

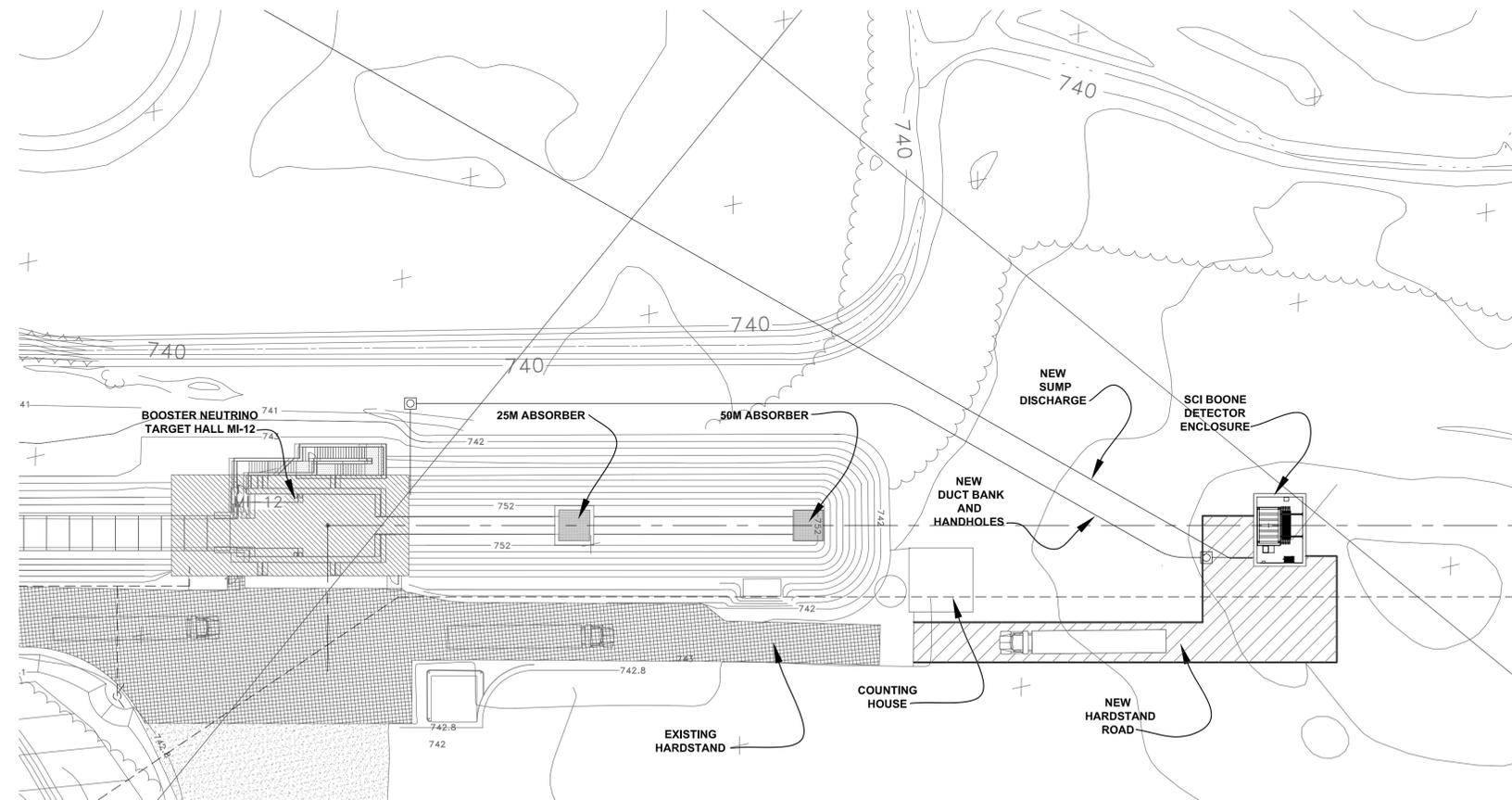
# SciBooNE DETECTOR

## ENCLOSURE

### PROJECT NUMBER 6-7-62

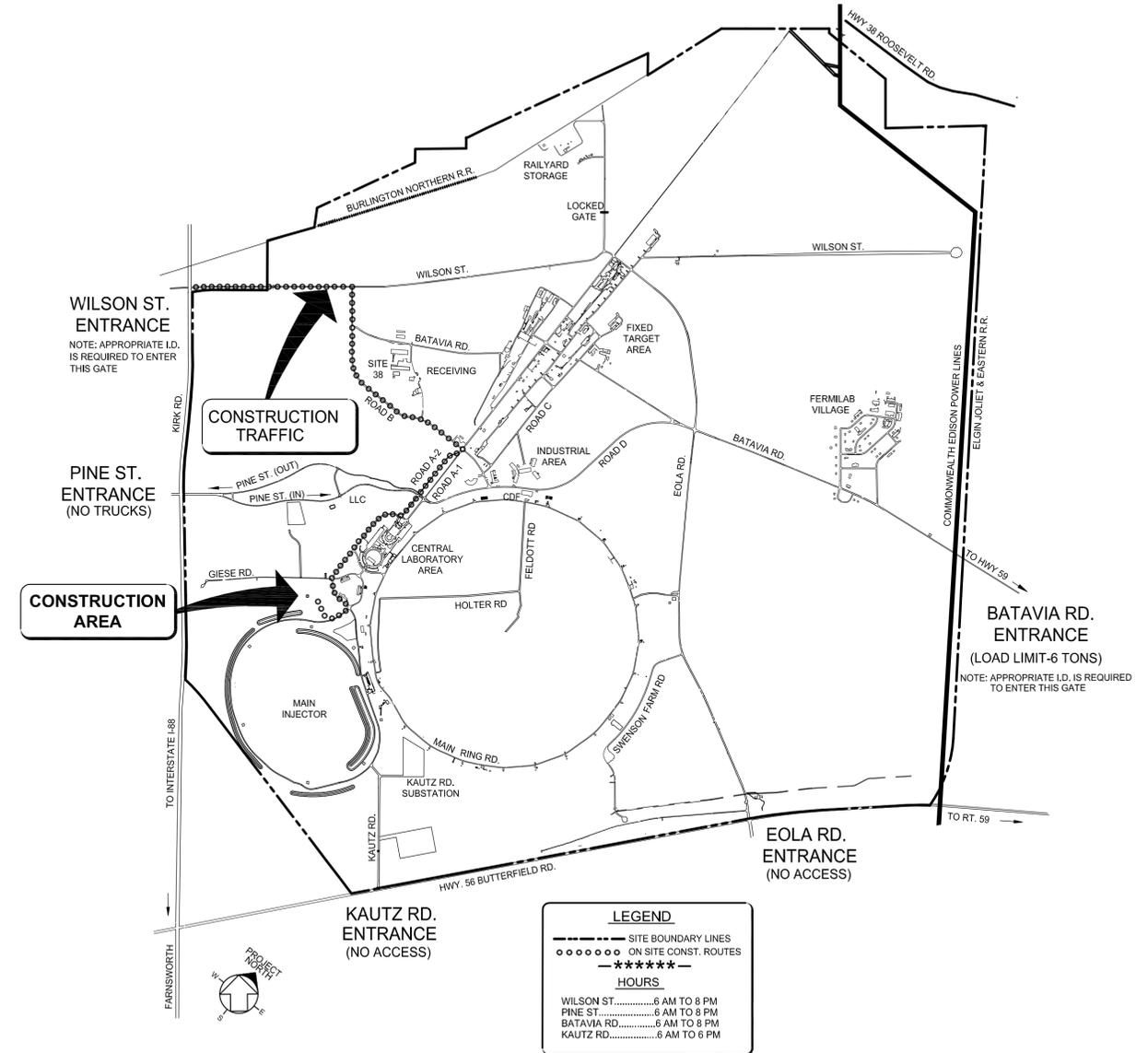
**DRAWING LIST:**

- |                                     |  |
|-------------------------------------|--|
| <b>GENERAL DRAWINGS</b>             | <b>MECHANICAL DRAWINGS</b>             |
| G-1 DRAWING LIST AND LOCATION PLANS | M-1 PLANS AND DETAILS                  |
| G-2 GENERAL CONSTRUCTION NOTES      | M-2 SECTIONS & DETAILS                 |
| G-3 ELECTRICAL SPECIFICATIONS - 1   | M-3 SCHEDULE, NOTES AND DETAILS        |
| G-4 ELECTRICAL SPECIFICATIONS - 2   |  |
| <b>CIVIL DRAWINGS</b>               | <b>ELECTRICAL DRAWINGS</b>             |
| C-1 SITE PLAN                       | E-1 SINGLE LINE DIAGRAM                |
| C-2 CIVIL DETAILS SHEET - 1         | E-2 PANELBOARD SCHEDULES               |
| C-3 CIVIL DETAILS SHEET - 2         | E-3 POWER PLAN EL. 7'16'-0" & 7'31'-6" |
| <b>STRUCTURAL DRAWINGS</b>          | E-4 POWER PLAN EL. 7'44'-0"            |
| S-1 PLANS & DETAILS - SHEET 1       | E-5 MI-12 POWER PLAN                   |
| S-2 PLANS & DETAILS - SHEET 2       | E-6 ELECTRICAL SECTIONS                |
| S-3 PLANS & DETAILS - SHEET 3       | E-7 SECTIONS AND DETAILS               |
| S-4 SECTIONS AND DETAILS - SHEET 1  |  |
| S-5 SECTIONS AND DETAILS - SHEET 2  |  |
| S-6 HANDRAIL DETAILS                |  |



**SITE PLAN**

SCALE: 1"=60'-0"



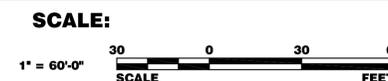
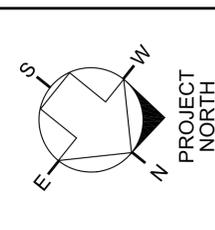
**VICINITY PLAN**

SCALE: NONE

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REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS
		REVISIONS

	NAME	DATE
DESIGNED	<b>R. ALBER</b>	<b>06/26/06</b>
DRAWN	<b>R. JEDZINIAK</b>	<b>06/26/06</b>
CHECKED	<b>T. LACKOWSKI</b>	<b>06/26/06</b>
APPROVED	<b>V. KUCHLER / E. CRUMPLEY</b>	<b>06/26/06</b>
SUBMITTED	<b>R. TESAREK</b>	<b>06/26/06</b>



**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY

**SciBooNE DETECTOR ENCL.**  
**DRAWING LIST AND LOCATION PLANS**

DRAWING NO. **6-7-62** **G-1** REV. **0**

26-JUNE 2006 F.I.M.S. No. 780

**1.0 GENERAL CONDITIONS**

1. THE SUBCONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS BEFORE STARTING WORK. IF CONDITIONS VARY FROM THOSE INDICATED ON THE DRAWINGS, THE FERMLAB CONSTRUCTION COORDINATOR SHALL BE NOTIFIED AND NO WORK SHALL BE DONE IN THIS AREA WITHOUT HIS APPROVAL.
2. THE SUBCONTRACTORS SHALL COORDINATE WORK AND COOPERATE WITH SUBCONTRACTORS ON ADJACENT AND CONCURRENT WORK.
3. SCALE FOR THE DRAWINGS IS FOR GENERAL INFORMATION ONLY, LOCATIONS AND DIMENSIONS SHALL BE TAKEN AS SHOWN AND NOT SCALED.
4. DAILY CLEAN UP SHALL ELIMINATE ALL MATERIALS FROM DEMOLITION, DROPPINGS, SCRAPS, AND PACKING MATERIALS.
5. DEBRIS SHALL BE REMOVED FROM THE FERMLAB SITE.
6. MATERIAL STOCKPILING AREAS SHALL BE COORDINATED WITH THE CONSTRUCTION COORDINATOR. ALL CONSTRUCTION MATERIALS MUST BE DELIVERED TO, ASSEMBLED, AND UTILIZED IN THE IMMEDIATE CONSTRUCTION AREA, UNLESS OTHERWISE COORDINATED WITH EITHER THE BUILDING MANAGER ON A CASE-BY-CASE BASIS.
7. REMOVE ALL WALLS AND MATERIALS AS INDICATED AND/OR NOTED ON PLANS OR SECTIONS. ALL MATERIALS FROM DEMOLITION ARE TO BE REMOVED FROM THE SITE UNLESS NOTED OTHERWISE.
8. ALL POWDER ACTUATED FASTENING TOOLS SHALL BE OPERATED EXCLUSIVELY BY PERSONS WITH A CURRENT OPERATORS CERTIFICATE ISSUED BY THE MANUFACTURER OF THE TOOL BEING USED. ALL OPERATORS SHALL HAVE PROOF OF CERTIFICATION AVAILABLE FOR APPROVAL BY THE FERMLAB CONSTRUCTION COORDINATOR PRIOR TO COMMENCEMENT OF ANY TOOL USE.
9. ALL PAINT WASTE SHALL BE REMOVED FROM FERMLAB AND PROPERLY DISPOSED OF.
10. WARNING SIGNS AND BARRICADES SHALL BE USED IN THE CONSTRUCTION AREAS.
11. THE SUBCONTRACTOR SHALL CONTROL THE DUST TO THE BEST EXTENT POSSIBLE AS DETERMINED BY THE CONSTRUCTION COORDINATOR.
12. THE SUBCONTRACTOR SHALL PROVIDE AN EXCAVATION PLAN FOR REVIEW. THE PLAN SHALL BE PREPARED AND SEALED BY A REGISTERED ENGINEER IN THE STATE OF ILLINOIS.
12. SEE EXHIBIT "A" AND ADDENDUM, SCHEDULE AND SUPPLEMENTARY TERMS AND CONDITIONS, FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

**2.0 SITE CONSTRUCTION**

**2.1 GENERAL NOTES**

1. CIVIL SITE CONSTRUCTION OF THIS PROJECT SHALL BE DONE IN ACCORDANCE TO THE STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION IN ILLINOIS, DIVISIONS II, III AND IV - MAY 1996 EDITION AND THE I.D.O.T. STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, JANUARY 2002 EDITION. ALL REFERENCES TO METHOD OF PAYMENT ARE NOT APPLICABLE. ALL REFERENCES TO CONTRACTOR SHALL MEAN SUBCONTRACTOR AS DEFINED BY FERMLAB.
2. EXISTING UTILITIES ARE SHOWN ON THE PLAN AS A GUIDE TO THE SUBCONTRACTOR. LOCATIONS OF EXISTING UTILITIES ARE SHOWN BASED ON FERMLAB RECORD DRAWINGS AND JULIE LOCATES. ACTUAL LOCATION OF THESE UTILITIES MAY VARY. PRIOR TO START OF CONSTRUCTION, FERMLAB WILL PROVIDE THE SUBCONTRACTOR WITH A JULIE LOCATE OF ALL KNOWN UTILITIES WITHIN THE CONSTRUCTION LIMITS. SUBCONTRACTOR SHALL THEN BE RESPONSIBLE FOR LOCATING AND EXPOSING ALL UTILITIES WHERE THERE ARE POTENTIAL CONFLICTS. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING AND SUPPORTING ALL EXISTING UTILITIES AND APPURTENANCES. ANY UTILITIES DAMAGED SHALL BE IMMEDIATELY REPAIRED AT NO ADDITIONAL COST TO FERMLAB.
3. THE SUBCONTRACTOR SHALL NOTIFY FERMLAB AT LEAST 48 HOURS IN ADVANCE, PRIOR TO THE START OF CONSTRUCTION AND ANY SHUTDOWN OF SEWER OR WATER SERVICE.
4. TRAFFIC CONTROL - MODIFICATION TO SECTION 20-2.17 OF THE STANDARD SPECIFICATIONS. THE SUBCONTRACTOR SHALL MAINTAIN ACCESS TO THE EXISTING GCC BUILDING AND WIDE BAND HIGH BAY BUILDINGS AT ALL TIMES. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING, INSTALLING AND MAINTAINING ALL NECESSARY SIGNAGE, TRAFFIC CONTROL DEVICES, WARNING DEVICES AND FLAGMEN TO PROTECT THE PUBLIC DURING ALL PHASES OF CONSTRUCTION.
5. ALL CONSTRUCTION MEANS AND METHODS AS WELL AS SAFETY ARE THE RESPONSIBILITY OF THE SUBCONTRACTOR.
6. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING EXISTING SOIL CONDITIONS AND THE DESIGN AND CONSTRUCTION OF STABLE TRENCH EXCAVATIONS PER OSHA REQUIREMENTS TO MAINTAIN SAFE WORKING CONDITIONS.
7. SUBCONTRACTOR IS RESPONSIBLE FOR ALL PROJECT LAYOUT, HORIZONTAL AND VERTICAL CONTROL. FIELD ADJUSTMENTS TO ANY PORTIONS OF THE WORK SHALL BE MADE ONLY WITH PRIOR APPROVAL FROM THE FERMLAB CONSTRUCTION COORDINATOR.
8. SUBCONTRACTOR SHALL PROTECT ALL TREES, SHRUBS AND SURROUNDING LANDSCAPE WITHIN THE CONSTRUCTION LIMITS FROM DAMAGE DURING CONSTRUCTION. ANY EXISTING TRAFFIC SIGNS WITHIN THE CONSTRUCTION LIMITS SHALL BE PROTECTED OR TEMPORARILY REMOVED AND REPLACED UPON COMPLETION OF WORK.
9. SUBCONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ALL AREAS AND DRAINAGE DITCHES DISTURBED DURING THE COURSE OF CONSTRUCTION. TRENCH AREAS TO BE REGRADED WITH A MIN. OF 6" TOPSOIL, FERTILIZED AND RESEEDED WITH AN IDOT CL 1 LAWN MIX AS PER SECTION 21-2.05 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
10. SUBCONTRACTOR SHALL BE RESPONSIBLE FOR USING APPROPRIATE SOIL EROSION CONTROL MEASURES DURING THE COURSE OF CONSTRUCTION TO PREVENT SEDIMENT FROM ENTERING EXISTING DRAINAGE DITCHES AND CULVERTS. SUBCONTRACTOR SHALL SUBMIT A SOIL EROSION AND SEDIMENT CONTROL PLAN FOR APPROVAL PRIOR TO START OF CONSTRUCTION.
11. DRAINAGE DITCHES OR SWALES IN EXCESS OF 0.50% IN SLOPE OR WITH SIDESLOPES IN IN EXCESS OF 3:1 SHALL BE COVERED WITH AN SR-1 100% STRAW EROSION CONTROL BLANKET AS MANUFACTURED BY CARTHAGE MILLS OR APPROVED EQUAL.
12. SUBCONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING TRENCHES. PUMP DISCHARGES FROM TRENCH EXCAVATIONS SHALL DIRECT SEDIMENT LADEN WATER TO TEMPORARY SEDIMENT BASINS CONSTRUCTED FROM STRAW BALES.
13. SUBCONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING ALL ROADS CLEAR FROM LOOSE MATERIALS AND DEBRIS. SUBCONTRACTOR SHALL CLEAR ALL PAVED AREAS AT THE CLOSE OF WORK EACH DAY OR AS NEEDED DURING THE COURSE OF CONSTRUCTION.
14. ALL UNSUITABLE SOIL MATERIALS AND DEBRIS GENERATED FROM THIS SITE SHALL BE HAULED OFFSITE AND LEGALLY DISPOSED OF AT THE SUBCONTRACTOR'S EXPENSE. ALL EXCESS SUITABLE SOIL MATERIALS GENERATED SHALL BE USED TO CONSTRUCT THE WIDENING OF THE EXISTING BERM AS SHOWN ON THE DRAWINGS.
15. THE SUBCONTRACTOR SHALL SUBMIT TO FERMLAB THE FOLLOWING ITEMS FOR APPROVAL PRIOR TO THE START OF CONSTRUCTION:
  - A. SIX (6) COPIES OF ALL SHOP DRAWINGS AND CATALOG CUTS FOR ALL FABRICATED OR MANUFACTURED ITEMS TO BE INSTALLED.
  - B. SOIL EROSION CONTROL AND SEDIMENT PLAN.

