIPE PLAN EL 1196'-10"

DRAWING NO. 15-1-3B FPS-8 REV. 0

11 MAR, 2009



DRY STANDPIPE PLAN EL 1181'-8"

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

KEYED NOTES:

1. PROVIDE 4-INCH GROOVED DRAIN ELBOW WITH 1-INCH PLUG AT BASE OF STANDPIPE.

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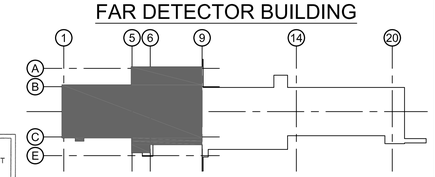

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PROJECT NORTH

SCALE: 1/8"=1'-0" 8 0 8 16 FEET

FERMI NATIONAL ACCELERATOR LABORATORY

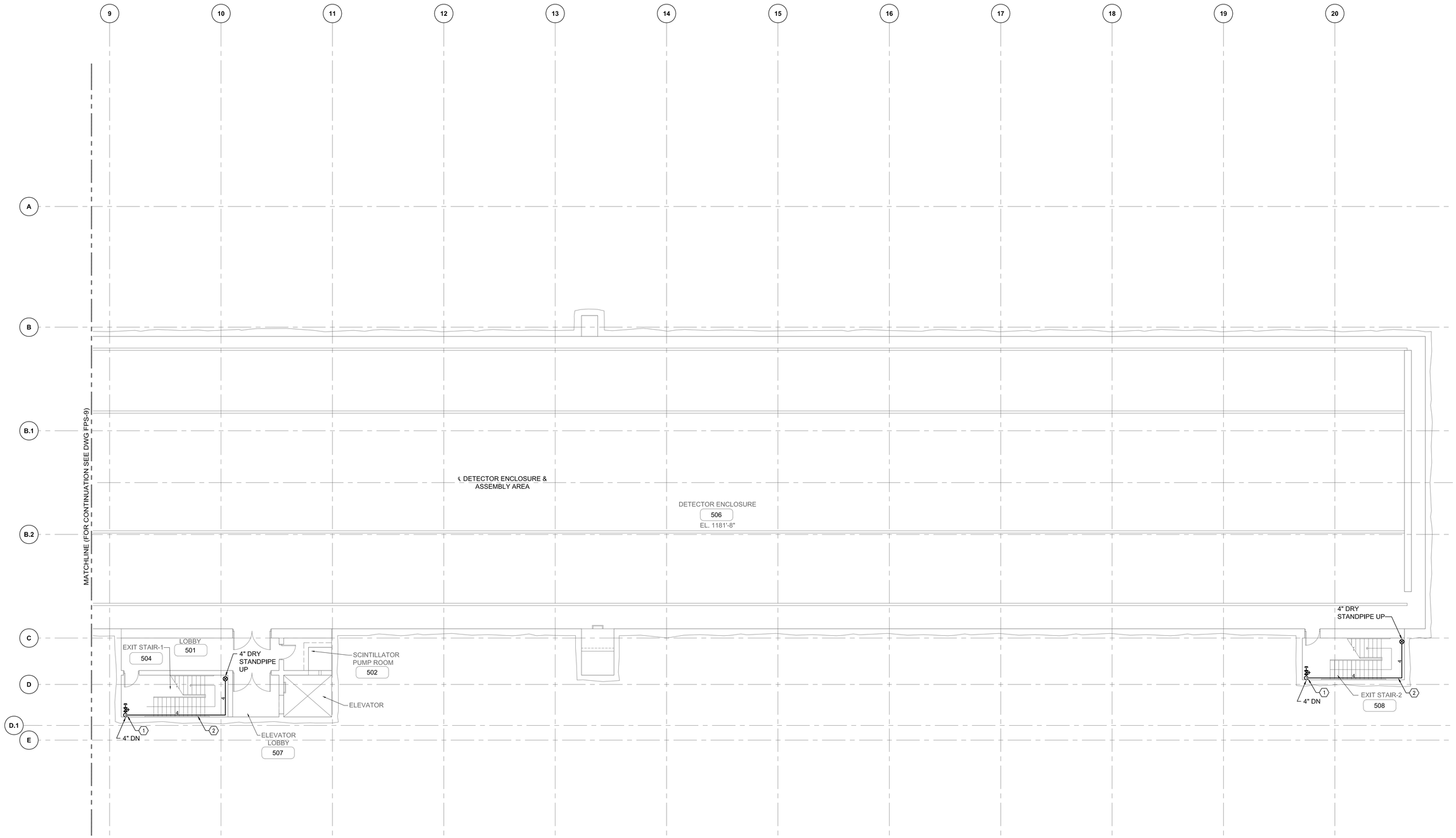
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

DRY STANDPIPE PLAN EL 1181'-8"

DRAWING NO. 15-1-3B FPS-9 REV. 0

11 MAR, 2009



DRY STANDPIPE PLAN EL 1181'-8"

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

KEYED NOTES:

1. PROVIDE 4-INCH GROOVED DRAIN ELBOW WITH 1-INCH PLUG AT BASE OF STANDPIPE.
2. INSTALL PIPING TIGHT TO WALLS AND UNDERSIDE OF STAIRS AND LANDINGS.

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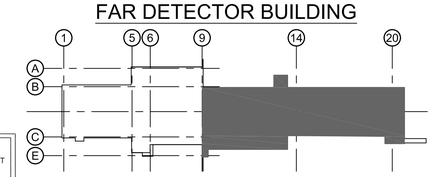

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PROJECT NORTH

SCALE: 1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

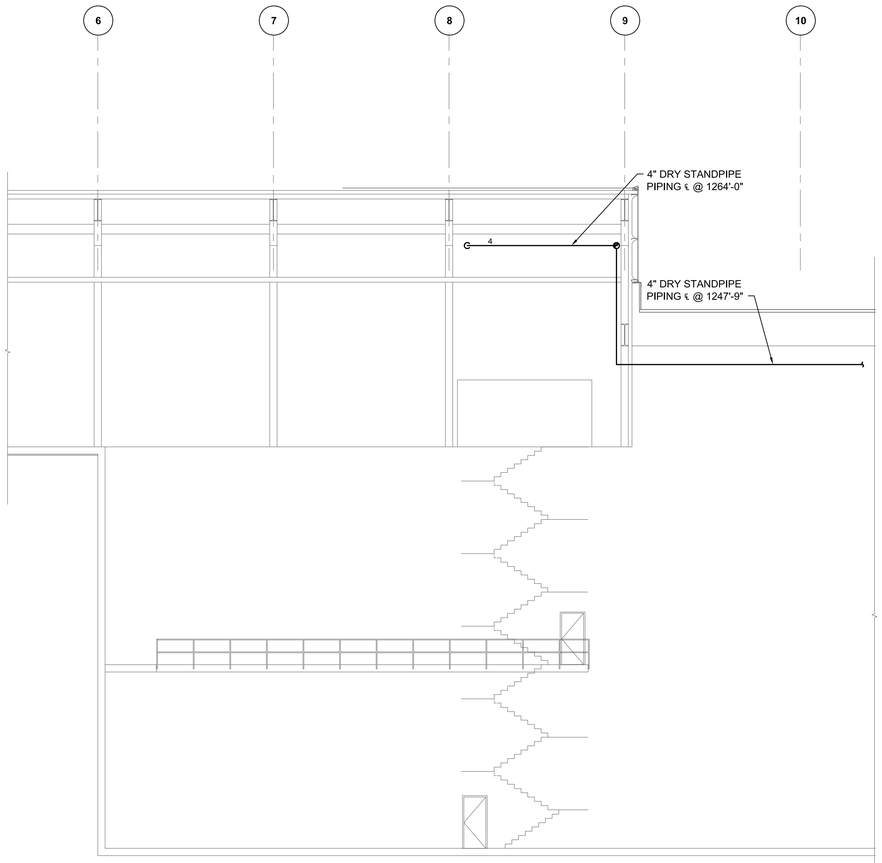
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

DRY STANDPIPE PLAN EL 1181'-8"

DRAWING NO. 15-1-3B FPS-10 REV. 0

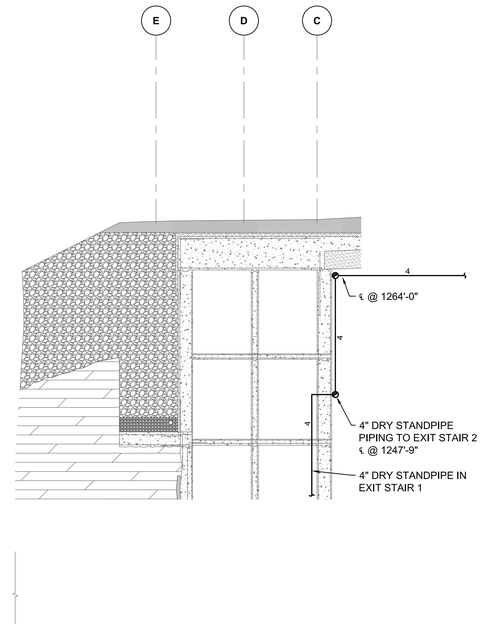
11 MAR, 2009



SECTION A

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

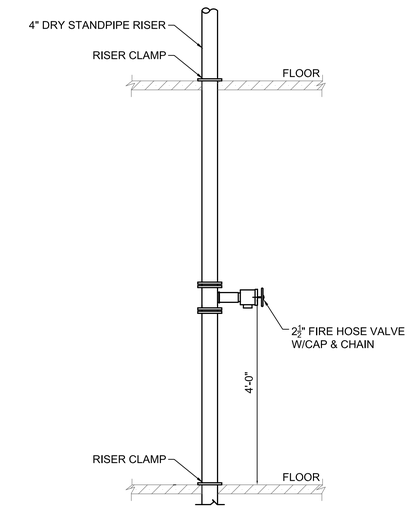
A FPS-1



SECTION B

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

B FPS-2



TYPICAL MANUAL DRY STANDPIPE

SCALE: N.T.S.

1 FPS-1 TO FPS-10

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SCALE:

1/8"=1'-0" 8 0 8 16
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

SECTIONS & DETAILS

DRAWING NO. 15-1-3B FPS-11 REV. 0

11 MAR, 2009

GENERAL NOTES

1. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN CONFORMANCE WITH NFPA70 (NEC MOST CURRENT ISSUE), THE RESPECTIVE EQUIPMENT MANUFACTURER'S DIRECTIONS AND ALL OTHER APPLICABLE LOCAL CODES, LAWS, ORDINANCES AND REQUIREMENTS IN FORCE. ANY INSTALLATION WHICH VOIDS THE U.L. LISTINGS (OR THIRD PARTY LISTING) AND /OR THE MANUFACTURER'S WARRANTY OF A DEVICE SHALL NOT BE PERMITTED.
2. ALL MATERIALS AND ELECTRICAL EQUIPMENT SHALL BE LISTED BY UNDERWRITERS LABORATORIES, INC (UL). ALL INSTALLATIONS SHALL COMPLY WITH THE RULES AND REGULATIONS OF THE LATEST EDITION OF THE NEC.
3. MINIMUM CONDUIT SIZE SHALL BE 3/4" IN DIAMETER. LARGER SIZES SHALL BE INSTALLED WHERE NOTED OR WHERE REQUIRED BY NEC.
4. CONDUIT SHALL BE 12" MIN AWAY FROM HOT WATER LINES, STEAM LINES ETC, AND 1/4" CLEARANCE FROM THE WALL OR CEILING.
5. ALL INTERIOR CONDUIT NOT SUBJECT TO IMPACT OR DAMAGE TO BE ELECTRICAL METALLIC TUBING (EMT), STEEL SE T SCREW TYPE CONNECTORS/COUPLINGS WITH INSULATED THROATS SHALL BE UTILIZED. ALL CONDUIT BELOW 18"AFF IN GENERAL AREAS OR BELOW 12' AFF IN LOADING DOCK SHALL BE RIGID STEEL (RGS) WITH THREADED CONNECTORS.
6. ALL DIRECT BURIED AND ROOFTOP CONDUITS SHALL BE HEAVY WALLED GALVANIZED RIGID STEEL (RGS PVC COATED). ALL CONCRETE ENCASED CONDUIT SHALL BE PVC TYPE SCHEDULE 40. BENDS OVER 30 DEGREES IN PVC DUCT BANKS SHALL BE MADE OF RGS CONDUIT ELBOWS.
7. LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE PROVIDED AS A CONNECTION BETWEEN EACH MOTOR JUNCTION BOX, TRANSFORMER (OR ANY OTHER PIECE OF EQUIPMENT SUBJECT TO MOVEMENT OR VIBRATION) AND SHALL NOT EXCEED 3' IN LENGTH AND SHALL BE OZ-GEDNY TYPE UAG, OR EQUIVALENT.
8. ALL PULL BOXES, OUTLET BOXES AND JUNCTION BOXES SHALL BE SIZED IN ACCORDANCE WITH THE NEC.
9. LABEL ALL ELECTRICAL EQUIPMENT (SWITCHBOARDS, TRANSFORMERS, PANELBOARDS, DISCONNECTS, SWITCHES...ETC) WITH EQUIPMENT NAME DESIGNATION AND VOLTAGE.
10. THREE PHASE CIRCUITS SHOWN ON POWER PLANS ARE IDENTIFIED ONLY BY THE CENTER PHASE CIRCUIT NUMBER OF THE THREE POLE CIRCUIT BREAKERS.
11. LOCATION OF FIXTURES, PANELBOARDS AND ELECTRICAL EQUIPMENT AS SHOWN ON THE DRAWINGS IS APPROXIMATE, AND SHOULD BE COORDINATED IN THE FIELD WITH THE LOCATION OF WATER PIPES, VENTILATION DUCTS AND MECHANICAL EQUIPMENT TO AVOID INTERFERENCES. ANY CONFLICT DERIVING FROM EQUIPMENT INSTALLATION SHALL BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE CONSTRUCTION COORDINATOR.

ABBREVIATIONS

A/C	AIR CONDITIONER
A.F.F.	ABOVE FINISHED FLOOR
AC	ABOVE COUNTER
ADA	AMERICAN DISABILITIES ACT
AHU	AIR HANDLING UNIT
ASC	ABOVE SUSPENDED CEILING
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAGE
C	CONDUIT
CAT.	CATALOG
CB	CIRCUIT BREAKER
CKT. BKR.	CIRCUIT BREAKER
CKT	CIRCUIT
CND	CONDUIT
COMM	COMMUNICATIONS
CONT	CONTROL
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
DB	DIRECT BURIED
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
EBB	ELECTRIC BASEBOARD SPACE HEATER
EMT	ELECTRICAL METALLIC TUBING
EP	EXPLOSION PROOF
EWC	ELECTRIC WATER COOLER
EXH	EXHAUST
FVNR	FULL VOLTAGE NON-REVERSING
GND	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
HH	HANDHOLE
HOA	HAND OFF AUTO
HP	HORSEPOWER
HZ	HERTZ (CYCLE)
JB	JUNCTION BOX
KVA	KILOVOLT AMPERE
KW	KILOWATT
LC	LIGHTING CONTACTOR
MC	MOMENTARY CONTACT
MCA	MINIMUM CIRCUIT AMPS
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MECH	MECHANICAL
MH	MOUNTING HEIGHT
MLO	MAIN LUGS ONLY
NEC	NATIONAL ELECTRIC CODE
NIC	NOT IN CONTRACT
NO.	NUMBER
OL	OVERLOAD
OS	OCCUPANCY SENSOR
PB	PULL BOX OR PUSHBUTTON
PLC	PROGRAMMABLE LOGIC CONTROLLER
PT	POTENTIAL TRANSFORMER
PVC	POLY VINYL CHLORIDE CONDUIT
RECEPT	RECEPTACLE
RGS	RIGID GALVANIZED STEEL CONDUIT
RM	ROOM
RTU	ROOF TOP UNIT
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SWGR	SWITCHGEAR
TTB	TELEPHONE TERMINAL BOARD
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP.	TYPICAL
UH	UNIT HEATER
VFD	VARIABLE FREQUENCY DRIVE
WP	WEATHERPROOF
XFMR	TRANSFORMER

POWER & LIGHTING LEGEND

- SINGLE POLE SWITCH
- THREE WAY SWITCH
- FOUR WAY SWITCH
- FRACTIONAL H.P. MANUAL STARTER
- SIMPLEX RECEPTACLE
- DUPLEX RECEPTACLE
- DUPLEX FLOOR OUTLET
- QUADRUPLEX RECEPTACLE
- SPECIAL PURPOSE OUTLET (IDENTIFIED ON PLANS)
- JUNCTION BOX (LINE GOES TO BOX)
- OUTDOOR FLOOD LIGHT
- FLUORESCENT LIGHT FIXTURE
- UNIT BATTERY LIGHT
- 22" METAL HALIDE HIGH BAY
- 34" COMPACT FLUORESCENT
- OUTDOOR COMPACT FLOURESCENT
- EXIT SIGN - SHADED AREA DENOTES VIEWED FACE
- EXIT SIGN - SHADED AREA DENOTES VIEWED FACE
- POWER PANEL (PP, EPP)
- POWER PANEL (PHP, EPHP)
LIGHTING PANEL (LP)
- THERMOSTAT
- GROUND ROD
- EXPLOSION PROOF CONDUIT SEAL
- DISCONNECT SWITCH.
- MAGNETIC STARTER.
- COMBINATION STARTER
DISCONNECT
- REVERSING COMBINATION
MAGNETIC STARTER.
- LOCAL CONTROL STATION
W/PUSHBUTTON
- HT — HEAT TRACE CIRCUIT MANAGEMENT PANEL
- FACP — FIRE ALARM CONTROL PANEL
- ASP — AIR SAMPLING SMOKE DETECTOR POWER SUPPLY
- RPS — REMOTE POWER SUPPLY PANEL

LIGHTING FIXTURE LEGEND

A — INDICATES FIXTURE TYPE
1a — INDICATES CIRCUIT NUMBER AND SWITCH LEG
1 — INDICATES FED FROM EMERGENCY PANEL

SITE PLAN LEGEND

- MH — MANHOLE
- HH — EXISTING ELECTRICAL HANDHOLE
- LIGHTING FIXTURE - POLE MOUNTED
- CONDUIT CAPPED
- CONDUIT SURFACE MOUNTED
- CONDUIT BELOW ROOF
- NEW UNDERGROUND/EMBEDDED POWER OR COMMUNICATIONS
- EXISTING UNDERGROUND ELECTRIC
- EXISTING UNDERGROUND UTILITIES
- NEW GROUND CABLE
- EXISTING GROUND CABLE
- CR — CARD READER
- OUTDOOR SECURITY CAMERA
- INDOOR SECURITY CAMERA

ONE-LINE LEGEND

- GROUND - CHASSIS, BUS, OR AT EARTH POTENTIAL
- M — MOTOR
- CIRCUIT BREAKER (MAGNETIC ONLY)
- CIRCUIT BREAKER (THERMAL MAGNETIC)
- CIRCUIT BREAKER (DRAW OUT TYPE)
- FUSE
- SURGE ARRESTOR
- REMOTE CONTROL STATION. (3-DEVICE STA. SHOWN)
- CAPACITOR
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER
- A — AMMETER
- V — VOLTMETER
- PM — POWER MONITOR
- EMERGENCY GENERATOR
- K — KEY INTERLOCK
- AS — AMMETER SWITCH
- VS — VOLTMETER SWITCH
- FUSED DISCONNECT SWITCH
XXA - DENOTES AMPERE RATING
P - DENOTES NUMBER OF POLES
- TRANSFORMER

TAG SYMBOLS

2000N-PVC — FEEDER TAG

- CONDUIT TYPE:
RGS-RIGID STEEL
EMT-ELEC. METALLIC TUBING
PVC-PVC SCHEDULE 40
- N-NEUTRAL
SP-SINGLE PHASE
- FEEDER AMPACITY

WIRE AND CONDUIT SCHEDULE

TAG	WIRE SIZES (AWG)			CONDUIT SIZE	REMARKS
	PHASES	NEUTRAL	GROUND		
20	3#12	-	1#12	3/4"	-
20SP	1#12	-	1#12	3/4"	-
25	3#10	-	1#12	3/4"	-
25SP	1#10	1#12	1#12	3/4"	-
30	3#10	-	1#10	3/4"	-
35	3#8	-	1#10	3/4"	-
40	3#8	-	1#10	3/4"	-
40SP	2#8	1#10	1#10	3/4"	-
50	3#8	-	1#10	1 "	-
60	3#6	-	1#10	1 "	-
60N	3#6	1#6	1#10	1 "	-
70	3#4	-	1#8	1 1/4"	-
70SP	2#4	1#4	1#8	1 1/4"	-
85	3#4		1#8	1 1/4"	-
100N	3#2	1#2	1#6	1 1/4"	-
100SP	2#2	1#2	1#6	1 1/4"	
115	3#2	-	1#6	1 1/4"	-
125	3#1	-	1#6	1 1/2 "	-
125N	3#1	1#1	1#6	1 1/2 "	
150	3#1/0	-	1#6	1 1/2 "	-
175	3#2/0	-	1#6	2 "	-
200SP	2#3/0	-	1#6	1 1/2"	-
225	3#4/0	-	1#4	2 "	-
225N	3#4/0	1#4/0	1#4	2 1/2 "	-
225N2	3#4/0	2#4/0	1#4	2 1/2 "	-
250	3-250MCM	-	1#4	2 1/2"	-
300N	3-350MCM	1-350MCM	1#3	2 1/2 "	-
350SP	3-500MCM	1-500MCM	1#3	3 "	-
400	2#3/0/Ø	-	2#3	(2) 2"	-
400N	2#3/0/Ø	2#3/0	2#3	(2) 2"	-
800	2-600MCM/Ø	-	2#1/0	(2) 4"	-
2000N	6-500MCM/Ø	6-500MCM	-	(6) 5"	-

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SIGNATURE:

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Burns & McDonnell SINCE 1898

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CHECKED	D. MERTZ	03-11-09
APPROVED	J. STEENKEN	03-11-09

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NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

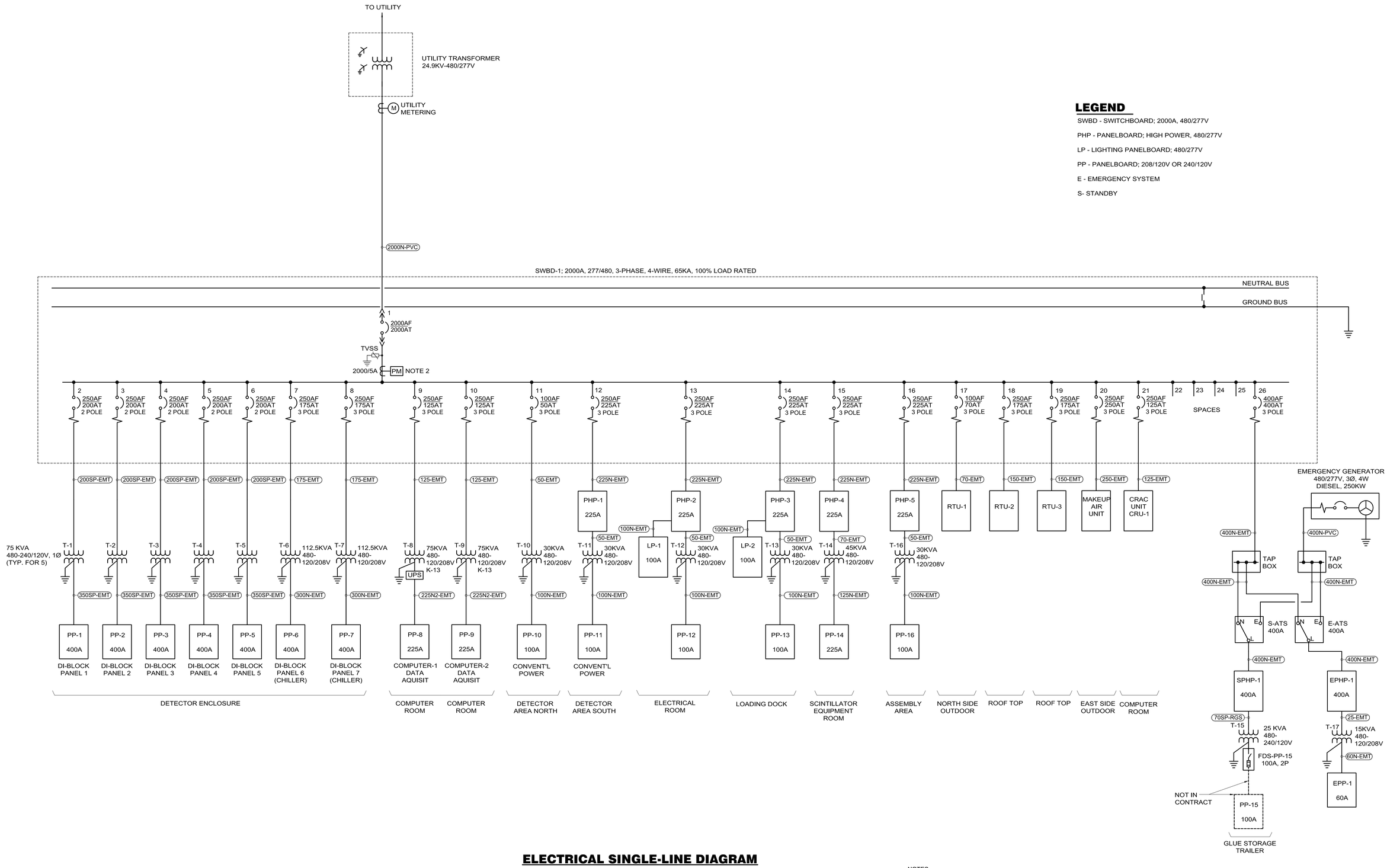
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ELECTRICAL SYMBOLS & GENERAL NOTES

DRAWING NO. 15-1-3B E-1 REV. 0

11 MAR, 2009



LEGEND

SWBD - SWITCHBOARD; 2000A, 480/277V

PHP - PANELBOARD; HIGH POWER, 480/277V

LP - LIGHTING PANELBOARD; 480/277V

PP - PANELBOARD; 208/120V OR 240/120V

E - EMERGENCY SYSTEM

S- STANDBY

ELECTRICAL SINGLE-LINE DIAGRAM

NOTES:

1. SEE SHEET E-1 FOR WIRE AND CONDUIT SCHEDULE.
2. POWER MONITOR SHALL BE SQUARE-D CM-2350.

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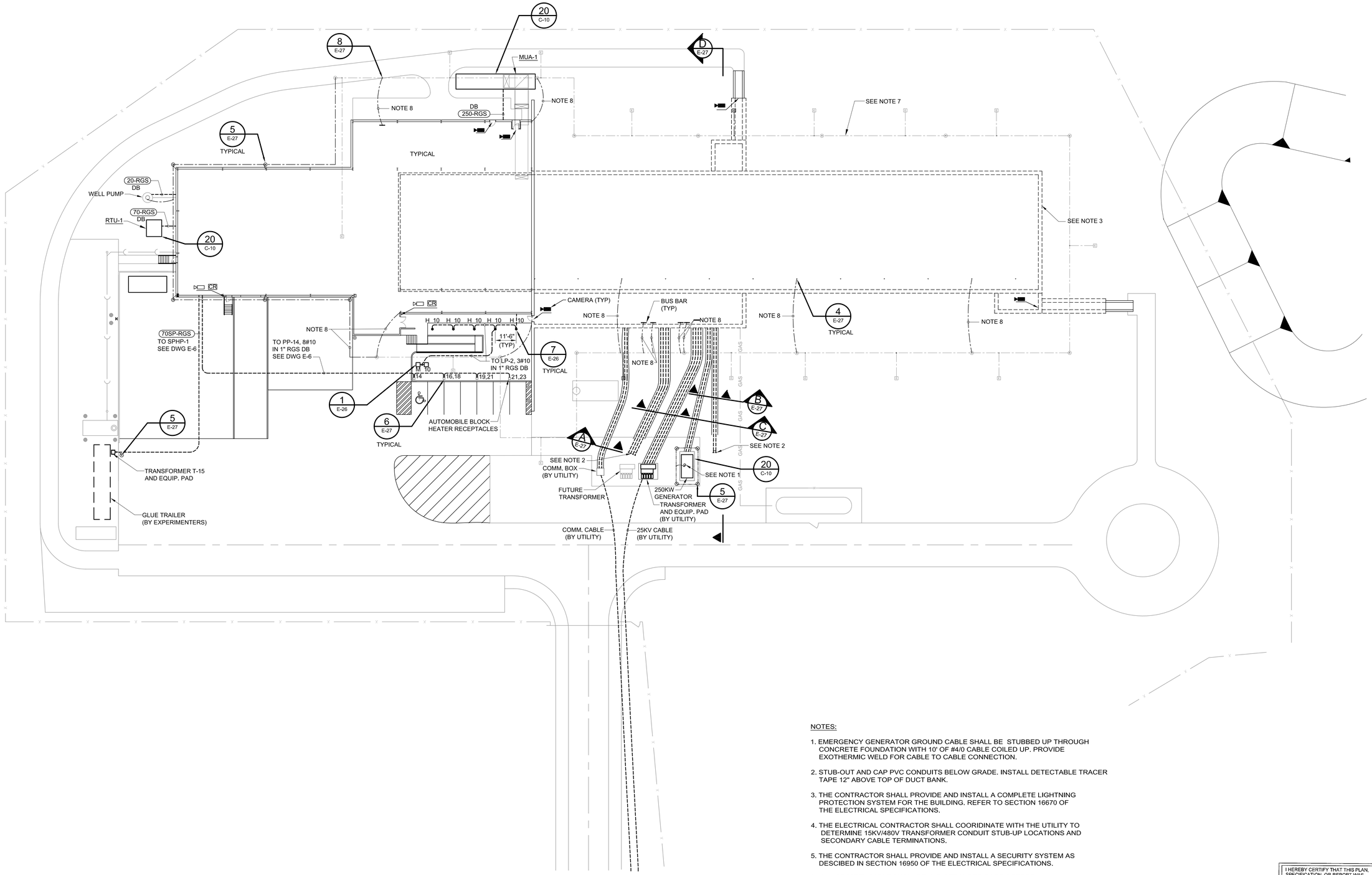
NOνA FAR DETECTOR BUILDING

SINGLE-LINE DIAGRAM

DRAWING NO. **15-1-3B** **E-2** REV. **0**

11 MAR, 2009



NOTES:

1. EMERGENCY GENERATOR GROUND CABLE SHALL BE STUBBED UP THROUGH CONCRETE FOUNDATION WITH 10' OF #4/0 CABLE COILED UP. PROVIDE EXOTHERMIC WELD FOR CABLE TO CABLE CONNECTION.
2. STUB-OUT AND CAP PVC CONDUITS BELOW GRADE. INSTALL DETECTABLE TRACER TAPE 12" ABOVE TOP OF DUCT BANK.
3. THE CONTRACTOR SHALL PROVIDE AND INSTALL A COMPLETE LIGHTNING PROTECTION SYSTEM FOR THE BUILDING. REFER TO SECTION 16670 OF THE ELECTRICAL SPECIFICATIONS.
4. THE ELECTRICAL CONTRACTOR SHALL COORIDINATE WITH THE UTILITY TO DETERMINE 15KV/480V TRANSFORMER CONDUIT STUB-UP LOCATIONS AND SECONDARY CABLE TERMINATIONS.
5. THE CONTRACTOR SHALL PROVIDE AND INSTALL A SECURITY SYSTEM AS DESCIBED IN SECTION 16950 OF THE ELECTRICAL SPECIFICATIONS.
6. ALL GROUND CABLE SHALL BE #4/0 STRANDED BARE COPPER.
7. DETECTOR AREA GROUND LOOP (SHOWN WITH LIGHT LINE) INSTALLED UNDER PHASE 1 CONSRUCTION PACKAGE. ELECTRICAL CONTRACTOR SHALL EXTEND GROUND LOOP AND COMPLETE ALL CONNECTIONS TO BUILDING STEEL OR BUS BARS AND EQUIPMENT AS INDICATED IN PLAN.
8. CONTRACTOR SHALL CONNECT EXISTING COILED-UP GROUND CABLE TO BUILDING STEEL, GROUND BUS BARS AND EXTENDED GROUND LOOP USING EXOTHERMIC CONNECTIONS. SEE SITE GROUNDING DIAGRAM, DWG. E-25.

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

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

UNIVERSITY OF MINNESOTA

Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

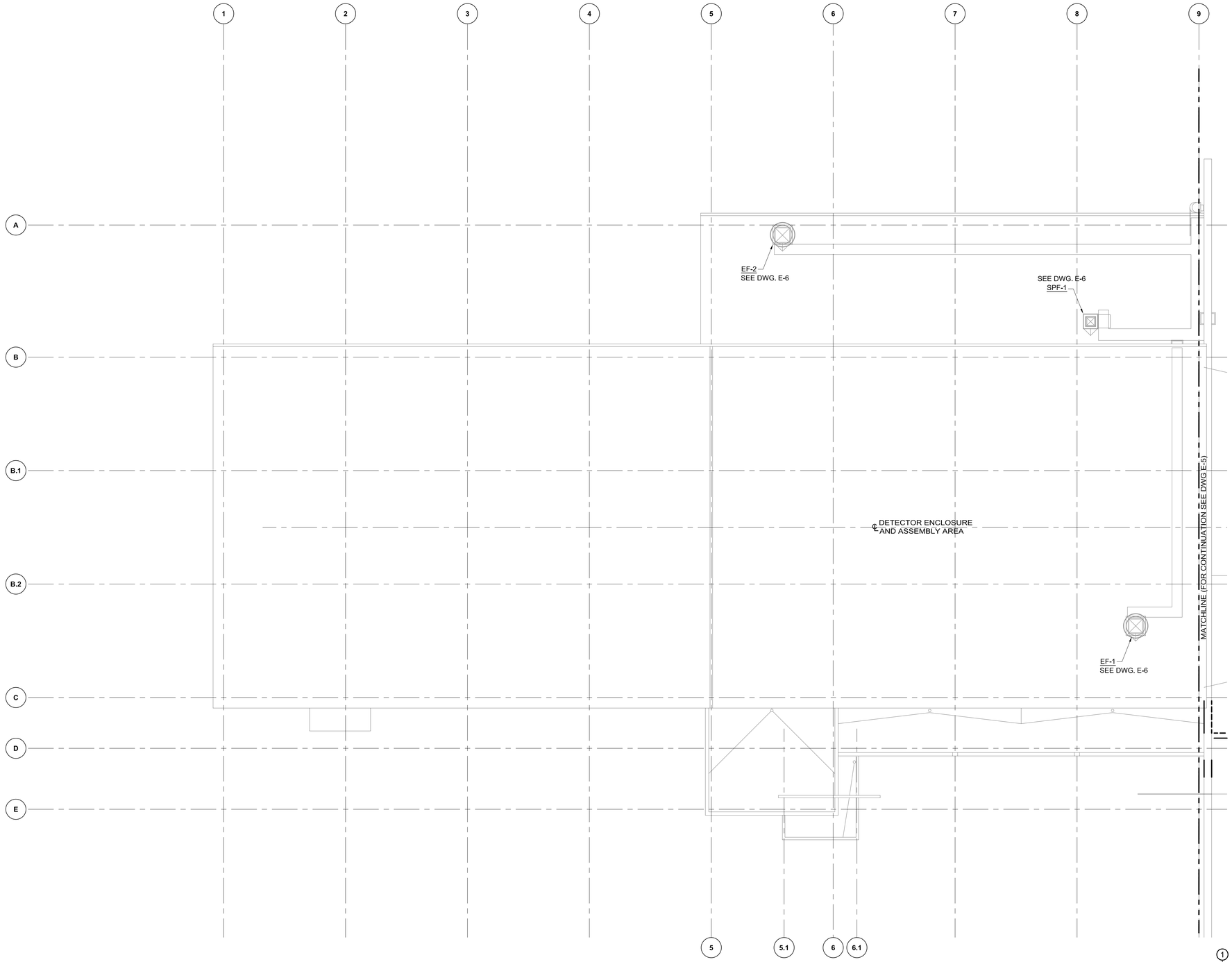
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

ELECTRICAL SITE PLAN

DRAWING NO. 15-1-3B E-3 REV. 0

11 MAR, 2009



ROOF PLAN

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

NOTE:

1. ALL CONDUITS FROM ABOVE ROOF SHALL BE ROUTED DOWN THROUGH EQUIPMENT CURBS.

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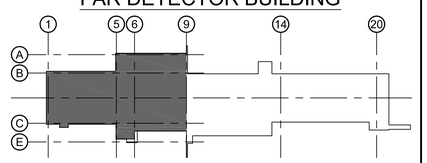
FAR DETECTOR BUILDING



KEY PLAN

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APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

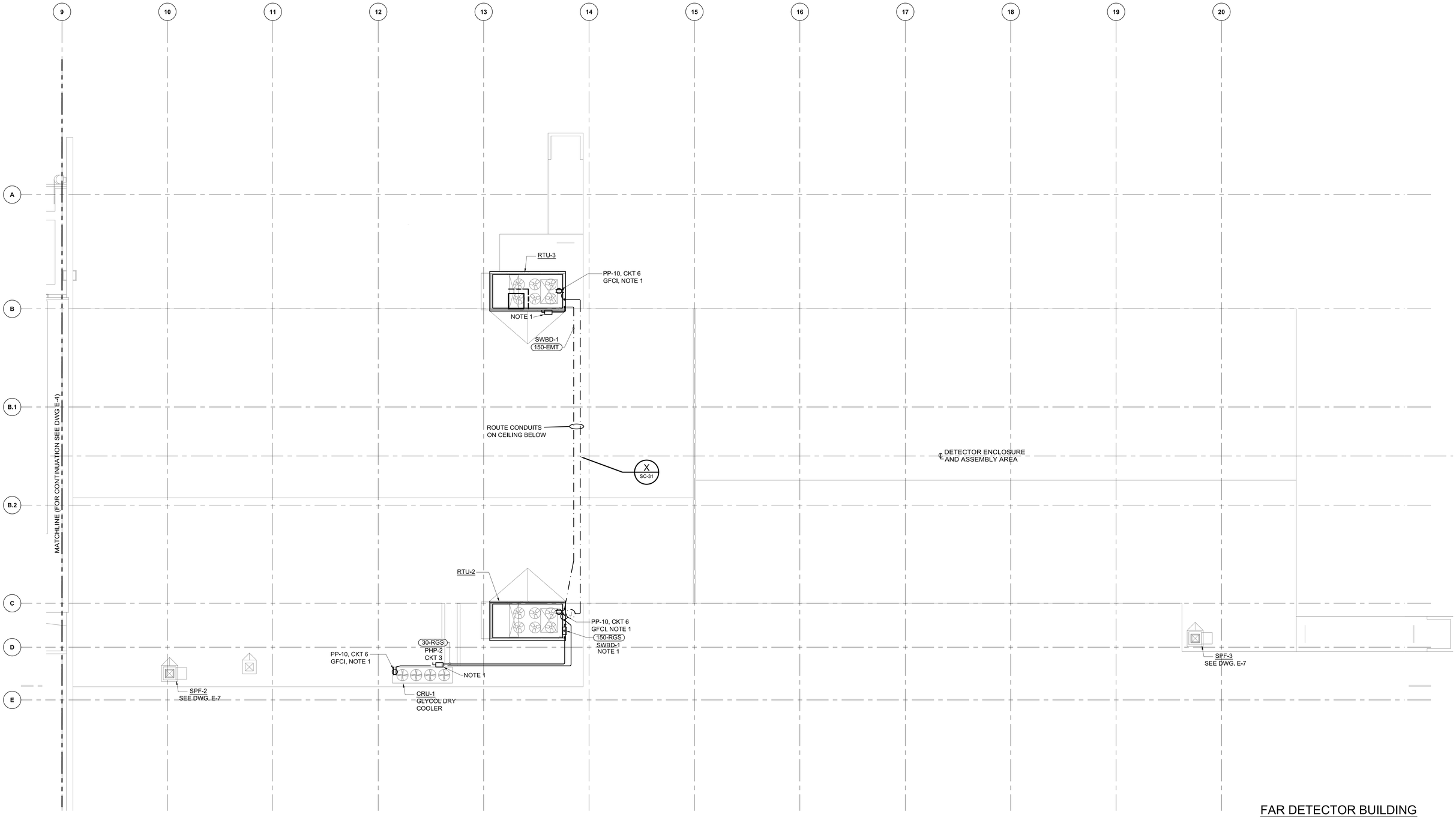
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

POWER PLAN - ROOF 1 OF 2

DRAWING NO. 15-1-3B E-4 REV. 0

11 MAR, 2009



ROOF PLAN

SCALE: 1/18"= 1'-0"

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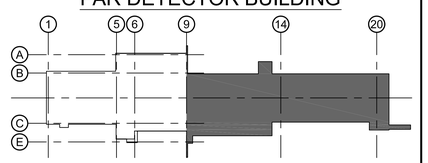
NOTE:

1. DISCONNECT SWITCHES AND RECEPTACLES TO BE PROVIDED BY HVAC EQUIPMENT MANUFACTURER.
2. ALL CONDUITS PENETRATING THE ROOF SHALL BE ROUTED DOWN THROUGH EQUIPMENT CURBS.

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA

Hines

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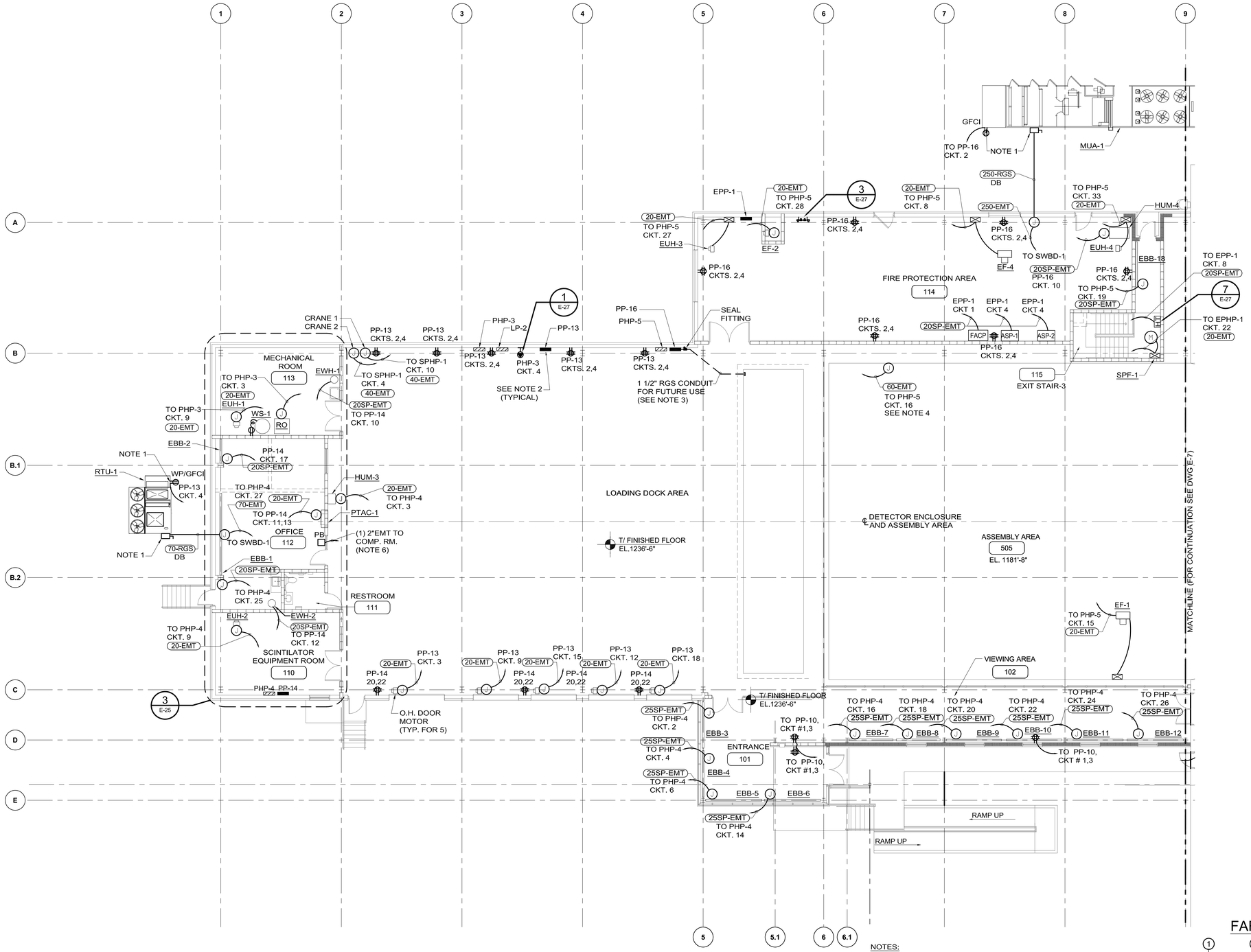
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

POWER PLAN - ROOF 2 OF 2

DRAWING NO. 15-1-3B E-5 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1236'-6"

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

NOTES:

1. DISCONNECT SWITCH AND RECEPTACLE TO BE PROVIDED BY HVAC EQUIPMENT MANUFACTURER.
2. ALL 480-120/208V TRANSFORMERS SHALL BE WALL MOUNTED DIRECTLY ABOVE THE ASSOCIATED 120V/208V PANELBOARD. TRANSFORMERS NOT SHOWN ON PLAN FOR CLARITY. SEE DETAIL 5, DWG. SS-21.
3. EMBEDDED CONDUIT SHALL EXTEND FROM PP-16 TO GLUE PIT. STUB OUT AND CAP IN PIT. FOR GLUE EQUIPMENT, WIRING BY EXPERIMENTERS.
4. CONDUIT AND J-BOX FOR BLOCK PIVITOR MOTOR.
5. CONTRACTOR SHALL HEAT TRACE ALL FIRE PROTECTION PIPES LOCATED IN STAIRWELLS. SEE FIRE PROTECTION DRAWINGS FOR PIPE LOCATIONS.
6. 2" EMT CONDUIT FROM OFFICE TO COMPUTER ROOM FOR CONTROL WIRING.

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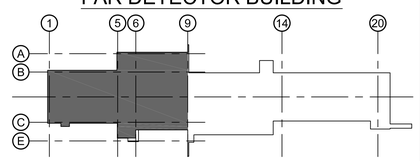
FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE: 1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

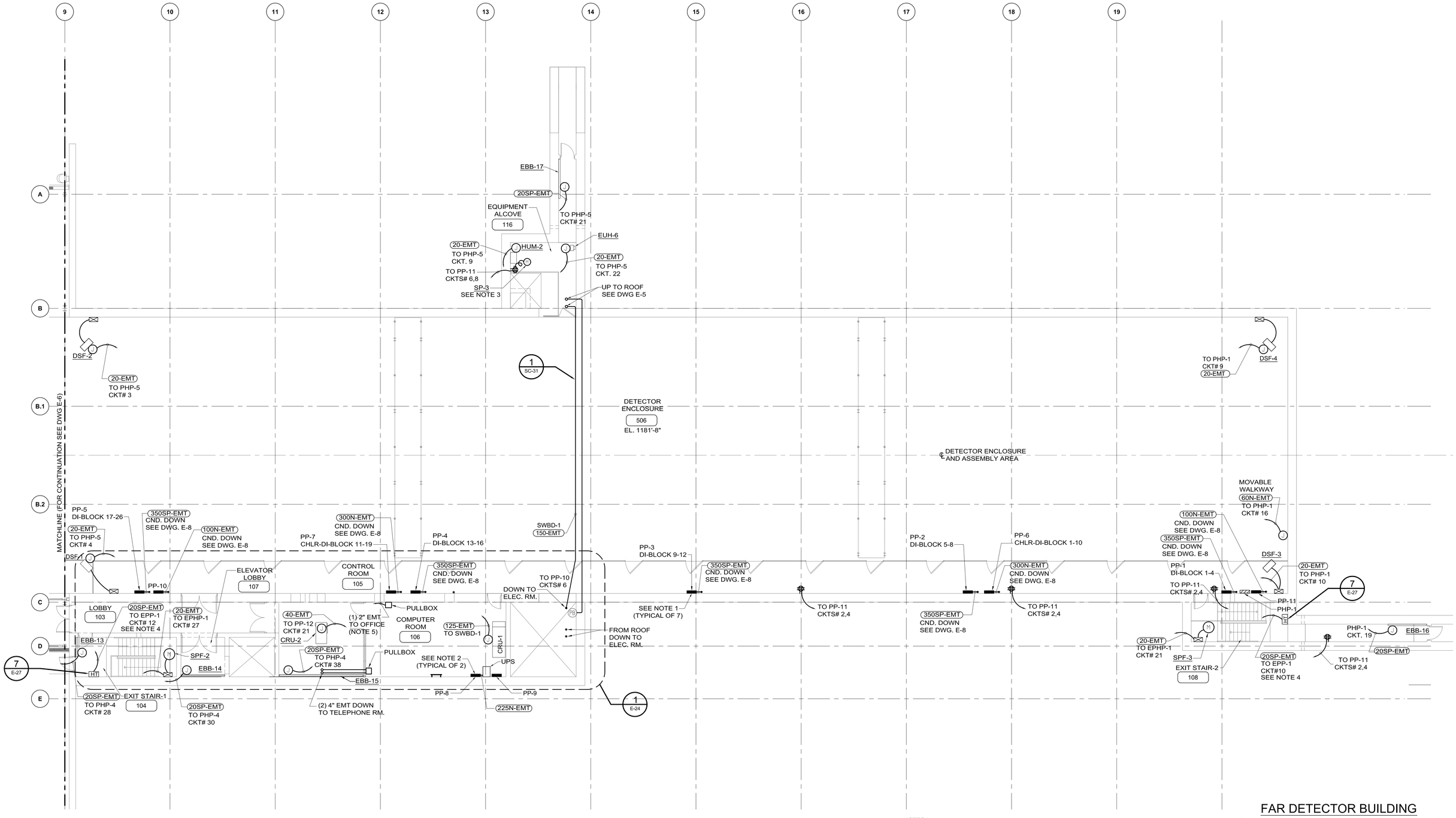
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

POWER PLAN - EL 1236'-6" 1 OF 2

DRAWING NO. 15-1-3B E-6 REV. 0

11 MAR, 2009



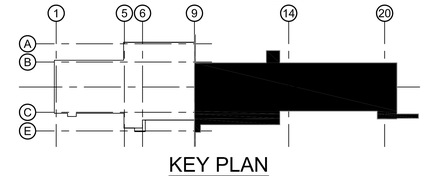
FLOOR PLAN EL 1236'-6"

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

NOTES:

1. TRANSFORMERS FOR PP1-PP7 AND PP-10, PP-11 SHALL BE WALL MOUNTED BELOW THE ASSOCIATED PANELBOARD ON EL. 1224'-10". SEE DETAIL 7, DWG. SS-21
2. TRANSFORMERS FOR PP-8 AN PP-9 SHALL BE WALL MOUNTED DIRECTLY ABOVE THE ASSOCIATED 120V/208V PANELBOARD. TRANSFORMERS NOT SHOWN ON PLAN FOR CLARITY. SEE DETAL 7, DWG. SS-21.
3. CONTRACTOR SHALL SUPPLY ASSOCIATED CONTROL PANEL FOR SUMP PUMP 3. CONTROL SEQUENCE SHALL BE AS FOLLOWS: WHEN CONDENSATE REACHES HIGH LEVEL ALARM FLOAT THE CONTROL PANEL TURNS ON A FLASHING WHITE ALARM LIGHT LOCATED IN THE DETECTOR AREA AS WELL AS THE SUMP PUMP. WHEN THE CONDENSATE REACHES THE PUMP OFF LEVEL, THE PUMP WILL TURN OFF. THE ALARM WILL BE MANUALLY SHUT OFF AT THE PANEL.
4. CONTRACTOR SHALL HEAT TRACE ALL FIRE PROTECTION PIPES LOCATED IN STAIRWELLS. SEE FIRE PROTECTION DRAWINGS FOR PIPE LOCATIONS.
5. 2" EMT CONDUIT FROM OFFICE TO COMPUTER ROOM FOR FUTURE WIRING.

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE: 1/8"=1'-0" (8 0 8 16 FEET)

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

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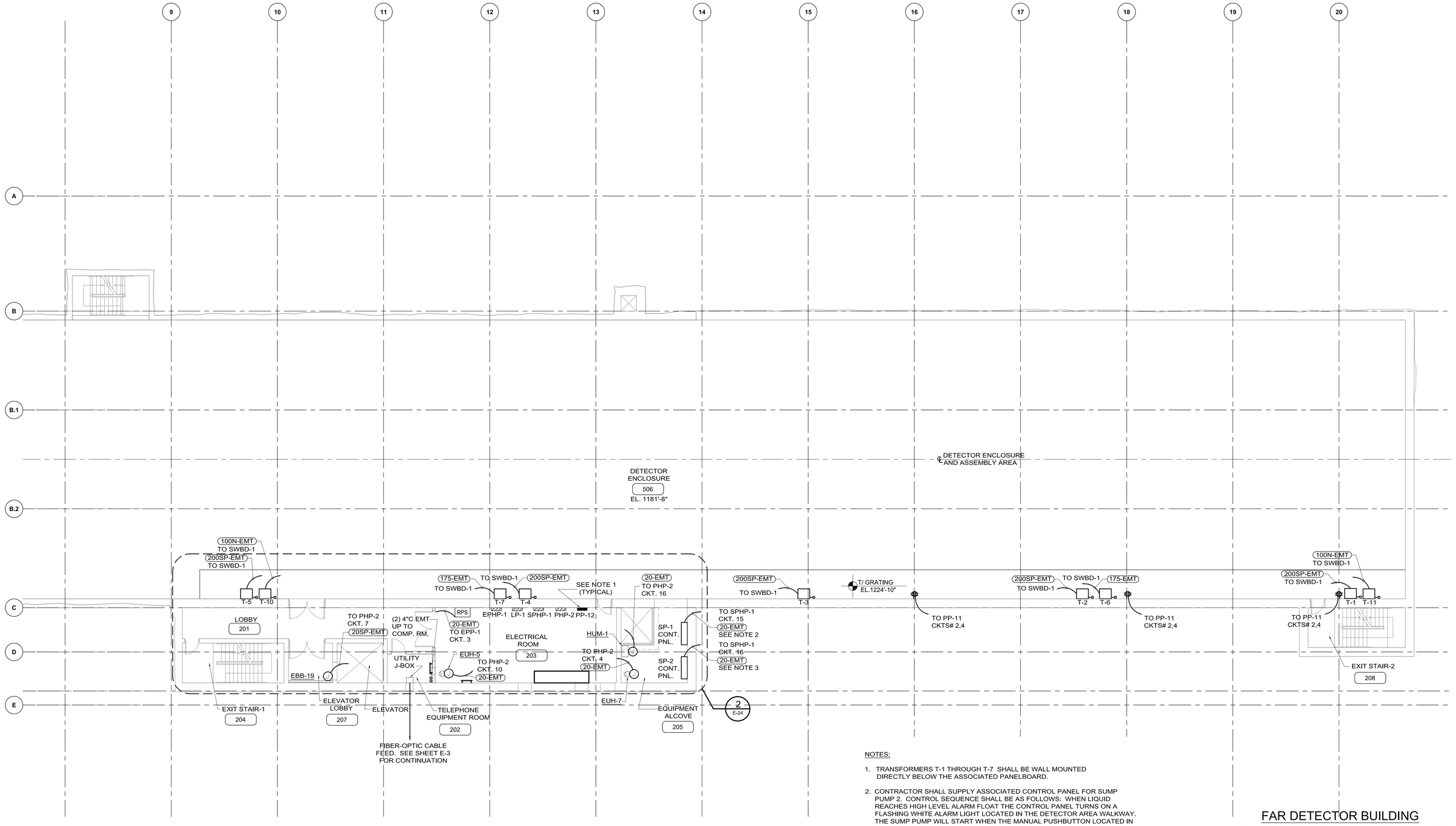
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

POWER PLAN EL 1236'-6" 2 OF 2

DRAWING NO. 15-1-3B E-7 REV. 0

11 MAR, 2009



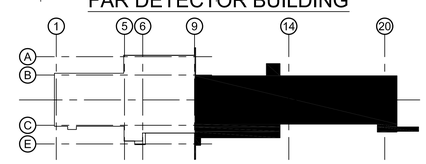
FLOOR PLAN EL 1224'-10"

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

NOTES:

1. TRANSFORMERS T-1 THROUGH T-7 SHALL BE WALL MOUNTED DIRECTLY BELOW THE ASSOCIATED PANELBOARD.
2. CONTRACTOR SHALL SUPPLY ASSOCIATED CONTROL PANEL FOR SUMP PUMP 2. CONTROL SEQUENCE SHALL BE AS FOLLOWS: WHEN LIQUID REACHES HIGH LEVEL ALARM FLOAT THE CONTROL PANEL TURNS ON A FLASHING WHITE ALARM LIGHT LOCATED IN THE DETECTOR AREA WALKWAY. THE SUMP PUMP WILL START WHEN THE MANUAL PUSHBUTTON LOCATED IN THE EQUIPMENT ALCOVE IS ACTIVATED. THE SUMP PUMP WILL BE AUTOMATICALLY SHUT DOWN WHEN THE LIQUID DROPS BELOW THE PUMP OFF LEVEL FLOAT. THE ALARM WILL BE MANUALLY SHUT OFF AT THE PANEL.
3. CONTRACTOR SHALL SUPPLY ASSOCIATED CONTROL PANEL FOR SUMP PUMP 1. CONTROL SEQUENCE SHALL BE AS FOLLOWS: WHEN WATER REACHES LEAD PUMP ON FLOAT, THE LEAD PUMP SHALL TURN ON. WHEN WATER REACHES THE HIGH LEVEL ALARM FLOAT, THE LEAD PUMP WILL CONTINUE TO RUN AND A RED FLASHING LIGHT AS WELL AS A HIGH LEVEL ALARM WILL SOUND. WHEN WATER REACHES THE LAG PUMP ON FLOAT, THE LEAD PUMP WILL CONTINUE TO OPERATE AND THE LAG PUMP WILL TURN ON. WHEN THE WATER LEVEL DROPS BELOW THE PUMPS OFF FLOAT, ALL PUMPS AND ALARMS WILL TURN OFF. THE PANEL WILL ALSO INCLUDE AN ALARM (YELLOW FLASHING LIGHT) FOR TEMPERATURE AND SEAL FAILURE. ALL ALARMS WILL BE MANUALLY SHUT OFF AT THE PANEL.

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

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FERMI NATIONAL ACCELERATOR LABORATORY

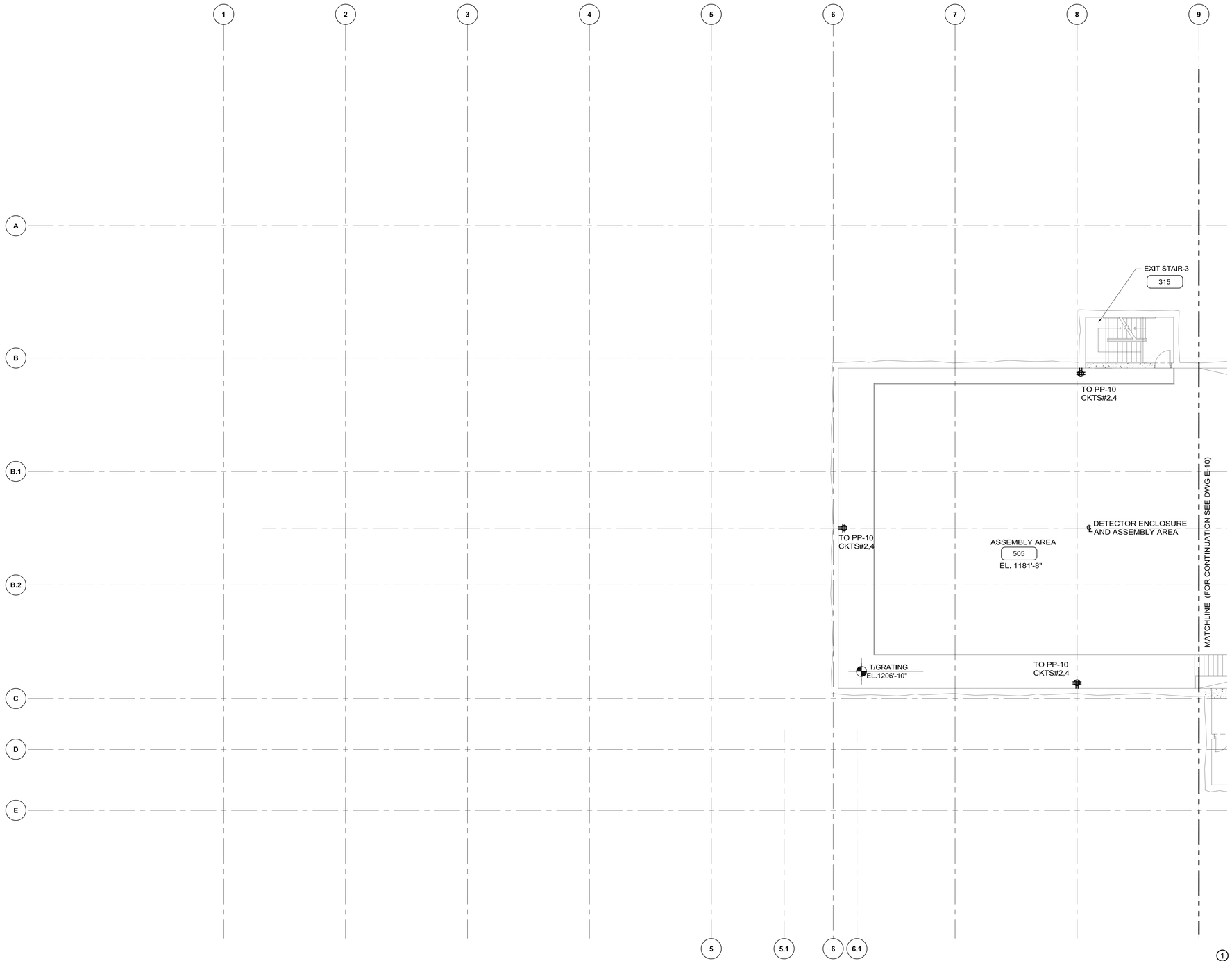
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

POWER PLAN EL 1224'-10"

DRAWING NO. 15-1-3B E-8 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1206'-10"

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

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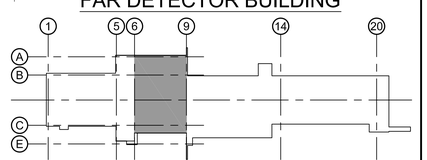
PRINT NAME: DAVID E. MERTZ

SIGNATURE:

DATE: 03/11/2009 LICENSE #47241

FAR DETECTOR BUILDING



KEY PLAN

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	B. HAAS	03-11-09
DRAWN	K. WHITTEN	03-11-09
CHECKED	D. MERTZ	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0"