**2.2 PIPE MATERIALS**

1. HDPE PIPE MATERIALS
  - (1.) THE SUMP DISCHARGE PIPING SHALL BE: HIGH DENSITY POLYETHYLENE PIPE, DIPS SIZED PIPE HDPE PIPE SHALL BE PE 3408 IN ACCORDANCE WITH AWWA-C906. WALL THICKNESS SHALL BE DR 11.
  - (2.) ALL TEES INSTALLED ON HDPE PIPE SHALL BE DUCTILE IRON. FLAT FACE FLANGES WITH FULL FACE GASKETS. HDPE PIPE FLANGES SHALL BE MOLDED FLANGE ADAPTERS HEAT FUSED TO THE PIPE. STEEL BACKER RINGS SHALL BE INSTALLED ON ALL PE TO DUCTILE IRON FLANGED CONNECTIONS.
  - (3.) FITTINGS (OTHER THAN TEES) AND JOINTS SHALL BE HEAT FUSED IN ACCORDANCE WITH THE PIPE MANUFACTURER'S GUIDELINES.
2. DUCTILE IRON PIPE MATERIALS
  - (1.) TO FACILITATE CATHODIC PROTECTION OF HYDRANTS AND VALVES, HYDRANTS, AUXILIARY VALVES, AND ISOLATION VALES SHALL BE INTERCONNECTED WITH DUCTILE IRON PIPE INSTEAD OF PVC, PROVIDED WITH CATHODIC PROTECTION (SEE SPECIFICATIONS NOTE 10) AND WRAPPED WITH POLYETHYLENE.
  - (2.) DUCTILE IRON PIPE SHALL BE PRESSURE CLASS 350 (AWWA C-151) MIN WALL THICKNESS OF 0.25", WITH CEMENT MORTAR LINING (AWWA C-104) AND RESTRAINED JOINTS. FITTINGS SHALL BE DUCTILE IRON WITH FUSION-BONDED EPOXY COATING AND MECHANICAL JOINTS WITH MEGALUGS AND STAINLESS STEEL NUTS AND BOLTS AND WRAPPED WITH POLYETHYLENE.

**3.0 CONCRETE**

1. ALL REINFORCED CONCRETE SHALL CONFORM TO "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE ACI-318, LATEST EDITION.
  2. ALL REINFORCED CONCRETE SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4,000PSI IN 28 DAYS.
  3. REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60 FOR DEFORMED BARS.
  4. WELDED PLAIN WIRE FABRIC (FLAT SHEET ONLY) SHALL CONFORM TO ASTM A185.
  5. CEMENT SHALL BE ASTM C150, TYPE 1. THIS WILL ADDRESS THE CONCRETE FOR NEW SIDEWALKS, AND FOR THE INTERIOR RAMP AND THE CURB FOR THE NEW WINDOW WALL.
  6. ALL INTERIOR CONCRETE SURFACES SHALL BE TROWEL FINISHED AND TREATED WITH "VOCOMP-20" MANUFACTURED BY W. R. MEADOWS OR APPROVED EQUAL.
  7. ALL EXTERIOR CONCRETE SURFACES SHALL BE TROWEL FINISHED AND TREATED WITH "MEADOW-PRUF SEAMLESS Single-Component, Water-Base, Polymer-Modified, Cold-Applied, Residential Waterproofing Membrane" MANUFACTURED BY W. R. MEADOWS OR APPROVED EQUAL.
- 5.0 METALS**
1. ALL STEEL SHALL BE NEW STEEL AND SHALL CONFORM TO ASTM SPECIFICATION INDICATED (LATEST REVISION) UNLESS OTHERWISE NOTED AND SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH CURRENT A.I.S.C. STANDARDS AND APPLICABLE CODES:
 

WIDE FLANGE	A572 GRADE 50
PLATE, ANGLE, CHANNELS	A36
  2. ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH "THE CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" AND THE "SPECIFICATIONS FOR DESIGN FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (A.I.S.C. LATEST EDITION).
  3. ALL STRUCTURAL STEEL SHALL BE OF SIZE SHOWN ON DRAWINGS AND SHALL BE STRAIGHT AND FREE OF TWIST. SUBSTITUTIONS WILL NOT BE PERMITTED WITHOUT APPROVAL OF THE FERMLAB.
  4. THE FABRICATOR/ERECTOR SHALL SUBMIT TO THE ARCHITECT FOR REVIEW, ENGINEERED AND CHECKED DRAWINGS SHOWING SHOP FABRICATION, DETAILS, FIELD ASSEMBLY DETAILS AND ERECTION DIAGRAMS FOR ALL STRUCTURAL STEEL PRIOR TO FABRICATION. ALL SHOP DRAWINGS MUST BE COMPLETE FOR ALL STRUCTURAL STEEL WITH BEAM SIZES, MARKS, ETC., SHOWN ON ERECTION PLANS. ALL SHOP DRAWINGS SHALL BE PREPARED UNDER THE DIRECTION OF A LICENSED STRUCTURAL ENGINEER.
  5. THERE SHALL BE NO FIELD CUTTING OF STRUCTURAL STEEL MEMBERS FOR THE WORK OR OTHER TRADES WITHOUT THE PRIOR WRITTEN APPROVAL OF FERMLAB.
  6. BOLTED CONNECTIONS SHALL BE BEARING TYPE CONNECTIONS WITH THREADS INCLUDED IN SHEAR PLANE (A325-N) UTILIZING 3/4" DIAMETER HIGH STRENGTH BOLTS WITH WASHERS UNDER NUTS CONFORMING TO ASTM DESIGNATION A325 (LATEST REVISION) TIGHTENED TO SPECIFIED TENSION UNLESS OTHERWISE SHOWN OR NOTED.
  7. WELDED CONNECTIONS SHALL BE AS SHOWN ON DETAILS. ALL WELDING SHALL BE EITHER MANUAL ARC WELDING OR SUBMERGED ARC WELDING, BOTH TO PROVIDE PROPERTIES OF THE BASE MATERIAL. TECHNIQUES OF WELDING AND PREHEAT ARE TO FOLLOW PUBLISHED RECOMMENDATIONS OF BASE MATERIAL MANUFACTURER. ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS AND IN ACCORDANCE WITH THE PUBLISHED RECOMMENDATIONS OF THE AMERICAN WELDING SOCIETY AS NOTED IN THE A.I.S.C. SPECIFICATIONS UNLESS OTHERWISE SHOWN. MINIMUM TENSILE STRENGTH OF ELECTRODES SHALL BE 70 KSI.
  8. SHOP CONNECTIONS SHALL BE WELDED OR BOLTED. WELDS SHALL BE DESIGNED TO BE FULLY EQUIVALENT IN STRENGTH TO BOLTED CONNECTIONS.
  9. ALL STRUCTURAL STEEL AND BAR GRATING TO HAVE (1) ONE COAT OF PRIMER AND (2) TWO COATS OF FINISH COAT. PREPARE SURFACE FOR EXTERIOR EXPOSURE AND APPLY PER MANUFACTURER'S RECOMMENDATIONS. SUPPLY DRAW DOWN SAMPLE OF PAINTCOLORS.
  10. STEEL GRATING SHALL BE 1 1/4" x 3/16" (W 19-4). GRATING SHALL BE WELDED TO STRUCTURAL STEEL ON REMOVABLE PLATFORMS. GRATING ON FIXED PLATFORMS SHALL BE SECURED WITH SADDLE CLIPS AND WELDED STUDS.

**7.0 DOORS**

1. DOORS SHALL BE 3'-6" x 7'-0" x 1 3/4" GALVANIZED DOOR & FRAME (INSULATED) HINGES -- 1 1/2" PAIR HINGES - HAGER #BB1191-NRP-26D  
**LOCKSET** - 1 Ea. (FUNCTION: ENTRANCE) - BEST 99K/D15D / S3 / 626 CYLINDERS; EQUIP. LOCKS WITH CYLINDERS FOR INTERCHANGEABLE CORE. SHALL FORMAT. 7 PIN TUMBLER INSERTS. FURNISH ONLY TEMPORARY INSERTS FOR THE CONSTRUCTION PERIOD, AND REMOVE THESE WHEN DIRECTED. FINAL CORES AND KEYS FOR INSTALLATION WILL BE FERMLAB'S RESPONSIBILITY.  
**CLOSER** ----- 1 Ea. LCN 4040 SERIES  
**THRESHOLD** - 1 Ea. ZERO #545A  
**WEATHERSTRIPPING** - 1 Set ZERO #314AA  
**SWEEP** ----- 1 Ea. #339A  
**DRIP CAP** ----- 1 Ea. HAGER
2. HOLLOW METAL DOORS SHALL BE AS MANUFACTURED BY CECO CORP. OR EQUAL.
3. PROVIDE METAL DOORS OF SDI GRADES AND MODELS SPECIFIED BELOW AND AS INDICATED ON DRAWINGS OR SCHEDULES:
4. DOORS SHALL BE FULL FLUSH SEAMLESS CONSTRUCTION AND SHALL HAVE CONTINUOUS VERTICAL MECHANICAL INTER-LOCKING JOINTS AT LOCK AND HINGE EDGES WITH VISIBLE EDGE SEAM FILLED AND GROUND SMOOTH.
5. FABRICATE FRAMES WITH MITERED CORNERS, CONTINUOUSLY WELDED CONSTRUCTION.
6. DOOR SILENCERS: DRILL STOPS TO RECEIVE 3 SILENCERS ON STRIKE JAMBS OF SINGLE DOOR FRAMES.
7. HEAD REINFORCING: FOR FRAMES OVER 4'-0" WIDE PROVIDE 2 CONTINUOUS STEEL ANGLES NOT LESS THAN 2" X 2" X 12 GAUGE AND WIDTH OF OPENING, WELDED TO BACK OF FRAME AT HEAD, UNLESS OTHERWISE SHOWN.
8. STEEL DOORS SHALL BE FULLY WELDED CONSTRUCTION. FABRICATE STEEL DOOR AND FRAME UNITS TO BE RIGID, NEAT IN APPEARANCE AND FREE FROM DEFECTS, WARP OR BUCKLE. WHEREVER PRACTICABLE, FIT AND ASSEMBLE UNITS IN MANUFACTURER'S PLANT. CLEARLY IDENTIFY WORK THAT CANNOT BE PERMANENTLY FACTORY-ASSEMBLED BEFORE SHIPMENT, TO ASSURE PROPER ASSEMBLY AT PROJECT SITE. COMPLY WITH ANSISDI-100 REQUIREMENTS.
9. INTERNAL CONSTRUCTION: MANUFACTURER'S STANDARD HONEYCOMB OR POLYURETHANE CORE WITH INTERNAL SOUND DEADENER ON INSIDE OF FACE SHEETS WHERE APPROPRIATE IN ACCORDANCE WITH SDI STANDARDS.
10. EXPOSED FASTENERS: UNLESS OTHERWISE INDICATED, PROVIDE COUNTERSUNK FLAT OR OVAL HEADS FOR EXPOSED SCREWS AND BOLTS.
11. HARDWARE PREPARATION: PREPARE DOORS AND FRAMES TO RECEIVE MORTISED AND CONCEALED HARDWARE IN ACCORDANCE WITH FINAL DOOR HARDWARE SCHEDULE AND TEMPLATES PROVIDED BY HARDWARE SUPPLIER. COMPLY WITH APPLICABLE REQUIREMENTS OF ANSI A115 SERIES SPECIFICATIONS FOR DOOR AND FRAME PREPARATION FOR HARDWARE. HINGE REINFORCEMENTS SHALL BE 7 GAUGE. LOCK REINFORCEMENTS SHALL BE 16 GAUGE AND CLOSER REINFORCEMENTS, 12 GAUGE.
12. REINFORCE DOORS AND FRAMES TO RECEIVE SURFACE-APPLIED HARDWARE. DRILLING AND TAPPING FOR SURFACE-APPLIED HARDWARE MAY BE DONE AT PROJECT SITE.
13. JAMB ANCHORS: FURNISH JAMB ANCHORS AS REQUIRED TO SECURE FRAMES TO ADJACENT CONSTRUCTION, FORMED OF NOT LESS THAN 18 GAUGE GALVANIZED STEEL.
14. PROVIDE SCREWLESS SNAP-IN TYPE GLAZING BEADS ON INSIDE OF GLASS.
15. INSTALL HOLLOW METAL WORK IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND DRAWINGS AND STEEL DOOR INSTITUTE SDI-105.
16. BACKS OF FRAMES IN MASONRY OR CONCRETE CONSTRUCTION SHALL BE FILLED SOLID WITH GROUT. FRAMES SHALL BE SECURED TO EXISTING OR PREVIOUSLY CONSTRUCTED CONCRETE AND MASONRY WALLS WITH GALVANIZED STEEL EXPANSION BOLTS IN LEAD SHIELDS.

Dwg: G-02\_6-7-62.dwg Plotted: 30JUN06 @ 06:43:29a.m.

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REV.	DATE	DESCRIPTIONS
		REVISIONS

	NAME	DATE
DESIGNED	<b>R. ALBER</b>	<b>06/26/06</b>
DRAWN	<b>R. JEDZINIAK</b>	<b>06/26/06</b>
CHECKED	<b>T. LACKOWSKI</b>	<b>06/26/06</b>
APPROVED	<b>V. KUCHLER / E. CRUMPLEY</b>	<b>06/26/06</b>
SUBMITTED	<b>R. TESAREK</b>	<b>06/26/06</b>

**SCALE:**

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



**SciBoONE DETECTOR ENCL.**  
**GENERAL CONSTRUCTION NOTES**

DRAWING NO. **6-7-62**

**G-2** REV. **0**

F.I.M.S. No. 780  
26 JUNE 2006



**CONDUITS, RACEWAYS AND FITTINGS**

- APPLICABLE STANDARDS
  - ANSI C80.1
  - ANSI C80.5
  - ASTM A615
  - FEDERAL SPECIFICATIONS WW-C-581D
  - FEDERAL SPECIFICATIONS WW-C-540C
  - FEDERAL SPECIFICATIONS WC-1094-A
  - NEMA RN1-1980
  - NEMA TC-2
  - NEMA TC-3
  - NEMA TC-7
  - NFPA 70 (NEC)
  - UL-651, A.A.S.H.T.O.
  - UL STANDARD UL-6
- CONDUITS SHALL NOT BE SHIPPED LOOSE, BUT SHALL BE BUNDLED BY SIZES. THREADS OF METAL CONDUITS SHALL BE PROTECTED BY PLASTIC CAPS. FITTINGS SHALL BE STORED IN BOXES. ALL EQUIPMENT SHALL BE STORED ON PALLETS TO PREVENT CONTACT WITH EARTH AND SHALL BE COVERED WITH PLASTIC SHEETING TO PROTECT THEM FROM DIRT AND DUST.
- SUBMITTALS (SUBMIT ONLY ON TYPES APPLICABLE FOR PROJECT)
  - GALVANIZED RIGID STEEL CONDUIT (RGS)
  - INTERMEDIATE METAL CONDUIT (IMC)
  - ELECTRICAL METALLIC TUBING (EMT)
  - SCHEDULE 40 PVC CONDUIT
  - SCHEDULE 80 PVC CONDUIT
  - TYPE "EB" CONDUIT
  - LIQUID TIGHT FLEXIBLE METAL CONDUIT
  - FLEXIBLE METAL CONDUIT
- ALL MATERIAL SHALL BE PURCHASED NEW FROM SUPPLIERS/MANUFACTURERS REGULARLY ENGAGED IN THE BUSINESS OF ELECTRICAL CONDUIT, DUCTS AND FITTINGS.
- ALL EQUIPMENT SHALL BE WARRANTED TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION ESTABLISHED BY FERMLAB.
- ELECTRIC METALLIC TUBING SHALL BE FURNISHED WITH COMPRESSION TYPE FITTINGS. SET SCREW TYPE FITTINGS ARE NOT ACCEPTABLE.
- SCHEDULE 40 GALVANIZED RIGID STEEL CONDUIT SHALL BE OF HEAVY WALL TYPE FABRICATED FROM MILD STEEL TUBING AND SHALL HAVE A HOT-DIPPED GALVANIZED INNER AND OUTER COATING, WITH A FINAL COATING OF ZINC CHROMATE.
- EXPOSED PVC CONDUIT SHALL BE SCHEDULE 40 OR SCHEDULE 80, AS NOTED ON THE DRAWINGS. PVC, 90°C, UL RATED OR APPROVED EQUIVALENT. MATERIAL SHALL COMPLY TO NEMA SPECIFICATION TC-2 (CONDUIT), TC-3 (FITTINGS-UL-514) AND UL-651 (STANDARD FOR RIGID NONMETALLIC CONDUIT). CONDUIT SHALL BE MADE FROM POLYVINYL CHLORIDE C-300 COMPOUND WHICH INCLUDES INERT MODIFIERS TO IMPROVE WEATHERABILITY, HEAT DISTORTION, CONDUIT, FITTINGS AND CEMENT SHALL BE PRODUCED BY SAME MANUFACTURER TO ASSURE SYSTEM INTEGRITY.
- LIQUID TIGHT FLEXIBLE METAL CONDUIT SHALL CONSIST OF POLYVINYL JACKET OVER FLEXIBLE HOT DIP GALVANIZED STEEL TUBING. FLEXIBLE CONDUIT SHALL BE COMPLETELY SEALED FROM LIQUIDS, DUST, DIRT AND FUMES, BE RESISTANT TO OIL, GASOLINE, GREASE AND ABRASION. JACKET SHALL ALSO BE SUNLIGHT RESISTANT. FLEXIBLE CONDUIT SHALL BE U.L. LISTED AND COMPLY WITH ARTICLE 351 OF NEC. FLEXIBLE CONDUIT SHALL BE FLEXI-GUARD TYPE UAG, AS MANUFACTURED BY O-Z/GEDNEY, OR EQUAL.
- TYPE EB CONDUIT SHALL BE UTILIZED FOR CONCRETE ENCASEMENT. CONDUIT NOT CONCRETE ENCASED SHALL BE GALVANIZED RIGID STEEL CONDUIT.
- EACH EMPTY CONDUIT SHOWN OR DESCRIBED ON THE DRAWINGS SHALL BE FURNISHED WITH A PULL STRING TO FACILITATE FUTURE CONDUCTOR INSTALLATION. STRING SHALL CONSIST OF NON-DETERIORATING, NONMETALLIC, NON-COTTON CONSTRUCTION SUCH AS POLYESTER OR NYLON MATERIAL. MINIMUM TENSILE STRENGTH OF ALL PULL STRINGS SHALL BE 200#. LEAVE MINIMUM OF 12 INCHES SLACK AT EACH TERMINATION OR END. ANY REFERENCES ON PROJECT DRAWINGS TO "PULL WIRE" SHALL BE INTERPRETED AS A PULL STRING AS DESCRIBED HEREIN.
- FIRE STOPPING MATERIALS SHALL CONSIST OF COMMERCIALY MANUFACTURED PRODUCTS CAPABLE OF PASSING ASTM E-814 (UL 1479) STANDARD METHOD OF FIRE TEST FOR THROUGH PENETRATION FIRE STOPS.
  - FIRE STOPPING MATERIALS SHALL MAINTAIN THE RATING OF THE WALL, PARTITION, CEILING OR FLOOR OPENING THAT PENETRATION IS MADE. COMPLY WITH NEC 300-21.
  - FIRE STOPPING MATERIALS SHALL BE U.L. CLASSIFIED.
  - USE HEAVY WALL STEEL PIPE SLEEVES, ANCHORED TO BUILDING CONSTRUCTION AND FINISHED PLUMB WITH WALL, CEILING OR FLOOR LINES.
  - MANUFACTURERS:
    - CHASE TECHNOLOGY - CTC, PR-855.
    - DOW CORNING - SILICONE RTV FOAM 3-6548.
    - NELSON - FLAMESEAL.
    - THOMAS & BETTS - FLAME SAFE.
    - 3M - FIRE BARRIER.
  - WHERE APPLICABLE FOR THE RESPECTIVE WALL AND ITS FIRE RATING, SMOKE AND FIRE STOP FITTINGS MAY BE USED IN LIEU OF SEALANT AS MANUFACTURED BY OZ/GEDNEY, SERIES CFS.
- WATER SEAL:
  - SEAL PENETRATIONS OF PERIMETER WALLS OR FLOORS BELOW GRADE TO PREVENT ENTRY OF WATER. USE MATERIALS COMPATIBLE WITH WALL OR FLOOR CONSTRUCTION AND APPROVED BY FERMLAB CONSTRUCTION COORDINATOR.