8 0 8 16

SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

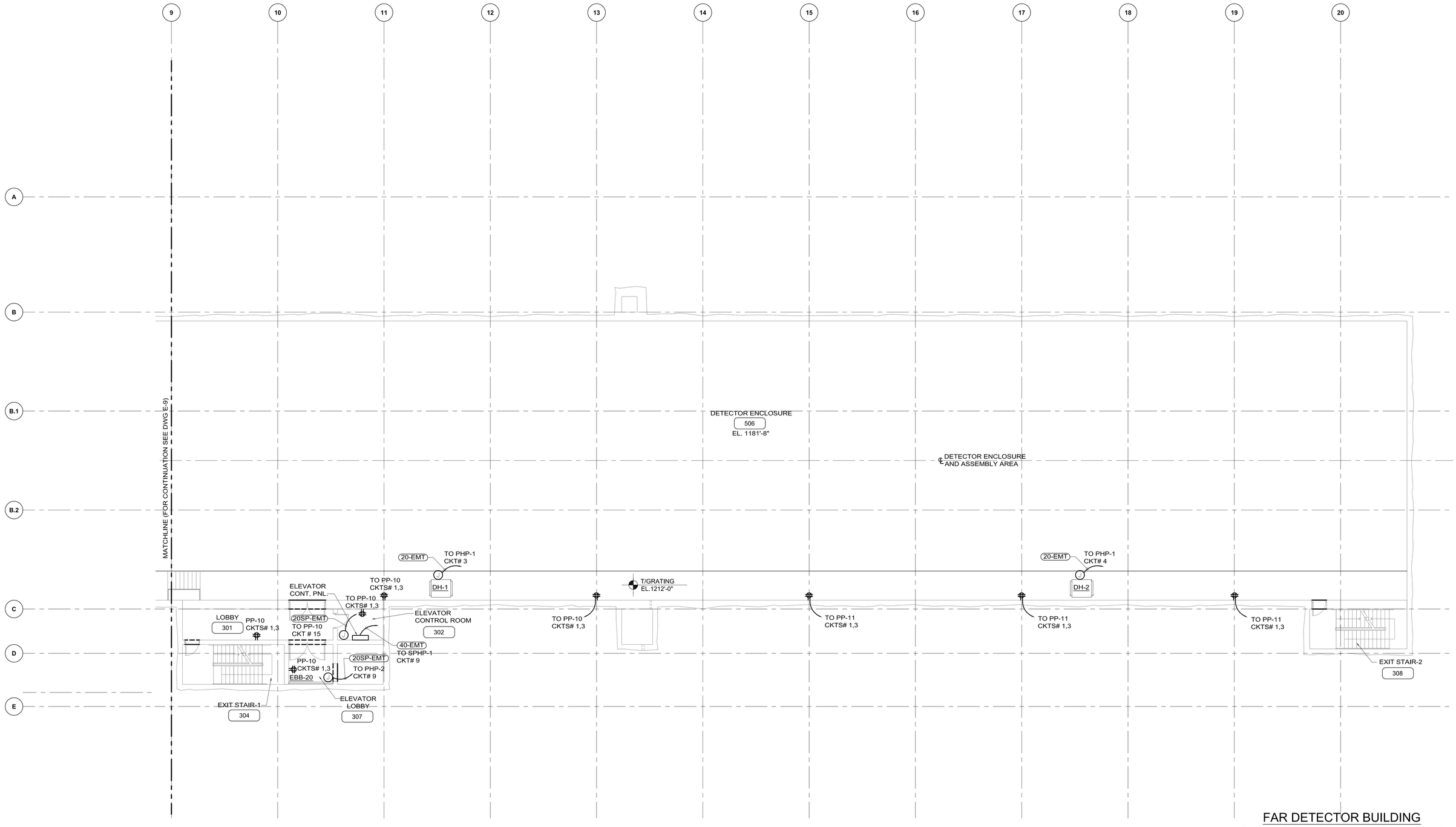
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

POWER PLAN EL 1206'-10"

DRAWING NO. 15-1-3B E-9 REV. 0

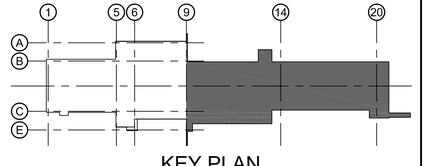
11 MAR, 2009



FLOOR PLAN EL 1212'-0"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE: 1/8"=1'-0" (8 0 8 16 FEET)

FERMI NATIONAL ACCELERATOR LABORATORY

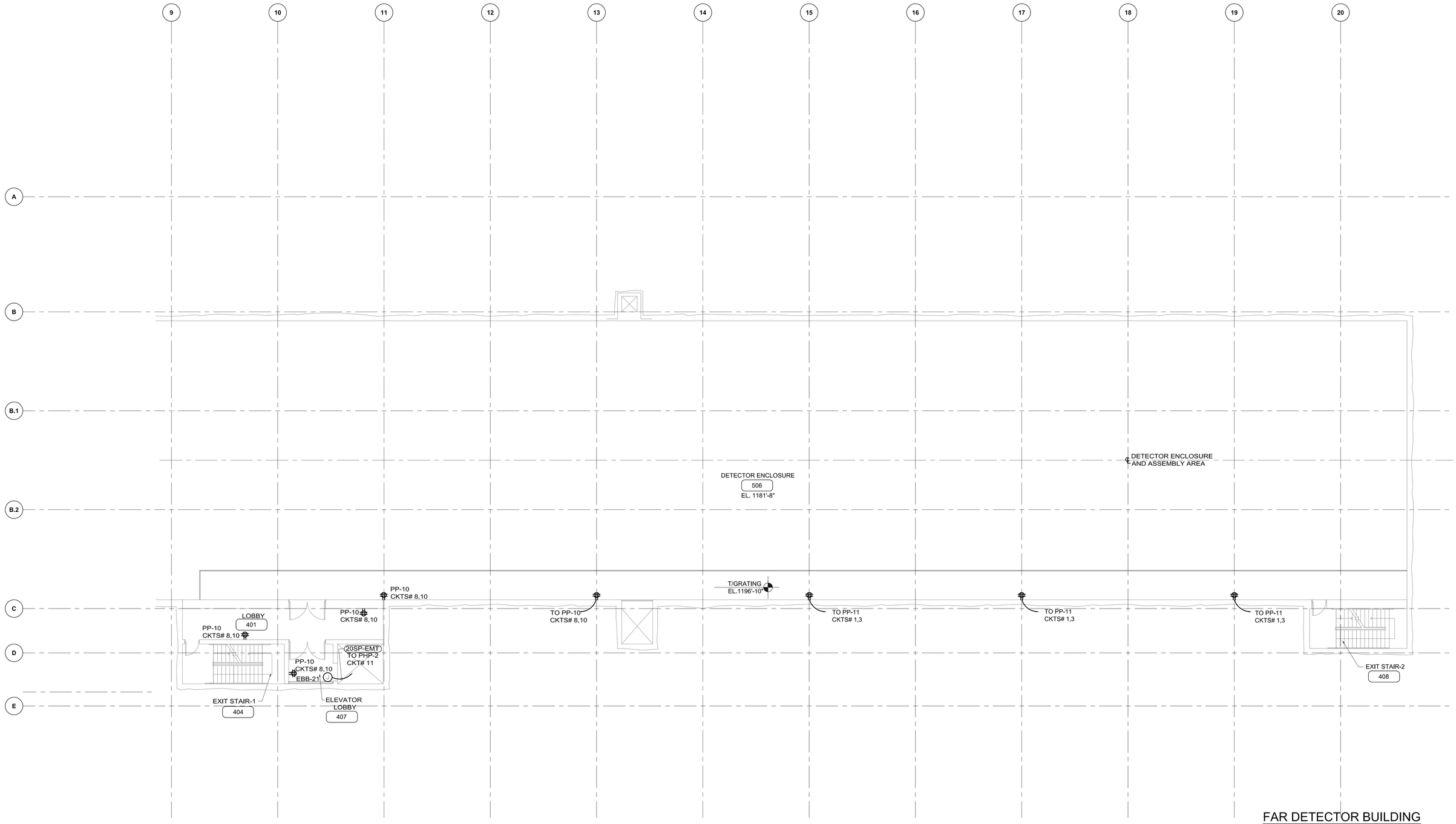
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

POWER PLAN EL 1212'-0"

DRAWING NO. 15-1-3B E-10 REV. 0

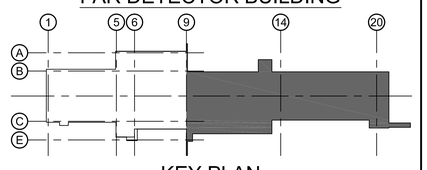
11 MAR, 2009



FLOOR PLAN EL 1196'-10"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0"

8 0 8 16

SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

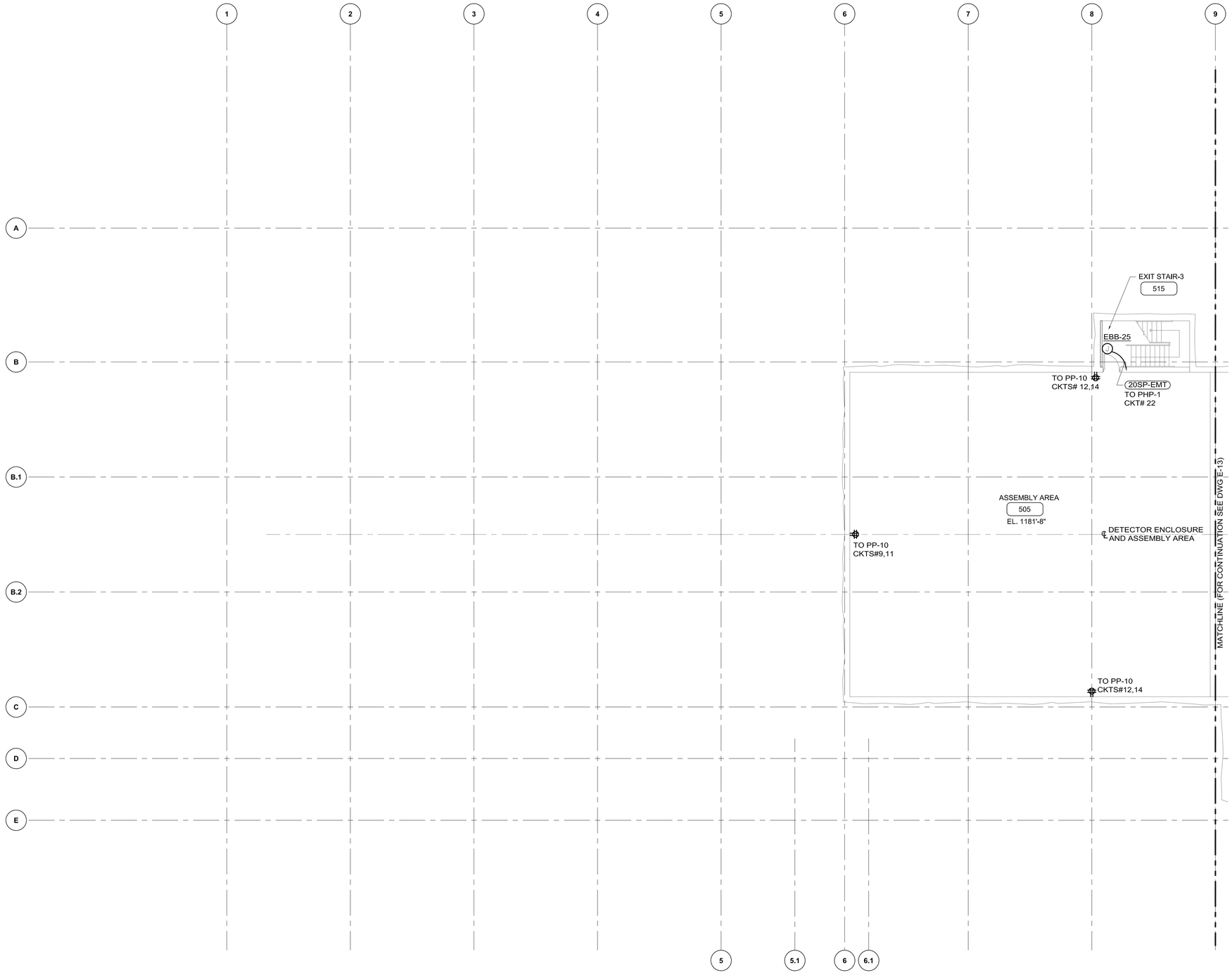
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

POWER PLAN EL 1196'-10"

DRAWING NO. 15-1-3B E-11 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1181'-8"

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

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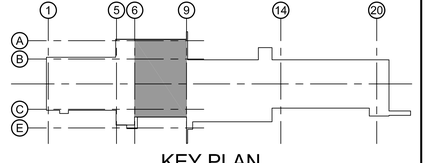

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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

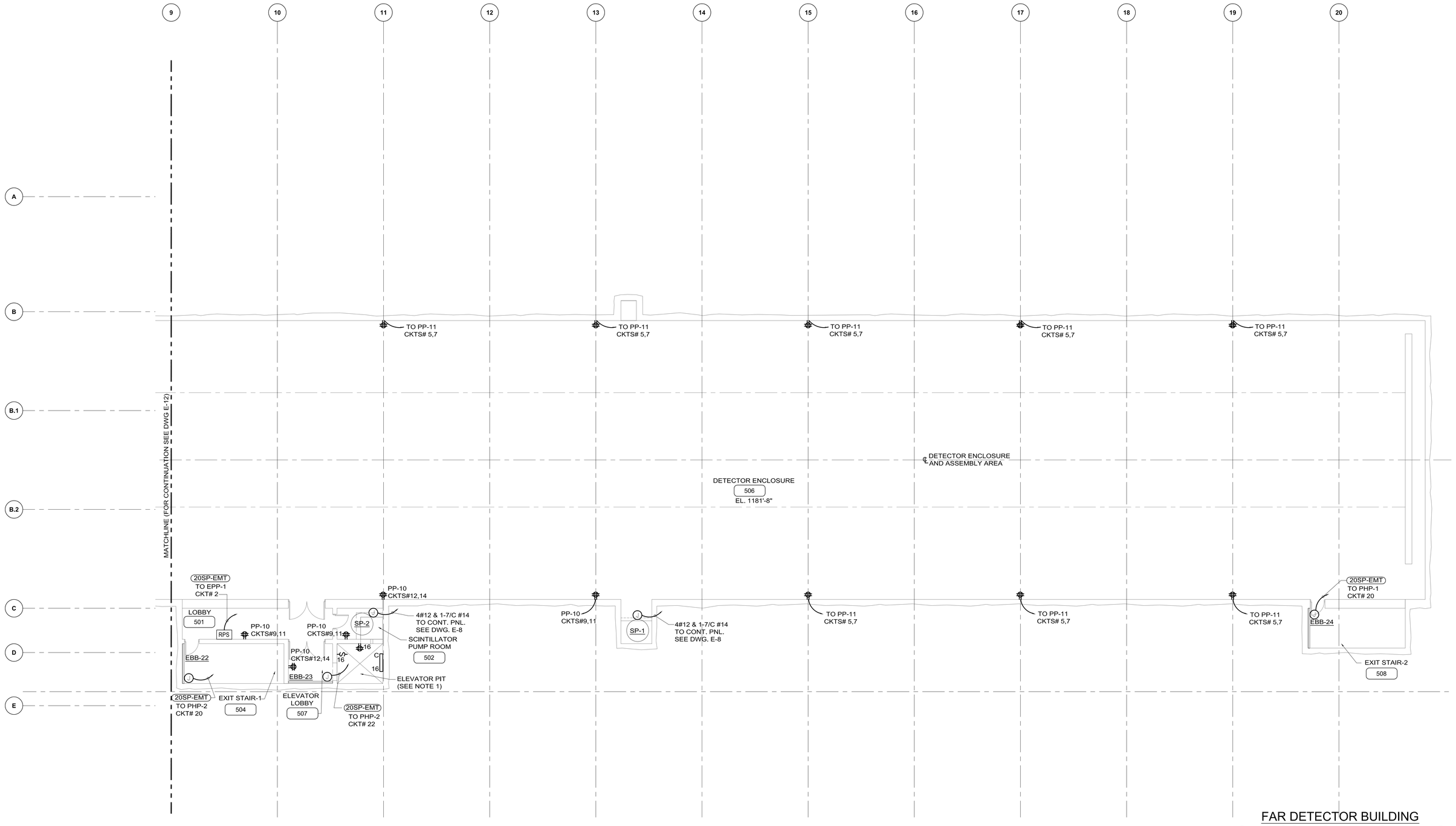
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

POWER PLAN EL 1181'-8" 1 OF 2

DRAWING NO. 15-1-3B E-12 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1181'-8"

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

NOTE:

1. INSTALL LIGHT FIXTURE, SWITCH AND RECEPTACLE IN ELEVATOR PIT. LIGHT FIXTURE MOUNTED 6 FT. AFF, RECEPTACLE 3'-0" AFF AND STCH 6" BELOW TOP OF PIT. FED FROM PP-10, CKT. 16.

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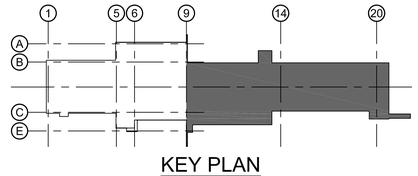

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PROJECT NORTH

SCALE: 1/8"=1'-0" — 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

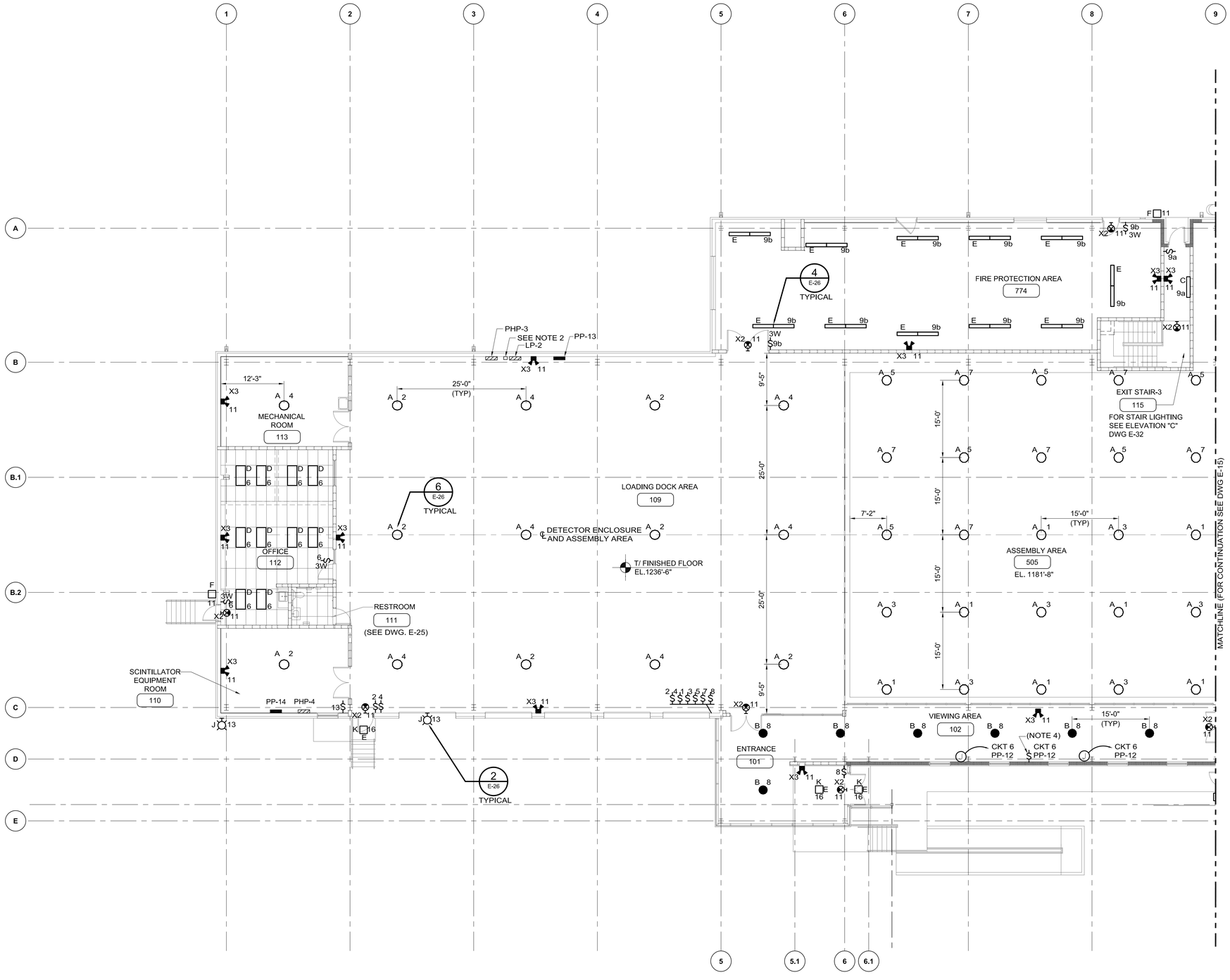
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
POWER PLAN EL 1181'-8" 2 OF 2

DRAWING NO. 15-1-3B E-13 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1236'-6"

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

NOTES:

1. ALL LIGHTING CIRCUITS SHOWN ARE FED FROM PANELBOARD LP-2 EXCEPT FOR FIXTURES MARKED "E" WHICH ARE FED FROM EPHP-1.
2. PROVIDE AND INSTALL DIGITAL TIMER TO CONTROL OUTDOOR LIGHTING CKTS. (LP-2 CKT 10 AND EPHP-1 CKT 16). DIGITAL TIMER SHALL BE TORK MODEL DZS100BP OR EQUAL.
3. EGRESS LIGHT FIXTURES TYPE "F" SHALL BE SWITCHED WITH MOTION SENSOR. SEE FIXTURE SCHEDULE DWG. E-26.
4. INSTALL (2) FLUSH MOUNTED JUNCTION BOXES AND SWITCH FOR FUTURE TRACK LIGHTING.

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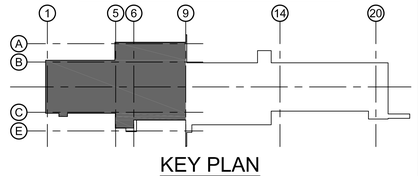

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE: 1/8"=1'-0" (8 0 8 16 FEET)

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

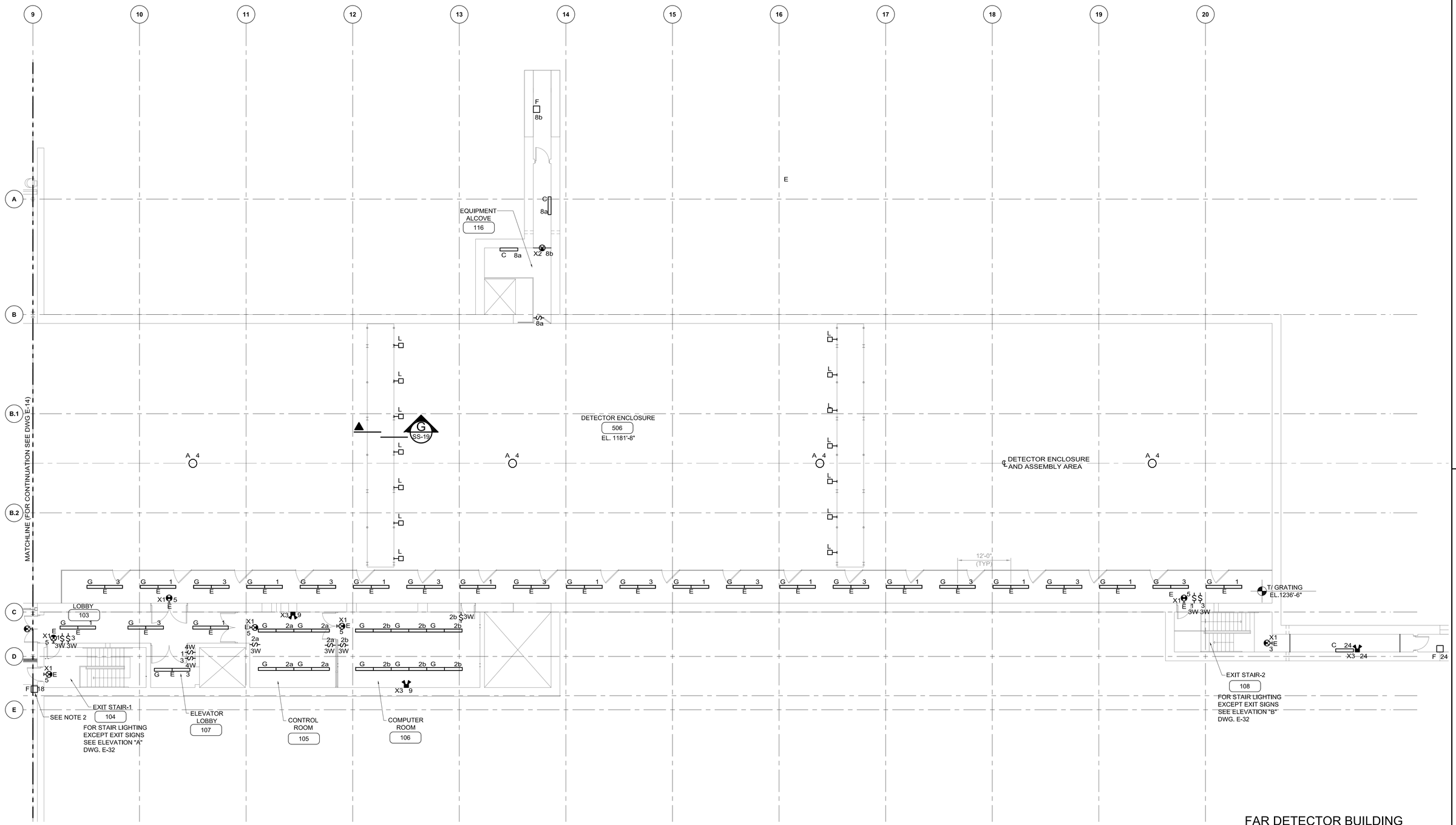
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

LIGHTING PLAN EL 1236'-6" 1 OF 2

DRAWING NO. 15-1-3B E-14 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1236'-6"

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

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PRINT NAME: DAVID E. MERTZ

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DATE: 03/11/2009 LICENSE #47241

NOTES:

1. LIGHTING FIXTURES MARKED "E" ARE FED FROM EPHP-1, ALL OTHER FIXTURES ARE FED FROM PANELBOARD LP-1.
2. EGRESS LIGHT FIXTURES TYPE "F" SHALL BE SWITCHED WITH MOTION SENSOR. SEE FIXTURE SCHEDULE DWG. E-26.

FAR DETECTOR BUILDING

KEY PLAN

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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA Hines

PROJECT NUMBER 896-06-1711

FERMI NATIONAL ACCELERATOR LABORATORY

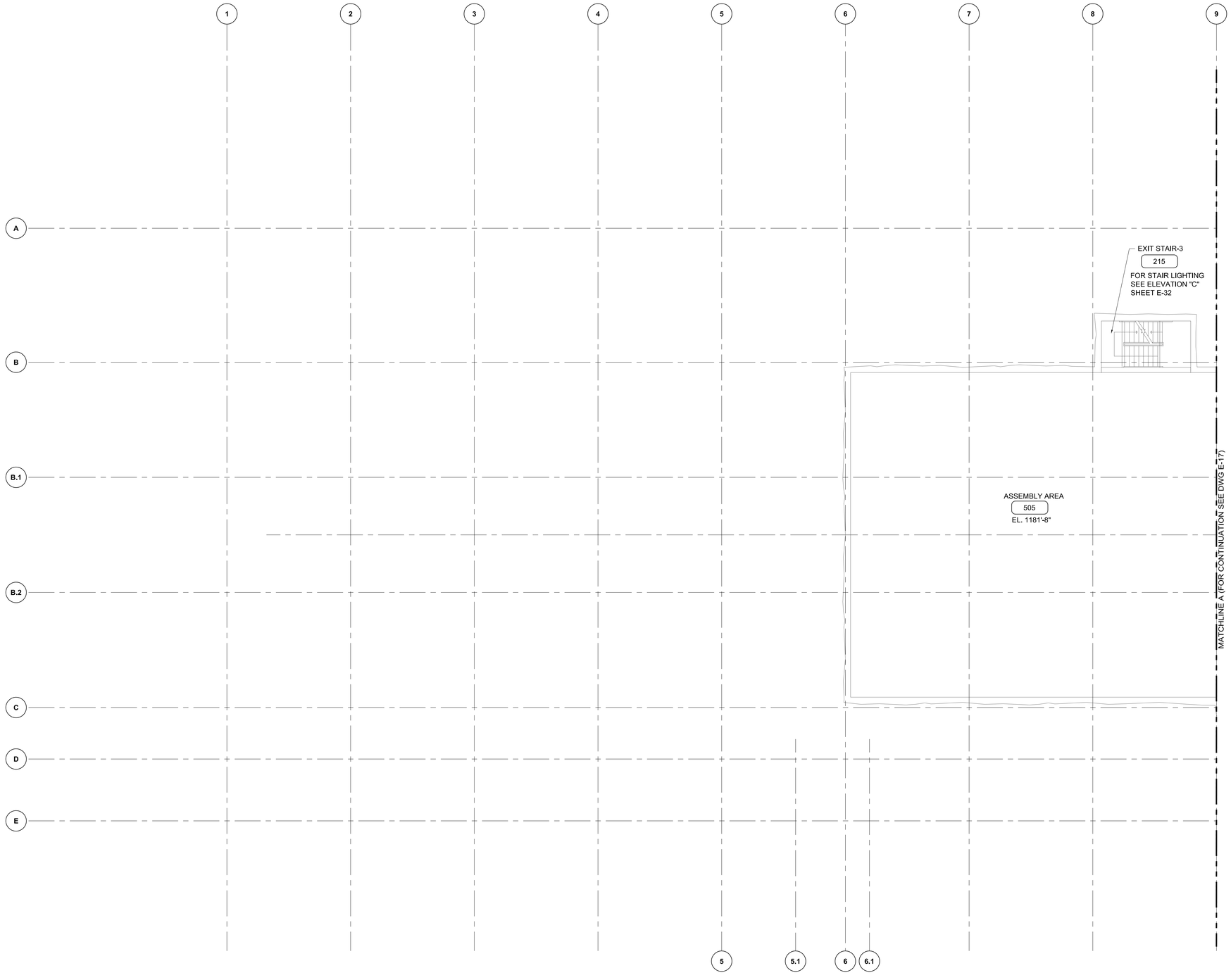
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

LIGHTING PLAN EL 1236'-6" 2 OF 2

DRAWING NO. 15-1-3B E-15 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1224'-10"

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

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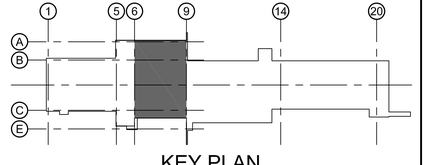

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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA

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FERMI NATIONAL ACCELERATOR LABORATORY

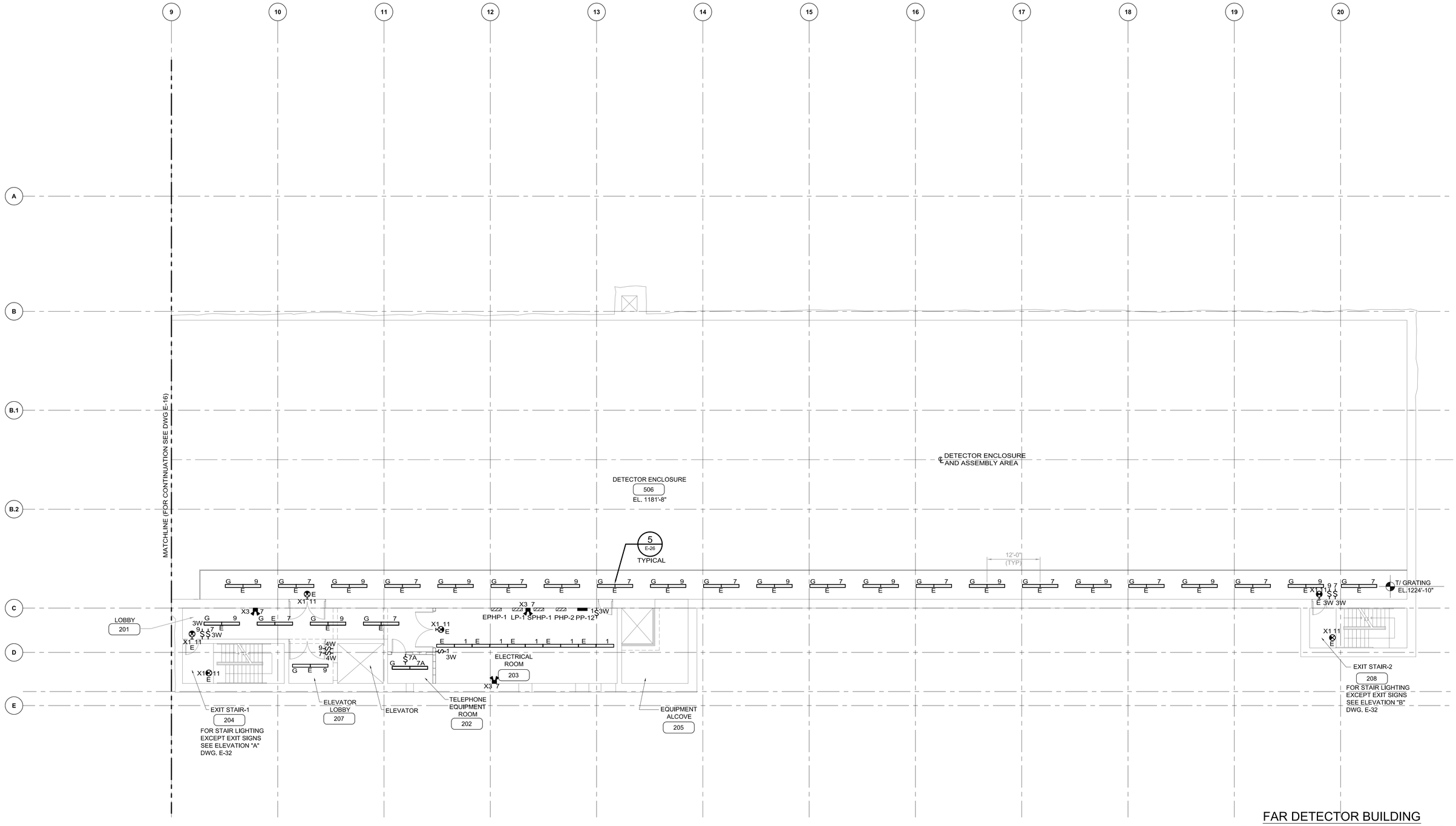
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

LIGHTING PLAN EL 1224'-10" 1 OF 2

DRAWING NO. 15-1-3B E-16 REV. 0

11 MAR, 2009



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NOTES:

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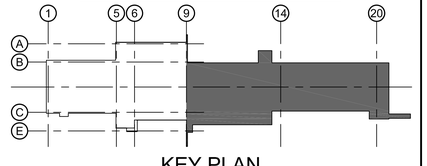
FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

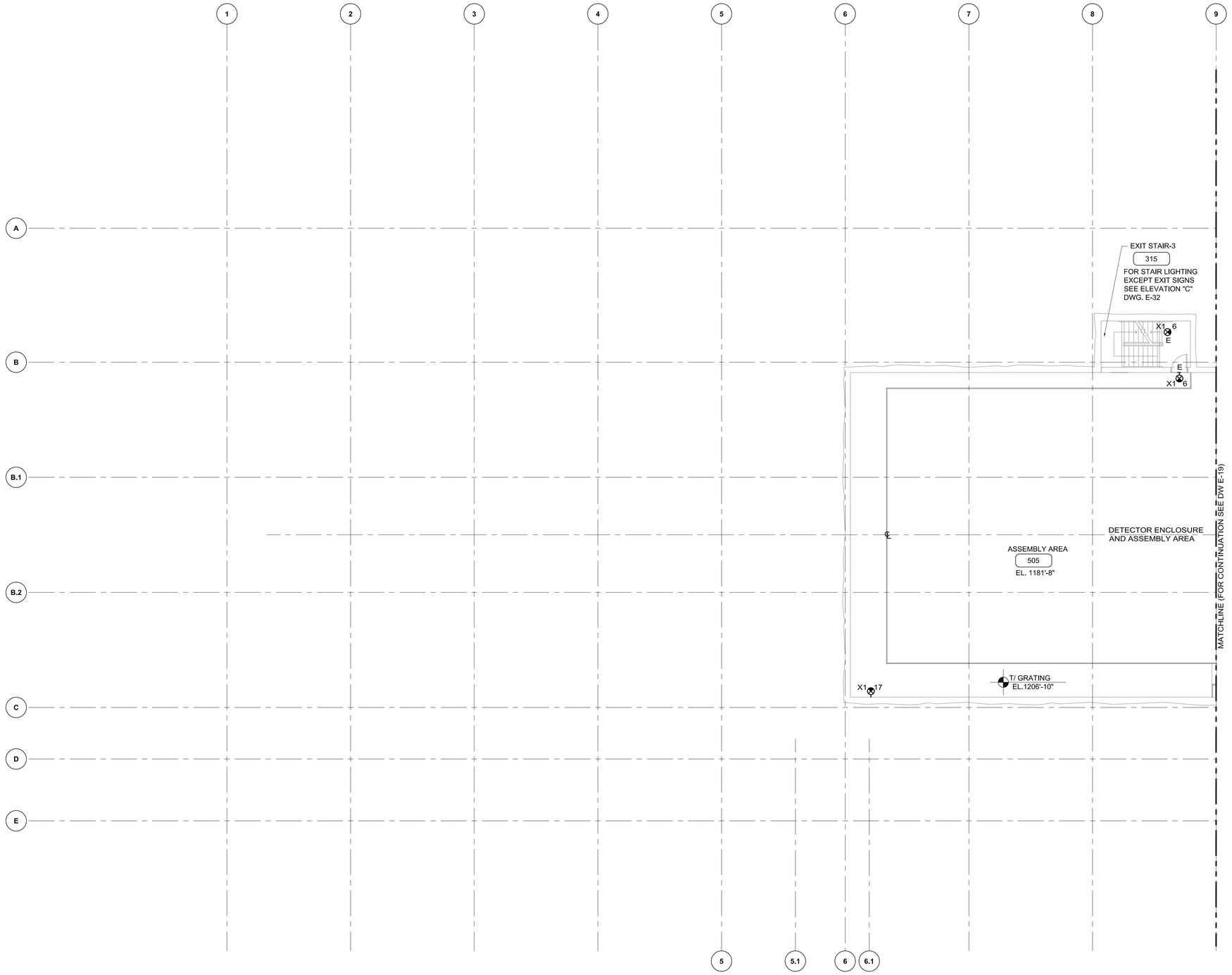
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

LIGHTING PLAN EL 1224'-10" 2 OF 2

DRAWING NO. 15-1-3B E-17 REV. 0

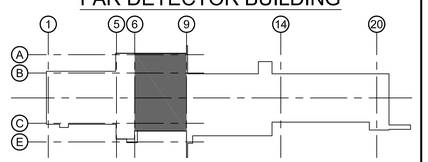
11 MAR, 2009



FLOOR PLAN EL 1206-10"

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

FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE: 1/8"=1'-0" — 8 0 8 16 — SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

LIGHTING PLAN EL 1206'-10"

DRAWING NO. 15-1-3B E-18 REV. 0

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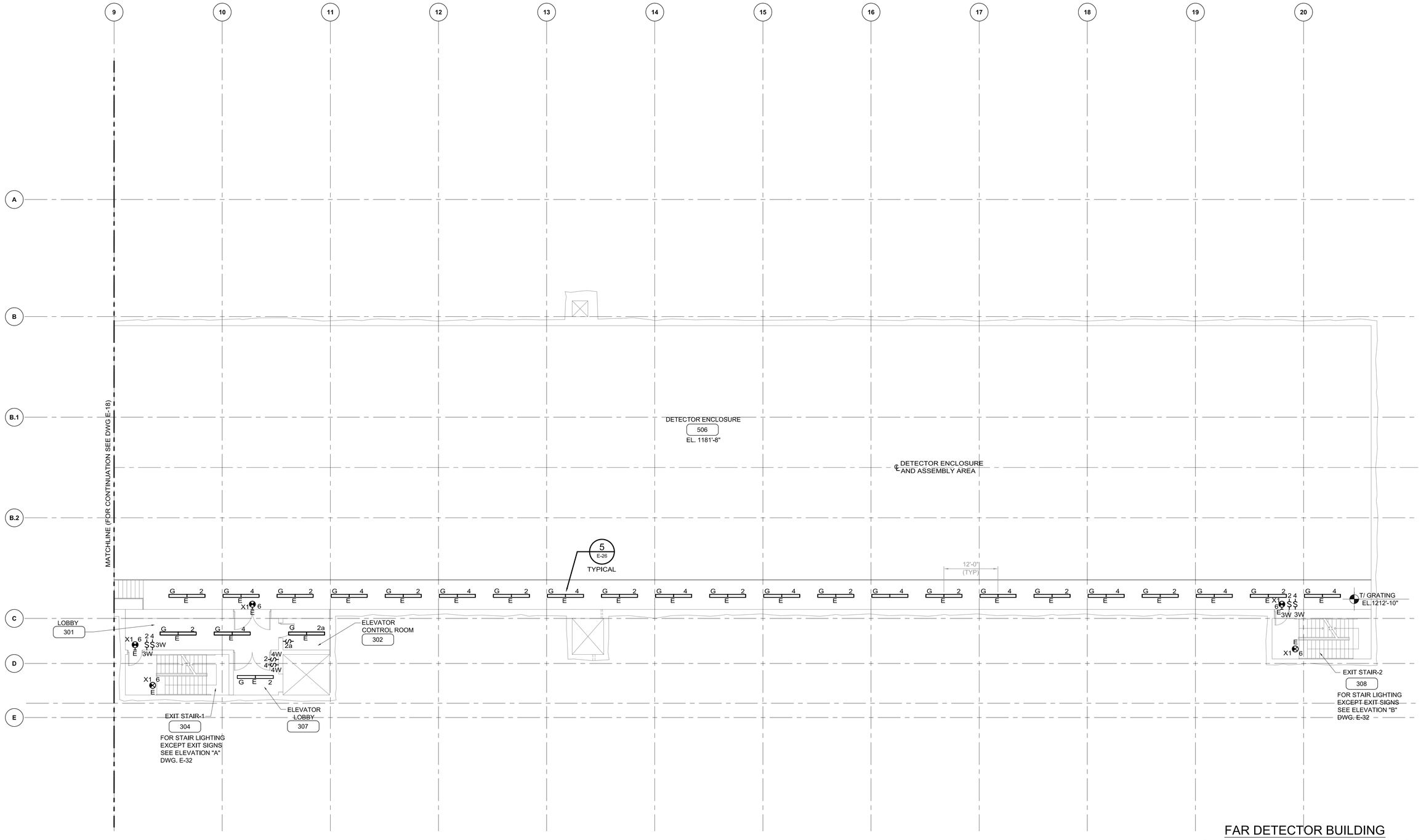

FLOOR PLAN EL 1212'-0"

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

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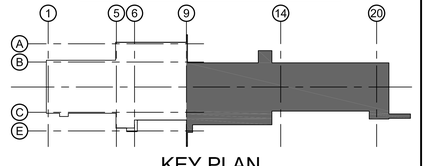
DATE: 03/11/2009 LICENSE #47241

NOTES:

1. ALL LIGHTING CIRCUITS SHOWN ARE FED FROM PANELBOARD EPHP-1.

FAR DETECTOR BUILDING



KEY PLAN

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	B. HAAS	03-11-09
DRAWN	K. WHITTEN	03-11-09
CHECKED	D. MERTZ	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

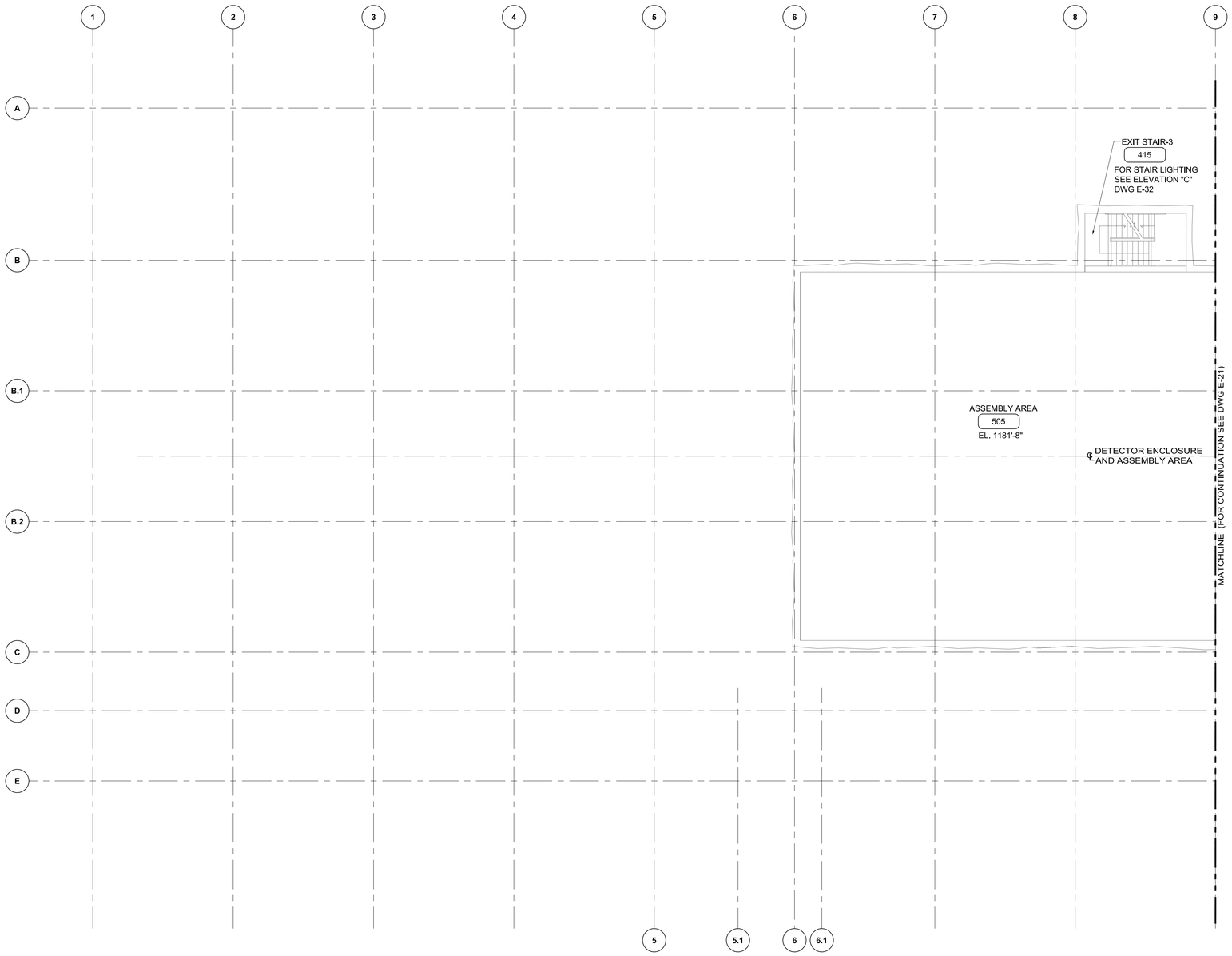
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

LIGHTING PLAN EL 1212'-0"

DRAWING NO. 15-1-3B E-19 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1196'-10"

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

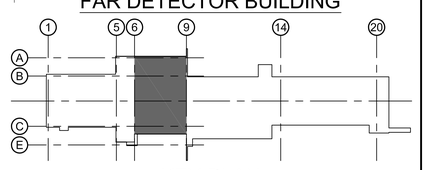
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DAVID E. MERTZ

SIGNATURE:

DATE: 03/11/2009 LICENSE #47241

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

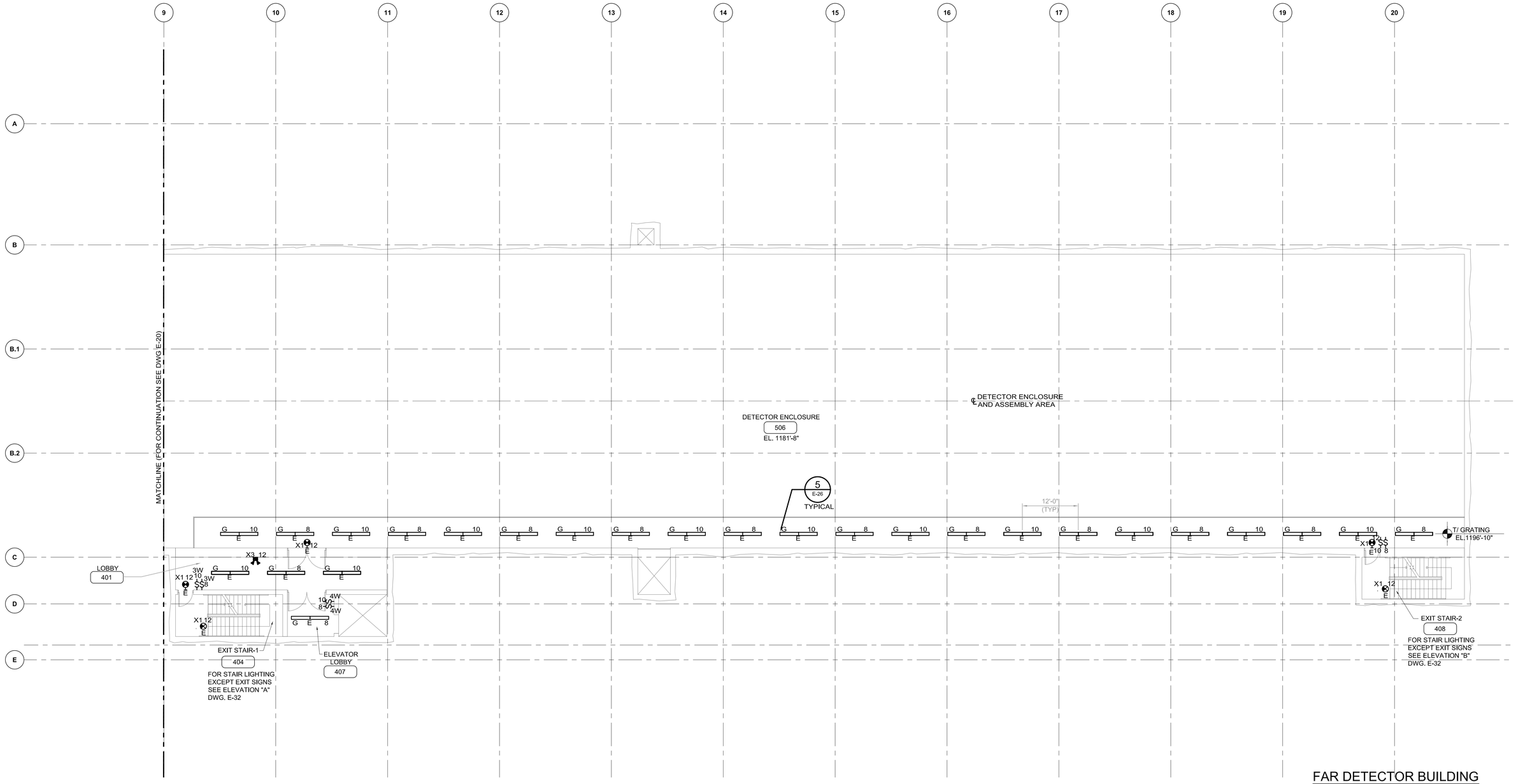
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

LIGHTING PLAN EL 1196'-10" 1 OF 2

DRAWING NO. 15-1-3B E-20 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1196'-10"

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

NOTES:

1. ALL LIGHTING CIRCUITS SHOWN ARE FED FROM PANELBOARD EPHP-1.

FAR DETECTOR BUILDING

KEY PLAN

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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA

PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

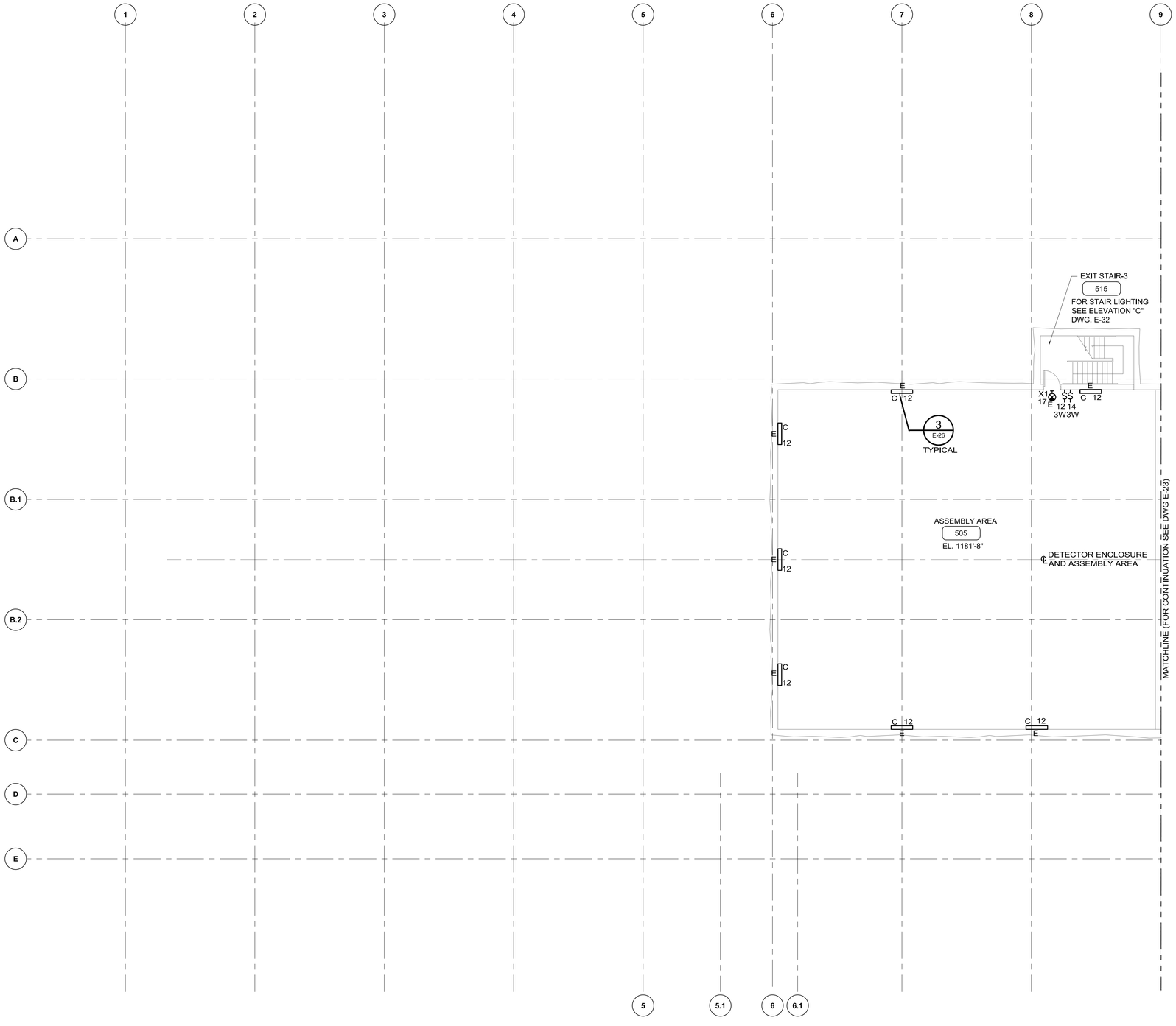
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

LIGHTING PLAN EL 1196'-10" 2 OF 2

DRAWING NO. 15-1-3B E-21 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1181'-8"

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

NOTES:

1. ALL LIGHTING CIRCUITS SHOWN ARE FED FROM PANELBOARD EPHP-1.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

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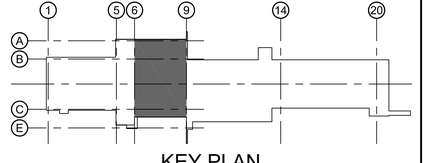

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PROJECT NORTH

SCALE:

1/8"=1'-0" 8 0 8 16 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY

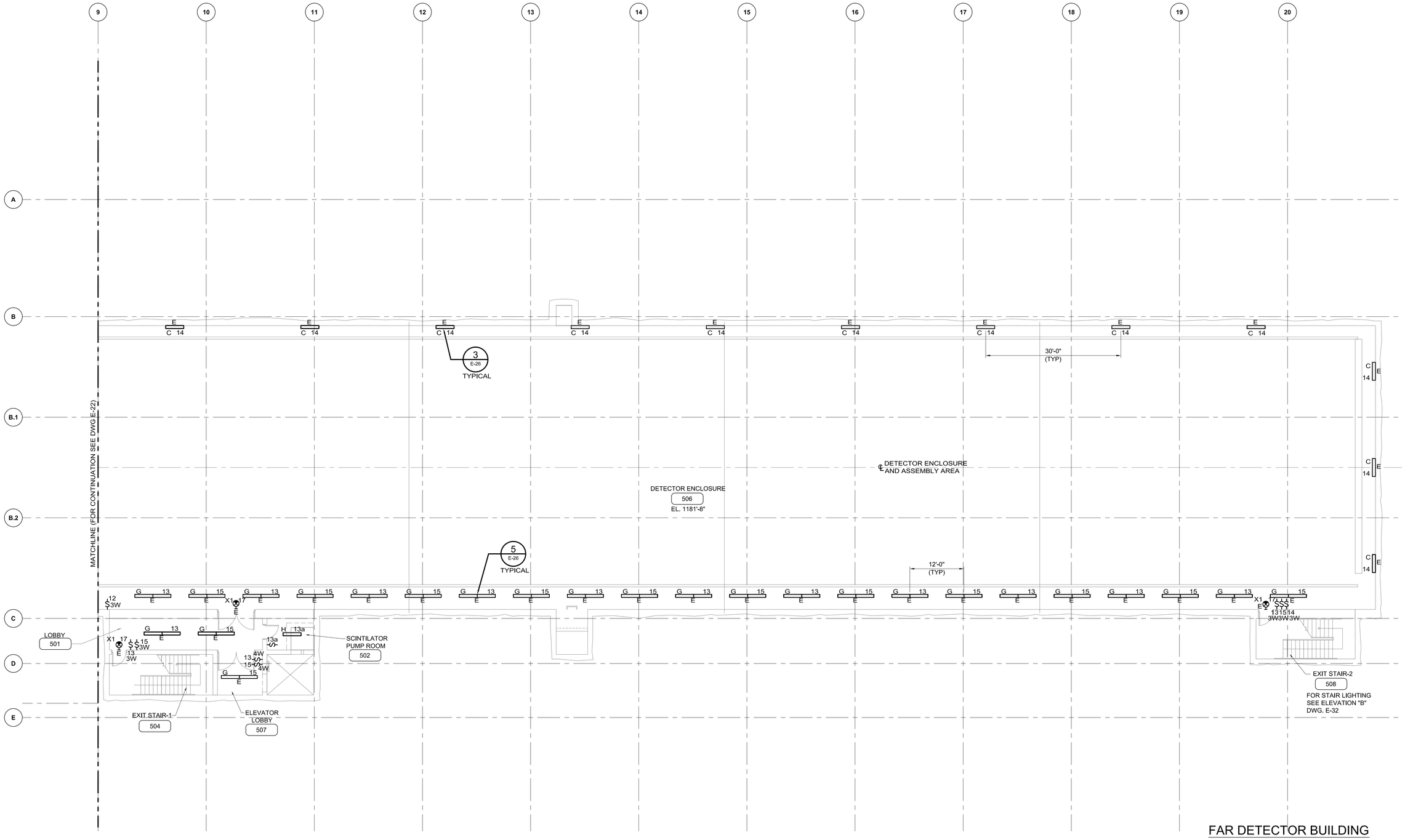
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

LIGHTING PLAN EL 1181'-8" 1 OF 2

DRAWING NO. 15-1-3B E-22 REV. 0

11 MAR, 2009



FLOOR PLAN EL 1181'-8"

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

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NOTES:

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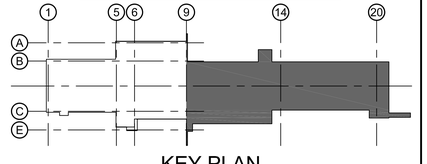
FAR DETECTOR BUILDING



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PROJECT NORTH

SCALE: 1/8"=1'-0" 8 0 8 16 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

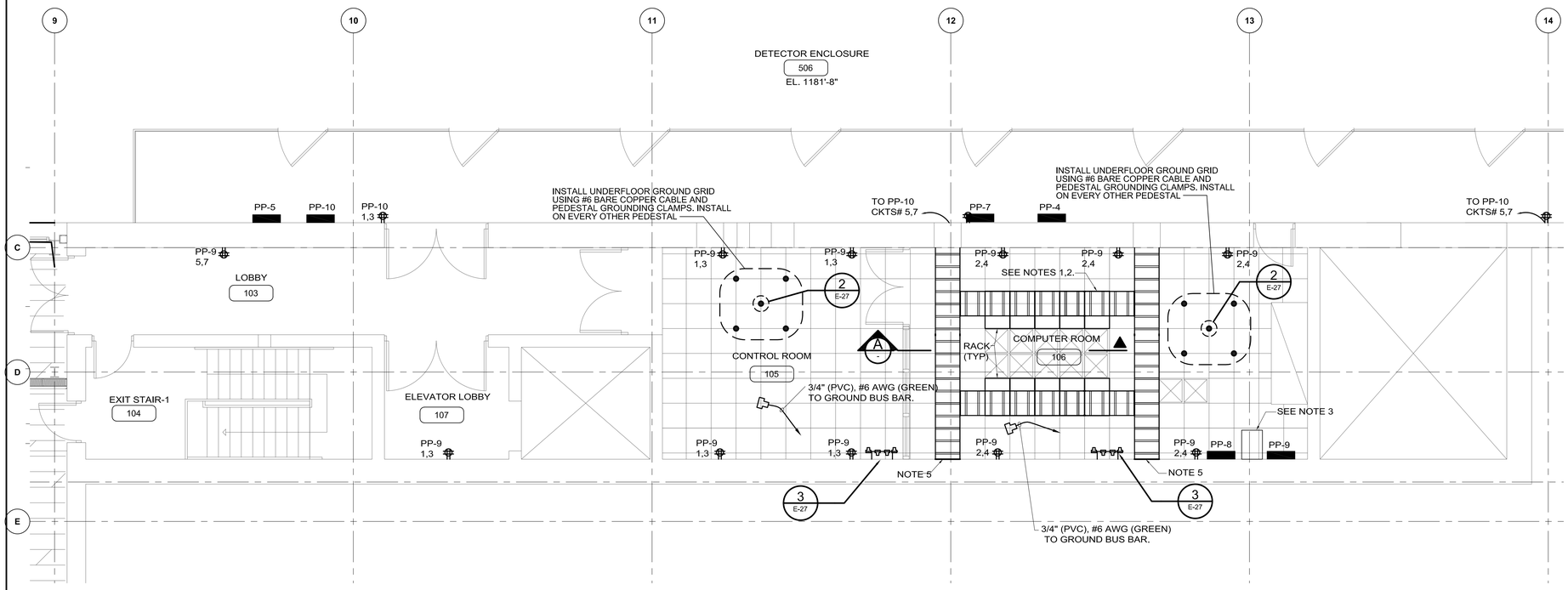
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

LIGHTING PLAN EL 1181'-8" 2 OF 2

DRAWING NO. 15-1-3B E-23 REV. 0

11 MAR, 2009



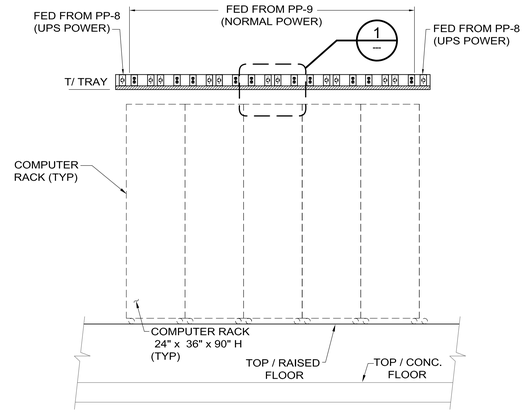
ENLARGED PLAN EL 1236'-6"

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

1 / E-7

SHEET NOTES:

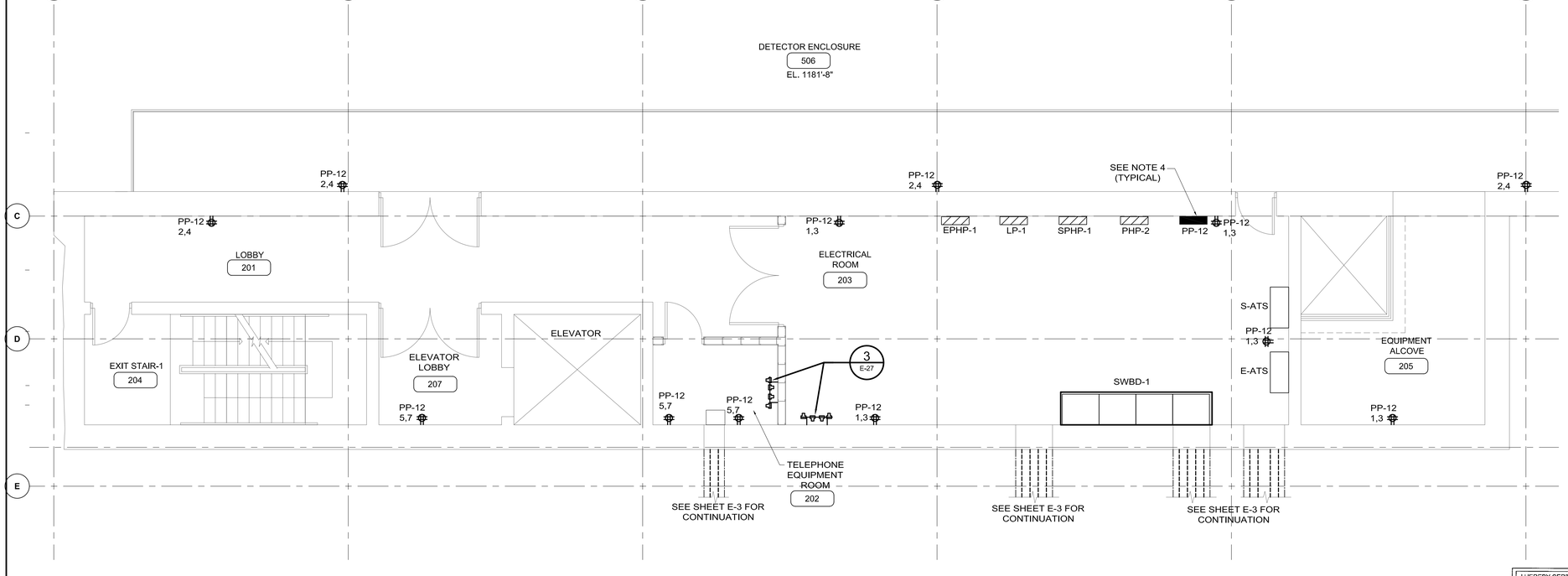
1. FURNISH AND INSTALL CABLE LADDER TRAY SYSTEM AS INDICATED ON DRAWINGS. PROVIDE AND INSTALL 24" WIDE LADDER TRAY CHATSWORTH PRODUCTS, INC. PART NO. 10250-724 OR APPROVED EQUIVALENT. ALL CONNECTION AND SUPPORT PARTS REQUIRED FOR A COMPLETE CABLE TRAY SYSTEM SHALL BE INCLUDED.
2. SUBCONTRACTOR SHALL SUBMIT SHOP DRAWINGS (3-COPIES) FOR APPROVAL OF THE LADDER TRAY SYSTEM SUBMITTALS TO INCLUDE PRODUCT LITERATURE, COMPONENT DATA SHEETS, PARTS DRAWINGS AND LAYOUT DRAWING OF THE COMPLETE CABLE LADDER TRAY SYSTEM.
3. CONTRACTOR SHALL PROVIDE AND INSTALL NEW UNINTERRUPTIBLE POWER SUPPLY (UPS). UPS SHALL BE LIEBERT INFINITY MODEL N212F0512600 OR APPROVED EQUIVALENT.
4. ALL 480-120/208V TRANSFORMERS SHALL BE WALL MOUNTED DIRECTLY ABOVE THE ASSOCIATED 120V/208V PANELBOARD. TRANSFORMERS NOT SHOWN ON PLAN FOR CLARITY.
5. PROVIDE AND INSTALL FIRESTOP PILLOWS 3M #249, 269 OR 369, USE SIZES AS REQUIRED TO FILL OPENING.