**CONDUITS, RACEWAYS AND FITTINGS - CONTINUED**

- SEAL PENETRATIONS OF ROOF WITH FLASHINGS COMPATIBLE WITH ROOF DESIGN AND APPROVED BY ROOFING SYSTEM MANUFACTURER AND ENGINEER.
- SEAL ANNULAR SPACE BETWEEN CONDUCTORS AND CONDUIT WALL OF ALL CONDUIT TERMINATIONS WHERE CONDUIT EXITS FROM BELOW GRADE IN ORDER TO BLOCK MOISTURE MIGRATION INTO ELECTRICAL EQUIPMENT. INSTALL PRODUCT ONLY AFTER CONDUCTORS HAVE BEEN INSTALLED, TERMINATED AND COMMISSIONED FOR SERVICE. CONDUIT MOISTURE BARRIER MATERIAL SHALL NOT HARDEN AND BE COMPATIBLE WITH BOTH WIRE INSULATION AND CONDUIT MATERIALS. INSTALLED PRODUCT SHALL BE EASILY REMOVED FOR MAINTENANCE OR MODIFICATIONS. REGARDLESS OF THE LENGTH OF TIME MATERIAL HAS BEEN INSTALLED. CONDUIT MOISTURE SEAL MATERIAL SHALL BE:
 

WATERGUARD INDUSTRIAL ENCAPSULANT, ADVANCE TECHNOLOGY PRODUCTS, 14123 I-10 EAST FREEWAY, HOUSTON, TEXAS 77015, PHONE(713) 450-5990, FAX:(713) 450-5980

AMERICAN POLYWATER CORPORATION, POLYWATER DUCT SEALANT FST-180 SERIES, P.O. BOX 53, STILLWATER, MN 55082, PHONE:(651) 430-2270, FAX:(651) 430-3634
- ALL CONDUITS SHALL BE INSPECTED FOR PROPER FIT AND FINISH. FOR OUT-OF-ROUND AND FOR PROPER THICKNESS. ALL BURRS AND FLASHING SHALL BE REMOVED. CONDUIT AND FITTINGS SHALL BE CLEAN AND FREE OF OBSTRUCTIONS
- MINIMUM CONDUIT SIZE SHALL BE 3/4" IN DIAMETER, UNLESS NOTED OTHERWISE ON THE SUBCONTRACT DRAWINGS. LARGER SIZES SHALL BE INSTALLED WHERE NOTED OR WHERE REQUIRED BY NEC.
- ALL EXTERIOR ABOVE GRADE CONDUIT SHALL BE GALVANIZED RIGID STEEL TYPE, EXCEPT WHERE NOTED OTHERWISE.
- EXPOSED INTERIOR CONDUIT SHALL BE ELECTRICAL METALLIC TUBING TYPE, UNLESS NOTED OTHERWISE ON THE SUBCONTRACT DRAWINGS.
- CONDUIT RUNS EMBEDDED IN STRUCTURE FLOORS SHALL GALVANIZED RIGID STEEL, UNLESS NOTED OTHERWISE ON THE SUBCONTRACT DRAWINGS OR DIRECTED BY THE FERMLAB CONSTRUCTION COORDINATOR.
- ALL WORK SHALL BE LAID OUT WITH SLEEVES FOR OPENINGS THROUGH FLOORS AND WALLS, ETC. AS REQUIRED PRIOR TO LAYING OF FLOORS AND WALLS. IF SLEEVES AND INSERTS ARE NOT PROPERLY INSTALLED, SUBCONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY CUTTING AND PATCHING LATER AT HIS OWN EXPENSE AND TO SATISFACTION OF THE FERMLAB CONSTRUCTION COORDINATOR.
- CONDUIT SIZE AND FILL REQUIREMENTS SHALL COMPLY WITH APPROPRIATE CONDUIT FILL TABLES IN ANNEX C OF NEC. IT SHOULD BE NOTED THESE ARE MINIMUM REQUIREMENTS AND LARGER CONDUIT SIZES OR SMALLER FILL REQUIREMENTS SHALL BE USED WHENEVER SPECIFIED OR DETAILED ON DRAWINGS.
- FLEXIBLE CONDUIT SHALL BE PROVIDED AS A CONNECTION BETWEEN EACH JUNCTION BOX AND HVAC UNIT, TRANSFORMERS OR ANY OTHER PIECE OF EQUIPMENT SUBJECT TO MOVEMENT OR VIBRATION AND RIGID CONDUIT SYSTEM. LIQUID-TIGHT FLEXIBLE CONDUIT SHALL NOT EXCEED 3' IN LENGTH.
- REAM CONDUITS ONLY AFTER THREADS ARE CUT. CUT JOINTS SQUARE TO BUTT SOLIDLY INTO COUPLINGS. WHERE NECESSARY TO JOIN TWO PIECES OF CONDUIT AND IT IS IMPOSSIBLE TO USE STANDARD COUPLING, USE THREE PIECE CONDUIT COUPLING. USE OF RUNNING THREAD IS PROHIBITED. THIS APPLIES TO ALL RIGID CONDUIT INSTALLATIONS, UNDERGROUND OR OTHERWISE. ALL FIELD THREADED RIGID STEEL CONDUIT SHALL HAVE FIELD THREADS RE-COATED USING AN ELECTRICALLY CONDUCTIVE, CORROSION-RESISTANT COMPOUND.
- MAKE ALL JOINTS IN UNDERGROUND CONDUIT WATERTIGHT WITH APPROVED JOINT COMPOUND. TEMPORARILY PLUG CONDUIT OPENINGS TO EXCLUDE WATER, CONCRETE OR ANY FOREIGN MATERIALS DURING CONSTRUCTION. CLEAN CONDUIT RUNS BEFORE PULLING IN CONDUCTORS.
- HICKEY BENDS WILL NOT BE ACCEPTABLE FOR CONDUITS 1" AND LARGER. USE MANUFACTURED ELBOWS OR BENDS FABRICATED WITH BENDING MACHINE. FIELD BENDING OF ALL PVC CONDUIT SHALL BE ACCOMPLISHED WITH USE OF EQUIPMENT APPROVED BY CONDUIT MANUFACTURER. OPEN FLAME BENDING EQUIPMENT WILL NOT BE ACCEPTABLE.
- A RUN OF CONDUIT BETWEEN OUTLET AND OUTLET, BETWEEN FITTING AND FITTING OR BETWEEN OUTLET AND FITTING SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF FOUR QUARTER TURN BENDS, INCLUDING BENDS IMMEDIATELY AT AN OUTLET OR FITTING.
- WHERE CONDUIT ENTERS A BOX OR FITTING, PROVIDE A LOCKNUT AND AN INSULATED BUSHING. USE THIS METHOD TO TERMINATE CONDUIT IN PANELS, PULL BOXES, SAFETY SWITCHES, ETC.
- DO NOT RUN CONDUIT BELOW OR A MINIMUM OF 12" ADJACENT TO WATER PIPING, EXCEPT WHERE PERMITTED BY FERMLAB CONSTRUCTION COORDINATOR.
- CONDUIT SHALL HAVE 1/4" CLEARANCE FROM WALL OR CEILING.
- RUN EXPOSED CONDUITS PARALLEL WITH WALLS AND AT RIGHT ANGLES TO BUILDING LINES, NOT DIAGONALLY. MAKE BENDS AND TURNS WITH PULL BOXES OR CONDUIT BODIES.
- SUPPORT EXPOSED SCHEDULE 40 PVC CONDUIT RUNS ON WALLS OR CEILING EVERY 3' AND SUPPORT EXPOSED RIGID METAL CONDUIT RUNS ON WALLS OR CEILING EVERY 5' WITH STAINLESS STEEL OR PVC COATED GALVANIZED CAST ONE HOLE STRAPS, CLAMP BACKS AND ANCHORS. PROVIDE LEAD SHIELD INSERT ANCHORS, WITH STAINLESS STEEL ROUND HEAD MACHINE SCREWS, FOR CONCRETE AND BRICK CONSTRUCTION. IN WOOD CONSTRUCTION, USE STAINLESS STEEL ROUND HEAD WOOD SCREWS. WHERE STEEL MEMBERS OCCUR, DRILL AND TAP AND USE STAINLESS STEEL ROUND HEAD MACHINE SCREWS.
- IN BRICK CONSTRUCTION, DRILL HOLE FOR INSERT NEAR CENTER OF BRICK, NOT NEAR EDGE OR IN MORTAR JOINT.
- SUPPORT TWO OR MORE PVC EXPOSED HANGING PARALLEL CONDUIT RUNS EVERY 3' AND SUPPORT EXPOSED RIGID METAL HANGING PARALLEL CONDUIT RUNS EVERY 5' WITH TRAPEZE HANGARS. HANGER ASSEMBLY TO CONSIST OF CONCRETE INSERTS, THREADED SOLID ROD, WASHERS, NUTS AND CROSS MEMBERS NOMINALLY 1-5/8" BY 1-5/8" NON-METALLIC FRAMING. ANCHOR EACH CONDUIT INDIVIDUALLY TO CROSS MEMBERS OF EVERY OTHER HANGER WITH CAST ONE HOLE STRAPS, CLAMPS BACKS AND PROPER SIZED STAINLESS STEEL OR NON-METALLIC MACHINE BOLTS AND NUTS..

**ELECTRICAL INSPECTION AND TESTING**

- SUBMITTALS
  - SUBMIT TEST REPORTS OF ENTIRE ELECTRICAL SYSTEM AS NOTED HEREIN.
- SUBCONTRACTOR SHALL FURNISH ALL METERS, INSTRUMENTS, CABLE CONNECTIONS, EQUIPMENT, TOOLS, MANPOWER AND LABOR NECESSARY FOR PERFORMING ALL TESTS.
- AFTER WIRES AND CABLES ARE IN PLACE AND CONNECTED TO DEVICES AND EQUIPMENT, THE SYSTEM SHALL BE TESTED FOR SHORT CIRCUITS, IMPROPER GROUNDS, AND OTHER FAULTS. WHEN FAULT CONDITIONS ARE PRESENT, THE TROUBLE SHALL BE RECTIFIED, THEN RE-TESTED. WHERE CABLE IS FOUND DEFECTIVE OR DAMAGED, IT SHALL BE REMOVED AND REPLACED IN ENTIRETY, DO NOT FIELD REPAIR. COST FOR CORRECTION SHALL BE CONSIDERED INCIDENTAL TO THE SUBCONTRACT.
- ALL WIRING DEVICES AND ELECTRICAL APPARATUS FURNISHED UNDER THIS SUBCONTRACT, WHEN GROUND OR SHORTED ON ANY INTEGRAL "LIVE" PART, SHALL BE REMOVED AND THE TROUBLE RECTIFIED BY REPLACING ALL DEFECTIVE PARTS AND MATERIALS. COST OF CORRECTION IS CONSIDERED INCIDENTAL TO THE SUBCONTRACT.
- ALL FEEDER CABLES, SWITCHBOARDS, PANELBOARDS, TRANSFORMERS AND OTHER POWER DISTRIBUTION APPARATUS SHALL HAVE A MEGGER RESISTANCE TEST CONDUCTED TO DETERMINE THAT INSULATION RESISTANCE IS NOT LESS THAN THAT RECOMMENDED BY THE MANUFACTURER, OR AS NOTED BELOW.
 

UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER, INSULATION RESISTANCE TESTING SHALL MEET OR EXCEED THE FOLLOWING ON 600 VOLT EQUIPMENT UTILIZING 500 VOLT RESISTANCE TEST INSTRUMENT:

CONDUCTORS:	50 MOHM
SWITCHBOARDS AND PANELBOARDS:	25 MOHM
POWER TRANSFORMERS:	5 MOHM
- EXAMINE CONNECTIONS TO EQUIPMENT FOR PROPER PHASE RELATIONSHIPS. ROTATE PHASE CONDUCTORS AS NECESSARY IN ORDER TO CORRECT.
- TESTING OF GROUND SYSTEM
  - EACH AND ALL GROUNDED CASES AND METAL PARTS ASSOCIATED WITH ELECTRICAL EQUIPMENT SHALL BE TESTED FOR CONTINUITY OF CONNECTION WITH THE GROUND BUS SYSTEM BY THE SUBCONTRACTOR IN THE PRESENCE OF THE FERMLAB CONSTRUCTION COORDINATOR.
  - ALL GROUNDING ELECTRODE CONDUCTORS BROUGHT IN FROM THE GROUND FIELD SHALL BE TESTED FOR SATISFACTORY CONTINUITY AND BY RESISTANCE MEASUREMENT BETWEEN THE ELECTRICAL EQUIPMENT GROUND BUS AND THE GROUND FIELD. THE GROUNDING PATH SHALL NOT EXCEED 0.010 OHMS.
  - EACH GROUND FIELD SHALL BE TESTED FOR RESISTANCE TO EARTH BY A STANDARD METHOD. A GROUND TESTING INSTRUMENT UTILIZING A "THREE-TERMINAL" OR "FALL-OF-POTENTIAL" TEST SHALL BE PERFORMED ON EACH GROUND FIELD. AS AN ALTERNATE, A SPECIALLY DESIGNED CLAMP-ON UNIT SUCH AEMC MODEL 3710 OR 3730 MAY BE USED IF FOUND ACCEPTABLE TO THE FERMLAB CONSTRUCTION COORDINATOR. GROUND RESISTANCE SHALL BE CALCULATED AND THE MAXIMUM GROUND ROD RESISTANCE TO EARTH SHALL NOT EXCEED 25 OHMS. IF THE RESISTANCE IS FOUND TO BE HIGHER THAN 25 OHMS, ONE ADDITIONAL ROD SHALL BE DRIVEN WITH A MINIMUM SEPARATION EQUAL TO THE LENGTH OF THE GROUND ROD USED AND CONNECTED IN PARALLEL WITH THE ROD UNDER TEST. COPIES OF ALL TEST DATA SHALL BE FORWARDED TO THE FERMLAB CONSTRUCTION COORDINATOR.
  - EXTERIOR GROUND FIELD RESISTANCE TESTING SHALL NOT BE MEASURED DURING UNUSUALLY WET WEATHER AND SHOULD BE PERFORMED DURING NORMAL WEATHER AND SOIL CONDITIONS. ANY TESTS INCORRECTLY PERFORMED OR NOT PERFORMED TO THE SATISFACTION OF THE FERMLAB CONSTRUCTION COORDINATOR SHALL BE REPEATED. COSTS FOR ALL SUCH RE-TESTING SHALL BE CONSIDERED INCIDENTAL TO THE SUBCONTRACT.
  - ALL SPECIFIED MAXIMUMS AND MINIMUMS OF THIS SPECIFICATIONS SHALL BE MET. COMPLETE TEST RECORDS OF ALL TESTS SHALL BE MADE AND SHALL SHOW RESISTANCE VALUES OBTAINED AND CALCULATIONS OF SAME, SHOWING METHOD OF TEST AND CALCULATION.
- TRANSFORMERS
  - ADJUST PRIMARY TAPS SO THAT THE SECONDARY VOLTAGE IS WITHIN 2% OF RATED VOLTAGE.
- CORRECTION OF DEFECTS
  - WHEN TESTS DISCLOSE ANY UNSATISFACTORY WORKMANSHIP OR EQUIPMENT FURNISHED UNDER THIS CONTRACT, CORRECT DEFECTS AND RETEST. REPEAT TESTS UNTIL SATISFACTORY RESULTS ARE OBTAINED.
  - WHEN ANY WIRING OR EQUIPMENT IS DAMAGED BY TESTS, REPAIR OR REPLACE SUCH WIRING OR EQUIPMENT. TEST REPAIRED ITEMS TO ENSURE SATISFACTORY OPERATION.

**SCALE:**

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

**SciBooNE DETECTOR ENCL.**

**ELECTRICAL SPECIFICATIONS - 2**

**DRAWING NO. 6-7-62** **G-4** REV. 0

0	06/26/06	ISSUED FOR BIDS
REV.	DATE	DESCRIPTIONS
		REVISIONS

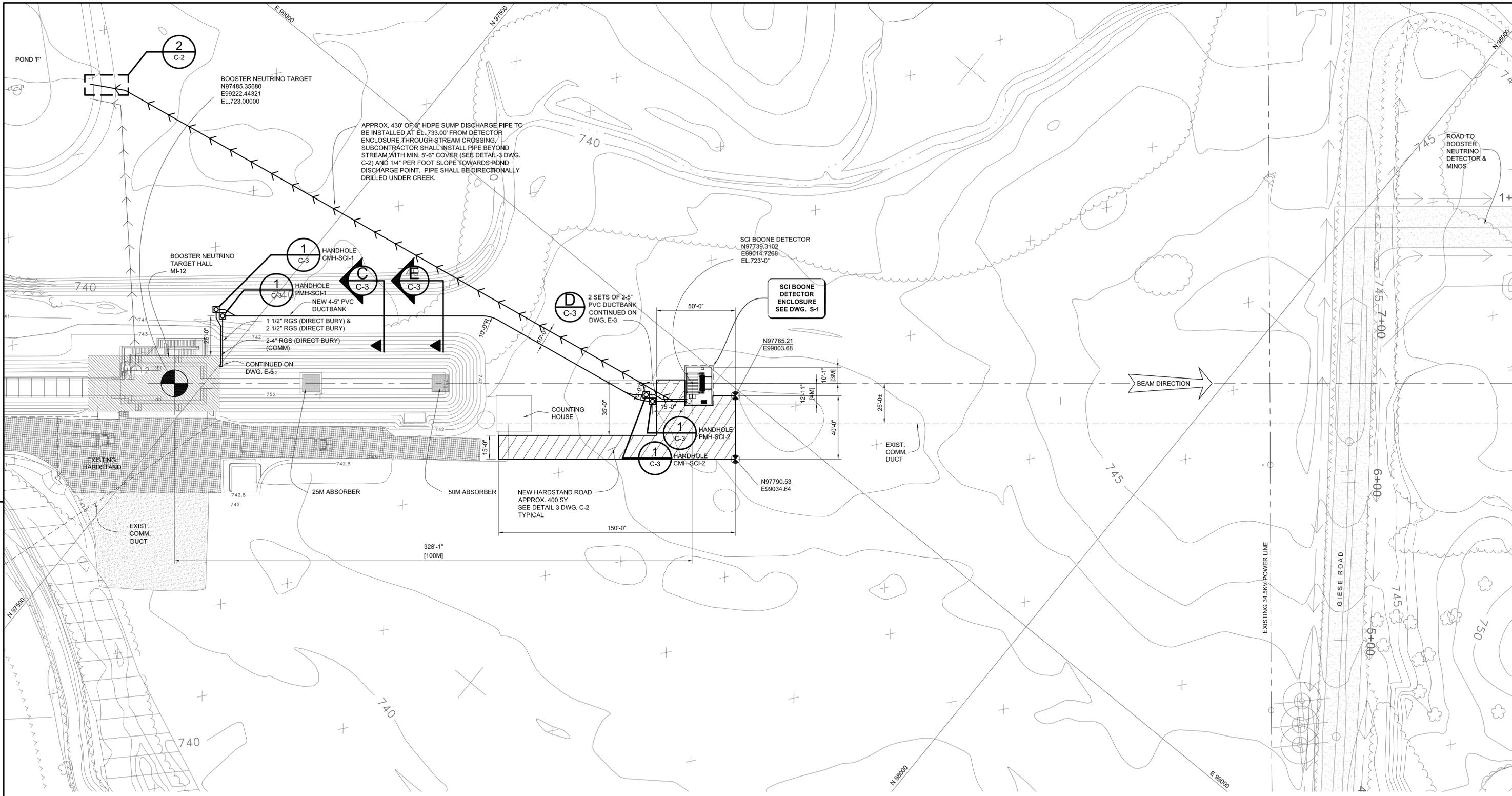
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	NAME	DATE
DESIGNED	<b>J. SANTIC</b>	<b>06/26/06</b>
DRAWN	<b>K. WHITTEN</b>	<b>06/26/06</b>
CHECKED	<b>T. LACKOWSKI</b>	<b>06/26/06</b>
APPROVED	<b>V. KUCHLER / E. CRUMPLEY</b>	<b>06/26/06</b>
SUBMITTED	<b>R. TESAREK</b>	<b>06/26/06</b>

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Dwg: G-04\_6-7-62.dwg Plotted: 30JUN06 @ 06:47:33a.m.

F.I.M.S. No. 780  
26 JUNE 2006



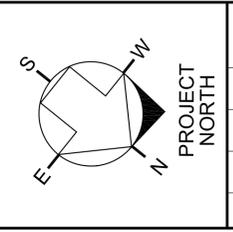
**SITE PLAN**

SCALE: 1"=60'-0"

Dwg: C-01\_6-7-62.dwg Plotted: 23MAY06 @ 08:41:23a.m.

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS

	NAME	DATE
DESIGNED	<b>R. ALBER</b>	<b>06/26/06</b>
DRAWN	<b>R. JEDZINIAK</b>	<b>06/26/06</b>
CHECKED	<b>T. LACKOWSKI</b>	<b>06/26/06</b>
APPROVED	<b>V. KUCHLER / E. CRUMPLEY</b>	<b>06/26/06</b>
SUBMITTED	<b>R. TESAREK</b>	<b>06/26/06</b>



**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

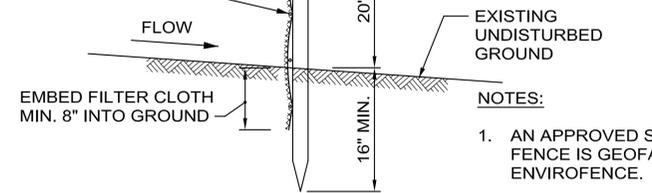
**SciBoONE DETECTOR ENCL.**  
**SITE PLAN**

DRAWING NO. **6-7-62** **C-1** REV. **0**

26-JUNE 2006 F.I.M.S. No. 780

FILTER CLOTH SHALL BE FASTENED SECURELY TO WWF W/TIES SPACED 24" @ TOP & MID SECTION; LAPS IN FILTER CLOTH SHALL BE 6" MIN. FILTER CLOTH SHALL BE FILTER X, MIRAFI 100X, STABI-LINKA T140N.

WOVEN WIRE FENCE 14 1/2 GA. MIN. MAX. 6" MESH SPCG. WITH FILTER CLOTH OVER. WWF SHALL BE SECURELY FASTENED TO POST W/WIRES OR STAPLES.

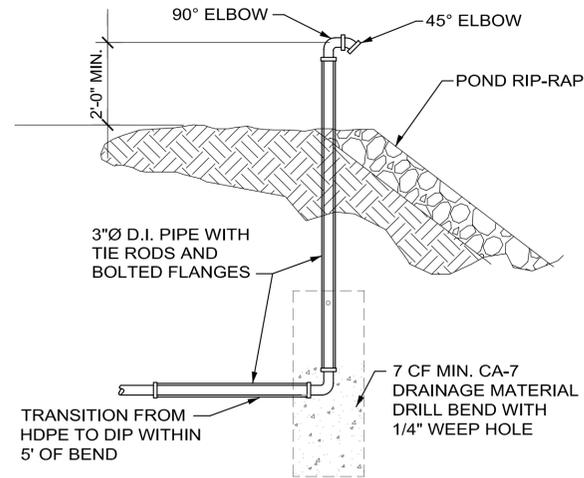
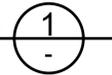


**NOTES:**

1. AN APPROVED SILT FENCE IS GEOFAB, ENVIROFENCE.
2. REPAIR OR REPLACE SILT FENCE WHEN "BULGES" DEVELOP IN FENCE.

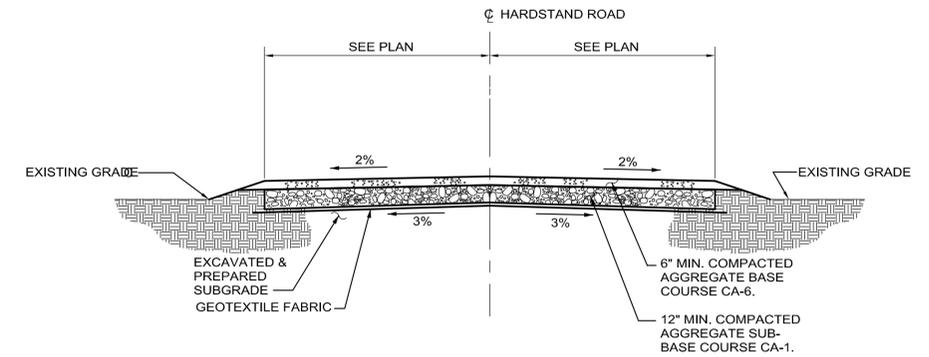
**TYPICAL SILT FENCE DETAIL**

NOT TO SCALE



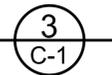
**DETAIL**

NOT TO SCALE  
SUMP DISCHARGE OUTFALL



**TYPICAL HARDSTAND/ROAD DETAIL**

NOT TO SCALE



Dwg: 6-7-62 CDF-01.dwg Plotted: 10/MAR/06 @ 09:17:50a.m.

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS

	NAME	DATE
DESIGNED	R. ALBER	06/26/06
DRAWN	R. JEDZINIAK	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06

SCALE:

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



**SciBooNE DETECTOR ENCL.**

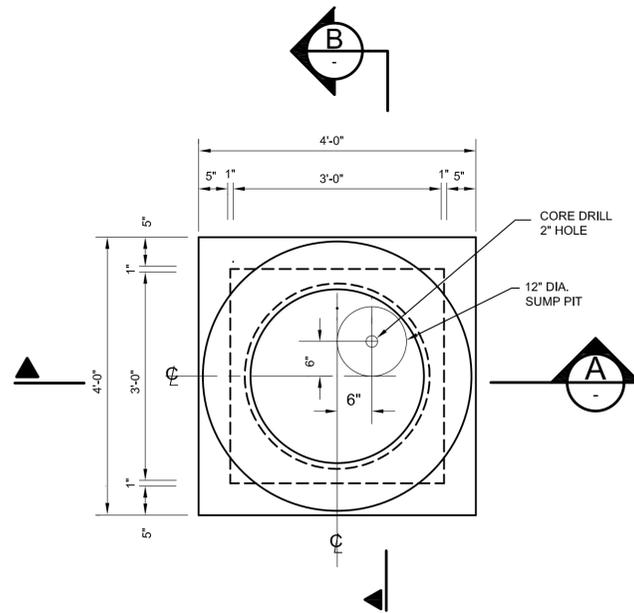
**CIVIL DETAILS - SHEET 1**

DRAWING NO. **6-7-62**

**C-2**

REV. **0**

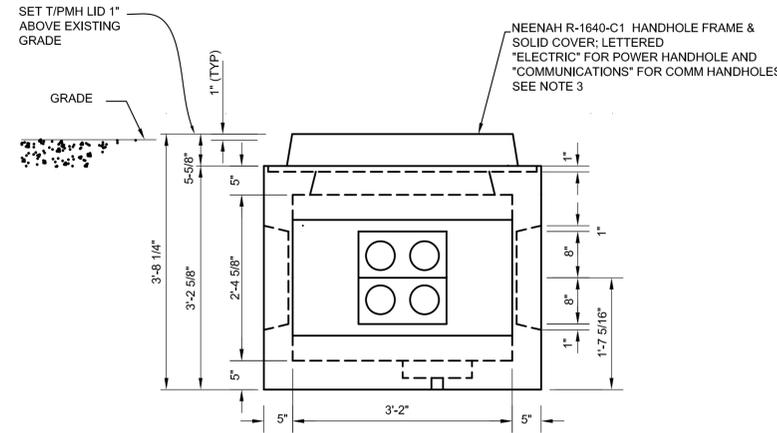
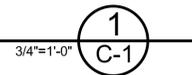
26-JUNE 2006



**DETAIL**

HANDHOLE PLAN

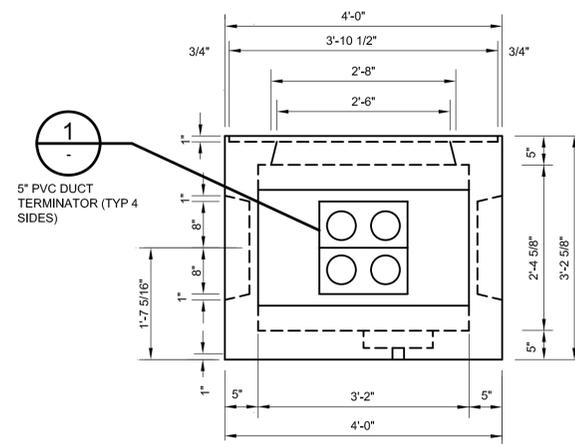
PMH-SCB-1 & PMH-SCB-2 HANDHOLE  
CMH-SCB-1 & CMH-SCB-2 HANDHOLE



**SECTION**

SCALE: 3/4"=1'-0"

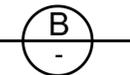
PMH-SCB-1 & PMH-SCB-2 HANDHOLE  
CMH-SCB-1 & CMH-SCB-2 HANDHOLE



**SECTION**

SCALE: 3/4"=1'-0"

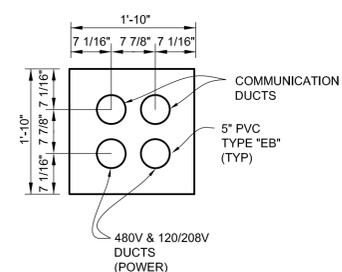
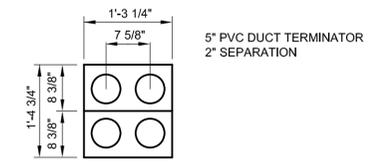
PMH-SCB-1 & PMH-SCB-2 HANDHOLE  
CMH-SCB-1 & CMH-SCB-2 HANDHOLE



**DETAIL**

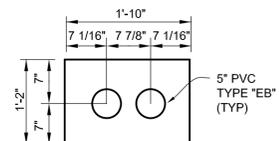
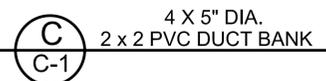
SCALE: 3/4"=1'-0"

DUCT TERMINATOR



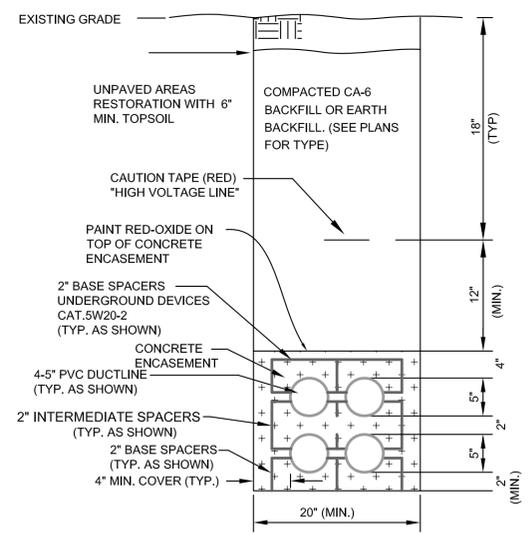
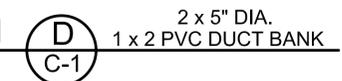
**SECTION**

N.T.S.



**SECTION**

N.T.S.



**SECTION**

N.T.S.



- NOTES:**
- CONCRETE DUCT BANKS SHALL BE CONSTRUCTED AS TO MAINTAIN 2" CONCRETE COVER BETWEEN CONDUITS AND 3" COVER.
  - ALL CONCRETE ENCASED CONDUIT SHALL BE PVC, TYPE EB; SIZE AS NOTED.
  - T/PMH LID FOR PMH-SCB-1& 2 AND CMH-SCB-1 & 2 TO BE SET APPROX. 1" ABOVE FINISHED GRADE.
  - SUBCONTRACTOR SHALL NOT COVER SPARE TERMINATORS AT HANDHOLES. SPARE TERMINATOR SHALL BE AVAILABLE FOR FUTURE USE.
  - UTILIZE TERMINATOR FOR RGS CONDUIT TO MI-12 BUILDING. PROVIDE EXPANDABLE FIRE STOP BETWEEN RGS CONDUITS AND DUCT TERMINATOR.
  - HANDHOLES SHALL BE AS MANUFACTURED BY UTILITY CONCRETE PRODUCTS OR FERMLAB APPROVED EQUAL.

Dwg: 6-7-62 CDF-01.dwg Plotted: 10/MAR/06 @ 09:17:50a.m.

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS

	NAME	DATE
DESIGNED	R. ALBER	06/26/06
DRAWN	R. JEDZINIAK	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06

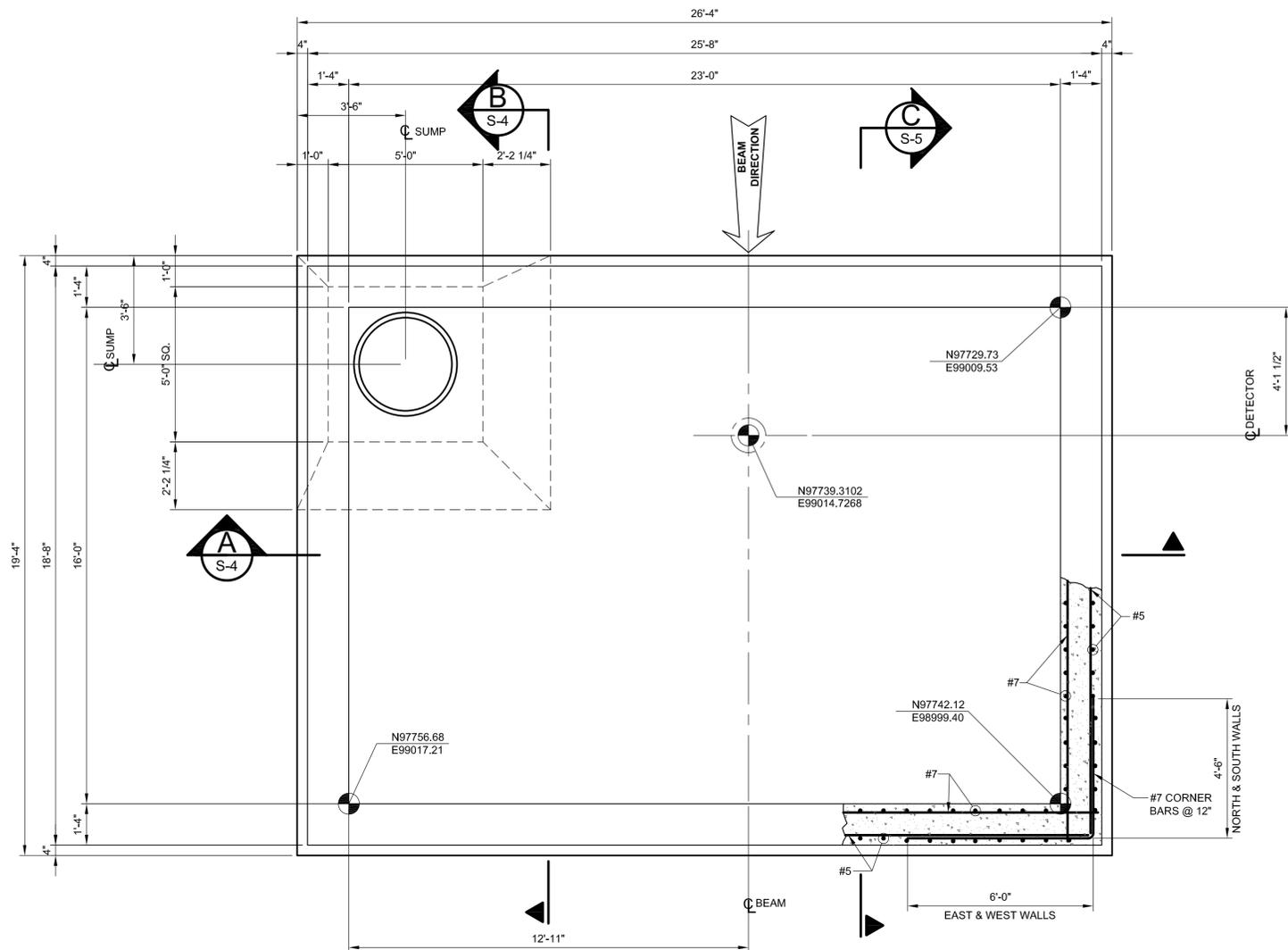


**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

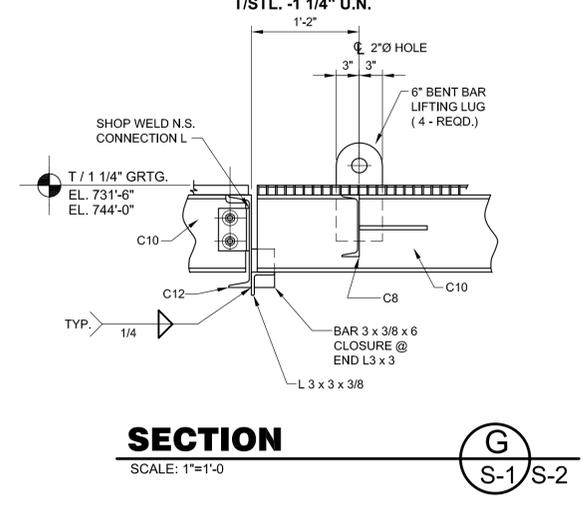
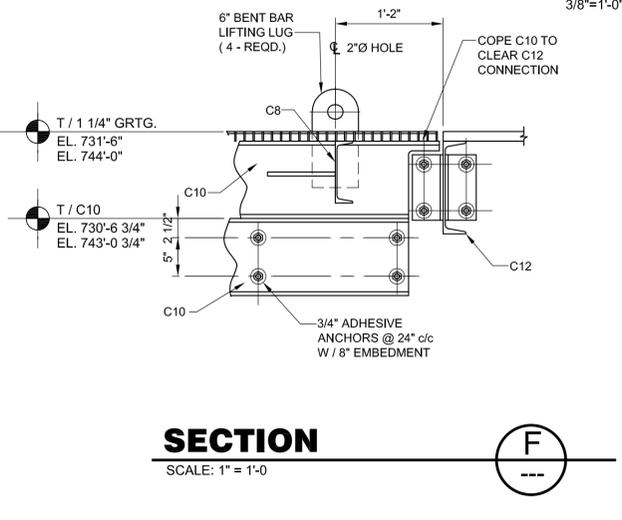
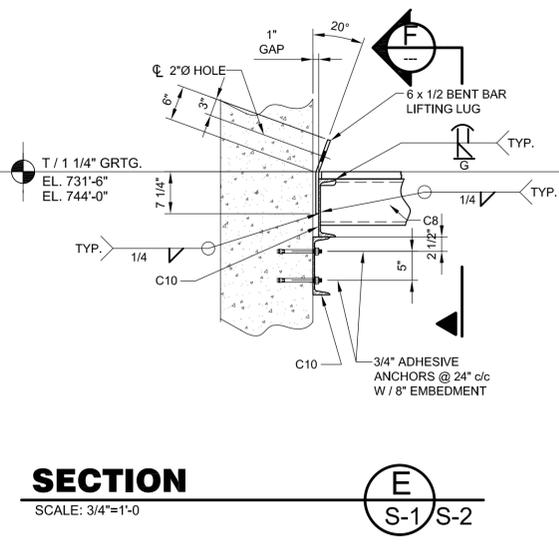
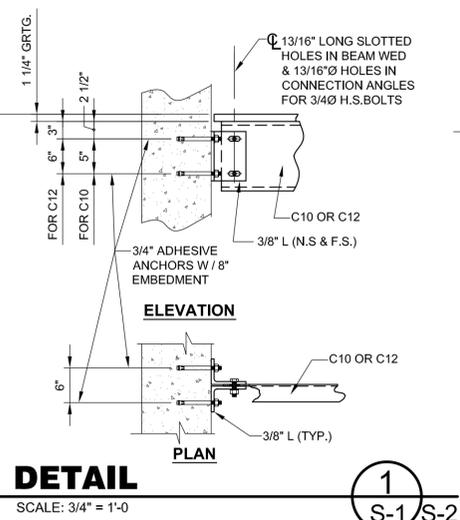
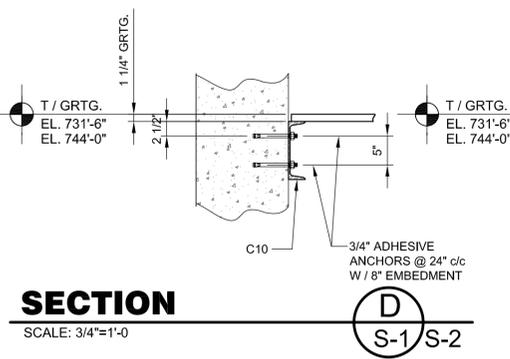
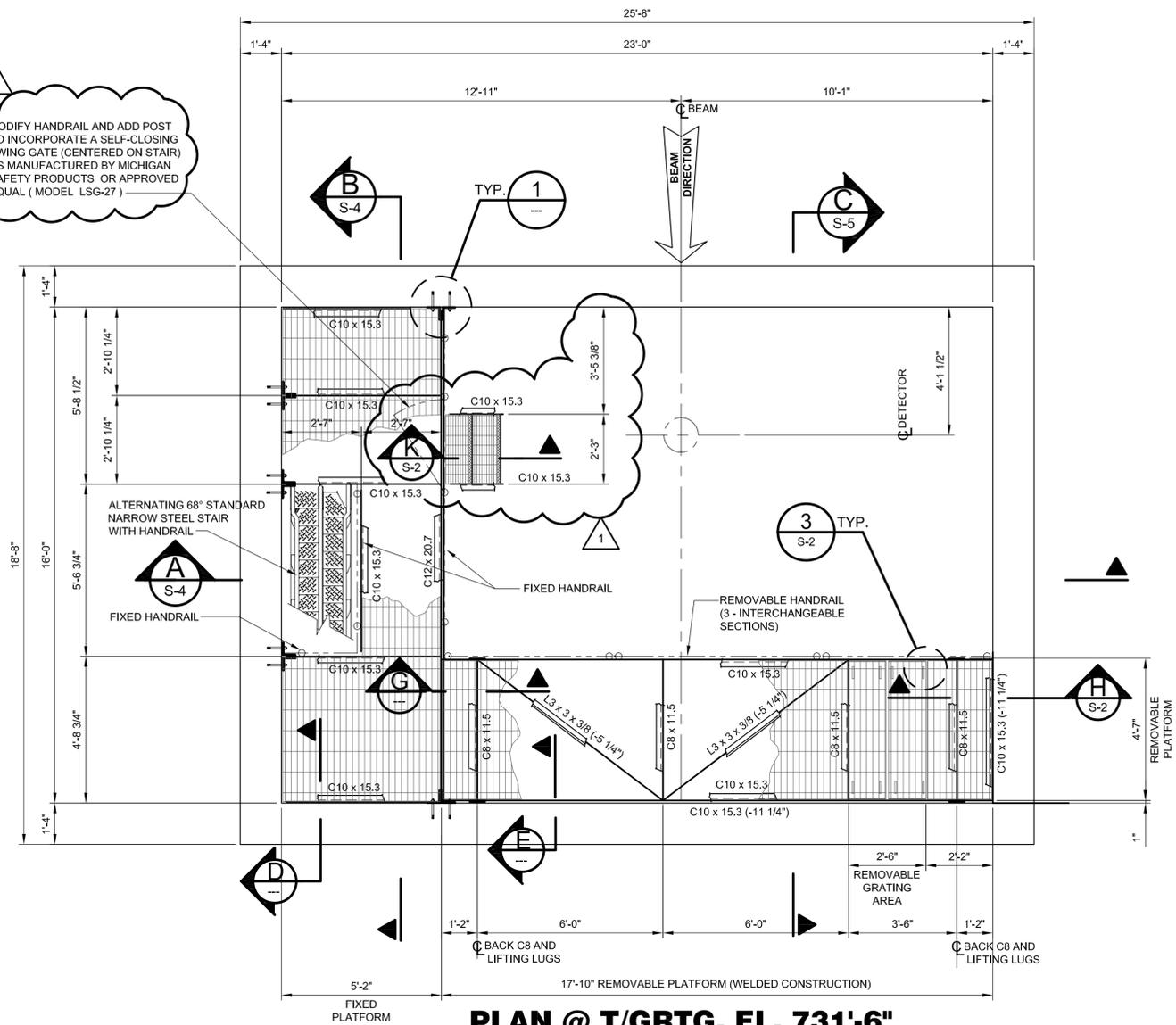
**SciBooNE DETECTOR ENCL.**  
**CIVIL DETAILS - SHEET 2**