SECTION

NTS

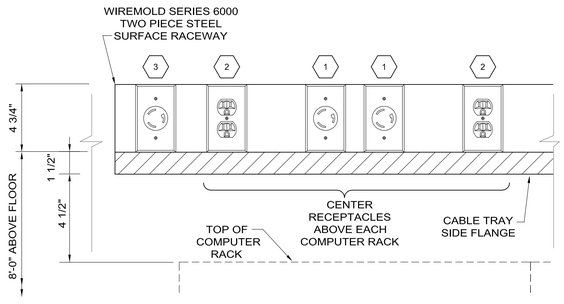
A / -



ENLARGED PLAN EL 1224'-10"

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

2 / E-8



DETAIL

SCALE 3"=1'-0"

1 / —

LEGEND:

1. 30A, 120V, 2 POLE, 3 WIRE, GROUNDING RECEPTACLE, 125V, NEMA #5, L5-30R IG
2. 20A, 120V, 1Ø, 2 WIRE WITH GROUND DUPLEX RECEPTACLE
3. 30A, 120V, 2 POLE, 3 WIRE, GROUNDING RECEPTACLE, 125V, NEMA #5, L5-30R IG TO BE FED FROM UPS PANEL. INSTALL ONE (1) AT EACH END OF RACK ROW FOR A TOTAL OF FOUR (4).

NOTES:

1. UTILIZE 2#10AWG & 1#12 GND FOR EACH 30A RECEPTACLE.
2. UTILIZE 3#12AWG FOR EACH 20A RECEPTACLE.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

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HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/4"=1'-0" 4 0 4 8 SCALE FEET

3"=1'-0" 0 1 SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

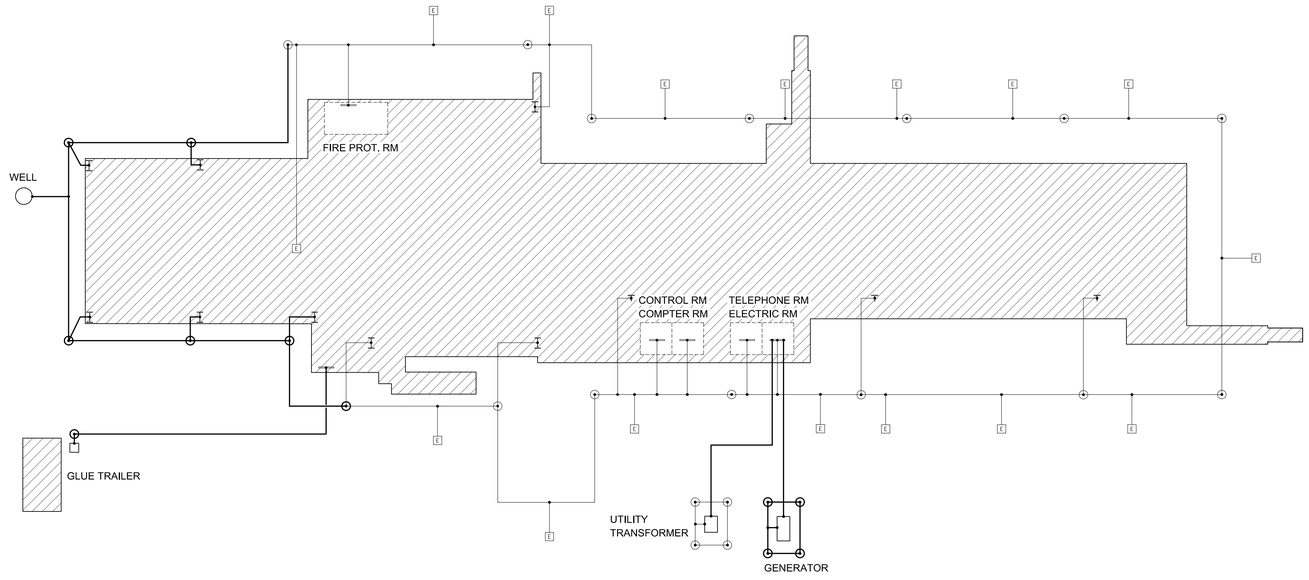
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ENLARGED POWER PLANS

DRAWING NO. 15-1-3B E-24 REV. 0

11 MAR, 2009

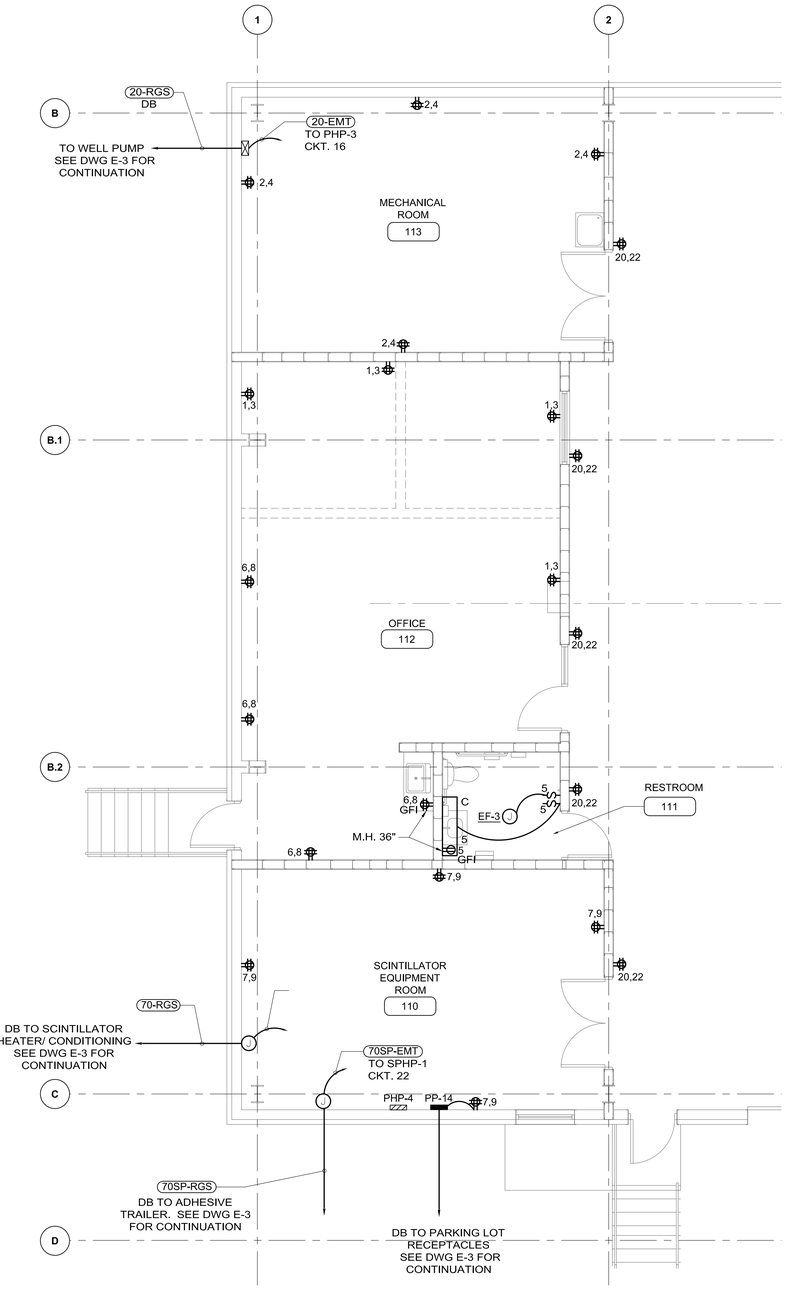


SITE GROUNDING DIAGRAM

NTS

LEGEND:

- INSTALLED UNDER SITE PREP CONTRACT
- INSTALLED UNDER BUILDING CONTRACT
- GROUND ROD
- EXOTHERIMIC CONNECTION
- WALKWAY STEEL
- BUILDING STEEL
- EXTENSOMETER (BY GEOTECHNICAL ENGINEER)
- GROUND BUS BAR



ENLARGED PLAN EL 1236'-6"

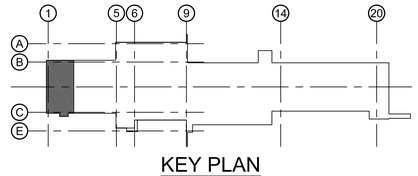
SCALE: 1/4"=1'-0"

3
E-6

NOTE:

1. ALL CIRCUITS ARE FED FROM PANELBOARD PP-14.
2. 480-120/208V TRANSFORMER SHALL BE WALL MOUNTED DIRECTLY ABOVE 120V/208V PANELBOARD PP-14. TRANSFORMERS NOT SHOWN ON PLAN FOR CLARITY. SEE DETAIL 5, DWG. SS-21.

FAR DETECTOR BUILDING



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U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH

SCALE:

1/4"=1'-0" SCALE 4 0 4 8 FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

ENLARGED POWER & LIGHTING PLAN

DRAWING NO. 15-1-3B E-25 REV. 0

11 MAR, 2009

PANEL SCHEDULE

PANEL DESIGNATION: EPHP-1
FED FROM: MAIN SWITCHBOARD
LOCATION: ELECTRICAL ROOM
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 20,149kA
TYPE:
POLE: 42

VOLTS: 480Y/277
PHASE: THREE
WIRE: *
MOUNTING: NEMA 1 ENCLOSURE/STRUT FRAMING
AMPS: 400
MAIN CIRCUIT BREAKER: MLO

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.		PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	LIGHTING (EL 1'288'-8")	20A-1P	9.75	1	9.75			1	2	9.75			1	9.75	20A-1P	LIGHTING (EL 1'213'-3")	2
3	LIGHTING (EL 1'288'-8")	20A-1P	9.75	1		9.75		3	4		9.75		1	9.75	20A-1P	LIGHTING (EL 1'213'-3")	4
5	LIGHTING (EL 1'288'-8")	20A-1P	1	1			1	5	6			1	1	1	20A-1P	LIGHTING (EL 1'213'-3")	6
7	LIGHTING (EL 1'224'-10")	20A-1P	9.75	1	9.75			7	8	9.75			1	9.75	20A-1P	LIGHTING (EL 1'198'-10")	8
9	LIGHTING (EL 1'224'-10")	20A-1P	9.75	1		9.75		9	10		9.8		1	9.75	20A-1P	LIGHTING (EL 1'198'-10")	10
11	LIGHTING (EL 1'224'-10")	20A-1P	1	1			1	11	12			1	1	1	20A-1P	LIGHTING (EL 1'198'-10")	12
13	LIGHTING (EL 1'161'-3")	20A-1P	9.75	1	9.75			13	14	8			1		20A-1P	LIGHTING (EL 1'161'-3")	14
15	LIGHTING (EL 1'161'-3")	20A-1P	9.75	1		9.75		15	16		1.3		1	1.3	20A-1P	CANOPY LIGHTS	16
17	LIGHTING (EL 1'161'-3")	20A-1P	1	1			1	17	18			8	1		20A-1P	SPARE	18
19	SPT-2(15 YAR 2)	20A-2P	9	1	9			19	20	9			1	9	20A-2P	SPT-1(15 YAR 9)	20
21	SPT-2(15 YAR 2)	20A-2P	9	1		9		21	22		9		1	9	20A-2P	SPT-1(15 YAR 9)	22
23	SPT-2(15 YAR 2)	20A-2P	9	1			9	23	24			9	1	9	20A-2P	SPT-1(15 YAR 9)	24
25	SPT-2(15 YAR 1)	20A-2P	9	1	9			25	26	48			1	48	100A-6P	FUT (EPP-1)	26
27	SPT-2(15 YAR 1)	20A-2P	9	1		9		27	28		48		1	48	100A-6P	FUT (EPP-1)	28
29	SPT-2(15 YAR 1)	20A-2P	9	1			9	29	30			48	1	48	100A-6P	FUT (EPP-1)	30
31	GENERATOR WATER JACKET HEATER	20A-2P	12	1	12			31	32	12			1	12	20A-2P	GENERATOR OIL HEATER	32
33	GENERATOR WATER JACKET HEATER	20A-2P	12	1		12		33	34		12		1	12	20A-2P	GENERATOR OIL HEATER	34
35	SPACE					0		35	36			0				SPACE	36
37	SPACE				0			37	38	0						SPACE	38
39	SPACE					0		39	40		0					SPACE	40
41	SPACE						0	41	42			0				SPACE	42
	SECTION TOTAL:				29.25	29.25	9			92.3	84.25	45					
										A	B	C					
	MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A				PHASE TOTAL AMPS:					91.75	92.3	54				TOTAL USAGE LOAD:	238.05 VA
										A	B	C				MINIMUM VA:	N/A VA
					PHASE TOTAL VA:					11010	11138	6480					

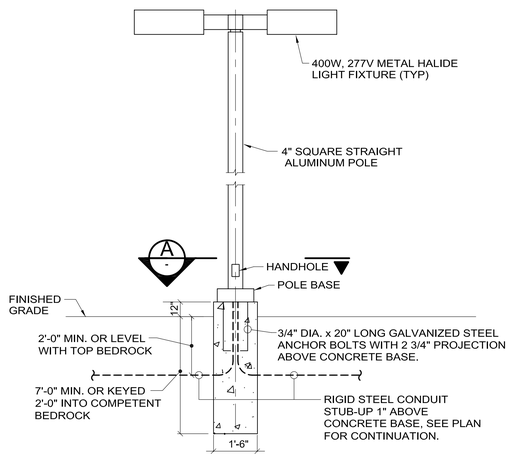
ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE FACTORY HANDLE LOCKOFF/PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER

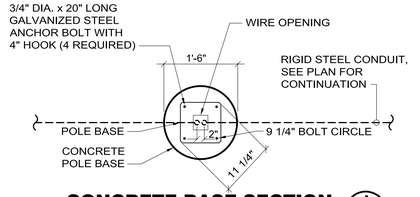
FIXTURE SCHEDULE

TYPE	DESCRIPTION	LAMP	BALLAST	MANUFACTURER	CATALOG NUMBER	REMARKS
A	22" DIA., 400W METAL HALIDE LUMINAIRE, INTEGRAL BALLAST, PULSE START, PRISMATIC GLASS REFLECTOR, 6' POWER CORD, SAFETY HOOK.	SYLVANIA MP350/400/PS/BU-ONLY	INTEGRAL PULSE START 277V	HOLOPHANE LITHONIA JUNO ACCULITE	PP5K400PPMDPN12 CDP-L7-15-6HK TPGE400MPG21GLEN21277VSCWAPPH-HC6P-SC ACG400PS-QT-PLS-HK75SS-6C-TLP-277-15-HB-SS	FOR LOADING DOCK , ASSEMBLY AREA AND DETECTOR ENCLOSURE. SEE MONTING DETAIL 6, THIS DWG.
B	34" DIA., COMPACT FLUORESCENT LUMINAIRE, 3-LAMP, PENDANT MOUNTED ON 96" CABLE, WHITE PATTERNED DIFFUSER, SATIN WHITE FINISH.	SYLVANIA FT40DL/841/RS	ELECTRONIC 277V	FOCAL POINT/METRO 34	FMEP34WA3BX401C277SC96L835WH	FOR VIEWING AREA MOUNTING HT: ADJUST SUPPORT CABLE TO 75" LENGTH
C	1'x4' FLUORESCENT LUMINAIRE, 2-LAMP, ANGLED WRAPAROUND, WALL MOUNTED, CLEAR PRISMATIC DIFFUSER, UNIVERSAL BALLAST.	SYLVANIA F032/741/ECO	ELECTRONIC 120-277V	H E WILLIAMS HOLOPHANE LITHONIA	WMA4232ACTEB2UNV WASN4XNACL042EP1U WP232MVOLT	FOR STAIRWELLS AND RESTROOM ABOVE MIRROR MOUNTING HT: 7FT ABOVE FLOOR
D	2'x4' FLUORESCENT LUMINAIRE, 2-LAMP TROFFER, MICRO-4 REFLECTOR, 12 CELL PARABOLIC LOUVERS.	SYLVANIA F032/741/ECO	ELECTRONIC 277V	HOLOPHANE LITHONIA H E WILLIAMS	HPGN24XSD26O42EP1U 2ESP8232MVOLTBILP HE3G-D24-232-2GM-EB2-UNV	FOR OFFICE AREA MOUNTING HT: RECESS MOUNTED IN CEILING GRID
E	1'x8' FLUORESCENT LUMINAIRE, 4-LAMP, OPEN, MIRCO ALUMINUM REFLECTOR, WIRE GUARD.	SYLVANIA F032/741/ECO	ELECTRONIC 277V	HOLOPHANE SPECLIGHT H E WILLIAMS	HSM08XNNNS045EP1U WGS044 FPIM8-432-B1-X20-MVOLT-WG 80-8-432-SPEC-STEEL-EB4-UNV-(2)-WG14	FOR FIRE PROTECTION AREA ELECTRICAL ROOM MOUNTING HT: 10FT ABOVE FLOOR
F	COMPACT FLUORESCENT LUMINAIRE, 1-LAMP, WALL MOUNTED OUTDOOR, NI-CAD BATTERY, BRONZE FINISH, COLD WEATHER BALLAST.	SYLVANIA CF13DS/827	ELECTRONIC 277V	LIGHTALARMS HOLOPHANE/CORTES A9 LITHONIA	GLOW-N-SP-21-BK-BKCL-DL CZA95EMCBZ3CW TWAC13DTT277ELDWMSI	FOR EGRESS LIGHTING AT EXIT DOORS, MTG. HT: 7 FT. PROVIDE AND INSTALL MOTION SENSOR SWITCH AT EACH FIXTURE. WATT STOPPER MODEL EW-100-277-W OR EQUAL.
G	1'x8' FLUORESCENT LUMINAIRE, 2-LAMP, OPEN, MIRCO ALUMINUM REFLECTOR, WIRE GUARD.	SYLVANIA F032/741/ECO	ELECTRONIC 277V	HOLOPHANE SPECLIGHT H E WILLIAMS	HSN08XNNNS041EP1UPF1G WGS054 FPIM-2-232-MVOLT-WG 80-8-232-UL-SPEC STEEL -EB2-UNV-(2)WG14	DETECTOR AREA WALKWAY CONTROL ROOM, COMPUTER ROOM AND LOBBIES
H	OUTDOOR BOLLARD FIXTURE, 60W LED, WHITE FINISH	INCLUDED	ELECTRONIC 277V	KIM LIGHTING	60LED277WH-WH	FOR ENTRANCE WALKWAY
J	OUTDOOR 250W METAL HALIDE LUMINAIRE, WALL MOUNTED, PULSE START, BRONZE FINISH.	SYLVANIA MS250/PS/BU-HOR	INTEGRAL 277V	LITHONIA HOLOPHANE JUNO ACCULITE	TWR2-250M-MVOLT W425027C2 WMLM250PS-277-L-WLL-FC	LOADING DOCK AREA, MTG. HT: 20FT ABOVE GRADE
K	OUTDOOR RECESSED LUMINAIRE, 12" SQUARE, 2-LAMP, 57WATT COMPACT FLUORESCENT, TEMPERED PRISMATIC LENS.	SYLVANIA CF57DT/DT/E/IN/827	ELECTRONIC 277V	KIRLIN KENALL INFINITY	FRS-10109 CSEF01212-2-57TT-SB-PAF-PAH-U PHSQ-12-242T-EB-GX24Q-4 DAMP LOCATOIN	FOR CANOPIES AT MAIN ENTANCE AND DOCK. RECESS MOUNTED IN CANOPY.
L	QUARTZ FLOOD LIGHT FIXTURE, CAST ALUMINUM, BRONZE FINISH, 120V.	INCLUDED WITH FIXTURE	N/A	HOLOPHANE LITHONIA	570-61/L TQE500	FOR MOVING WORK PLATFORM. PROVIDED AND INSTALLED BY MOVING WALKWAY SUPPLIER.
M	OUTDOOR 400W METAL HALIDE LUMINAIRE, TWO HEAD, POLE MOUNTED, TYPE IV THROW, WHITE FINISH.	SYLVANIA MS400/C/HOR	INTEGRAL 277V	KIM LIGHTING	2BSTL4400MH277WHTR	FOR PARKING LOT
	SQUARE ALUMINUM POLE FOR ABOVE FIXTURE	N/A	N/A	KIM LIGHTING	PSA25-5188SB-TR-WH	
X1	EXIT SIGN, LED, DIE CAST ALUMINUM HOUSING, RED LETTERS ON WHITE BACKGROUND, AC ONLY, CANOPY MOUNT.	LED	N/A	HOLOPHANE LITHONIA JUNO NAVILITE	MECELAMSRC LE-S-1-R-120/277 NXD1RWHX1, NAXD2RWH	SINGLE OR DOUBLE FACE PER PLAN
X2	SAME AS FIXTURE "X1", BUT WITH NICAD BATTERY.	LED	N/A	HOLOPHANE LITHONIA JUNO NAVILITE	MECELNCSRC LE-S-1-R-120/277-ELNSD NXDB1RWH, NXDB2RW	SINGLE OR DOUBLE FACE PER PLAN
X3	EMERGENCY LIGHT BATTERY PACK, 12V, 3-8 WATT HEADS, NI-CAD BATTERY, 277V CORD AND PLUG, MOUNTING PLATFORM.	HALOGEN	N/A	LIGHTALARMS HOLOPHANE/CORTES A1 LITHONIA	3P12N2-L8M-MP-PQA-3CP C1-12N-25-W-WD-3-LC-MSSSHELFW ELCC3-120/277	ALL AREAS PROVIDE AND INSTALL 15A, 277V, RECEPTACLE TO MATCH CORD AND PLUG PROVIDED WITH FIXTURE. MOUNT 7FT ABOVE FLOOR.

NOTE: CONTRACTOR SHALL PROVIDE FIXTURES IN ABOVE SCHEDULE OR SUBMIT EQUIVALENT FIXTURE FOR APPROVAL. EQUIVALENT FIXTURE MUST PROVIDE THE SAME FOOT CANDLE LEVELS SHOWN IN SPECIFICATIONS.

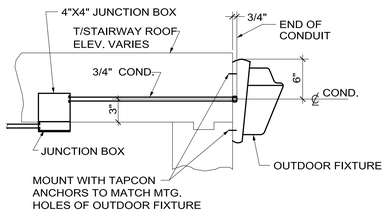


TYPICAL FIXTURE DETAIL (1 / E-3)
SCALE: NTS

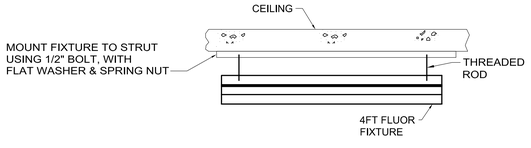


CONCRETE BASE SECTION (A / -)
SCALE: NTS

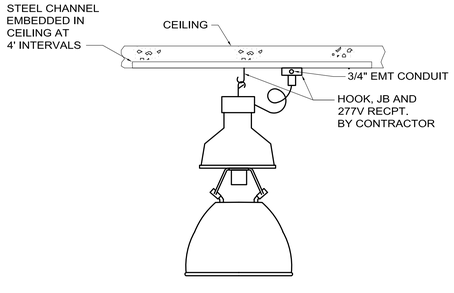
PLEASE NOTE: POLE BASE DIMENSIONS (ESPECIALLY ANCHOR BOLT LOCATIONS) SHALL BE VERIFIED BY SUBCONTRACTOR TO MATCH MANUFACTURER'S SPECIFICATIONS.



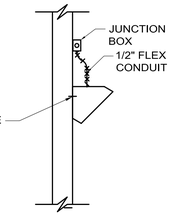
MTG. DETAIL FOR OUTDOOR HID FIXTURE (2 / E-14)
N.T.S.



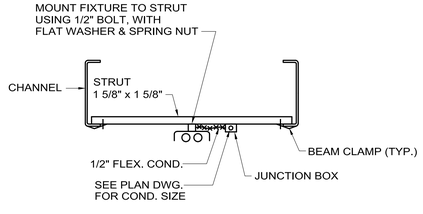
FLUORESCENT FIXTURE MTG DETAIL MOUNTING DETAIL TO CONCRETE (4 / E-14)
N.T.S.



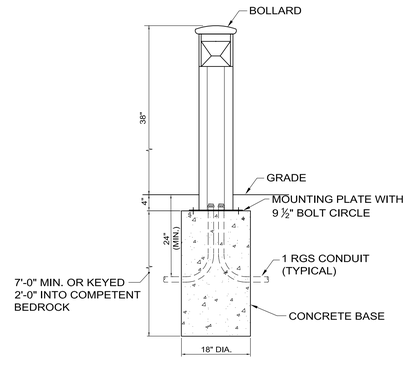
MTG. DETAIL HI-BAY HID FIXTURE (6 / E-14, E-15)
N.T.S.



WALL MTG DETAIL-FLUORESCENT FIXT (3 / -)
N.T.S.



FLUORESCENT FIXTURE MTG DETAIL (5 / E-15)
N.T.S. E-17,E-19,E-21,E-23



BOLLARD MOUNTING DETAIL (7 / E-3)
SCALE: NTS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: DAVID E. MERTZ
SIGNATURE:
DATE: 03/11/2009 LICENSE #47241

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	B. HAAS	03-11-09
DRAWN	K. WHITTEN	03-11-09
CHECKED	D. MERTZ	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

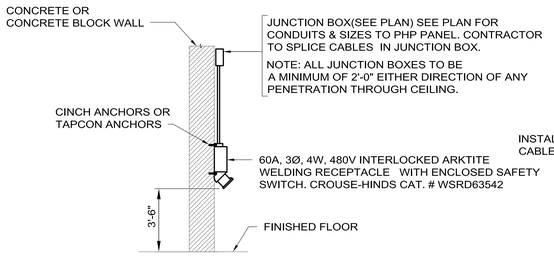
UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING
LIGHTING FIXTURE SCHEDULE & DETAILS

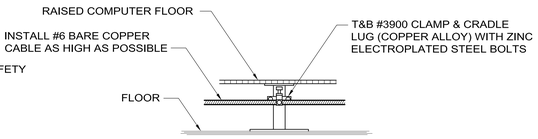
DRAWING NO. 15-1-3B E-26 REV. 0

11 MAR, 2009



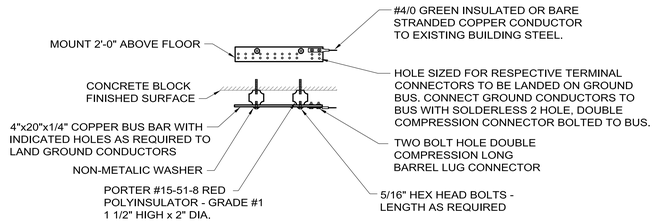
WELDING RECEPTACLE MOUNTING DETAIL 1 E-6

N.T.S.



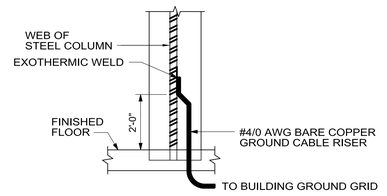
PEDESTAL GROUNDING DETAIL 2 E-24

NOT TO SCALE



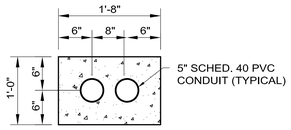
GROUND BUS BAR DETAIL 3 E-24

NOT TO SCALE



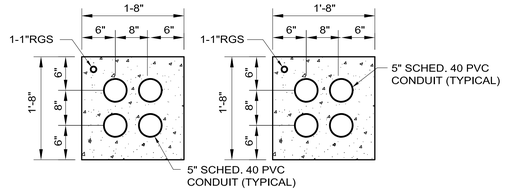
TYPICAL CONNECTION OF GROUND RISER AT COLUMN 4 E-3

NOT TO SCALE



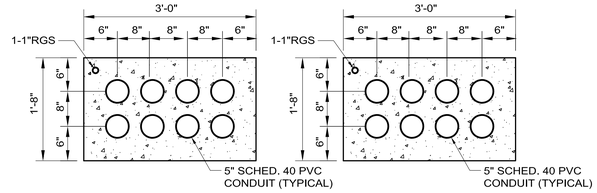
SECTION A E-3

SCALE: NONE



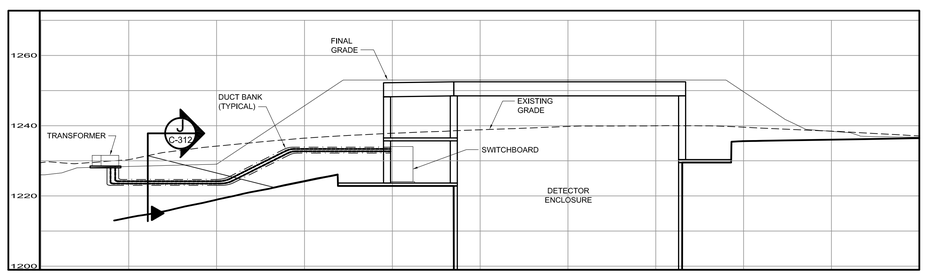
SECTION B E-3

SCALE: NONE



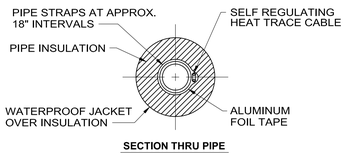
SECTION C E-3

SCALE: NONE

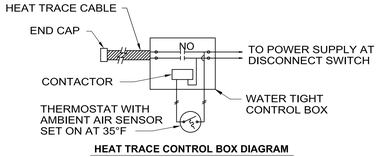


SECTION D E-3

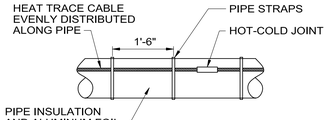
SCALE: NONE



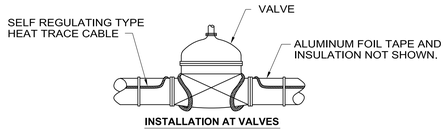
SECTION THRU PIPE



HEAT TRACE CONTROL BOX DIAGRAM



INSTALLATION DETAIL



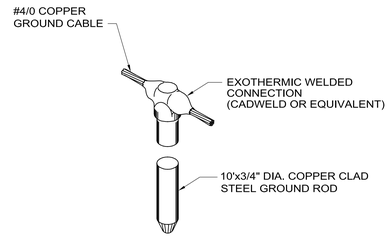
INSTALLATION AT VALVES

NOTES:

1. PROVIDE WEATHER RESISTANT LABELING ON EXTERIOR OF JACKET IDENTIFYING PIPES AS BEING "ELECTRIC TRACED" WITH VOLTAGE INDICATED.