DRAWING NO. **6-7-62** **C-3** REV. 0

26-JUNE 2006 F.I.M.S. No. 780



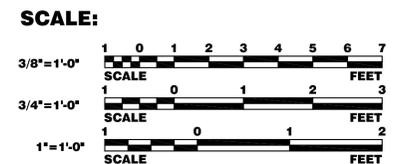
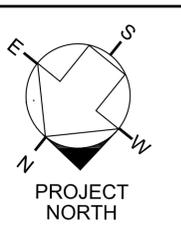
MODIFY HANDRAIL AND ADD POST TO INCORPORATE A SELF-CLOSING SWING GATE (CENTERED ON STAIR) AS MANUFACTURED BY MICHIGAN SAFETY PRODUCTS OR APPROVED EQUAL (MODEL LSG-27)



Dwg: SC-01 thru SC-06, 6-7-62.dwg Ploled: 26/JAN07 @ 10:17:10am.

REV.	DATE	DESCRIPTIONS	REVISIONS
1	01/26/07	ADDED STAIR - EC-35A	
0	06/26/06	ISSUED FOR BIDS	

	NAME	DATE
DESIGNED	R. ALBER	06/26/06
DRAWN	R. JEDZINIAK	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06

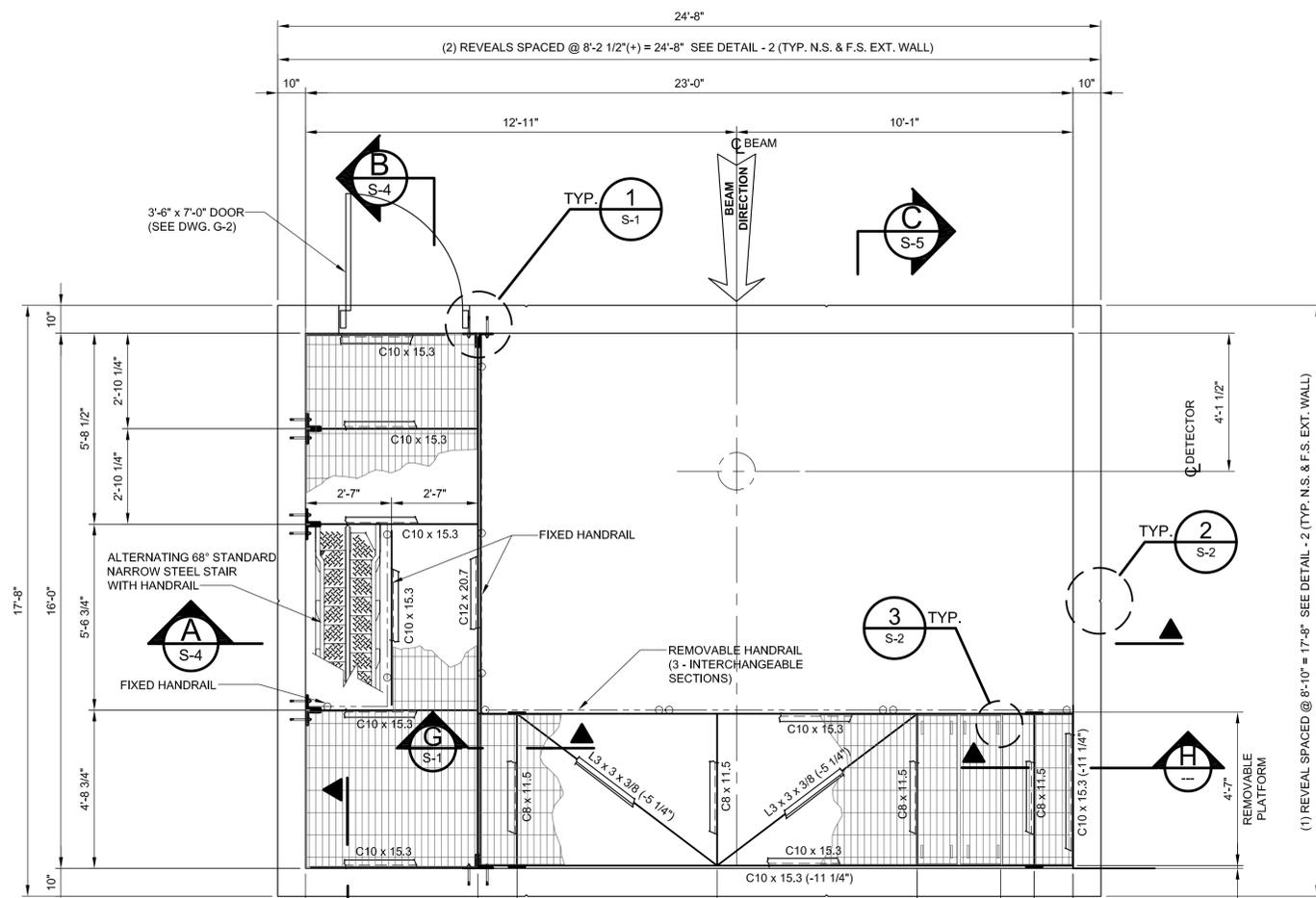


**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

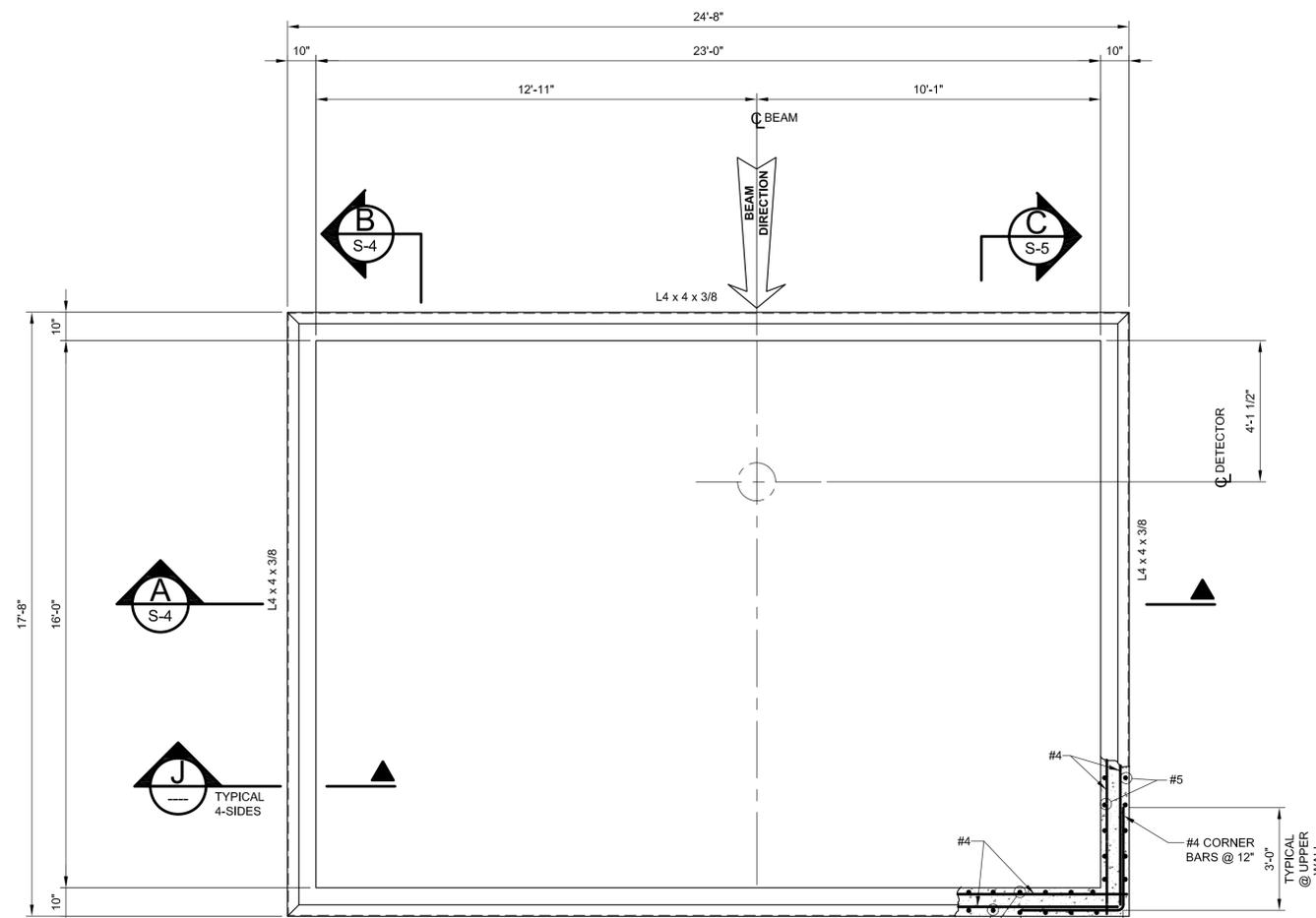
**SciBooNE DETECTOR ENCL.**  
**PLANS & DETAILS - SHEET 1**

DRAWING NO. **6-7-62** **S-1** REV. 1

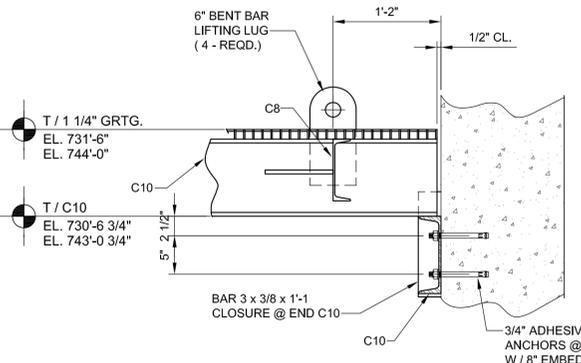
26 JAN. 2007 F.I.M.S. No. 780



**PLAN @ T/GRtg. EL. 744'-0"**  
3/8"=1'-0" T/STL. -1 1/4" U.N.

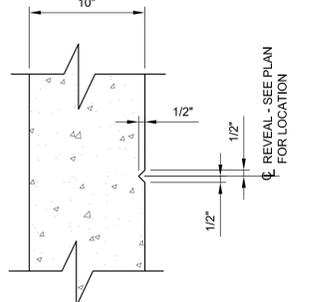


**CONCRETE - ROOF PLAN**  
3/8"=1'-0" T/CONC. EL. 753'-6"



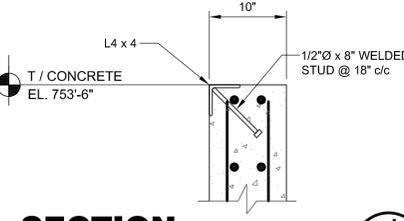
**SECTION**  
SCALE: 1"=1'-0"

H  
S-1 S-2



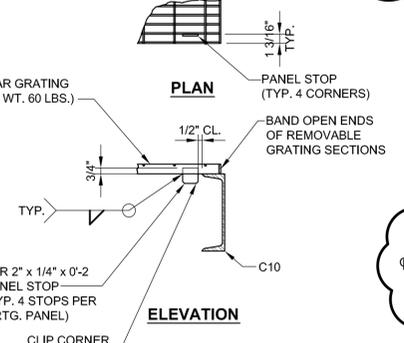
**DETAIL**  
SCALE: 1 1/2"=1'-0"

2  
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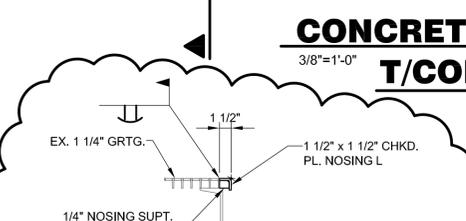
**SECTION**  
SCALE: 1"=1'-0"

J  
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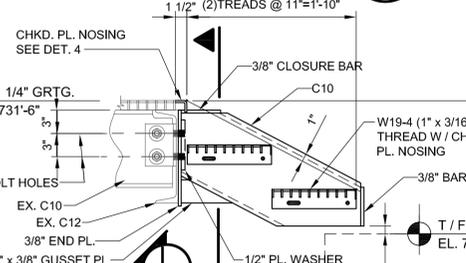
**DETAIL**  
SCALE: 1"=1'-0"

3  
S-1 S-2



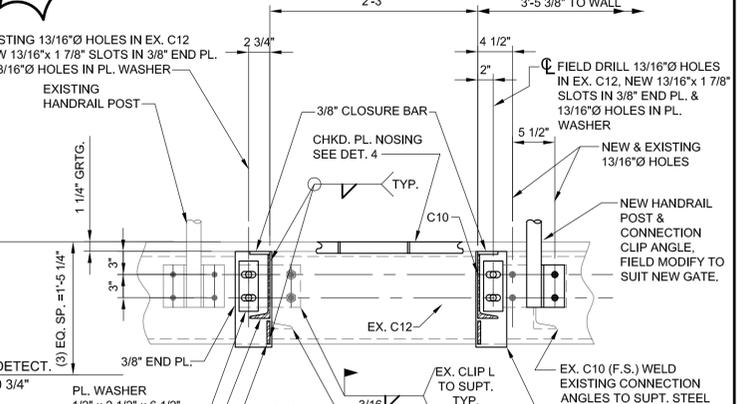
**DETAIL**  
SCALE: 1 1/2"=1'-0"

4  
---



**SECTION**  
SCALE: 1"=1'-0"

K  
S-1

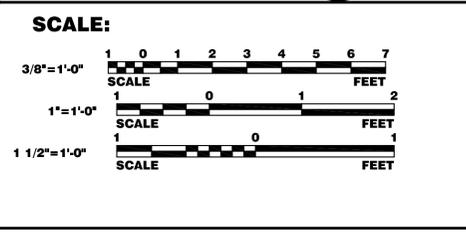
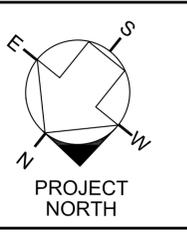


**SECTION**  
SCALE: 1"=1'-0"

L  
---

REV.	DATE	DESCRIPTIONS	REVISIONS
1	01/28/07	ADDED STAIR SECTIONS & DETAILS - EC-35A	
0	06/26/06	ISSUED FOR BIDS	

	NAME	DATE
DESIGNED	R. ALBER	06/26/06
DRAWN	R. JEDZINIAK	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06



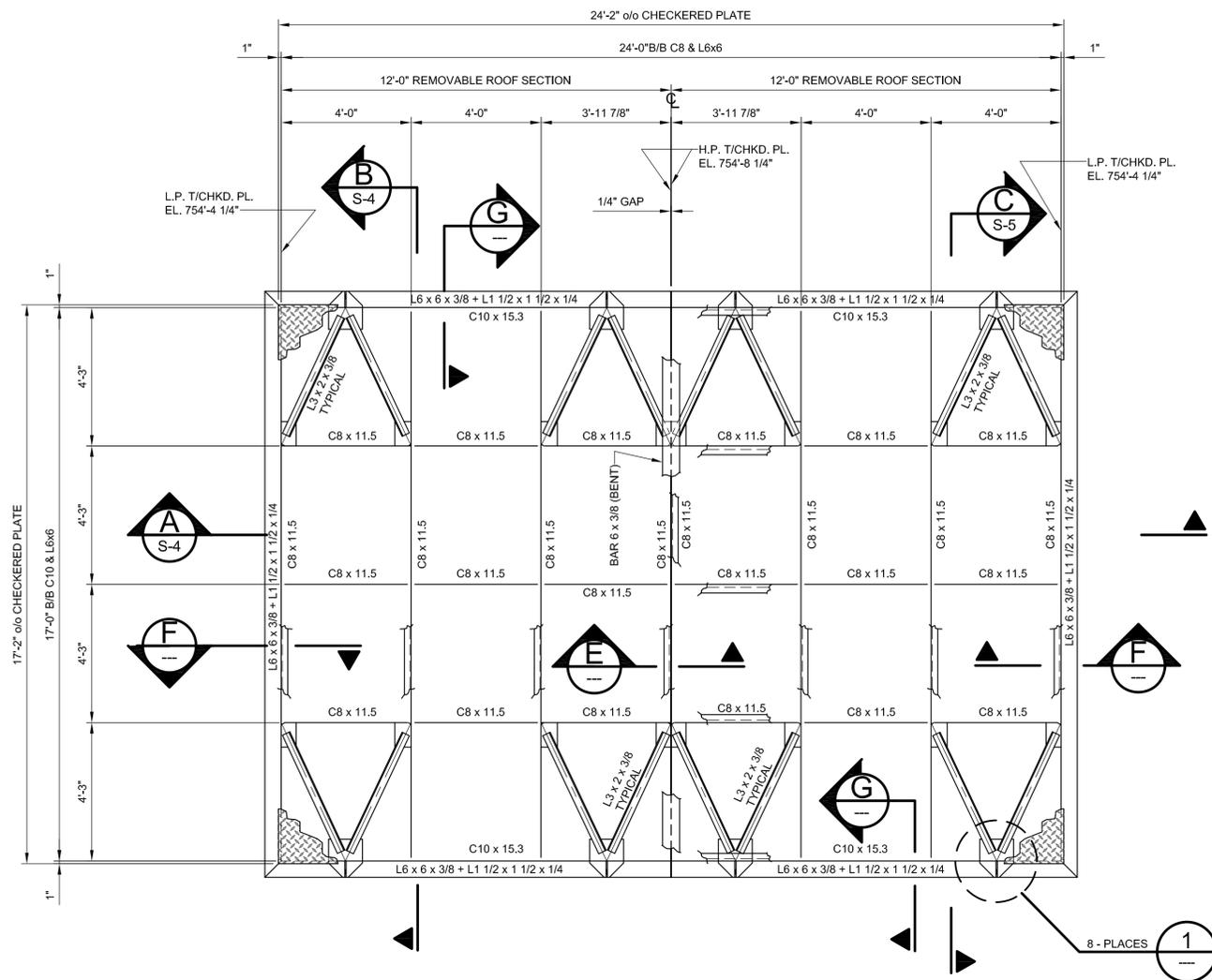
**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