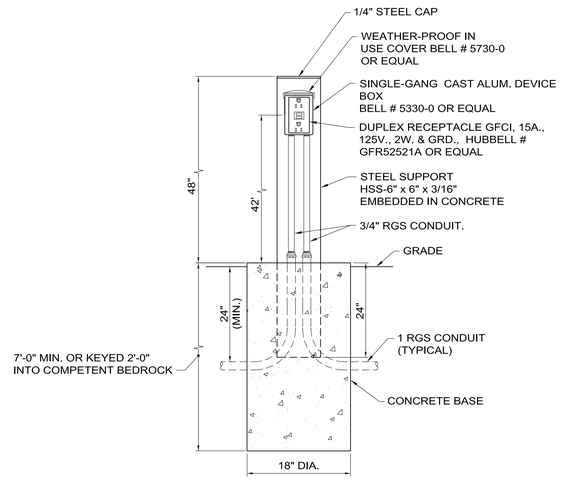
HEAT TRACING DETAILS 7 E-6 E-7

NOT TO SCALE



TYPICAL GROUND ROD DETAIL 5 E-3

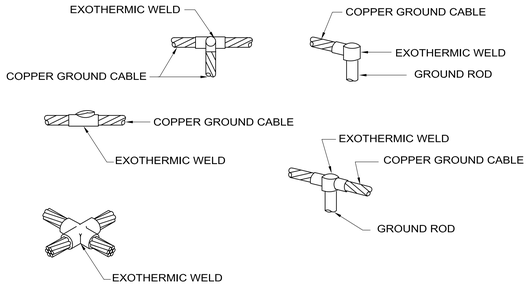
NOT TO SCALE



NOTE: MOUNT CONDUIT AND RECEPTACLE ON REAR OF STEEL SUPPORT FACING BUILDING.

BLOCK HEATER PEDESTAL DETAIL 6 E-3

SCALE: NTS



TYPICAL EXOTHERMIC WELD DETAILS 8 E-3

NOT TO SCALE

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REV.	DATE	DESCRIPTIONS
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REVISIONS

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE		OWNER / REPRESENTATIVE	DATE
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APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

ELECTRICAL SECTIONS AND DETAILS

DRAWING NO. 15-1-3B E-27 REV. 0

11 MAR, 2009

PANEL SCHEDULE

PANEL DESIGNATION: PHP-1
FED FROM: MAIN SWBD SWBD-1
LOCATION: DETECTOR AREA SOUTH
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 8.78 KA
TYPE:
POLE: 42

VOLTS: 480/277
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONCRETE WALL
AMPS: 225
MAIN CIRCUIT BREAKER, MAIN LUGS ONLY

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	DEHUMIDIFIER 1	20A-3P	4	1	4			1 2	4			1	4	20A-3P	DEHUMIDIFIER 2	2
3	DEHUMIDIFIER 1	20A-3P	4	1		4		3 4		4		1	4	20A-3P	DEHUMIDIFIER 2	4
5	DEHUMIDIFIER 1	20A-3P	4	1			4	5 6			4	1	4	20A-3P	DEHUMIDIFIER 2	6
7	DESTRATIFICATION FAN 3	20A-3P	2.1	1	2.1			7 8	2.1			1	2.1	20A-3P	DESTRATIFICATION FAN 4	8
9	DESTRATIFICATION FAN 3	20A-3P	2.1	1		2.1		9 10		2.1		1	2.1	20A-3P	DESTRATIFICATION FAN 4	10
11	DESTRATIFICATION FAN 3	20A-3P	2.1	1			2.1	11 12			2.1	1	2.1	20A-3P	DESTRATIFICATION FAN 4	12
13	FU-1, 90KVA (PP-11)	50A-3P	12	1	12			13 14	43			1	43	60A-3P	MOVABLE WALKWAY	14
15	FU-1, 90KVA (PP-11)	50A-3P	12	1		12		15 16		43		1	43	60A-3P	MOVABLE WALKWAY	16
17	FU-1, 90KVA (PP-11)	50A-3P	12	1			12	17 18			43	1	43	60A-3P	MOVABLE WALKWAY	18
19	EBB-18 (SOUTH EXIT HALLWAY)	20A-1P	10.3	1	10.3			19 20	10.3			1	10.3	20A-1P	EBB-24 (STAIR NO. 2)	20
21	SPARE	20A-1P				0		21 22		10.3		1	10.3	20A-1P	EBB-23 (STAIR NO. 2)	22
23	SPARE	20A-1P					0	23 24			0			20A-1P	SPARE	24
25	SPARE	20A-1P			0			25 26	0					20A-1P	SPARE	26
27	SPACE					0		27 28		0					SPACE	28
29	SPACE						0	29 30			0				SPACE	30
31	SPACE				0			31 32	0						SPACE	32
33	SPACE					0		33 34		0					SPACE	34
35	SPACE						0	35 36			0				SPACE	36
37	SPACE				0			37 38	0						SPACE	38
39	SPACE					0		39 40		0					SPACE	40
41	SPACE						0	41 42			0				SPACE	42
SECTION TOTAL					28.9	18.1	18.1		84.9	84.9	84.1					

	A	B	C
PHASE TOTAL AMPS.	99.8	89	72.2
PHASE TOTAL V.A.	11256	9880	8884

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 29880 V.A
MIN. XFMR V.A.: N/A V.A

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANEL SCHEDULE

PANEL DESIGNATION: PHP-2
FED FROM: SWBD-1
LOCATION: ELECTRICAL ROOM
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 21.83 KA
TYPE:
POLE: 42

VOLTS: 480/277
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONCRETE WALL
AMPS: 225
MAIN CIRCUIT BREAKER, MAIN LUGS ONLY

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	CRU-1 GLYCOL DRY COOLER (ON ROOF)	90A-3P	21.4	1	21.4			1 2				1	10.3	20A-3P	CUH-1 (EQUIP. ALCOVE 1 224'-10")	2
3	CRU-1 GLYCOL DRY COOLER (ON ROOF)	90A-3P	21.4	1		21.4		3 4				1	10.3	20A-3P	CUH-1 (EQUIP. ALCOVE 1 224'-10")	4
5	CRU-1 GLYCOL DRY COOLER (ON ROOF)	90A-3P	21.4	1			21.4	5 6				1	10.3	20A-3P	CUH-1 (EQUIP. ALCOVE 1 224'-10")	6
7	EBB-19 (ELEV. LOBBY 122'-10")	20A-1P	10.3	1	10.3			7 8				1	10.3	20A-3P	CUH-5 (ELECTRIC ROOM)	8
9	EBB-20 (ELEV. LOBBY 121'-2")	20A-1P	10.3	1		10.3		9 10				1	10.3	20A-3P	CUH-5 (ELECTRIC ROOM)	10
11	EBB-21 (ELEV. LOBBY 119'-10")	20A-1P	10.3	1			10.3	11 12				1	10.3	20A-3P	CUH-5 (ELECTRIC ROOM)	12
13	LP-1	100A-3P	82	1	70			13 14	8			1	8	20A-3P	HUM-1 (EQUIP. ALCOVE 1 224'-10")	14
15	LP-1	100A-3P	82	1		70		15 16		8		1	8	20A-3P	HUM-1 (EQUIP. ALCOVE 1 224'-10")	16
17	LP-1	100A-3P	82	1			70	17 18			8	1	8	20A-3P	HUM-1 (EQUIP. ALCOVE 1 224'-10")	18
19	F-12, 90KVA (PP-12)	50A-3P	24	1	24			19 20	10.3			1	10.3	20A-1P	EBB-22 (STAIR NO. 1 EL 1131'-3")	20
21	F-12, 90KVA (PP-12)	50A-3P	24	1		24		21 22		10.3		1	10.3	20A-1P	EBB-25 (ELEV. LOBBY EL 1131'-3")	22
23	F-12, 90KVA (PP-12)	50A-3P	24	1			24	23 24						20A-1P	SPARE	24
25	SPARE	20A-1P			0			25 26	0					20A-1P	SPARE	26
27	SPACE					0		27 28		0					SPACE	28
29	SPACE						0	29 30			0				SPACE	30
31	SPACE				0			31 32	0						SPACE	32
33	SPACE					0		33 34		0					SPACE	34
35	SPACE						0	35 36			0				SPACE	36
37	SPACE				0			37 38	0						SPACE	38
39	SPACE					0		39 40		0					SPACE	40
41	SPACE						0	41 42			0				SPACE	42
SECTION TOTAL					128.2	128.2	128.2		27.8	27.8	18.3					

	A	B	C
PHASE TOTAL AMPS.	155.3	155.3	146
PHASE TOTAL V.A.	13458	13458	11180

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 54072 V.A
MIN. XFMR V.A.: N/A V.A

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANEL SCHEDULE

PANEL DESIGNATION: PHP-3
FED FROM: SWBD-1
LOCATION: LOADING DOCK
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 16.92 KA
TYPE:
POLE: 42

VOLTS: 480/277
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONCRETE WALL
AMPS: 225
MAIN CIRCUIT BREAKER, MAIN LUGS ONLY

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	REVERSE OSMOSIS 6 (ROU)	50A-3P	8	1	8			1 2	80			1	80	60A-3P	WELDING RECEPTACLE	2
3	REVERSE OSMOSIS 6 (ROU)	50A-3P	8	1		8		3 4		80		1	80	60A-3P	WELDING RECEPTACLE	4
5	REVERSE OSMOSIS 6 (ROU)	50A-3P	8	1			8	5 6			80	1	80	60A-3P	WELDING RECEPTACLE	6
7	EUH-1 (MECH. RM)	20A-3P	9.8	1	9.8			7 8	50			1	50	40A-3P	LP-2	8
9	EUH-1 (MECH. RM)	20A-3P	9.8	1		9.8		9 10		50		1	50	40A-3P	LP-2	10
11	EUH-1 (MECH. RM)	20A-3P	9.8	1			9.8	11 12			50	1	50	40A-3P	LP-2	12
13	F-13, 90KVA (PP-13)	50A-3P	13	1	13			13 14	9.4			1	9.4	20A-3P	WELL PUMP	14
15	F-13, 90KVA (PP-13)	50A-3P	13	1		13		15 16		9.4		1	9.4	20A-3P	WELL PUMP	16
17	F-13, 90KVA (PP-13)	50A-3P	13	1			13	17 18			9.4	1	9.4	20A-3P	WELL PUMP	18
19	SPARE	20A-3P			0			19 20	0					20A-3P	SPARE	20
21	SPARE	20A-3P				0		21 22		0				20A-3P	SPARE	22
23	SPACE						0	23 24			0				SPACE	24
25	SPACE				0			25 26	0						SPACE	26
27	SPACE					0		27 28		0					SPACE	28
29	SPACE						0	29 30			0				SPACE	30
31	SPACE				0			31 32	0						SPACE	32
33	SPACE					0		33 34		0					SPACE	34
35	SPACE						0	35 36			0				SPACE	36
37	SPACE				0			37 38	0						SPACE	38
39	SPACE					0		39 40		0					SPACE	40
41	SPACE						0	41 42			0				SPACE	42
SECTION TOTAL					23.8	23.8	23.8		119.4	119.4	119.4					

	A	B	C
PHASE TOTAL AMPS.	142	142	142
PHASE TOTAL V.A.	17040	17040	17040

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 51120 V.A
MIN. XFMR V.A.: N/A V.A

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANEL SCHEDULE

PANEL DESIGNATION: PHP-4
FED FROM: SWBD-1
LOCATION: SCINTILLATOR ROOM
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 25.88 KA
TYPE:
POLE: 42

VOLTS: 480/277
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONCRETE WALL
AMPS: 400
MAIN CIRCUIT BREAKER, MAIN LUGS ONLY

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	HUM-3 (LOADING DOCK)	20A-3P	8	1	8			1 2	13			1	13	25A-1P	EBB-9 (ENTRANCE)	2
3	HUM-3 (LOADING DOCK)	20A-3P	8	1		8		3 4		13		1	13	25A-1P	EBB-9 (ENTRANCE)	4
5	HUM-3 (LOADING DOCK)	20A-3P	8	1			8	5 6			13	1	13	25A-1P	EBB-9 (ENTRANCE)	6
7	EUH-2 (SCINTILLATOR ROOM)	20A-3P	9.8	1				7 8	84			1	84	30A-3P	SCINTILLATOR TANK HEATER *	8
9	EUH-2 (SCINTILLATOR ROOM)	20A-3P	9.8	1				9 10		84		1	84	30A-3P	SCINTILLATOR TANK HEATER *	10
11	EUH-2 (SCINTILLATOR ROOM)	20A-3P	9.8	1				11 12			84	1	84	30A-3P	SCINTILLATOR TANK HEATER *	12
13	SCINTILLATOR CONDITIONING *	30A-3P	84	1	9.8			13 14	13			1	13	25A-1P	EBB-8 (ENTRANCE)	14
15	SCINTILLATOR CONDITIONING *	30A-3P	84	1		9.8		15 16		13		1	13	25A-1P	EBB-7 (VENTING CORR.)	16
17	SCINTILLATOR CONDITIONING *	30A-3P	84	1			9.8	17 18			13	1	13	25A-1P	EBB-9 (VENTING CORR.)	18
19	F-14, 45KVA (PP-14)	70A-3P	28	1	28			19 20	13			1	13	25A-1P	EBB-9 (VENTING CORR.)	20
21	F-14, 45KVA (PP-14)	70A-3P	28	1		28		21 22		13		1	13	25A-1P	EBB-10 (VENTING CORR.)	22
23	F-14, 45KVA (PP-14)	70A-3P	28	1			28	23 24			13	1	13	25A-1P	EBB-11 (VENTING CORR.)	24
25	EBB-1 (OFF DOE)	20A-1P	5.4	1	5.4			25 26	13			1	13	25A-1P	EBB-12 (VENTING CORR.)	26
27	EBB-2 (OFF DOE)	20A-1P	8.78	1		8.78		27 28		4		1	10.3	20A-1P	EBB-13 (WEST STAIR)	28
29	SPARE	20A-1P					0	29 30			4	1	10.3	20A-1P	EBB-14 (ELEVATOR LOBBY)	30
31	SPARE	20A-1P			0			31 32	4			1	4	20A-3P	SCINTILLATOR PUMP *	32
33	SPACE					0		33 34		4		1	4	20A-3P	SCINTILLATOR PUMP *	34
35	SPACE						0	35 36			4	1	4	20A-3P	SCINTILLATOR PUMP *	36
37	SPACE				0			37 38	10.3			1	10.3	20A-1P	EBB-15 (CONTROL ROOM)	38
39	SPACE					0		39 40		0					SPACE	40
41	SPACE						0	41 42			0				SPACE	42
SECTION TOTAL					41	42.38	25.8		150.3	126	126					

	A	B	C
PHASE TOTAL AMPS.	191.3	188.38	181.8
PHASE TOTAL V.A.	23018	22669.2	21882

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 82811.2 V.A
MIN. XFMR V.A.: N/A V.A

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
*CONNECTED BY OTHERS

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANEL SCHEDULE

PANEL DESIGNATION: PHP-6
FED FROM: SWBD-1
LOCATION: ASSEMBLY AREA
BOND NEUTRAL AND GROUND BAR: NO
BUS BOLTED FAULT: 16.15 KA
TYPE:
POLE: 42

VOLTS: 480/277
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONCRETE WALL
AMPS: 225
MAIN CIRCUIT BREAKER, MAIN LUGS ONLY

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	DESTRATIFICATION FAN 2	20A-3P	2.1	1	2.1			1 2	2.1			1	2.1	20A-3P	DESTRATIFICATION FAN 1	2
3	DESTRATIFICATION FAN 2	20A-3P	2.1	1		2.1		3 4		2.1		1	2.1	20A-3P	DESTRATIFICATION FAN 1	4
5	DESTRATIFICATION FAN 2	20A-3P	2.1	1			2.1	5 6			2.1	1	2.1	20A-3P	DESTRATIFICATION FAN 1	6
7	HUMIDIFIER 2 (EAST ALCOVE)	20A-3P	8	1	8			7 8	4.3			1	4.3	20A-3P	EXHAUST FAN EF-4	8
9	HUMIDIFIER 2 (EAST ALCOVE)	20A-3P	8	1		8		9 10		4.3		1	4.3	20A-3P	EXHAUST FAN EF-4	10
11	HUMIDIFIER 2 (EAST ALCOVE)	20A-3P	8	1			8	11 12			4.3	1	4.3	20A-3P	EXHAUST FAN EF-4	12
13	EXHAUST FAN EF-1	20A-3P	4.3	1	4.3			13 14	4.3			1	43	60A-3P	BLOCK PAVER	14
15	EXHAUST FAN EF-1	20A-3P	4.3	1		4.3		15 16		4.3		1	43	60A-3P	BLOCK PAVER	16
17	EXHAUST FAN EF-1	20A-3P	4.3	1			4.3	17 18			43	1	43	60A-3P	BLOCK PAVER	18
19	EBB-18 (EAST STAIRS)	20A-1P	10.3	1	10.3			19 20	5			1	5	20A-3P	EUH-8 (EAST ALCOVE)	20
21	EBB-17 (EAST ALCOVE)	20A-1P	10.3	1		10.3		21 22		5		1	5	20A-3P	EUH-8 (EAST ALCOVE)	22
23	SPARE	20A-3P					0	23 24			5	1	5	20A-3P	EUH-8 (EAST ALCOVE)	24
25	EUH-9 (FIRE PROT. ROOM)	20A-3P	10.8	1	10.8			25 26	4.3			1	4.3	20A-3P	EXHAUST FAN EF-2	26
27	EUH-9 (FIRE PROT. ROOM)	20A-3P	10.8	1		10.8		27 28		4.3		1	4.3	20A-3P	EXHAUST FAN EF-2	28
29	EUH-9 (FIRE PROT. ROOM)	20A-3P	10.8	1			10.8	29 30			4.3	1	4.3	20A-3P	EXHAUST FAN EF-2	30
31	EUH-4 (FIRE PROT. ROOM)	20A-3P	10.8	1	10.8			31 32	13			1	13	50A-3P	F-18, 90KVA (PP-18)	32
33	EUH-4 (FIRE PROT. ROOM)	20A-3P	10.8	1		10.8		33 34		13		1	13	50A-3P	F-18, 90KVA (PP-18)	34
35	EUH-4 (FIRE PROT. ROOM)	20A-3P	10.8	1			10.8	35 36			13	1	13	50A-3P	F-18, 90KVA (PP-18)	36
37	SPARE				0			37 38	0						SPACE	38
39	SPACE					0		39 40		0					SPACE	40
41	SPACE						0	41 42			0				SPACE	42
SECTION TOTAL					44.8	44.8	34.1		77.7	77.7	77.7					

	A	B	C
PHASE TOTAL AMPS.	122.8	122.8	111.8
PHASE TOTAL V.A.	14713	14713	13418

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 42840 V.A
MIN. XFMR V.A.: N/A V.A

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANEL SCHEDULE

PANEL DESIGNATION: SPHP-1
FED FROM: SWBD-1
LOCATION: ELECTRICAL ROOM
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 20.49 KA
TYPE:
POLE: 42

VOLTS: 480/277
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONC. WALL
AMPS: 400
MAIN CIRCUIT BREAKER, MAIN LUGS ONLY

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	EXHAUST FAN EF-3	20A-3P	4.3	1	4.3			1 2	27			1	9	40A-3P	CRANE 1	2
3	EXHAUST FAN EF-3	20A-3P	4.3	1		4.3		3 4		27		1	9	40A-3P	CRANE 1	4
5	EXHAUST FAN EF-3	20A-3P	4.3	1			4.3	5 6			27	1	9	40A-3P	CRANE 1	6
7	ELEVATOR	40A-3P	92	1	92			7 8	27			1	18	40A-3P	CRANE 2	8
9	ELEVATOR	40A-3P	92	1		92		9 10		27		1	18	40A-3P	CRANE 2	10
11	ELEVATOR	40A-3P	92	1			92	11 12			27	1	18	40A-3P	CRANE 2	12
13	SUMP PUMP 1	20A-3P	11	1	11			13 14	9.7			1	9.7	20A-3P	SUMP PUMP 2	14
15	SUMP PUMP 1	20A-3P	11	1		11		15 16		9.7		1	9.7	20A-3P	SUMP PUMP 2	16
17	SUMP PUMP 1	20A-3P	11	1			11	17 18			9.7	1	9.7	20A-3P	SUMP PUMP 2	18
19	SUMP PUMP 3	20A-3P	52	1	52			19 20	52			1	52	70A-3P	F-13, 25KVA (PP-15)	20
21	SUMP PUMP 3	20A-3P	52	1		52		21 22		52		1	52	70A-3P	F-13, 25KVA (PP-15)	22
23	SUMP PUMP 3	20A-3P	52	1			52	23 24			0				SPACE	24
25	SPACE				0			25 26	0						SPACE	26
27	SPACE					0		27 28		0					SPACE	28
29	SPACE						0	29 30			0				SPACE	30
31	SPACE				0			31 32	0						SPACE	32
33	SPACE					0		33 34		0					SPACE	34
35	SPACE						0	35 36			0				SPACE	36
37	SPACE				0			37 38	0						SPACE	38
39	SPACE					0		39 40		0					SPACE	40
41	SPACE						0	41 42			0				SPACE	42
SECTION TOTAL					55	55	55		103.7	103.7	37.7					

	A	B	C
PHASE TOTAL AMPS.	184.7	184.7	112.7
PHASE TOTAL V.A.	19784	19784	15624

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 55052 V.A
MIN. XFMR V.A.: N/A V.A

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DAVID E. MERTZ

SIGNATURE:

DATE: 03/11/2009 LICENSE #47241

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell
SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	B. HAAS	03-11-09
DRAWN	K. WHITTEN	03-11-09
CHECKED	D. MERTZ	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

PANELBOARD SCHEDULES - 1

DRAWING NO. 20-1-3B | E-28 | REV. 0

11 MAR, 2009

PANEL SCHEDULE

PANEL DESIGNATION: PP-1
FED FROM: SWBD-1
LOCATION: DETECTOR WALKWAY
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 67 SKA
TYPE:
POLE: 42

VOLTS: 240/120
PHASE: SINGLE
WIRE: 3
MOUNTING: NEMA 1 ENCLOSN CONC. WALL
AMPS: 400
MAIN CIRCUIT BREAKER: 350 AMP, 2 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS A	PHASE AMPS B	POLE NO.		PHASE AMPS A	PHASE AMPS B	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	DISLOCK 1-1	20A-2P	18	1	18		1	2	18		1	18	20A-2P	DISLOCK 1-2	2
3	DISLOCK 1-1	20A-2P	18	1		18	3	4		18	1	18	20A-2P	DISLOCK 1-2	4
5	DISLOCK 1-3	20A-2P	18	1	18		5	6	18		1	18	20A-2P	DISLOCK 1-4	6
7	DISLOCK 1-3	20A-2P	18	1		18	7	8		18	1	18	20A-2P	DISLOCK 1-4	8
9	DISLOCK 2-1	20A-2P	18	1	18		9	10	18		1	18	20A-2P	DISLOCK 2-2	10
11	DISLOCK 2-1	20A-2P	18	1		18	11	12		18	1	18	20A-2P	DISLOCK 2-2	12
13	DISLOCK 2-3	20A-2P	18	1	18		13	14	18		1	18	20A-2P	DISLOCK 2-4	14
15	DISLOCK 2-3	20A-2P	18	1		18	15	16		18	1	18	20A-2P	DISLOCK 2-4	16
17	DISLOCK 3-1	20A-2P	18	1	18		17	18	18		1	18	20A-2P	DISLOCK 3-2	18
19	DISLOCK 3-1	20A-2P	18	1		18	19	20		18	1	18	20A-2P	DISLOCK 3-2	20
21	DISLOCK 3-3	20A-2P	18	1	18		21	22	18		1	18	20A-2P	DISLOCK 3-4	22
23	DISLOCK 3-3	20A-2P	18	1		18	23	24		18	1	18	20A-2P	DISLOCK 3-4	24
25	DISLOCK 4-1	20A-2P	18	1	18		25	26	18		1	18	20A-2P	DISLOCK 4-2	26
27	DISLOCK 4-1	20A-2P	18	1		18	27	28		18	1	18	20A-2P	DISLOCK 4-2	28
29	DISLOCK 4-3	20A-2P	18	1	18		29	30	18		1	18	20A-2P	DISLOCK 4-4	30
31	DISLOCK 4-3	20A-2P	18	1		18	31	32		18	1	18	20A-2P	DISLOCK 4-4	32
33	DISLOCK 1 RECEPT	20A-1P	1.5	1	1.5		33	34	1.5		1	1.5	20A-1P	DISLOCK 2 RECEPT	34
35	DISLOCK 2 RECEPT	20A-1P	1.5	1		1.5	35	36		1.5	1	1.5	20A-1P	DISLOCK 4 RECEPT	36
37	SPARE	20A-1P					37	38	0				20A-1P	SPARE	38
39	SPARE	20A-1P					39	40		0			20A-1P	SPARE	40
41	SPACE				0		41	42	0					SPACE	42
	SECTION TOTAL.				129.5	129.5			129.5	129.5					

	A	B
PHASE TOTAL	259	259
PHASE TOTAL	31080	31080

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 62160 VA
MIN. XFMR VA: 77700 VA

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ALL LOADS ARE CONNECTED BY OTHERS

PANEL SCHEDULE

PANEL DESIGNATION: PP-2
FED FROM: SWBD-1
LOCATION: DETECTOR WALKWAY
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 7.96KA
TYPE:
POLE: 42

VOLTS: 240/120
PHASE: SINGLE
WIRE: 3
MOUNTING: NEMA 1 ENCLOSN CONC. WALL
AMPS: 400
MAIN CIRCUIT BREAKER: 350 AMP, 2 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS A	PHASE AMPS B	POLE NO.		PHASE AMPS A	PHASE AMPS B	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	DISLOCK 3-1	20A-2P	18	1	18		1	2	18		1	18	20A-2P	DISLOCK 3-2	2
3	DISLOCK 3-1	20A-2P	18	1		18	3	4		18	1	18	20A-2P	DISLOCK 3-2	4
5	DISLOCK 3-3	20A-2P	18	1	18		5	6	18		1	18	20A-2P	DISLOCK 3-4	6
7	DISLOCK 3-3	20A-2P	18	1		18	7	8		18	1	18	20A-2P	DISLOCK 3-4	8
9	DISLOCK B-1	20A-2P	18	1	18		9	10	18		1	18	20A-2P	DISLOCK B-2	10
11	DISLOCK B-1	20A-2P	18	1		18	11	12		18	1	18	20A-2P	DISLOCK B-2	12
13	DISLOCK B-3	20A-2P	18	1	18		13	14	18		1	18	20A-2P	DISLOCK B-4	14
15	DISLOCK B-3	20A-2P	18	1		18	15	16		18	1	18	20A-2P	DISLOCK B-4	16
17	DISLOCK F-1	20A-2P	18	1	18		17	18	18		1	18	20A-2P	DISLOCK F-2	18
19	DISLOCK F-1	20A-2P	18	1		18	19	20		18	1	18	20A-2P	DISLOCK F-2	20
21	DISLOCK F-3	20A-2P	18	1	18		21	22	18		1	18	20A-2P	DISLOCK F-4	22
23	DISLOCK F-3	20A-2P	18	1		18	23	24		18	1	18	20A-2P	DISLOCK F-4	24
25	DISLOCK B-1	20A-2P	18	1	18		25	26	18		1	18	20A-2P	DISLOCK B-2	26
27	DISLOCK B-1	20A-2P	18	1		18	27	28		18	1	18	20A-2P	DISLOCK B-2	28
29	DISLOCK B-3	20A-2P	18	1	18		29	30	18		1	18	20A-2P	DISLOCK B-4	30
31	DISLOCK B-3	20A-2P	18	1		18	31	32		18	1	18	20A-2P	DISLOCK B-4	32
33	DISLOCK 5 RECEPT	20A-1P	1.5	1	1.5		33	34	1.5		1	1.5	20A-1P	DISLOCK 6 RECEPT	34
35	DISLOCK F RECEPT	20A-1P	1.5	1		1.5	35	36		1.5	1	1.5	20A-1P	DISLOCK 8 RECEPT	36
37	SPARE	20A-1P					37	38	0				20A-1P	SPARE	38
39	SPARE	20A-1P					39	40		0			20A-1P	SPARE	40
41	SPACE				0		41	42	0					SPACE	42
	SECTION TOTAL.				129.5	129.5			129.5	129.5					

	A	B
PHASE TOTAL	259	259
PHASE TOTAL	31080	31080

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 62160 VA
MIN. XFMR VA: 77700 VA

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ALL LOADS ARE CONNECTED BY OTHERS

PANEL SCHEDULE

PANEL DESIGNATION: PP-3
FED FROM: SWBD-1
LOCATION: DETECTOR WALKWAY
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 8.14KA
TYPE:
POLE: 42

VOLTS: 240/120
PHASE: SINGLE
WIRE: 3
MOUNTING: NEMA 1 ENCLOSN CONC. WALL
AMPS: 400
MAIN CIRCUIT BREAKER: 350 AMP, 2 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS A	PHASE AMPS B	POLE NO.		PHASE AMPS A	PHASE AMPS B	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	DISLOCK 3-1	20A-2P	18	1	18		1	2	18		1	18	20A-2P	DISLOCK 3-2	2
3	DISLOCK 3-1	20A-2P	18	1		18	3	4		18	1	18	20A-2P	DISLOCK 3-2	4
5	DISLOCK 3-3	20A-2P	18	1	18		5	6	18		1	18	20A-2P	DISLOCK 3-4	6
7	DISLOCK 3-3	20A-2P	18	1		18	7	8		18	1	18	20A-2P	DISLOCK 3-4	8
9	DISLOCK 1B-1	20A-2P	18	1	18		9	10	18		1	18	20A-2P	DISLOCK 1B-2	10
11	DISLOCK 1B-1	20A-2P	18	1		18	11	12		18	1	18	20A-2P	DISLOCK 1B-2	12
13	DISLOCK 1B-3	20A-2P	18	1	18		13	14	18		1	18	20A-2P	DISLOCK 1B-4	14
15	DISLOCK 1B-3	20A-2P	18	1		18	15	16		18	1	18	20A-2P	DISLOCK 1B-4	16
17	DISLOCK 1-1	20A-2P	18	1	18		17	18	18		1	18	20A-2P	DISLOCK 1-2	18
19	DISLOCK 1-1	20A-2P	18	1		18	19	20		18	1	18	20A-2P	DISLOCK 1-2	20
21	DISLOCK 1-3	20A-2P	18	1	18		21	22	18		1	18	20A-2P	DISLOCK 1-4	22
23	DISLOCK 1-3	20A-2P	18	1		18	23	24		18	1	18	20A-2P	DISLOCK 1-4	24
25	DISLOCK 1-2	20A-2P	18	1	18		25	26	18		1	18	20A-2P	DISLOCK 1-2	26
27	DISLOCK 1-2	20A-2P	18	1		18	27	28		18	1	18	20A-2P	DISLOCK 1-2	28
29	DISLOCK 1-4	20A-2P	18	1	18		29	30	18		1	18	20A-2P	DISLOCK 1-4	30
31	DISLOCK 1-4	20A-2P	18	1		18	31	32		18	1	18	20A-2P	DISLOCK 1-4	32
33	DISLOCK 9 RECEPT	20A-1P	1.5	1	1.5		33	34	1.5		1	1.5	20A-1P	DISLOCK 10 RECEPT	34
35	DISLOCK 11 RECEPT	20A-1P	1.5	1		1.5	35	36		1.5	1	1.5	20A-1P	DISLOCK 12 RECEPT	36
37	SPARE	20A-1P					37	38	0				20A-1P	SPARE	38
39	SPARE	20A-1P					39	40		0			20A-1P	SPARE	40
41	SPACE				0		41	42	0					SPACE	42
	SECTION TOTAL.				129.5	129.5			129.5	129.5					