**SciBoone DETECTOR ENCL.**  
**PLANS AND DETAILS - SHEET 2**

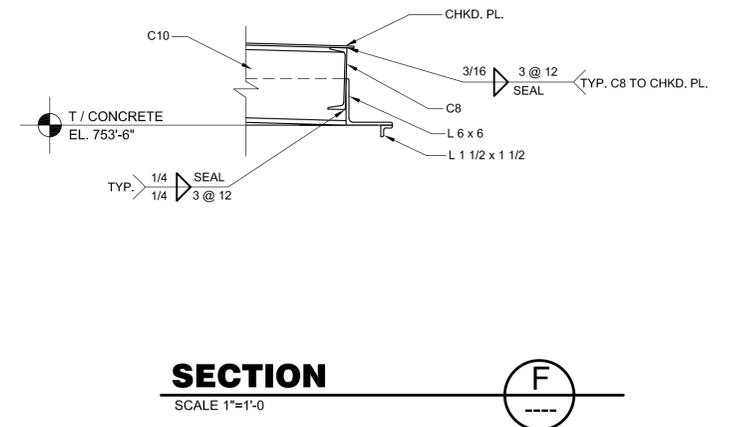
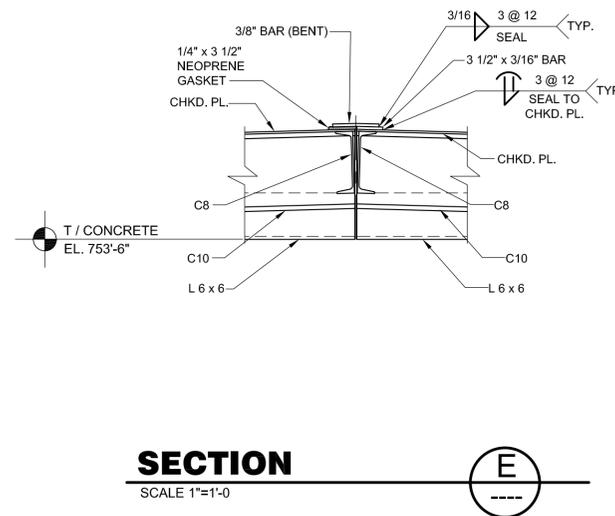
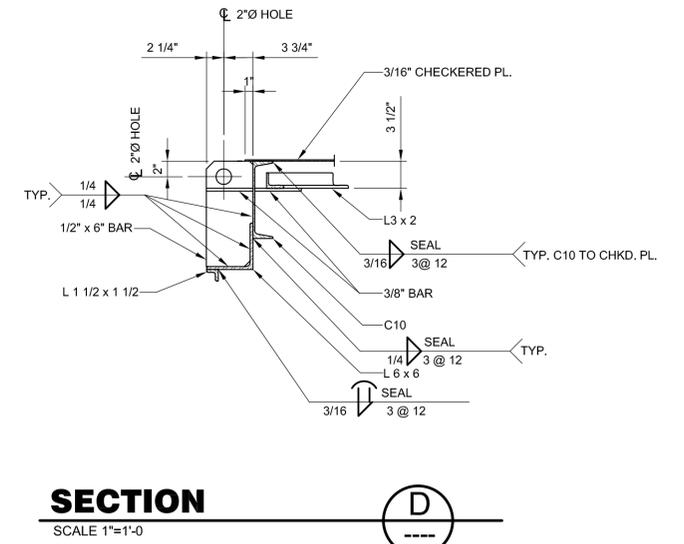
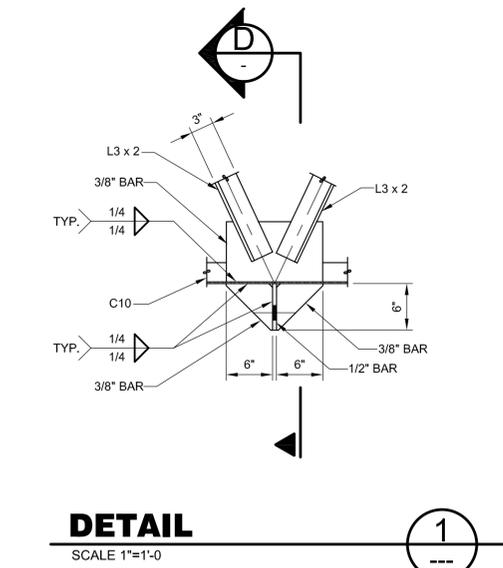
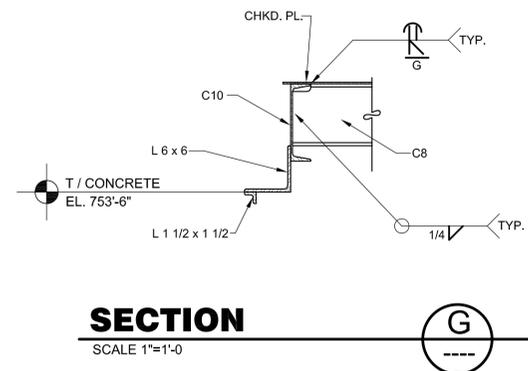
DRAWING NO. **6-7-62** **S-2** REV. 1

Dwg: SC-01 thru SC-06, 6-7-62.dwg Pfiled: 26/JAN07 @ 10:17:10am.

F.I.M.S. No. 780 26 JAN. 2007

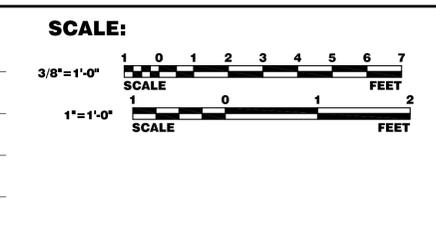
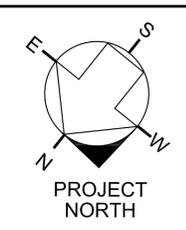


**STEEL - ROOF PLAN**  
 3/8"=1'-0"  
**T/STL. EL. VARIES**



REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS
		REVISIONS

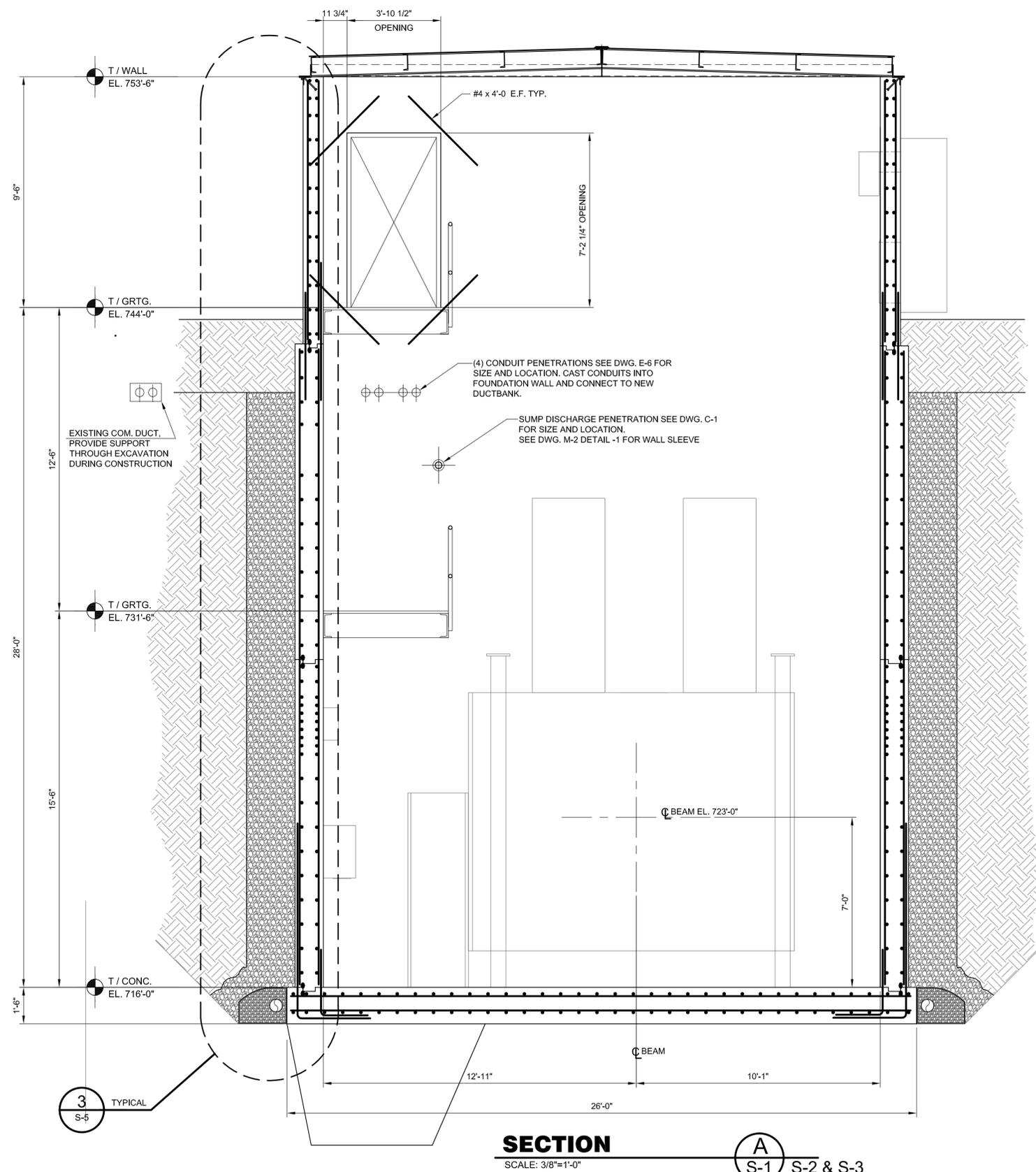
	NAME	DATE
DESIGNED	R. ALBER	06/26/06
DRAWN	R. JEDZINIAK	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06



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 UNITED STATES DEPARTMENT OF ENERGY

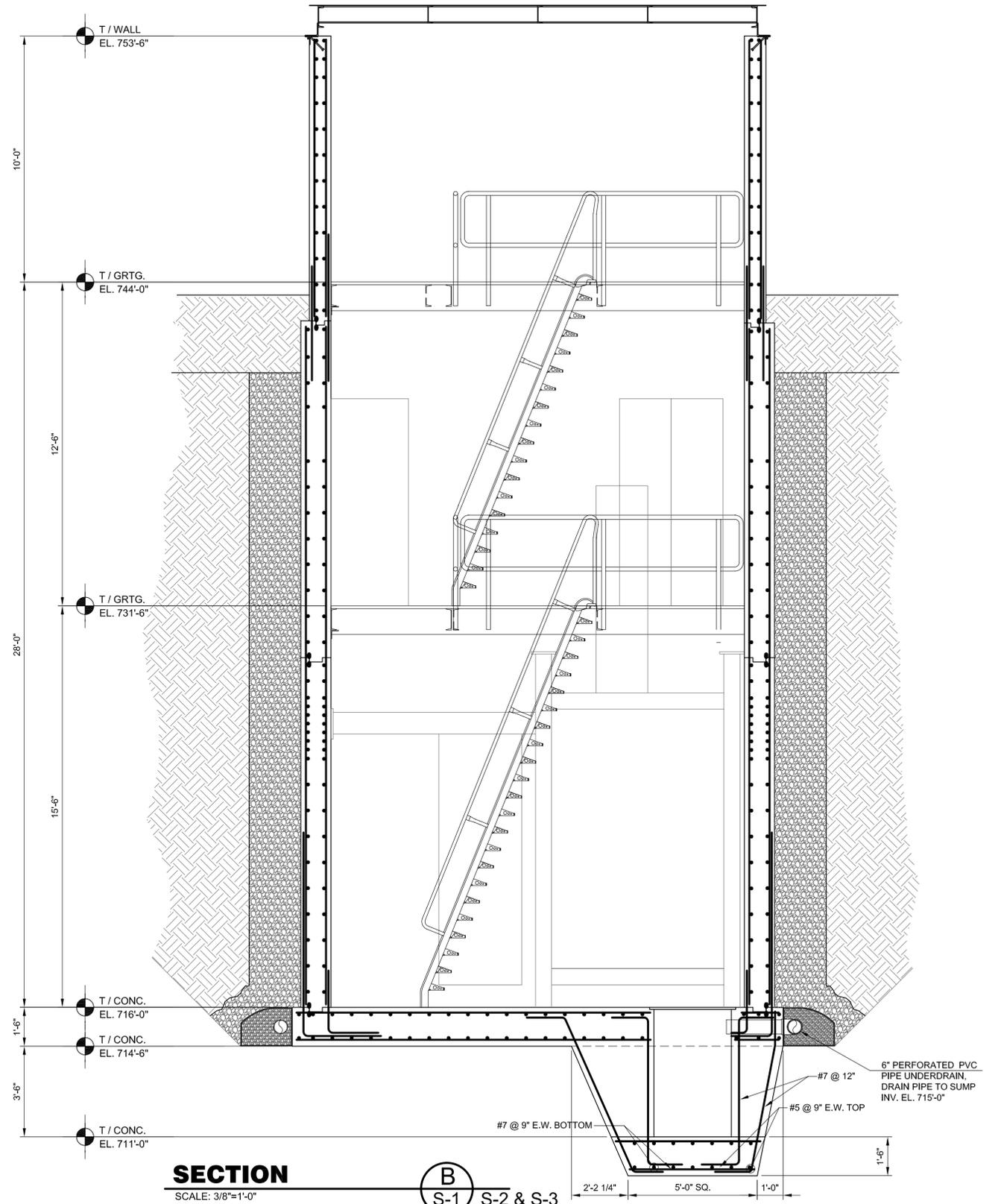
**SciBooNE DETECTOR ENCL.**  
**PLANS AND DETAILS - SHEET 3**

DRAWING NO. **6-7-62** **S-3** REV. 0



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

**A**  
S-1 S-2 & S-3



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

**B**  
S-1 S-2 & S-3

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS

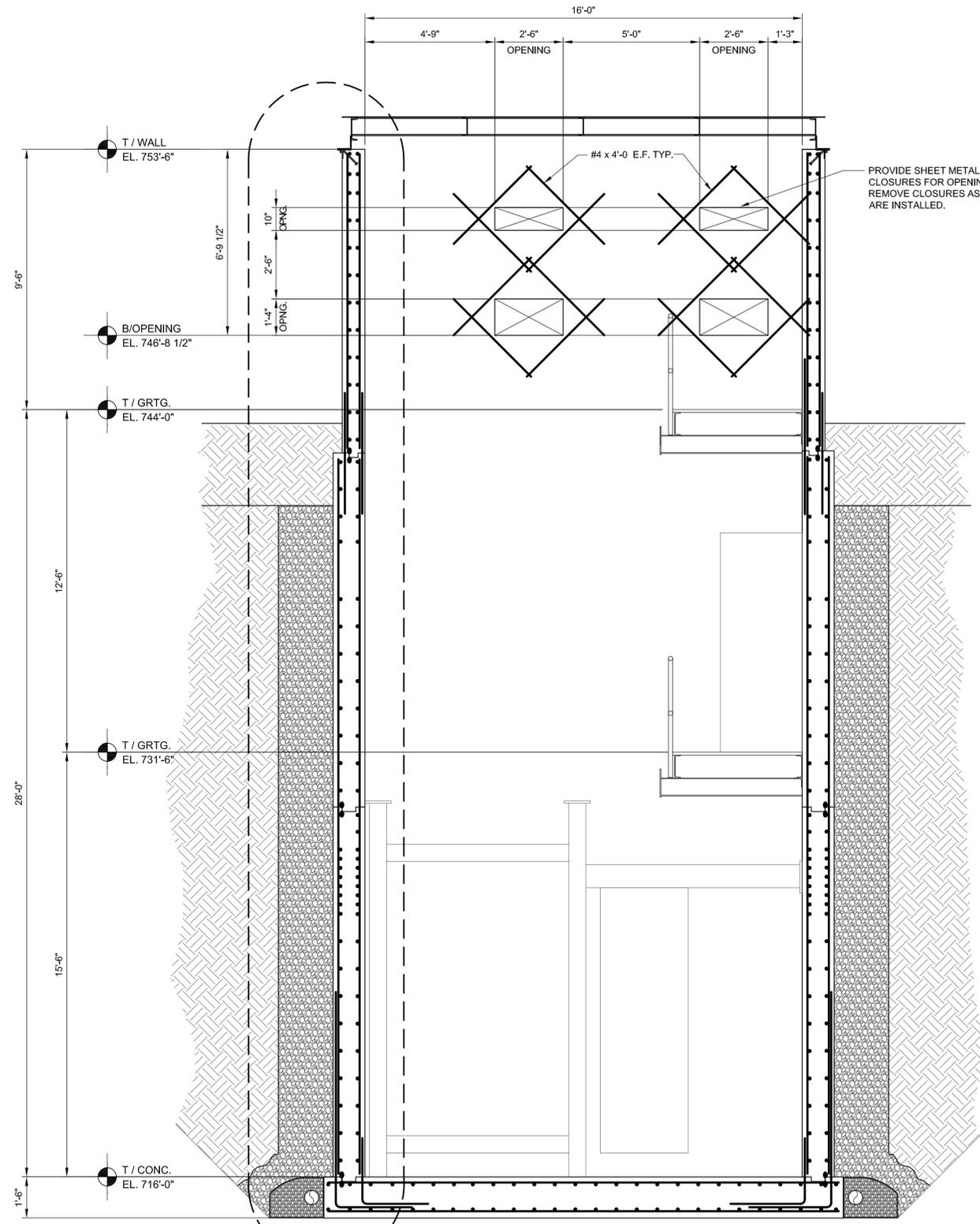
	NAME	DATE
DESIGNED	R. ALBER	06/26/06
DRAWN	R. JEDZINIAK	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06