	A	B
PHASE TOTAL	259	259
PHASE TOTAL	31080	31080

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 62160 VA
MIN. XFMR VA: 77700 VA

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ALL LOADS ARE CONNECTED BY OTHERS

PANEL SCHEDULE

PANEL DESIGNATION: PP-4
FED FROM: SWBD-1
LOCATION: DETECTOR WALKWAY
BOND NEUTRAL AND GROUND BAR: NO
BUS BOLTED FAULT: 8.44KA
TYPE:
POLE: 42

VOLTS: 240/120
PHASE: SINGLE
WIRE: 3
MOUNTING: NEMA 1 ENCLOSN CONC. WALL
AMPS: 400
MAIN CIRCUIT BREAKER: 350 AMP, 2 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS A	PHASE AMPS B	POLE NO.		PHASE AMPS A	PHASE AMPS B	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	DISLOCK 1B-1	20A-2P	18	1	18		1	2	18		1	18	20A-2P	DISLOCK 1B-2	2
3	DISLOCK 1B-1	20A-2P	18	1		18	3	4		18	1	18	20A-2P	DISLOCK 1B-2	4
5	DISLOCK 1B-3	20A-2P	18	1	18		5	6	18		1	18	20A-2P	DISLOCK 1B-4	6
7	DISLOCK 1B-3	20A-2P	18	1		18	7	8		18	1	18	20A-2P	DISLOCK 1B-4	8
9	DISLOCK 1A-1	20A-2P	18	1	18		9	10	18		1	18	20A-2P	DISLOCK 1A-2	10
11	DISLOCK 1A-1	20A-2P	18	1		18	11	12		18	1	18	20A-2P	DISLOCK 1A-2	12
13	DISLOCK 1A-3	20A-2P	18	1	18		13	14	18		1	18	20A-2P	DISLOCK 1A-4	14
15	DISLOCK 1A-3	20A-2P	18	1		18	15	16		18	1	18	20A-2P	DISLOCK 1A-4	16
17	DISLOCK 1-1	20A-2P	18	1	18		17	18	18		1	18	20A-2P	DISLOCK 1-2	18
19	DISLOCK 1-1	20A-2P	18	1		18	19	20		18	1	18	20A-2P	DISLOCK 1-2	20
21	DISLOCK 1-3	20A-2P	18	1	18		21	22	18		1	18	20A-2P	DISLOCK 1-4	22
23	DISLOCK 1-3	20A-2P	18	1		18	23	24		18	1	18	20A-2P	DISLOCK 1-4	24
25	DISLOCK 1B-1	20A-2P	18	1	18		25	26	18		1	18	20A-2P	DISLOCK 1B-2	26
27	DISLOCK 1B-1	20A-2P	18	1		18	27	28		18	1	18	20A-2P	DISLOCK 1B-2	28
29	DISLOCK 1B-3	20A-2P	18	1	18		29	30	18		1	18	20A-2P	DISLOCK 1B-4	30
31	DISLOCK 1B-3	20A-2P	18	1		18	31	32		18	1	18	20A-2P	DISLOCK 1B-4	32
33	DISLOCK 13 RECEPT	20A-1P	1.5	1	1.5		33	34	1.5		1	1.5	20A-1P	DISLOCK 14 RECEPT	34
35	DISLOCK 15 RECEPT	20A-1P	1.5	1		1.5	35	36		1.5	1	1.5	20A-1P	DISLOCK 16 RECEPT	36
37	SPARE	20A-1P					37	38	0				20A-1P	SPARE	38
39	SPARE	20A-1P					39	40		0			20A-1P	SPARE	40
41	SPACE				0		41	42	0					SPACE	42
	SECTION TOTAL.				129.5	129.5			129.5	129.5					

	A	B
PHASE TOTAL	259	259
PHASE TOTAL	31080	31080

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 62160 VA
MIN. XFMR VA: 77700 VA

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ALL LOADS ARE CONNECTED BY OTHERS

PANEL SCHEDULE

PANEL DESIGNATION: PP-5
FED FROM: SWBD-1
LOCATION: DETECTOR WALKWAY
SHORT CIRCUIT RATING: 10KA BUS BOLTED FAULT
POLE: 42

VOLTS: 240/120
PHASE: SINGLE
WIRE: 3
MOUNTING: NEMA 1 ENCLOSN STRUT FRAMING
AMPS: 400
MAIN CIRCUIT BREAKER: 250 AMP, 2 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS A	PHASE AMPS B	POLE NO.		PHASE AMPS A	PHASE AMPS B	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	DISLOCK 1T-1	20A-2P	18	1	18		1	2	18		1	18	20A-2P	DISLOCK 1T-2	2
3	DISLOCK 1T-1	20A-2P	18	1		18	3	4		18	1	18	20A-2P	DISLOCK 1T-2	4
5	DISLOCK 1T-3	20A-2P	18	1	18		5	6	18		1	18	20A-2P	DISLOCK 1T-4	6
7	DISLOCK 1T-3	20A-2P	18	1		18	7	8		18	1	18	20A-2P	DISLOCK 1T-4	8
9	DISLOCK 1B-1	20A-2P	18	1	18		9	10	18		1	18	20A-2P	DISLOCK 1B-2	10
11	DISLOCK 1B-1	20A-2P	18	1		18	11	12		18	1	18	20A-2P	DISLOCK 1B-2	12
13	DISLOCK 1B-3	20A-2P	18	1	18		13	14	18		1	18	20A-2P	DISLOCK 1B-4	14
15	DISLOCK 1B-3	20A-2P	18	1		18	15	16		18	1	18	20A-2P	DISLOCK 1B-4	16
17	DISLOCK 1S-1	20A-2P	18	1	18		17	18	18		1	18	20A-2P	DISLOCK 1S-2	18
19	DISLOCK 1S-1	20A-2P	18	1		18	19	20		18	1	18	20A-2P	DISLOCK 1S-2	20
21	DISLOCK 1S-3	20A-2P	18	1	18		21	22	18		1	18	20A-2P	DISLOCK 1S-4	22
23	DISLOCK 1S-3	20A-2P	18	1		18	23	24		18	1	18	20A-2P	DISLOCK 1S-4	24
25	DISLOCK 1T-1 RECEPT	20A-1P	1.5	1	1.5		25	26	1.5		1	1.5	20A-1P	DISLOCK 18 RECEPT	26
27	DISLOCK 1S RECEPT	20A-2P	1.5	1		1.5	27	28		1.5	1	1.5	20A-1P	DISLOCK 20 RECEPT	28
29	SPACE				0		29	30	0					SPACE	30
31	SPACE					0	31	32		0				SPACE	32
33	SPACE				0		33	34	0					SPACE	34
35	SPACE					0	35	36		0				SPACE	36
37	SPACE				0		37	38	0					SPACE	38
39	SPACE				0		39	40	0					SPACE	40
41	SPACE				0		41	42	0					SPACE	42
	SECTION TOTAL.				97.5	97.5			97.5	97.5					

	A	B
PHASE TOTAL	195	195
PHASE TOTAL	29400	29400

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 46800 VA
MIN. XFMR VA: 58500 VA

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ALL LOADS ARE CONNECTED BY OTHERS

PANEL SCHEDULE

PANEL DESIGNATION: PP-6
FED FROM: SWBD-1
LOCATION: DETECTOR WALKWAY
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULTS 12KA
TYPE:
POLE: 42

VOLTS: 208Y/120
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCLOSN CONC. WALL
AMPS: 400
MAIN CIRCUIT BREAKER: 300 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	PHASE AMPS (USAGE) B	PHASE AMPS (USAGE) C	POLE NO.		PHASE AMPS (USAGE) A	PHASE AMPS (USAGE) B	PHASE AMPS (USAGE) C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	CHUR-DISLOCK-1	30A-3P	22	1	22			1	2	22			1	22	30A-3P	CHUR-DISLOCK-2	2
3	CHUR-DISLOCK-1					22		3	4		22		1	22	30A-3P	CHUR-DISLOCK-2	4
5	CHUR-DISLOCK-1						22	5	6			22	1	22	30A-3P	CHUR-DISLOCK-2	6
7	CHUR-DISLOCK-3	30A-3P	22	1	22			7	8				1	22	30A-3P	CHUR-DISLOCK-4	8
9	CHUR-DISLOCK-3					22		9	10		22		1	22	30A-3P	CHUR-DISLOCK-4	10
11	CHUR-DISLOCK-3						22	11	12			22	1	22	30A-3P	CHUR-DISLOCK-4	12
13	CHUR-DISLOCK-5	30A-3P	22	1	22			13	14	22			1	22	30A-3P	CHUR-DISLOCK-6	14
15	CHUR-DISLOCK-5					22		15	16		22		1	22	30A-3P	CHUR-DISLOCK-6	16
17	CHUR-DISLOCK-5						22	17	18			22	1	22	30A-3P	CHUR-DISLOCK-6	18
19	CHUR-DISLOCK-7	30A-3P	22	1	22			19	20	22			1	22	30A-3P	CHUR-DISLOCK-8	20
21	CHUR-DISLOCK-7					22		21	22		22		1	22	30A-3P	CHUR-DISLOCK-8	22
23	CHUR-DISLOCK-7						22	23	24			22	1	22	30A-3P	CHUR-DISLOCK-8	24
25	CHUR-DISLOCK-9	30A-3P	22	1	22			25	26	22			1	22	30A-3P	CHUR-DISLOCK-10	26
27	CHUR-DISLOCK-9					22		27	28		22		1	22	30A-3P	CHUR-DISLOCK-10	28
29	CHUR-DISLOCK-9						22	29	30			22	1	22	30A-3P	CHUR-DISLOCK-10	30
31	SPARE	20A-1P						31	32							SPACE	32
33	SPARE	20A-1P						33	34							SPACE	34
35	SPACE							35	36							SPACE	36
37	SPACE							37	38							SPACE	38
39	SPACE							39	40							SPACE	40
41	SPACE							41	42							SPACE	42
	SECTION TOTAL.				110	110	110			110	110	110					

	A	B	C
PHASE TOTAL AMPS.	220	220	220
PHASE TOTAL VA.	28400	28400	28400

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

TOTAL USAGE LOAD: 79200 VA
MIN. XFMR VA: 95000 VA

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ALL LOADS ARE CONNECTED BY OTHERS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DAVID E. MERTZ
SIGNATURE:
DATE: 03/11/2009 LICENSE #47241

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	B. HAAS	03-11-09
DRAWN	K. WHITTEN	03-11-09
CHECKED	D. MERTZ	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
PANELBOARD SCHEDULES - 2

DRAWING NO. 15-1-3B
E-29
REV. 0

11 MAR, 2009

PANEL SCHEDULE

PANEL DESIGNATION: PP-7
FED FROM: SWBD-1
LOCATION: DETECTOR ENCLOSURE
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 5.54KA
TYPE:
POLE: 42

VOLTS. 208Y / 120
PHASE. THREE
WIRE. 4
MOUNTING. NEMA 1 ENCLOSN CONC WALL
AMPS. 400
MAIN CIRCUIT BREAKER. 300 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.		PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	CHURO NBLOCK-11	90A-3P	22	1	22			1	2	22			1	22	90A-3P	CHURO NBLOCK-12	2
3	CHURO NBLOCK-11	90A-3P	22	1		22		3	4		22		1	22	90A-3P	CHURO NBLOCK-12	4
5	CHURO NBLOCK-11	90A-3P	22	1			22	5	6			22	1	22	90A-3P	CHURO NBLOCK-12	6
7	CHURO NBLOCK-13	90A-3P	22	1	22			7	8	22			1	22	90A-3P	CHURO NBLOCK-14	8
9	CHURO NBLOCK-13	90A-3P	22	1		22		9	10		22		1	22	90A-3P	CHURO NBLOCK-14	10
11	CHURO NBLOCK-13	90A-3P	22	1			22	11	12			22	1	22	90A-3P	CHURO NBLOCK-14	12
13	CHURO NBLOCK-15	90A-3P	22	1	22			13	14	22			1	22	90A-3P	CHURO NBLOCK-16	14
15	CHURO NBLOCK-15	90A-3P	22	1		22		15	16		22		1	22	90A-3P	CHURO NBLOCK-16	16
17	CHURO NBLOCK-15	90A-3P	22	1			22	17	18			22	1	22	90A-3P	CHURO NBLOCK-16	18
19	CHURO NBLOCK-17	90A-3P	22	1	22			19	20	22			1	22	90A-3P	CHURO NBLOCK-18	20
21	CHURO NBLOCK-17	90A-3P	22	1		22		21	22		22		1	22	90A-3P	CHURO NBLOCK-18	22
23	CHURO NBLOCK-17	90A-3P	22	1			22	23	24			22	1	22	90A-3P	CHURO NBLOCK-18	24
25	CHURO NBLOCK-19	90A-3P	22	1	22			25	26	22					20A-1P	SPARE	26
27	CHURO NBLOCK-19	90A-3P	22	1		22		27	28		22				20A-1P	SPARE	28
29	CHURO NBLOCK-19	90A-3P	22	1			22	29	30			22				SPACE	30
31	SPARE	20A-1P						31	32							SPACE	32
33	SPARE	20A-1P						33	34							SPACE	34
35	SPACE							35	36							SPACE	36
37	SPACE							37	38							SPACE	38
39	SPACE							39	40							SPACE	40
41	SPACE							41	42							SPACE	42
SECTION TOTAL.					110	110	110			110	110	110					

	A	B	C
PHASE TOTAL AMPS.	220	220	220
PHASE TOTAL V.A.	26400	26400	26400

MINIMUM MAIN CIRCUIT BREAKER CAPACITY. N/A

TOTAL USAGE LOAD. 79200 V.A.
MIN. XFMR V.A. 99000 V.A.

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE FACTORY HANDLE LOCKOFF PADLOCK ATTACHMENT FOR ALL BRANCH CIRCUIT BREAKERS
ALL LOADS ARE CONNECTED BY OTHERS

PANEL SCHEDULE

PANEL DESIGNATION: PP-8
FED FROM: UPS-1
LOCATION: COMPUTER ROOM
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 4.83KA
TYPE:
POLE: 42

VOLTS. 208Y / 120
PHASE. THREE
WIRE. 4
MOUNTING. NEMA 1 ENCLOSN CONC WALL
AMPS. 225
MAIN CIRCUIT BREAKER. 225 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.		PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	UPS-RECEPT-1	90A-1P	24	1	24			1	2	24			1	24	90A-1P	UPS-RECEPT-2	2
3	UPS-RECEPT-3	90A-1P	24	1		24		3	4		0		1	24	90A-1P	UPS-RECEPT-4	4
5	SPARE	90A-1P					0	5	6			0			90A-1P	SPARE	6
7	SPARE	90A-1P			0			7	8	0						SPACE	8
9	SPACE					0		9	10		0					SPACE	10
11	SPACE						0	11	12			0				SPACE	12
13	SPACE				0			13	14	0						SPACE	14
15	SPACE					0		15	16		0					SPACE	16
17	SPACE						0	17	18			0				SPACE	18
19	SPACE				0			19	20	0						SPACE	20
21	SPACE					0		21	22		0					SPACE	22
23	SPACE						0	23	24			0				SPACE	24
25	SPACE				0			25	26	0						SPACE	26
27	SPACE					0		27	28		0					SPACE	28
29	SPACE						0	29	30			0				SPACE	30
31	SPACE				0			31	32	0						SPACE	32
33	SPACE					0		33	34		0					SPACE	34
35	SPACE						0	35	36			0				SPACE	36
37	SPACE				0			37	38	0						SPACE	38
39	SPACE					0		39	40		0					SPACE	40
41	SPACE						0	41	42			0				SPACE	42
SECTION TOTAL.					24	24	0			24	0	0					

	A	B	C
PHASE TOTAL AMPS.	48	24	0
PHASE TOTAL V.A.	5760	2880	0

MINIMUM MAIN CIRCUIT BREAKER CAPACITY. N/A

TOTAL USAGE LOAD. 3840 V.A.
MIN. XFMR V.A. 10000 V.A.

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 200% NEUTRAL
INCLUDE FACTORY HANDLE LOCKOFF PADLOCK ATTACHMENT FOR ALL BRANCH CIRCUIT BREAKERS
ALL LOADS ARE CONNECTED BY OTHERS

PANEL SCHEDULE

PANEL DESIGNATION: PP-9
FED FROM: SWBD-1
LOCATION: COMPUTER ROOM
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 4.96KA
TYPE:
POLE: 42

VOLTS. 208Y / 120
PHASE. THREE
WIRE. 4
MOUNTING. NEMA 1 ENCLOSN CONC WALL
AMPS. 225
MAIN CIRCUIT BREAKER. 225 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.		PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	CONV. RECEPT. (CONFIRMELEV LOBBY)	20A-1P	9	1	9			1	2	9			1	9	20A-1P	CONV. RECEPT. (COMPUTER ROOM)	2
3	CONV. RECEPT. (CONFIRMELEV LOBBY)	20A-1P	9	1		9		3	4		9		1	9	20A-1P	CONV. RECEPT. (COMPUTER ROOM)	4
5	COMP. RM. RACK 2	90A-1P	24	1			24	5	6			24	1	24	90A-1P	COMP. RM. RACK 1	6
7	COMP. RM. RACK 2	90A-1P	24	1	24			7	8	24			1	24	90A-1P	COMP. RM. RACK 1	8
9	COMP. RM. RACK 4	90A-1P	24	1		24		9	10		24		1	24	90A-1P	COMP. RM. RACK 3	10
11	COMP. RM. RACK 4	90A-1P	24	1			24	11	12			24	1	24	90A-1P	COMP. RM. RACK 3	12
13	COMP. RM. RACK 6	90A-1P	24	1	24			13	14	24			1	24	90A-1P	COMP. RM. RACK 5	14
15	COMP. RM. RACK 6	90A-1P	24	1		24		15	16		24		1	24	90A-1P	COMP. RM. RACK 5	16
17	COMP. RM. RACK 3	90A-1P	24	1			24	17	18			24	1	24	90A-1P	COMP. RM. RACK 7	18
19	COMP. RM. RACK 3	90A-1P	24	1	24			19	20	24			1	24	90A-1P	COMP. RM. RACK 7	20
21	COMP. RM. RACK 10	90A-1P	24	1		24		21	22		24		1	24	90A-1P	COMP. RM. RACK 9	22
23	COMP. RM. RACK 10	90A-1P	24	1			24	23	24			24	1	24	90A-1P	COMP. RM. RACK 9	24
25	SPACE				0			25	26	8			1	8	20A-1P	CONV. RECEPT. (COMPUTER ROOM RACK 1-5)	26
27	SPACE					0		27	28		8		1	8	20A-1P	CONV. RECEPT. (COMPUTER ROOM RACK 6-10)	28
29	SPACE						0	29	30			0				SPACE	30
31	SPACE				0			31	32	0						SPACE	32
33	SPACE					0		33	34		0					SPACE	34
35	SPACE						0	35	36			0				SPACE	36
37	SPACE				0			37	38	0						SPACE	38
39	SPACE					0		39	40		0					SPACE	40
41	SPACE						0	41	42			0				SPACE	42
SECTION TOTAL.					93.5	72.5	96			81	81	96					

	A	B	C
PHASE TOTAL AMPS.	166.5	166.5	192
PHASE TOTAL V.A.	19980	19980	23040

MINIMUM MAIN CIRCUIT BREAKER CAPACITY. N/A

TOTAL USAGE LOAD. 85000 V.A.
MIN. XFMR V.A. 79750 V.A.

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 200% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER

PANEL SCHEDULE

PANEL DESIGNATION: PP-10
FED FROM: SWBD-1
LOCATION: DETECTOR AREA (NORTH)
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 1.79KA
TYPE:
POLE: 42

VOLTS. 208Y / 120
PHASE. THREE
WIRE. 4
MOUNTING. NEMA 1 ENCLOSN CONC WALL
AMPS. 100
MAIN CIRCUIT BREAKER. 100 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.		PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	CONV. RECEPT (EL. 1218'-8")	20A-1P	8	1	8			1	2	10.5			1	1	20A-1P	CONV. RECEPT (EL. 1212'-0")	2
3	CONV. RECEPT (EL. 1218'-8")	20A-1P	8	1		8		3	4		10.5		1	1	20A-1P	CONV. RECEPT (EL. 1212'-0")	4
5	CONV. RECEPT (EL. 1218'-8")	20A-1P	8	1			8	5	6			9	1	1	20A-1P	CONV. RECEPTS ON ROOF	6
7	CONV. RECEPT (EL. 1218'-8")	20A-1P	8	1	8			7	8	7.5			1	1.5	20A-1P	CONV. RECEPT (EL. 1198'-10")	8
9	CONV. RECEPT (EL. 1131'-3")	20A-1P	8	1		8		9	10		7.5		1	1.5	20A-1P	CONV. RECEPT (EL. 1198'-10")	10
11	CONV. RECEPT (EL. 1131'-3")	20A-1P	8	1			8	11	12			8	1	1	20A-1P	CONV. RECEPT (EL. 1131'-3")	12
13	CONV. RECEPT EXIT SIGN NO.1	20A-1P	1.5	1	1.5			13	14	8			1	1	20A-1P	CONV. RECEPT (EL. 1131'-3")	14
15	ELEVATOR CAR LIGHTING	20A-1P	3	1		3		15	16		0					SPACE	16
17	SPACE						0	17	18			0				SPACE	18
19	SPACE				0			19	20	0						SPACE	20
21	SPACE					0		21	22		0					SPACE	22
23	SPACE						0	23	24			0				SPACE	24
25	SPACE				0			25	26	0						SPACE	26
27	SPACE					0		27	28		0					SPACE	28
29	SPACE						0	29	30			0				SPACE	30
31	SPACE				0			31	32	0						SPACE	32
33	SPACE					0		33	34		0					SPACE	34
35	SPACE						0	35	36			0				SPACE	36
37	SPACE				0			37	38	0						SPACE	38
39	SPACE					0		39	40		0					SPACE	40
41	SPACE						0	41	42			0				SPACE	42
SECTION TOTAL.					19.5	20	12			24	18	9					

	A	B	C
PHASE TOTAL AMPS.	43.5	38	21
PHASE TOTAL V.A.	5220	4560	2520

MINIMUM MAIN CIRCUIT BREAKER CAPACITY. N/A

TOTAL USAGE LOAD. 12900 V.A.
MIN. XFMR V.A. 15675 V.A.

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER

PANEL SCHEDULE

PANEL DESIGNATION: PP-11
FED FROM: PHP-1
LOCATION: DETECTOR AREA (SOUTH)
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 1.74KA
TYPE:
POLE: 42

VOLTS. 208Y / 120
PHASE. THREE
WIRE. 4
MOUNTING. NEMA 1 ENCLOSN CONC WALL
AMPS. 100
MAIN CIRCUIT BREAKER. 100 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.		PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	CONV. RECEPT (EL. 1198'-10", 1212'-0")	20A-1P	9	1	9			1	2	9			1	9	20A-1P	CONV. RECEPT (EL. 1224'-10", 1218'-8")	2
3	CONV. RECEPT (EL. 1198'-10", 1212'-0")	20A-1P	9	1		9		3	4		9		1	9	20A-1P	CONV. RECEPT (EL. 1224'-10", 1218'-8")	4
5	CONV. RECEPT (EL. 1131'-3")	20A-1P	8	1			8	5	6			7.2	1	7.2	20A-1P	SP-SECONV. RECEPT (EAST ALCOVE)	6
7	CONV. RECEPT (EL. 1131'-3")	20A-1P	8	1	8			7	8	1.5			1	1.5	20A-1P	SP-SECONV. RECEPT (EAST ALCOVE)	8
9	SPACE					0		9	10		9		1	9	20A-1P	CONV. RECEPT STAIR NO.3	10
11	SPACE						0	11	12			0				SPACE	12
13	SPACE				0			13	14	0						SPACE	14
15	SPACE					0		15	16		0					SPACE	16
17	SPACE						0	17	18			0				SPACE	18
19	SPACE				0			19	20	0						SPACE	20
21	SPACE					0		21	22		0					SPACE	22
23	SPACE						0	23	24			0				SPACE	24
25	SPACE				0			25	26	0						SPACE	26
27	SPACE					0		27	28		0					SPACE	28
29	SPACE						0	29	30			0				SPACE	30
31	SPACE				0			31	32	0						SPACE	32
33	SPACE					0		33	34		0					SPACE	34
35	SPACE						0	35	36			0				SPACE	36
37	SPACE				0			37	38	0						SPACE	38
39	SPACE					0		39	40		0					SPACE	40
41	SPACE						0	41	42			0				SPACE	42
SECTION TOTAL.					15	9	8			10.5	13	7.2					

	A	B	C
PHASE TOTAL AMPS.	25.5	27	19.2
PHASE TOTAL V.A.	3060	3240	1534

MINIMUM MAIN CIRCUIT BREAKER CAPACITY. N/A

TOTAL USAGE LOAD. 7834 V.A.
MIN. XFMR V.A. 9355 V.A.

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER

PANEL SCHEDULE

PANEL DESIGNATION: PP-12
FED FROM: PHP-2
LOCATION: ELECTRICAL ROOM
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 1.80KA
TYPE:
POLE: 42

VOLTS. 208Y / 120
PHASE. THREE
WIRE. 4
MOUNTING. NEMA 1 ENCLOSN CONC WALL
AMPS. 100
MAIN CIRCUIT BREAKER. 100 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.		PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	ELECTRICAL RM. CONV. RECEPT.	20A-1P	7.5	1	7.5			1	2	1.5			1	1.5	20A-1P	LOBBY/VIEWING AREA CONV. RECEPT.	2
3	ELECTRICAL RM. CONV. RECEPT.	20A-1P	7.5	1		7.5		3	4		1.5		1	1.5	20A-1P	LOBBY/VIEWING AREA CONV. RECEPT.	4
5	CONV. RECEPT. EL. (EL 1224'-10")	20A-1P	10.5	1			10.5	5	6			1.5	1	1.5	20A-1P	LOBBY/VIEWING AREA CONV. RECEPT.	6
7	CONV. RECEPT EL. (EL 1224'-10")	20A-1P	10.5	1	10.5			7	8	1.5			1	1.5	20A-1P	LOBBY/VIEWING AREA CONV. RECEPT.	8
9	LOBBY/VIEWING AREA CONV. RECEPT.	20A-1P	1.5	1		1.5		9	10		1.5		1	1.5	20A-1P	LOBBY/VIEWING AREA CONV. RECEPT.	10
11	LOBBY/VIEWING AREA CONV. RECEPT.	20A-1P	1.5	1			1.5	11	12			1.5	1	1.5	20A-1P	LOBBY/VIEWING AREA CONV. RECEPT.	12
13	LOBBY/VIEWING AREA CONV. RECEPT.	20A-1P	1.5	1	1.5			13	14	5			1	5	20A-1P	EMERG. GENERATOR LOAD	14
15	LOBBY/VIEWING AREA CONV. RECEPT.	20A-1P	1.5	1		1.5		15	16		5		1	5	20A-1P	LOBBY/VIEWING AREA FRMCK. LTG	16
17	SPACE						0	17	18			0				SPACE	18
19	CRU-2	40A-3P	21.5	1	21.5			19	20	0						SPACE	20
21	CRU-2	40A-3P	21.5	1		21.5		21	22		0					SPACE	22
23	CRU-2	40A-3P	21.5	1			21.5	23	24			0				SPACE	24
25	SPACE				0			25	26	0						SPACE	26
27	SPACE					0		27	28		0					SPACE	28
29	SPACE						0	29	30			0				SPACE	30
31	SPACE				0			31	32	0						SPACE	32
33	SPACE					0		33	34		0					SPACE	34
35	SPACE						0	35	36			0				SPACE	36
37	SPACE				0			37	38	0						SPACE	38
39	SPACE					0		39	40		0					SPACE	40
41	SPACE						0	41	42			0				SPACE	42
SECTION TOTAL.					47	33	33.5			3	3	3					

	A	B	C
PHASE TOTAL AMPS.	50	46	42.5
PHASE TOTAL V.A.	8800	8320	5100

MINIMUM MAIN CIRCUIT BREAKER CAPACITY. N/A

TOTAL USAGE LOAD. 11220 V.A.
MIN. XFMR V.A. 21525 V.A.

ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: DAVID E. MERTZ
SIGNATURE:
DATE: 03/11/2009 LICENSE #47241

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell SINCE 1898
BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	B. HAAS	03-11-09
DRAWN	K. WHITTEN	03-11-09
CHECKED	D. MERTZ	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING

PANELBOARD SCHEDULES - 3

DRAWING NO. 15-1-3B
E-30
REV. 0

11 MAR, 2009

PANEL SCHEDULE

PANEL DESIGNATION: PP-13
FED FROM: PHP-3
LOCATION: LOADING DOCK
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 5.30KA
TYPE:
POLE: 30

VOLTS: 208Y/120
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONCRETE WALL
AMPS: 100
MAIN CIRCUIT BREAKER: 100 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	OVERHEAD DOOR 109-2	20A-3P	7.5	1	7.5			1	2	4.5			1	4.5	20A-1P	CONV. RECEPT. (LOADING DOCK)	2
3	OVERHEAD DOOR 109-2	20A-3P	7.5	1		7.5		3	4		4.5		1	4.5	20A-1P	CONV. RECEPT. (LOADING DOCK)	4
5	OVERHEAD DOOR 109-2	20A-3P	7.5	1			7.5	5	6			0			20A-1P	SPARE	6
7	OVERHEAD DOOR 109-3	20A-3P	7.5	1	7.5			7	8	0					20A-1P	SPARE	8
9	OVERHEAD DOOR 109-3	20A-3P	7.5	1		7.5		9	10		7.5		1	7.5	20A-3P	OVERHEAD DOOR 109-5	10
11	OVERHEAD DOOR 109-3	20A-3P	7.5	1			7.5	11	12			7.5	1	7.5	20A-3P	OVERHEAD DOOR 109-5	12
13	OVERHEAD DOOR 109-4	20A-3P	7.5	1	7.5			13	14	7.5			1	7.5	20A-3P	OVERHEAD DOOR 109-5	14
15	OVERHEAD DOOR 109-4	20A-3P	7.5	1		7.5		15	16		7.5		1	7.5	20A-3P	OVERHEAD DOOR 109-6	16
17	OVERHEAD DOOR 109-4	20A-3P	7.5	1			7.5	17	18			7.5	1	7.5	20A-3P	OVERHEAD DOOR 109-6	18
19	SPARE	20A-3P			0			19	20	7.5			1	7.5	20A-3P	OVERHEAD DOOR 109-6	20
21	SPARE	20A-3P				0		21	22		0				20A-3P	SPARE	22
23	SPACE						0	23	24			0				SPACE	24
25	SPACE				0			25	26	0						SPACE	26
27	SPACE					0		27	28		0					SPACE	28
29	SPACE						0	29	30			0				SPACE	30
	SECTION TOTAL:				22.5	22.5	22.5			19.5	19.5	15					

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

	A	B	C
PHASE TOTAL AMPS:	42	42	37.5
PHASE TOTAL VA:	5040	5040	4500

TOTAL USAGE LOAD: 14580 VA
MIN. XFMR VA: 18225 VA

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF/PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANEL SCHEDULE

PANEL DESIGNATION: PP-14
FED FROM: PHP-4
LOCATION: SHOP SCINTILATOR ROOM
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 1.43KA
TYPE:
POLE: 42

VOLTS: 208Y/120
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONCRETE WALL
AMPS: 225
MAIN CIRCUIT BREAKER: 150 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	OFFICE RECEPT.	20A-1P	6	1	6			1	2	6			1	6	20A-1P	MECH. RM. RECEPT.	2
3	OFFICE RECEPT.	20A-1P	6	1		6		3	4		6		1	6	20A-1P	MECH. RM. RECEPT.	4
5	REST RM. RECEPT/EXH FAN	20A-1P	6	1			6	5	6			6	1	6	20A-1P	OFFICE RECEPT.	6
7	SCINTILATOR RM. RECEPT.	20A-1P	6	1	6			7	8	6			1	6	20A-1P	OFFICE RECEPT.	8
9	SCINTILATOR RM. RECEPT.	20A-1P	6	1		6		9	10		13.75		1	13.75	20A-1P	EWH-1 WATER HEATER (MECH. RM.)	10
11	PTAC-1 OFFICE A/C UNIT	15A-2P	5.82	1			5.82	11	12			13.75	1	13.75	20A-1P	EWH-2 WATER HEATER (OFFICE)	12
13	PTAC-1 OFFICE A/C UNIT	15A-1P	5.82	1	5.82			13	14	9.2			1	9.2	20A-1P	BLOCK HEATER (PARKING)	14
15	SPARE	20A-1P				0		15	16		9.2		1	9.2	20A-1P	BLOCK HEATER (PARKING)	16
17	WS-1 WATER SOFTENER (MECH RM.)	20A-1P	3	1			3	17	18			9.2	1	9.2	20A-1P	BLOCK HEATER (PARKING)	18
19	BLOCK HEATER (PARKING)	20A-1P	9.2	1	9.2			19	20	9			1	9	20A-1P	CONV. RECEPT. (LOADING DOCK)	20
21	BLOCK HEATER (PARKING)	20A-1P	9.2	1		9.2		21	22		9		1	9	20A-1P	CONV. RECEPT. (LOADING DOCK)	22
23	BLOCK HEATER (PARKING)	20A-1P	9.2	1			9.2	23	24			0				SPACE	24
25	SPACE				0			25	26	0						SPACE	26
27	SPACE					0		27	28		0					SPACE	28
29	SPACE						0	29	30			0				SPACE	30
31	SPACE				0			31	32	0						SPACE	32
33	SPACE					0		33	34		0					SPACE	34
35	SPACE						0	35	36			0				SPACE	36
37	SPACE				0			37	38	0						SPACE	38
39	SPACE					0		39	40		0					SPACE	40
41	SPACE						0	41	42			0				SPACE	42
	SECTION TOTAL:				27.02	21.2	24.02			30.2	37.95	28.95					

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

	A	B	C
PHASE TOTAL AMPS:	57.22	59.15	52.97
PHASE TOTAL VA:	6866.4	7098	6356.4

TOTAL USAGE LOAD: 20320.8 VA
MIN. XFMR VA: 25401 VA

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF/PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANEL SCHEDULE

PANEL DESIGNATION: PP-16
FED FROM: PHP-6
LOCATION: ASSEMBLY AREA
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 1.81KA
TYPE:
POLE: 30

VOLTS: 208Y/120
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONCRETE WALL
AMPS: 100
MAIN CIRCUIT BREAKER: 100 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	ADHESIVE FLIPPING MOTOR	20A-3P	8	1	8			1	2	9			1	9	20A-1P	CONV. RECEPT. (FIRE PROT. ROOM)	2
3	ADHESIVE FLIPPING MOTOR	20A-3P	8	1		8		3	4		3		1	3	20A-1P	CONV. RECEPT. (FIRE PROT. ROOM)	4
5	ADHESIVE FLIPPING MOTOR	20A-3P	8	1			8	5	6			2	1	2	20A-1P	ADHESIVE CONV. RECEPT 1	6
7	ADHESIVE CARRIAGE	60A-1P	10	1	10			7	8	2			1	2	20A-1P	ADHESIVE CONV. RECEPT 2	8
9	SPARE	20A-1P				0		9	10		6		1	6	20A-1P	HUM-4	10
11	SPARE	20A-1P					0	11	12			0			20A-1P	SPARE	12
13	SPACE				0			13	14	0						SPACE	14
15	SPACE					0		15	16		0					SPACE	16
17	SPACE						0	17	18			0				SPACE	18
19	SPACE				0			19	20	0						SPACE	20
21	SPACE					0		21	22		0					SPACE	22
23	SPACE						0	23	24			0				SPACE	24
25	SPACE				0			25	26	0						SPACE	26
27	SPACE					0		27	28		0					SPACE	28
29	SPACE						0	29	30			0				SPACE	30
	SECTION TOTAL:				18	8	8			11	9	2					

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

	A	B	C
PHASE TOTAL AMPS:	29	17	10
PHASE TOTAL VA:	3480	2040	1200

TOTAL USAGE LOAD: 6720 VA
MIN. XFMR VA: 8400 VA

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF/PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANEL SCHEDULE

PANEL DESIGNATION: EPP-1
FED FROM: EPHP-1
LOCATION: FIRE PROTECTION ROOM
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 30KA
TYPE:
POLE: 42

VOLTS: 208Y/120
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONCRETE WALL
AMPS: 100
MAIN CIRCUIT BREAKER: 100 AMP, 3 POLE

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	FACP (FIRE PROT. RM.)	20A-1P	10	1	10			1	2	1			1	1	20A-1P	RPS (ELEV. 110'-3")	2
3	RPS (ELEV. 122'-10")	20A-1P	8	1		8		3	4		1		1	1	20A-1P	ASPS (FIRE PROT. RM.)	4
5	SPARE	20A-1P	2	1			2	5	6			0	1		20A-1P	SPARE	6
7	SPARE	20A-1P		1	0			7	8	8			1	8	20A-1P	HEAT TRACE PANEL (STAIR 3)	8
9	SPARE	20A-1P		1		0		9	10		8		1	8	20A-1P	HEAT TRACE PANEL (STAIR 2)	10
11	SPARE	20A-1P		1			0	11	12			8		8	20A-1P	HEAT TRACE PANEL (STAIR 1)	12
13	SPF-1	20A-1P	6.5	1	6.5			13	14	6.5			1	6.5	20A-1P	SPF-2	14
15	SPF-1	20A-1P	6.5	1		6.5		15	16		6.5		1	6.5	20A-1P	SPF-2	16
17	SPF-1	20A-1P	6.5	1			6.5	17	18			6.5	1	6.5	20A-1P	SPF-2	18
19	SPF-3	20A-1P	6.5	1	6.5			19	20	4			1	4	20A-1P	GENERATOR BATTERY CHARGER	20
21	SPF-3	20A-1P	6.5	1		6.5		21	22		0					SPACE	22
23	SPF-3	20A-1P	6.5	1			6.5	23	24			0				SPACE	24
25	SPACE				0			25	26	0						SPACE	26
27	SPACE					0		27	28		0					SPACE	28
29	SPACE						0	29	30			0				SPACE	30
31	SPACE				0			31	32	0						SPACE	32
33	SPACE					0		33	34		0					SPACE	34
35	SPACE						0	35	36			0				SPACE	36
37	SPACE				0			37	38	0						SPACE	38
39	SPACE					0		39	40		0					SPACE	40
41	SPACE						0	41	42			0				SPACE	42
	SECTION TOTAL:				23	21	15			19.5	15.5	14.5					

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: 58

	A	B	C
PHASE TOTAL AMPS:	42.5	36.5	29.5
PHASE TOTAL VA:	5100	4380	3540

TOTAL USAGE LOAD: 13020 VA
MIN. XFMR VA: 16275 VA

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF/PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANEL SCHEDULE

PANEL DESIGNATION: LP-1
FED FROM: PHP-2
LOCATION: ELECTRICAL ROOM
BOND NEUTRAL AND GROUND BAR: YES
BUS BOLTED FAULT: 21.83KA
TYPE:
POLE: 42

VOLTS: 480Y/277
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON CONCRETE WALL
AMPS: 100
MAIN CIRCUIT BREAKER: MAIN LUGS ONLY

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	ELECTRIC ROOM LTG	20A-1P	3.6	1	3.6			1	2	13			1	13	20A-1P	CONTROL/COMPUTER RM LTG (EL. 129'-6")	2
3	EMERGENCY LTG STAIR NO.1	20A-1P	5.8	1		5.8		3	4		6.5		1	7	20A-1P	HIBAY LTG DETECTOR AREA	4
5	FLUOR. LTG STAIR NO.1	20A-1P	2.6	1			2.6	5	6			5.8	1	5.8	20A-1P	EMERGENCY LTG STAIR NO.2	6
7	EMERGENCY LTG (EL. 122'-10")	20A-1P	2	1	2			7	8	2			1	2	20A-1P	EQUIP. ALCOVE (129'-6")	8
9	EMERGENCY LTG (EL. 129'-6")	20A-1P	1	1		1		9	10		2.7		1	2.7	20A-1P	FLUOR. LTG STAIR NO.2	10
11	SPARE	20A-1P						11	12						20A-1P	SPARE	12
13	SPARE	20A-1P						13	14						20A-1P	SPARE	14
15	SPARE	20A-1P						15	16							SPACE	16
17	SPACE							17	18							SPACE	18
19	SPACE							19	20	0						SPACE	20
21	!SPACE							21	22		0					SPACE	22
23	SPACE							23	24			0				SPACE	24
25	SPACE							25	26	0						SPACE	26
27	SPACE					0		27	28		0					SPACE	28
29	SPACE						0	29	30			0				SPACE	30
31	SPACE				0			31	32	0						SPACE	32
33	SPACE					0		33	34		0					SPACE	34
35	SPACE						0	35	36			0				SPACE	36
37	SPACE				0			37	38	0						SPACE	38
39	SPACE					0		39	40		0					SPACE	40
41	SPACE						0	41	42			0				SPACE	42
	SECTION TOTAL:				5.6	6.8	2.6			15	9.2	5.8					

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

	A	B	C
PHASE TOTAL AMPS:	20.6	16	8.4
PHASE TOTAL VA:	2472	1920	1008

TOTAL USAGE LOAD: 5400 VA
MIN. XFMR VA: 6750 VA

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF/PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

PANEL SCHEDULE

PANEL DESIGNATION: LP-2
FED FROM: PP-3
LOCATION: LOADING DOCK
BOND NEUTRAL AND GROUND BAR: YES
SHORT CIRCUIT RATING: 35KA
TYPE:
POLE: 42

VOLTS: 480Y/277
PHASE: THREE
WIRE: 4
MOUNTING: NEMA 1 ENCL ON STRUT FRAMING
AMPS: 100
MAIN CIRCUIT BREAKER: MAIN LUGS ONLY

CKT NO.	LOAD	BREAKER SIZE	LOAD AMPS	USAGE FACTOR	PHASE AMPS (USAGE) A	B	C	POLE NO.	POLE NO.	PHASE AMPS (USAGE) A	B	C	USAGE FACTOR	LOAD AMPS	BREAKER SIZE	LOAD	CKT NO.
1	ASSEMBLY AREA LTG (129'-6")	20A-1P	11.4	1	11.4			1	2	11.4			1	11.4	20A-1P	LOADING DOCK AREA LTG	2
3	ASSEMBLY AREA LTG (129'-6")	20A-1P	9.7	1		9.7		3	4		11.45		1	11.4	20A-1P	LOADING DOCK AREA LTG	4
5	ASSEMBLY AREA LTG (129'-6")	20A-1P	9.7	1			9.7	5	6			3.1	1	3.1	20A-1P	OFFICE LTG (129'-6")	6
7	ASSEMBLY AREA LTG (129'-6")	20A-1P	9.7	1	9.7			7	8	12.6			1	9	20A-1P	VIEWING AREA, LOBBY LTG (129'-6")	8
9	FIRE PROT. AREA LTG (129'-6")	20A-1P	4	1		4		9	10		10.5		1	6.7	20A-1P	OUTDOOR AREA LTG	10
11	EMERGENCY LTG	20A-1P	7	1			5	11	12			5.8	1	5.8	20A-1P	EMERGENCY LTG. STAIR NO.3	12
13	OUTDOOR LTG LOADING AREA	20A-1P	2.6	1	2.6			13	14	2.6			1	2.6	20A-1P	FLUOR. LTG STAIR NO.3	14
15	SPACE					0		15	16		0					SPACE	16
17	SPACE						0	17	18			0				SPACE	18
19	SPACE				0			19	20	0						SPACE	20
21	SPACE					0		21	22		0					SPACE	22
23	SPACE						0	23	24			0				SPACE	24
25	SPACE				0			25	26	0						SPACE	26
27	SPACE					0		27	28		0					SPACE	28
29	SPACE						0	29	30			0				SPACE	30
31	SPACE				0			31	32	0						SPACE	32
33	SPACE					0		33	34		0					SPACE	34
35	SPACE						0	35	36			0				SPACE	36
37	SPACE				0			37	38	0						SPACE	38
39	SPACE					0		39	40		0					SPACE	40
41	SPACE						0	41	42			0				SPACE	42
	SECTION TOTAL:				23.7	13.7	14.7			26.6	21.95	8.9					

MINIMUM MAIN CIRCUIT BREAKER CAPACITY: N/A

	A	B	C
PHASE TOTAL AMPS:	50.3	35.65	23.6
PHASE TOTAL VA:	6036	4278	2832

TOTAL USAGE LOAD: 13146 VA
MIN. XFMR VA: 16432.5 VA

PANELBOARDS SHALL HAVE A 100% NEUTRAL
INCLUDE HANDLE LOCKOFF/PADLOCK ATTACHMENT FOR EVERY BRANCH CIRCUIT BREAKER
ISOLATED NEUTRAL AND SEPARATE GROUND BUS BAR

NOTE:

1. FOR EPHP-1 PANELBOARD SCHEDULE SEE DWG. E-26.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: DAVID E. MERTZ
SIGNATURE:
DATE: 03/11/2009 LICENSE #47241

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell
SINCE 1898
BMcD PROJECT NUMBER 49617

	A/E CONSULTANT	DATE		OWNER / REPRESENTATIVE	DATE
DESIGNED	B. HAAS	03-11-09	NOvA FESS SUBMITTED	S. DIXON	03-11-09
DRAWN	K. WHITTEN	03-11-09	NOvA PROJECT MANAGER	J. COOPER	03-11-09
CHECKED	D. MERTZ	03-11-09	HINES SUBMITTED	C. McNABNEY	03-11-09
APPROVED	J. STEENKEN	03-11-09	U of M SUBMITTED	M. MARSHAK	03-11-09

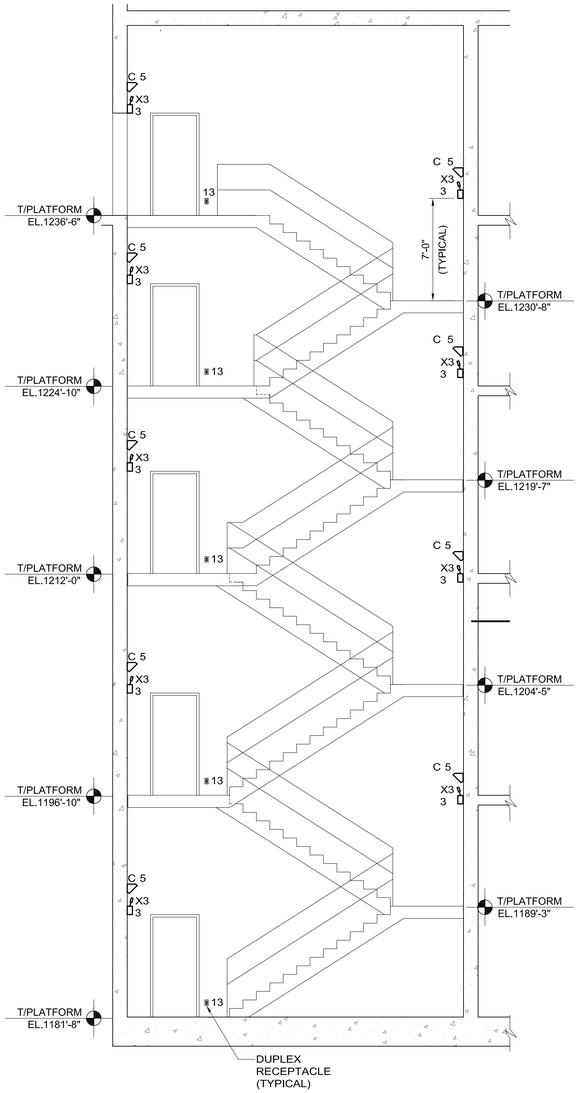
SCALE:

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
PANELBOARD SCHEDULES - 4

DRAWING NO. 15-1-3B E-31 REV. 0
11 MAR, 2009



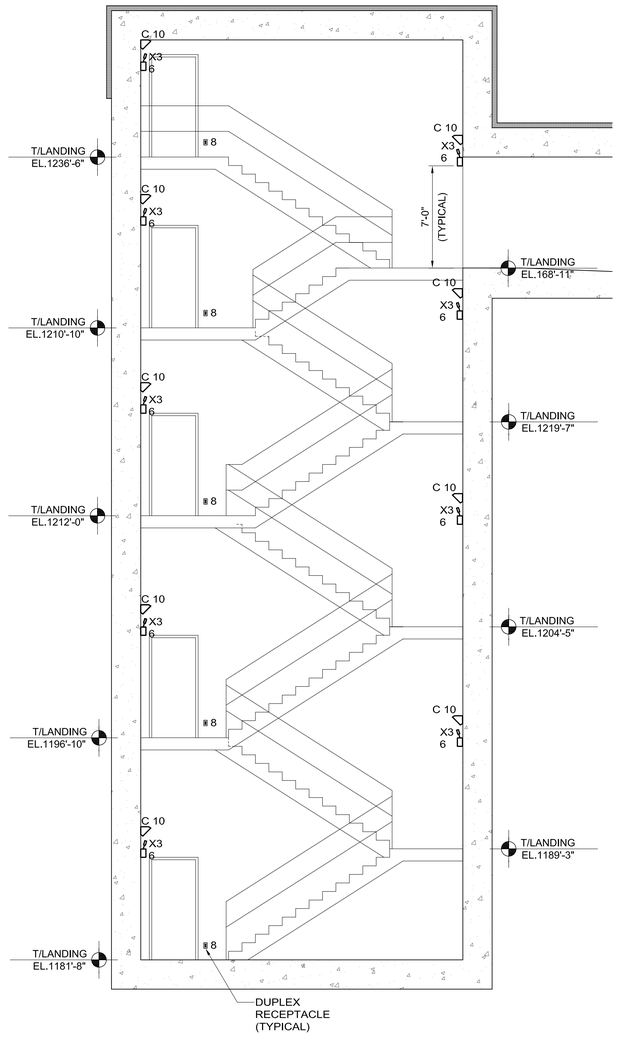
EXIT STAIR 1 ELEVATION

A
-

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

NOTES:
1. ALL LIGHTING CIRCUITS SHOWN ARE FED FROM PANELBOARD LP-1 LOCATED IN ELECTRICAL RM. EL.1224'-10".

2. ALL RECEPTACLES SHOWN ARE FED FROM PANELBOARD PP-10 LOCATED IN THE DETECTOR AREA EL. 1236'-6".



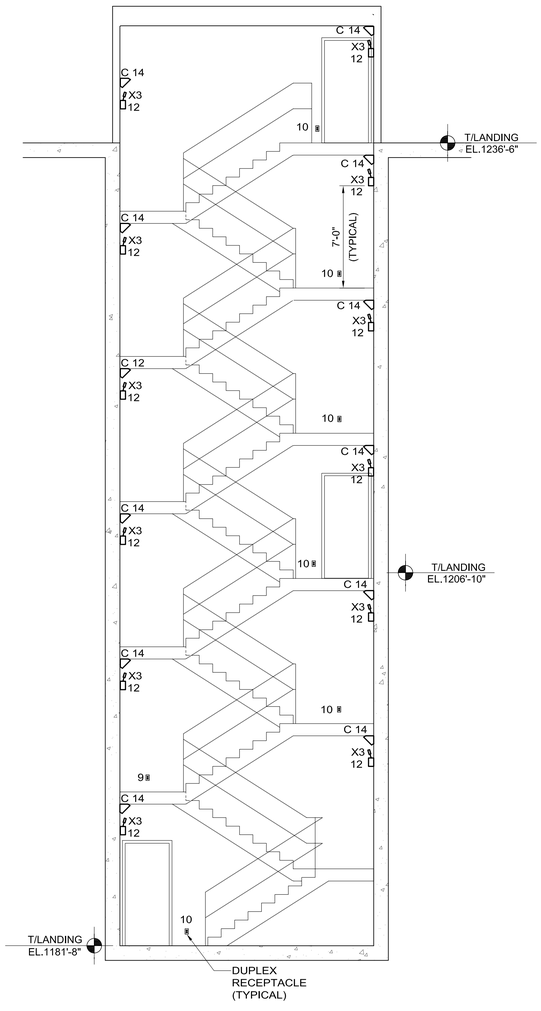
EXIT STAIR 2 ELEVATION

B
-

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

NOTES:
1. ALL LIGHTING CIRCUITS SHOWN ARE FED FROM PANELBOARD LP-1 LOCATED IN ELECTRICAL RM. EL.1224'-10".

2. ALL RECEPTACLES SHOWN ARE FED FROM PANELBOARD PP-11 LOCATED ON THE DETECTOR AREA EL. 1236'-6".



EXIT STAIR 3 ELEVATION

C
-

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

NOTES:
1. ALL LIGHTING CIRCUITS SHOWN ARE FED FROM PANELBOARD LP-2 LOCATED IN THE LOADING DOCK AREA EL.1236'-6".

2. ALL RECEPTACLES SHOWN ARE FED FROM PANELBOARD PP-11 LOCATED AT THE SOUTH END WALKWAY EL. 1236'-6".

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DAVID E. MERTZ

SIGNATURE:

DATE: 03/11/2009 LICENSE #47241

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

Burns & McDonnell
SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	B. HAAS	03-11-09
DRAWN	K. WHITTEN	03-11-09
CHECKED	D. MERTZ	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

SCALE:

1/4"=1'-0" SCALE 4 0 4 8 FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711

Hines

FERMI NATIONAL ACCELERATOR LABORATORY

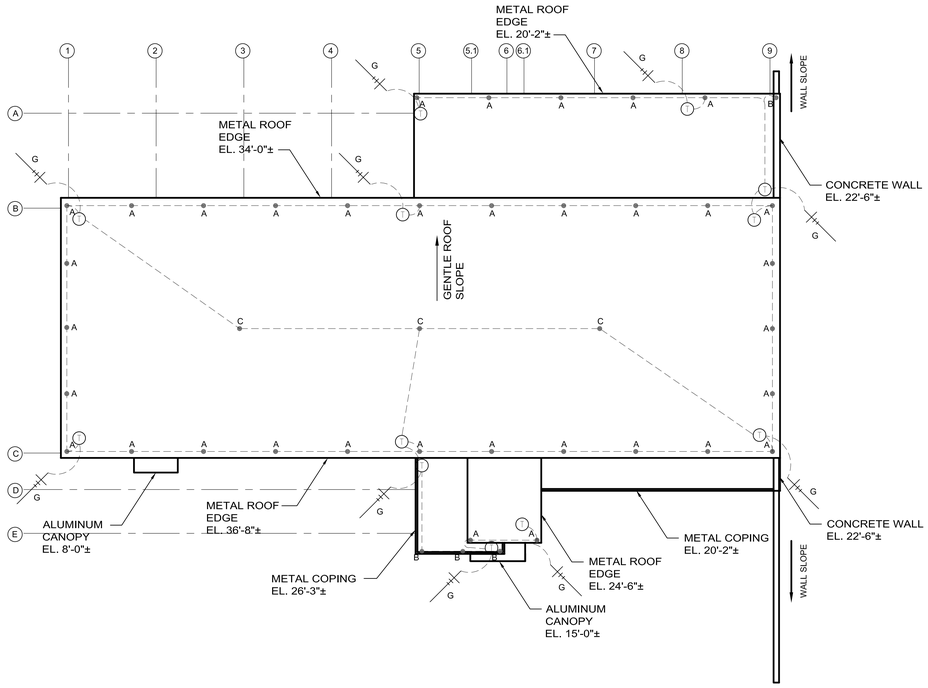
UNITED STATES DEPARTMENT OF ENERGY

NOνA FAR DETECTOR BUILDING

STAIRWAY LIGHTING

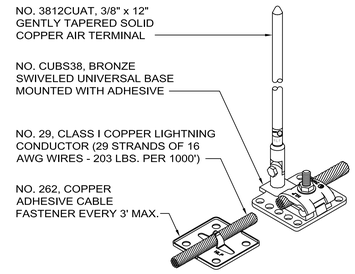
DRAWING NO. **15-1-3B** **E-32** REV. 0

11 MAR, 2009



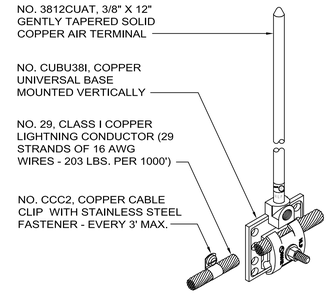
LIGHTNING PROTECTION SYSTEM PLAN

SCALE: 1/16" = 1'-0"



AIR TERMINAL DETAIL "A"

NTS



AIR TERMINAL DETAIL "B"

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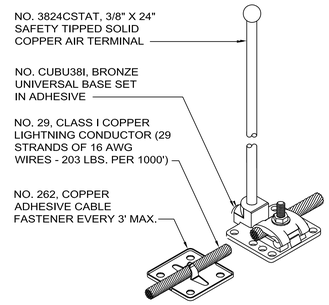

AIR TERMINAL DETAIL "C"

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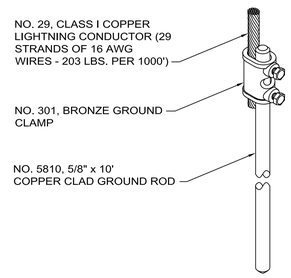
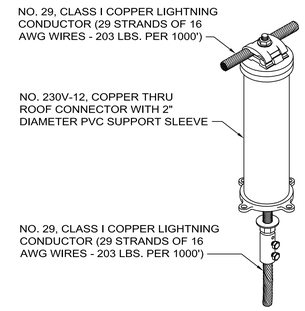


GROUND ROD DETAIL "G"

NTS



THRU ROOF DETAIL "T"

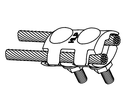
NTS

NOTES:

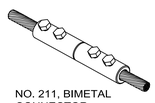
1. THE INSTALLATION OF THIS SYSTEM WILL BE MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION'S "STANDARD FOR THE INSTALLATION OF LIGHTNING PROTECTION SYSTEMS, 2008 EDITION" (NFPA780) AND THE "INSTALLATION REQUIREMENTS FOR LIGHTNING PROTECTION SYSTEMS, UL 96A" OF UNDERWRITERS LABORATORIES INC. THE MASTER LABEL CERTIFICATE SHALL BE FURNISHED TO THE OWNER UPON COMPLETION.
2. COPPER LIGHTNING PROTECTION SYSTEM COMPONENTS SHALL NOT BE MOUNTED TO ALUMINUM SURFACES. ALUMINUM COMPONENTS SHALL BE USED TO AVOID ELECTROLYTIC CORROSION.
3. METAL BODIES WITHIN 6' - 0" OF THE LIGHTNING PROTECTION SYSTEM SHALL BE BONDED TO THE SYSTEM IN ACCORDANCE WITH UL96A REQUIREMENTS.
4. UNDERGROUND METALLIC PIPING ENTERING THE BUILDING SHALL BE BONDED TO THE NEAREST DOWN CONDUCTOR OR GROUND ELECTRODE IN ACCORDANCE WITH UL96A REQUIREMENTS.
5. ALL ELEVATIONS ARE APPROXIMATE AND ARE TAKEN FROM AVERAGE GRADE.
6. THE DESIGNS SHOWN FOR THESE SYSTEMS ARE SCHEMATIC AND ARE INTENDED TO SHOW BASIC SYSTEM DESIGN BASED ON THE INFORMATION PROVIDED TO DATE.
7. AIR TERMINALS ARE TO BE LOCATED AS SHOWN. THEY ARE TO BE A MAXIMUM OF 24" FROM THE ROOF EDGE AND PROJECT A MINIMUM OF 10" ABOVE THE PROTECTED EDGE. THE SPACING BETWEEN AIR TERMINALS SHALL NOT EXCEED 20 FEET.
8. ALL LIGHTNING CONDUCTORS ARE TO MAINTAIN A HORIZONTAL OR DOWNWARD PATH. ALL BENDS IN THE CONDUCTOR SHALL HAVE A RADIUS BEND OF 8 INCHES OR GREATER, AND SHALL HAVE AN ANGLE BEND OF 90 DEGREES OR GREATER.
9. IF THE METAL THICKNESS OF AN OBJECT IS 3/16" OR GREATER, AIR TERMINALS MAY BE ELIMINATED IF THE OBJECT IS PROPERLY CONNECTED TO THE SYSTEM.
10. LOWER ROOF / EQUIPMENT FALLS WITHIN ZONES OF PROTECTION AFFORDED BY HIGHER PROTECTED STRUCTURE(S). ROOF LEVELS NOT INDICATING PROTECTION FALL WITHIN THESE ZONES OF PROTECTION.

LEGEND

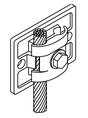
- A — NO. 3812CUAT, 3/8" X 12" GENTLY TAPERED SOLID COPPER AIR TERMINAL WITH NO. CUBS38, BRONZE SWIVELED UNIVERSAL BASE. SEE DETAIL "A"
- B — NO. 3812CUAT 3/8" X 12" GENTLY TAPERED COPPER AIR TERMINAL WITH NO. CUBU38I, BRONZE UNIVERSAL BASE. SEE DETAIL "B"
- C — NO. 3824CSTAT, 3/8" X 24" SAFETY TIPPED SOLID COPPER AIR TERMINAL WITH NO. CUBU38I, BRONZE UNIVERSAL BASE. SEE DETAIL "C"
- NO. 29 CLASS I COPPER LIGHTNING CONDUCTOR (29 STRANDS OF 16 AWG WIRE - 203 LBS. PER 1000 FEET). SECURE TO BUILDING EVERY THREE FEET MAXIMUM.
- T — NO. 230V-18, THRU ROOF CONNECTOR ASSEMBLY WITH NO. 29, DOWN CONDUCTOR - SEE DETAIL "T"
- G — NO. 5810, 5/8" X 10'-0" COPPERCLAD GROUND ROD WITH NO. 301 BRONZE GROUND CLAMP. SEE DETAIL "G".



NO. 204, BRONZE NO. A204, ALUMINUM PARALLEL SPLICER



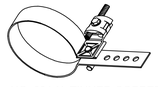
NO. 211, BIMETAL CONNECTOR



NO. 217, TINNED BRONZE NO. A217, ALUMINUM BONDING PLATE

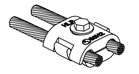
NO. 213, BRONZE NO. A213, ALUMINUM CABLE TO FLAT METAL CLAMP

NO. 216, BRONZE NO. A216, ALUMINUM SECONDARY BONDING LUG

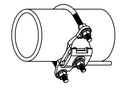


NO. 231-X, TINNED COPPER NO. A231-X, ALUMINUM STRAP TYPE PIPE CLAMP

NO. 210, BRONZE NO. A210, ALUMINUM NO. 210BM, BI-METAL CROSS RUN CONNECTOR



NO. 212, BRONZE NO. A212, ALUMINUM 1 BOLT PARALLEL CLAMP



NO. CPC-X, TINNED BRONZE NO. APC-X, ALUMINUM STRAP TYPE PIPE CLAMP

TYPICAL BONDING/SPLICING DETAILS

NTS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DAVID E. MERTZ

SIGNATURE:

DATE: 03/11/2009 LICENSE #47241

REV.	DATE	DESCRIPTIONS
0	03-11-09	ISSUED FOR BID

REVISIONS

INSTALLATION BY:
HLP Systems, Inc.
426 North Avenue,
Libertyville, IL 60048
Ph 847.362.0777
Fax 847.362.6443
www.hlpsystems.com

Burns & McDonnell SINCE 1898

BMcD PROJECT NUMBER 49617

A/E CONSULTANT		DATE
DESIGNED	B. HAAS	03-11-09
DRAWN	K. WHITTEN	03-11-09
CHECKED	D. MERTZ	03-11-09
APPROVED	J. STEENKEN	03-11-09

OWNER / REPRESENTATIVE		DATE
NOvA FESS SUBMITTED	S. DIXON	03-11-09
NOvA PROJECT MANAGER	J. COOPER	03-11-09
HINES SUBMITTED	C. McNABNEY	03-11-09
U of M SUBMITTED	M. MARSHAK	03-11-09

PROJECT NORTH — E, S, W

SCALE:
1/16"=1'-0" 8 0 8 16 24 32 40
SCALE FEET

UNIVERSITY OF MINNESOTA
PROJECT NUMBER 896-06-1711
Hines

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

NOvA FAR DETECTOR BUILDING
LIGHTNING PROTECTION PLAN & DETAILS

DRAWING NO. 15-1-3B E-33 REV. 0

11 MAR, 2009