**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

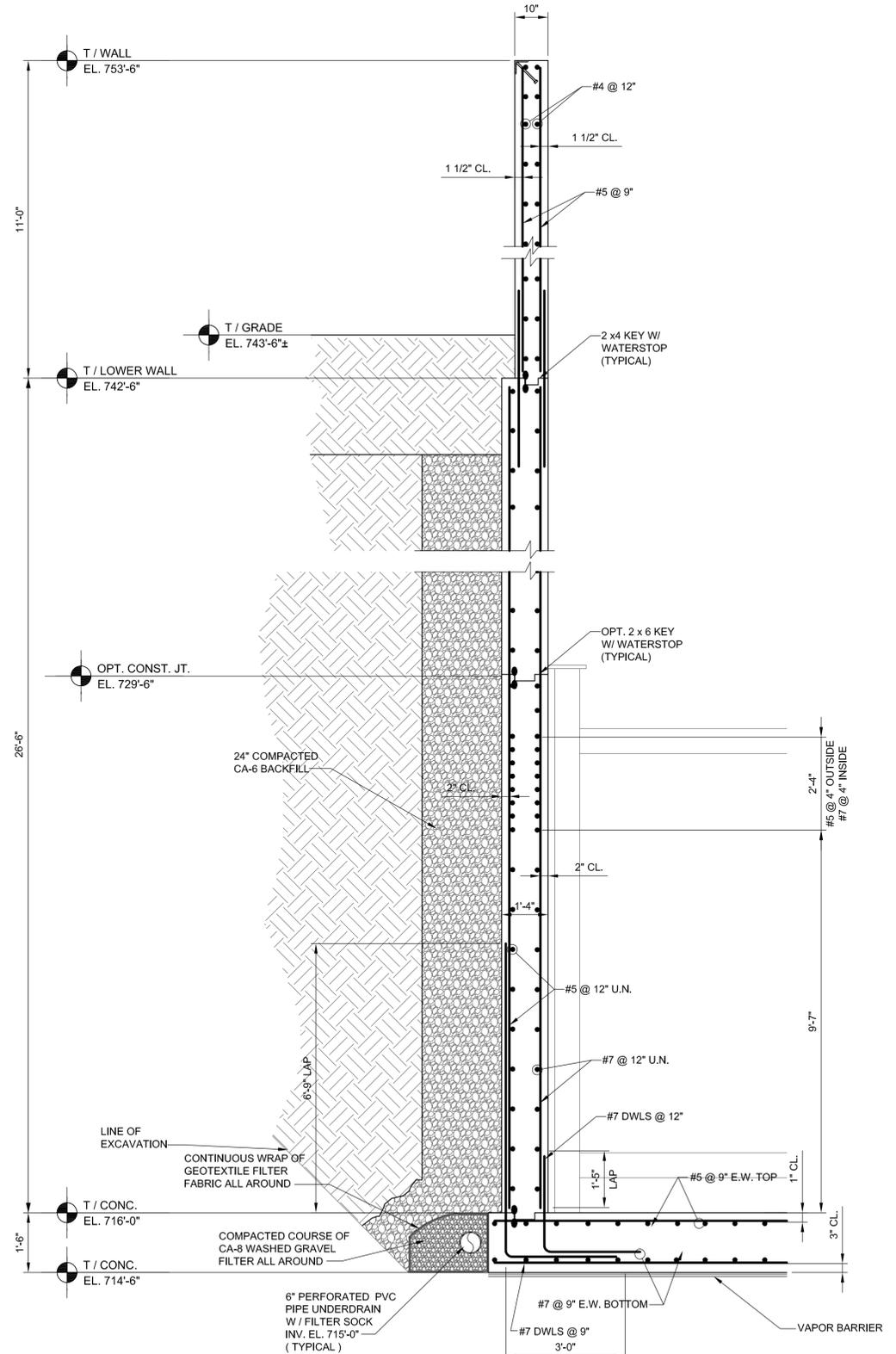
**SciBooNE DETECTOR ENCL.**  
**SECTIONS AND DETAILS - SHEET 1**

DRAWING NO. **6-7-62** **S-4** REV. 0



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

C  
S-1 S-2

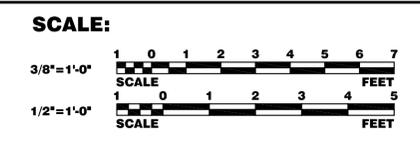


**DETAIL**  
SCALE: 1/2"=1'-0"

3  
S-4 S-5

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS
		REVISIONS

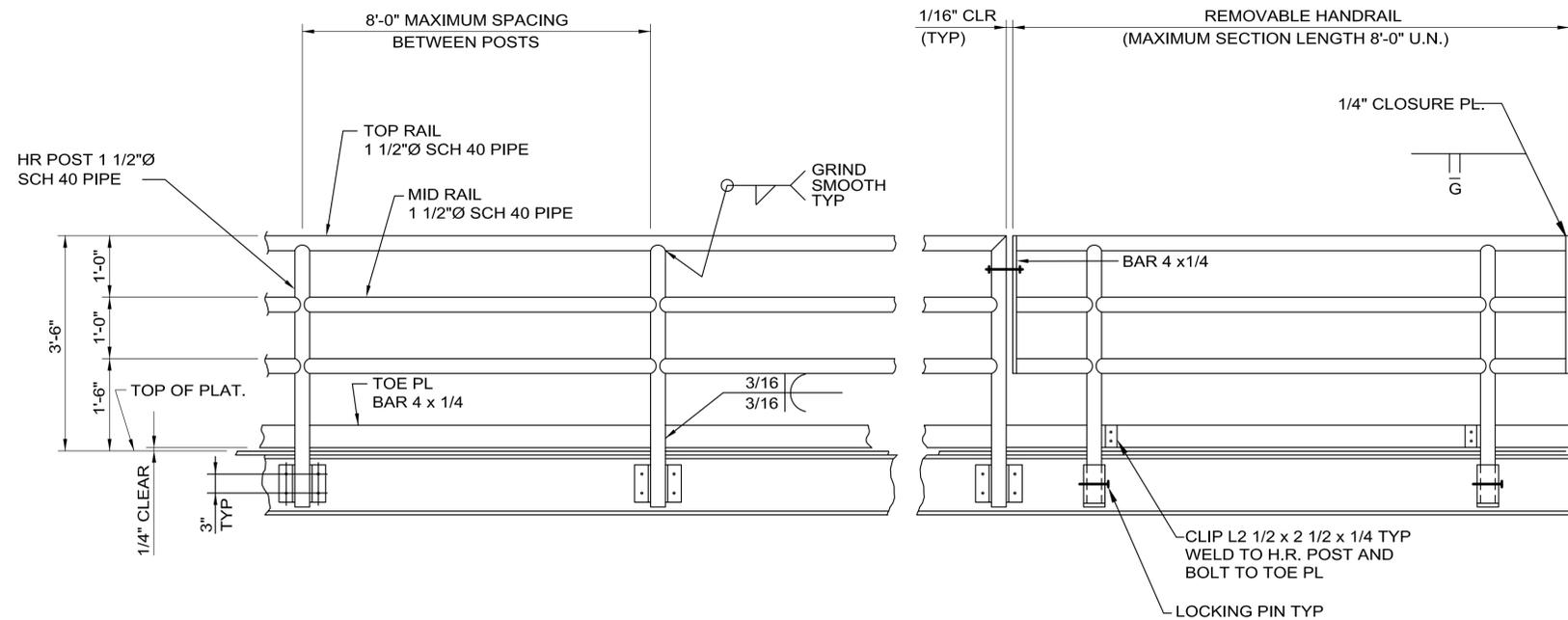
	NAME	DATE
DESIGNED	R. ALBER	06/26/06
DRAWN	R. JEDZINIAK	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06



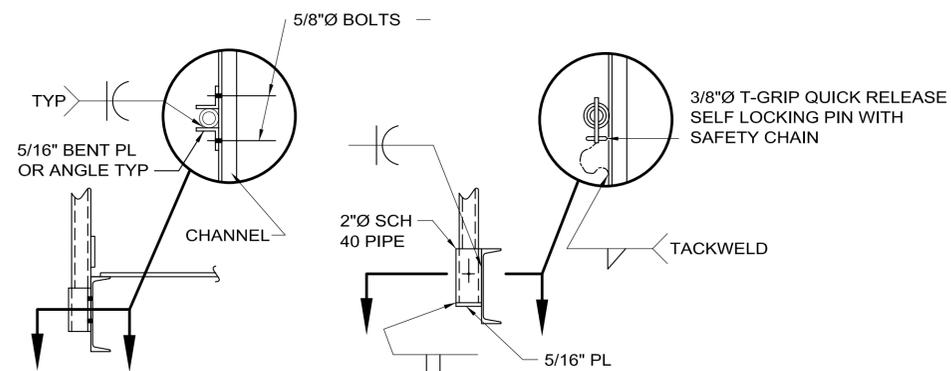
**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

**SciBooNE DETECTOR ENCL.**  
**SECTIONS AND DETAILS - SHEET 2**

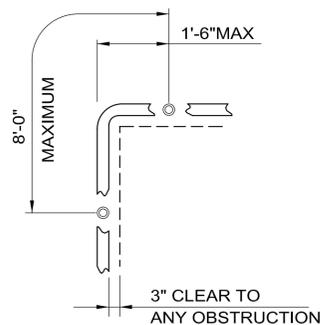
DRAWING NO. **6-7-62** **S-5** REV. 0



**HANDRAIL ELEVATION AT PLATFORM**



**AT BACK OF CHANNEL H.R. POST SLEEVES**  
**HANDRAIL POST CONNECTIONS**



**PLAN**  
**TYPICAL HANDRAIL CORNER**

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS
		REVISIONS

	NAME	DATE
DESIGNED	R. ALBER	06/26/06
DRAWN	R. JEDZINIAK	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06

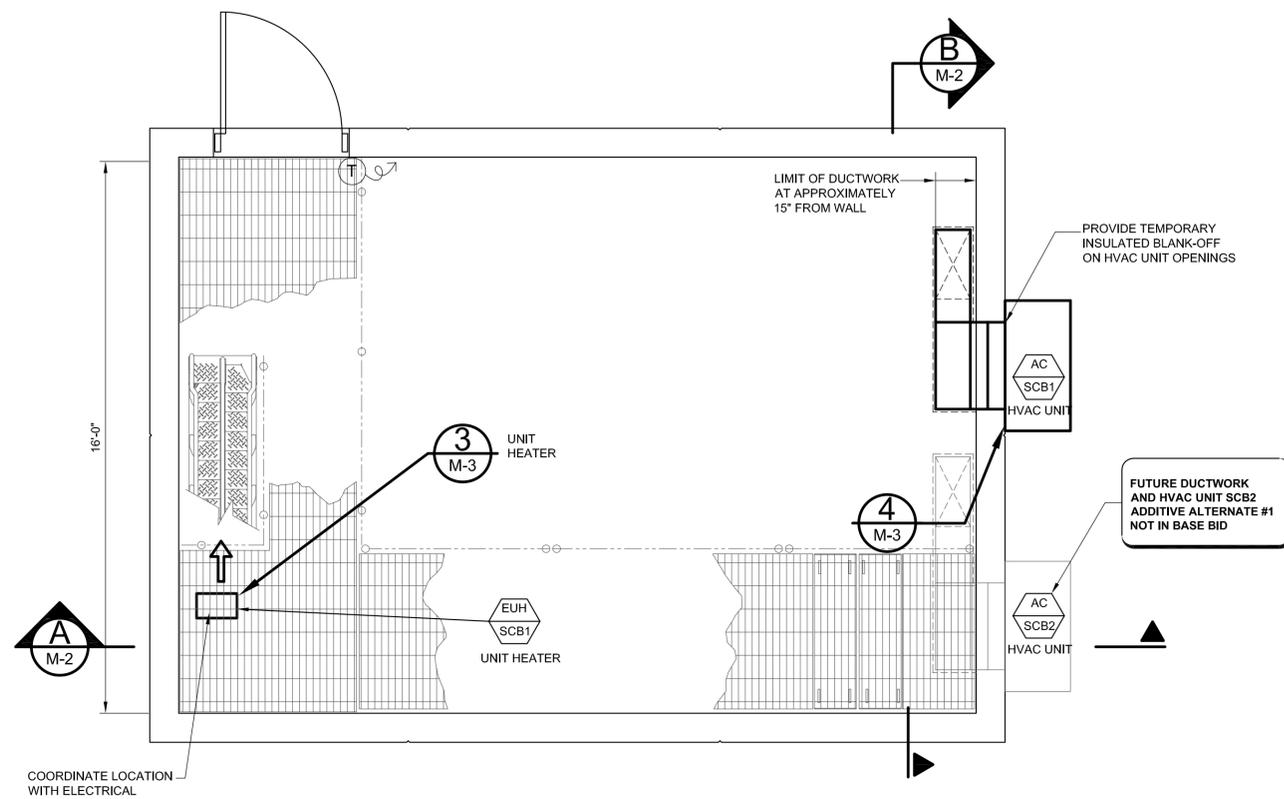
SCALE:

**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY



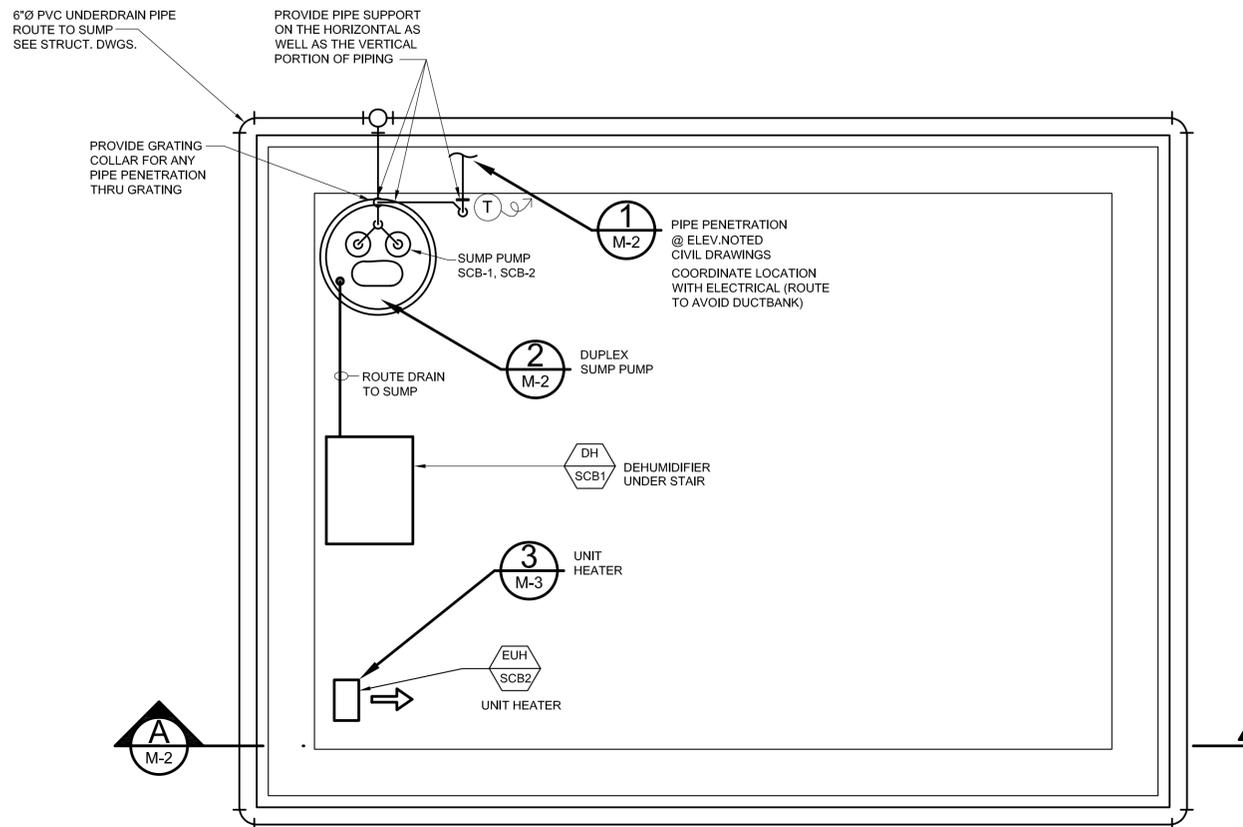
**SciBooNE DETECTOR ENCL.**  
**HANDRAIL DETAILS**

DRAWING NO. **6-7-62** **S-6** REV. **0**



**PLAN @ EL. 744'-0"**

3/8"=1'-0"



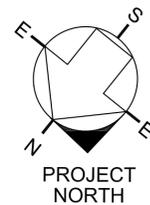
**PLAN AT EL. 716'-0"**

3/8"=1'-0"

Dwg: M-01 and M-02\_6-7-62.dwg Plotted: 25JUN06 @ 12:11:58a.m.

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS
		REVISIONS

	NAME	DATE
DESIGNED	E. HUEDEM	06/26/06
DRAWN	E. HUEDEM	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06



SCALE:

3/8"=1'-0"



**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

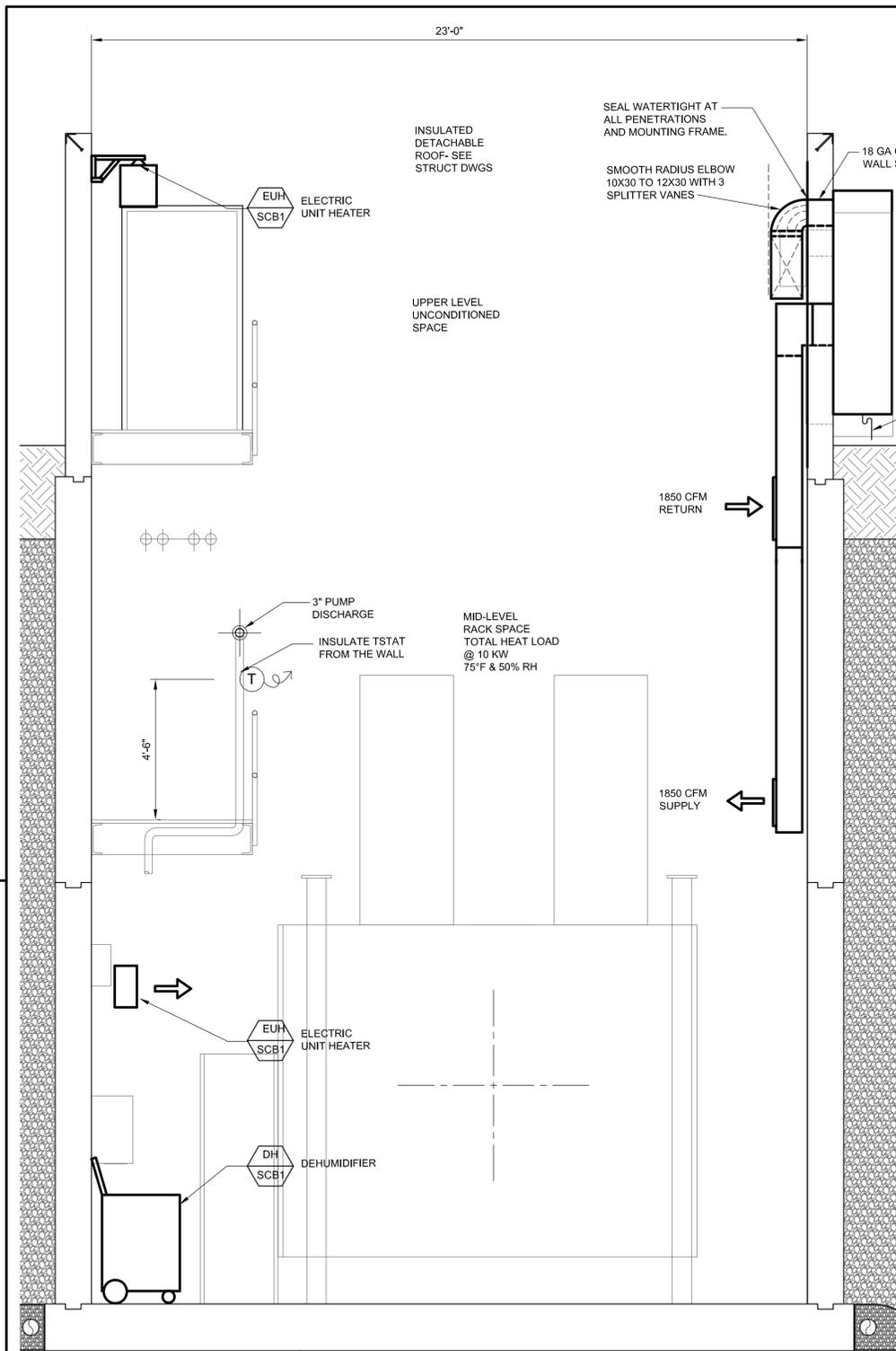


**SciBooNE DETECTOR ENCL.  
PLANS & DETAILS**

DRAWING NO. **6-7-62**

**M-1** REV. **0**

26-JUNE 2006 F.I.M.S. No. 780

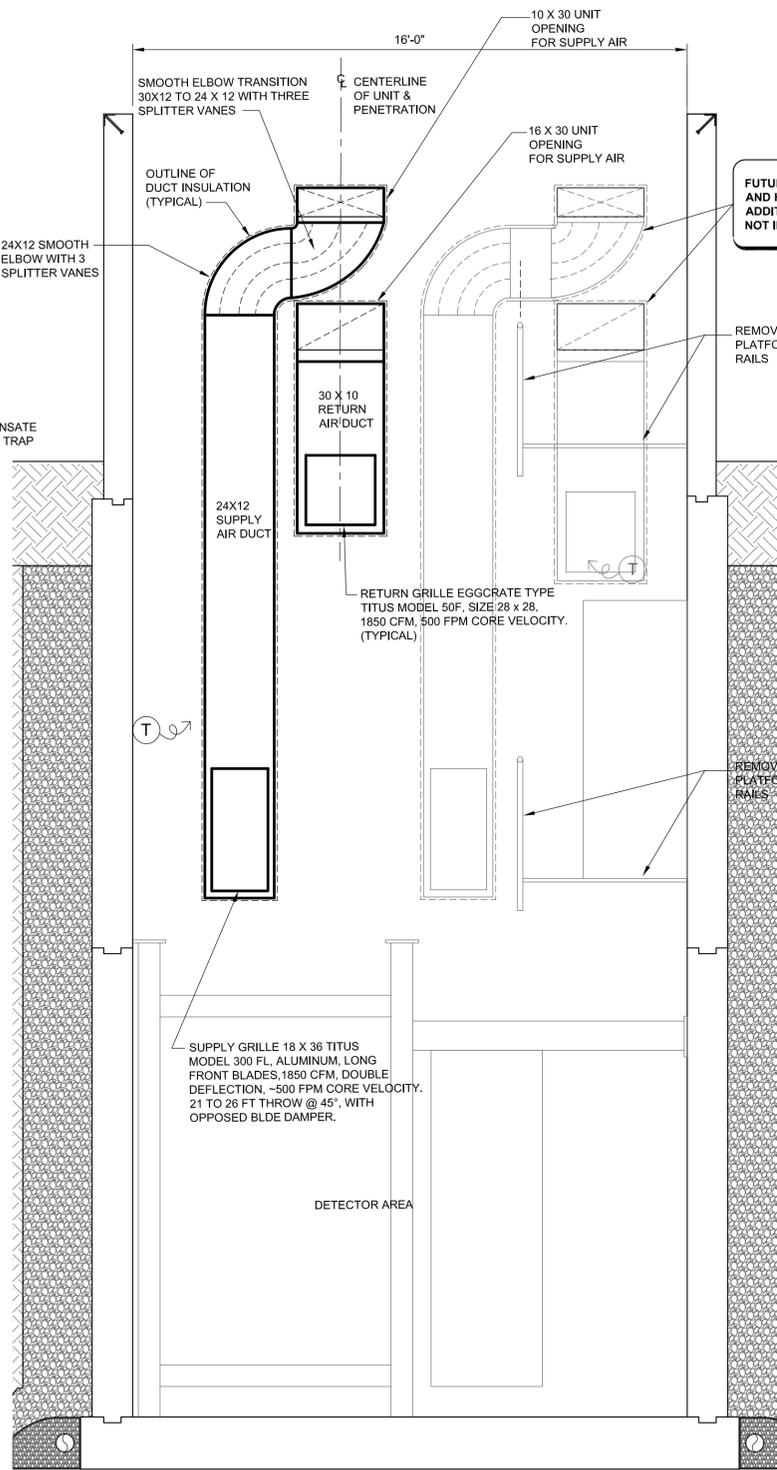


**SECTION**

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

**A**

M-1

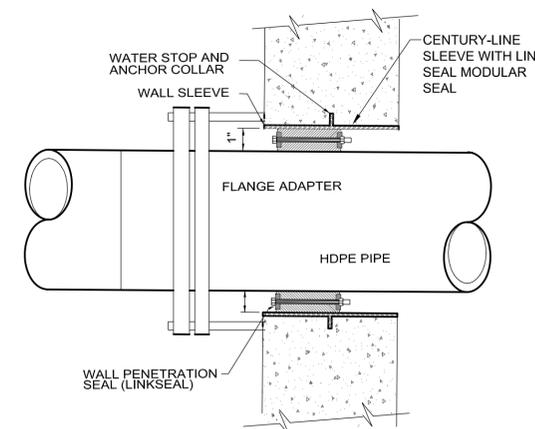


**SECTION**

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

**B**

M-1

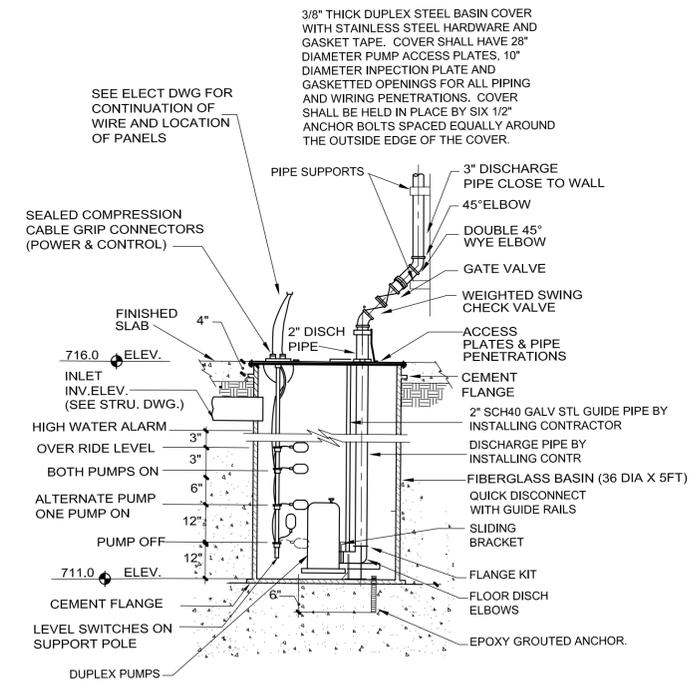


**DETAIL**

SCALE: NONE

**1**

M-1



**DETAIL**

SCALE: NONE

**2**

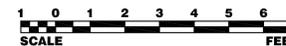
M-1

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS
		REVISIONS

	NAME	DATE
DESIGNED	<b>E. HUEDEM</b>	<b>06/26/06</b>
DRAWN	<b>E. HUEDEM</b>	<b>06/26/06</b>
CHECKED	<b>T. LACKOWSKI</b>	<b>06/26/06</b>
APPROVED	<b>V. KUCHLER / E. CRUMPLEY</b>	<b>06/26/06</b>
SUBMITTED	<b>R. TESAREK</b>	<b>06/26/06</b>

**SCALE:**

3/8"=1'-0"



**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



**SciBooNE DETECTOR ENCL.**  
**SECTIONS AND DETAILS**

DRAWING NO. **6-7-62**

**M-2**

REV. **0**

26-JUNE 2006 F.I.M.S. No. 780

### AIR CONDITIONING UNIT SCHEDULE FOR RACK AREA (MID-LEVEL AREA)

TAG NUMBER	QTY.	AREA SERVED	MFR./ MODEL NO.	COOLING CAPACITY		SUPPLY (INDOOR) FAN						OUTDOOR FAN			COMPRESSOR			ELECTRIC REHEAT	ELECTRICAL POWER SUPPLY			FILTER SIZE	SHIP WEIGHT	SEER	REMARKS				
				MBH TOTAL	MBH SENSIBLE	CFM	MIN. O.A.	ESP	RPM	H.P.	V/Ø/HZ	FLA	CFM	RPM	H.P.	V/Ø/HZ	FLA		TYPE	RLA	LRA					V/Ø/HZ	V/Ø/HZ	MIN. CIRCUIT AMPACITY	MAX. EXT. FUSE SIZE
AC-SCB1	1	RACK AREA	MARVAIR COMPAQ II AVP60ACD (NO SUBSTITUTIONS)	57 (~16.7KW)	45.6 (~13 KW)	1,850	100 (3%)	0.20	1075	1/2	208/1/60	3.2	2,700	825	1/3	208/1/60	2.8	SCROLL	7.4	49.5	460/3/60	9 KW	460/3/60	28.8	30	22 X 36.5 X 2	565 LBS	10	
AC-SCB2	1	RACK AREA	MARVAIR COMPAQ II AVP60ACD (NO SUBSTITUTIONS)	57 (~16.7KW)	45.6 (~13 KW)	1,850	100 (3%)	0.20	1075	1/2	208/1/60	3.2	2,700	825	1/3	208/1/60	2.8	SCROLL	7.4	49.5	460/3/60	9 KW	460/3/60	28.8	30	22 X 36.5 X 2	565 LBS	10	

BUILT-IN ECONOMIZER - STD FEATURE  
 LOW AMBIENT CONTROL STD FEATURE  
 DIGITAL THERMOSTAT WITH 2-STAGE CONTROL  
 100% OUTSIDE AIR INTAKE & PRESSURE RELIEF  
 SLOPED RAIN HOOD  
 BOTTOM MOUNTING BRACKET  
 MIN POSITION POTENTIOMETER  
 2" FILTER  
 DRY CONTACT FOR REMOTE ALARM ON LOCKOUT  
 FIELD INSTALLED SINGLE POWER ENTRY  
 FACTORY INSTALLED DISCONNECT SWITCH  
 INCLUDE FACTORY STARTUP OF UNIT

ADDITIVE ALTERNATE #1 NOT IN BASE BID

- 1) **Ductwork:** Galvanized Sheet Metal. ASTM A525, Lockforming Quality. Coating G-90 (0.90 oz./S.F.). The weight of steel used shall not be less than is listed in the SMACNA manual "HVAC Duct Construction Standards", Latest Edition. See SMACNA manual for gage and reinforcement requirements and provide all as required.
- 2) **DUCTWORK INSULATION:** 1" armaflex closed cell elastomeric, UV resistant, thermal insulation with thermal conductivity of 0.27 at 75 F mean temperatures. Install per manufacturers instruction and finish with WB Armaflex white finish.
- 3) **Steel Pipe:** ASTM A-106 or ASTM A-53 Grade B. Schedule 40 unless noted or specified otherwise. Uncoated black pipe unless specifically designated hot dip galvanized. N.P.T. screw joints. Banded For 2" and lower, and flange for 3" and larger, malleable iron, 150 pounds per square inch standard weight; ANSI B16.3; hot dip galvanized where specifically designated.

### SUMP PUMP SCHEDULE

SUMP PUMP SCHEDULE											REMARKS
TAG NUMBER	QTY.	AREA SERVED	MFR./ MODEL NO.	TYPE	GPM	TDH	H.P.	RPM	V/Ø/HZ	DISCH SIZE	
SP-SCB1 SP-SCB2	1	SCIBOONE DETECTOR	WEIL NO SUBSTITUTIONS.	DUPLEX	40	40	1	1760	460/3/60	2"	

(2) WEIL PUMP MODEL 2442 SUBMERSIBLE NON CLOG PUMP WITH CARBON CERAMIC MECHANICAL SEALS, CAST IRON IMPELLER AND 25 FT POWER CABLE. NON-OVERLOADING MOTOR. WITH QUICK REMOVAL SYSTEM WITH BASE ELBOW, GUIDE PLATE, GUIDE RAILS AND UPPERGUIDE BRACKET. WITH WEIL SERIES 8100 REMOTE 480V CONTROL PANEL. NEMA 4X DUPLEX, UL LISTED, WITH MAIN DISCONNECT, TRANSFORMER, STARTERS, DISCONNECT, O.L. BLKS, H-O-A SWITCHES, RUN LIGHT ALARM HORN ND LIGHT WSILENCE PUSH-BUTTON, AND REMOTE 115V ALARM CONTACTS, AUXILIARY DRY CONTACTS AND MOTOR RUN TIME METER. CONTROL SHALL AUTOMATICALLY START THE SECOND PUMP AS REQUIRED. WITH WEIL MODEL 8234 FLOAT SWITCHES CONTROL FLOAT SWITCHES TO CONTROL PUMP "OFF", "ON", "LAG" AND "HIGH WATER ALARM" LEVEL. CONTROL SHALL AUTOMATICALLY START THE SECOND PUMP AS REQUIRED. WITH BASIN 36" ID X 60" DEEP FIBERGLASS WITH STEEL COVER INCLUDING TWO PUMP ACCESS PLATES EACH WITH DISCHARGE FLANGE AND CABLE SLOT, VENT FLANGE AND INSPECTION OPENING. CORRECT WIRING DIAGRAMS SHALL BE SUBMITTED FOR APPROVAL AND FURNISHED WITH PUMP AND CONTROL UNITS WHEN SHIPPED.

- 4) **PIPE AND DUCT SUPPORT:** Whether noted or not, provide and Install hangers, supports, clamps, and attachments as required to properly support piping AND DUCTWORK from building structure.

### DEHUMIDIFIER SCHEDULE

TAG NUMBER	QTY.	AREA SERVED	MFR./ MODEL NO.	TYPE	REFRIG	VOLUME	NOMINAL TON	H.P.	ESP	ELECTRIC		REMARKS
										V/Ø/HZ	FLA	
DH-SCB1	1	SCIBOONE DETECTOR AREA	DESERT AIRE HPR-090	REFRIG	R22	400 CFM	0.9	0.25	0.1"	115/1/60	10.3	PORTABLE DEHUMIDIFICATION INDOOR UNIT WITH GALVANNEAL METAL CABINET WITH NON-CORROSIVE POWDER COAT FINISH, INDUSTRIAL GRADE CENTRIFUGAL BLOWER, FACTORY MOUNTED HUMIDISTAT CONTROL, HANDLE AND WHEEL ASSEMBLY

SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND ALL LOOSE ITEMS FOR FIELD INSTALLATION, WHETHER NOTED OR NOT, IN ACCORDANCE WITH INSTALLATION MANUAL.

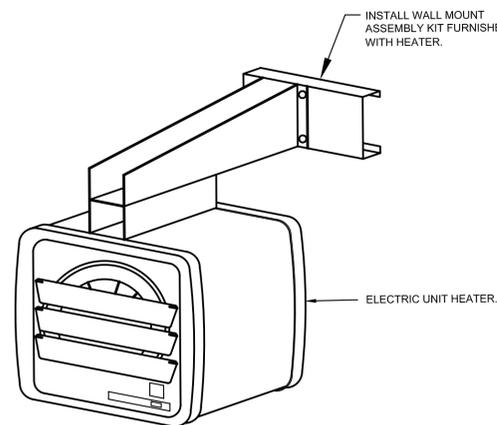
SUBCONTRACTOR SHALL COORDINATE WITH OTHER DRAWINGS AND ESTABLISH THE LOCATION AND DEPTH OF PIPE PENETRATIONS IN THE BASIN, PRIOR TO SHOP DRAWING SUBMITTALS.

- 5) **Gate Valve, 2 Inch and Smaller Sizes,** Bronze body, union and bonnet, bronze mounted gate or wedge style. Rising stem, handwheel operated, open CCW, conventional packing gland, re-packable under pressure. Pressure rating: 150 psi WSP; 300 psi CWP. N.P.T. screw ends, ANSI B2.1. Nibco T134 or equal.
- 6) **Check Valves, Vertical and Horizontal Piping,** All Pipe Material, 2 Inch & Smaller Sizes: Bronze body, Teflon disc, in-line center guided. Pressure Rating: 125 psi WSP, 250 psi CWP. NIBCO - Number T-480 or equal.
- 7) **Leak Test of Pipe:** Provide materials and labor for complete hydrostatic leak testing of all piping at system pressure at maximum 4 hour duration. Provide signed written report.

### ELECTRIC HEATER SCHEDULE

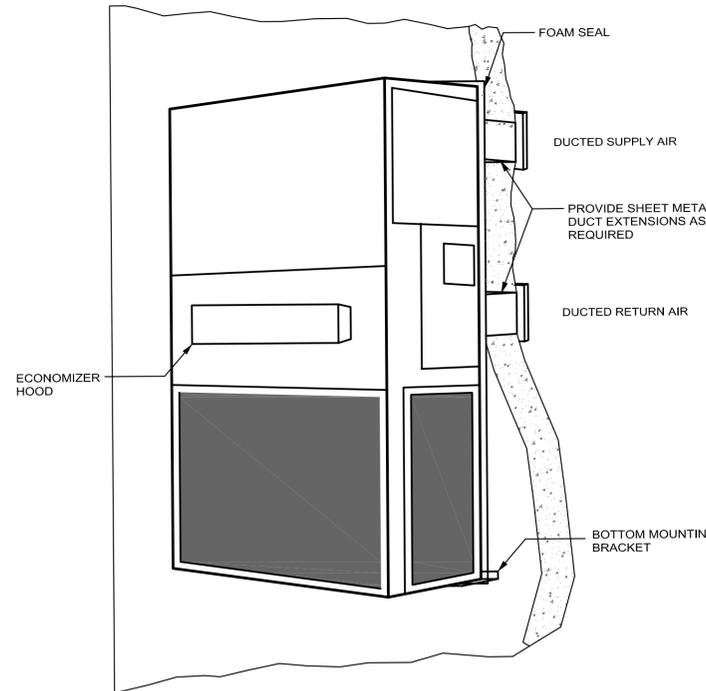
UNIT NO.	MFR	MODEL	KW	VOLTS	AMP	STEPS	AIRFLOW CFM	OUTLET VELOCITY FPM	THROW feet	TEMP RISE ° F	WEIGHT (LBS)	DIMENSIONS inches	
EUH-SCB1	BRASCH	BTUH-3-4803	3	480 / 3	3.7	1	315	785	18	30	42	19H x 14 x 12	① ② ③
EUH-SCB1	BRASCH	BTUH-3-4803	3	480 / 3	3.7	1	315	785	18	30	42	19H x 14 x 12	① ② ③

- ① WALL MOUNT ASSEMBLY KIT FOR HORIZONTAL DISCHARGE AND WALL MOUNTED THERMOSTAT. STANDARD BUILT-IN CONTROL TRANSFORMER, CONTACTORS AND 480V DISCONNECT SWITCH.
- ② INSTALL AS NOTED AND IN ACCORDANCE WITH MANUFACTURERS INSTALLATION MANUAL
- ③ WITH 480V DISCONNECT SWITCH



**DETAIL**  
NOT TO SCALE

3  
M-1



**DETAIL**  
NOT TO SCALE

4  
M-1

- 8) **INSPECTION, TESTING AND CLEANING OF SUMP PUMP.**  
Impeller, motor rating and electrical connections shall be checked for compliance with this specification.  
  
Prior to submergence, each pump shall be checked for correct rotation.  
  
Each pump shall be run submerged in water.  
  
Motor and cable insulation shall be tested for moisture content or insulation defects.  
  
Upon request, a written quality assurance record confirming the above testing/inspections shall be supplied with each pump at the time of shipment.

- 9) **INSTALLATION, TESTING AND CLEANING OF HVAC UNIT**  
Provide adequate drainage connections for condensate.  
  
Unit shall be installed as detailed on the plans and as required per manufacturer's manual. Subcontractor shall maintain minimum service clearances as required by manufacturer.

- 10) **INSTALLATION, TESTING AND CLEANING OF UNIT HEATERS & DEHUMIDIFIER**  
Unit shall be installed as SHOWN on the plans and as required by manufacturer. Contractor shall maintain minimum distance from combustibles as required by manufacturer. Where required, stiffener plates shall be installed to walls to assist in supporting UNIT.

- 11) **TEST AND BALANCE:** Provide for testing, adjusting and balancing of the HVAC system. Adjust balancing dampers to provide for the proper flow as noted. Submit test report.

- 12) **TEST AND BALANCE:** Provide for testing, adjusting and balancing of the HVAC system. Adjust balancing dampers to provide for the proper flow as noted. Submit test report.

- 13) **TEST AND BALANCE:** Provide for testing, adjusting and balancing of the HVAC system. Adjust balancing dampers to provide for the proper flow as noted. Submit test report.

- 14) **TEST AND BALANCE:** Provide for testing, adjusting and balancing of the HVAC system. Adjust balancing dampers to provide for the proper flow as noted. Submit test report.

- 15) **TEST AND BALANCE:** Provide for testing, adjusting and balancing of the HVAC system. Adjust balancing dampers to provide for the proper flow as noted. Submit test report.

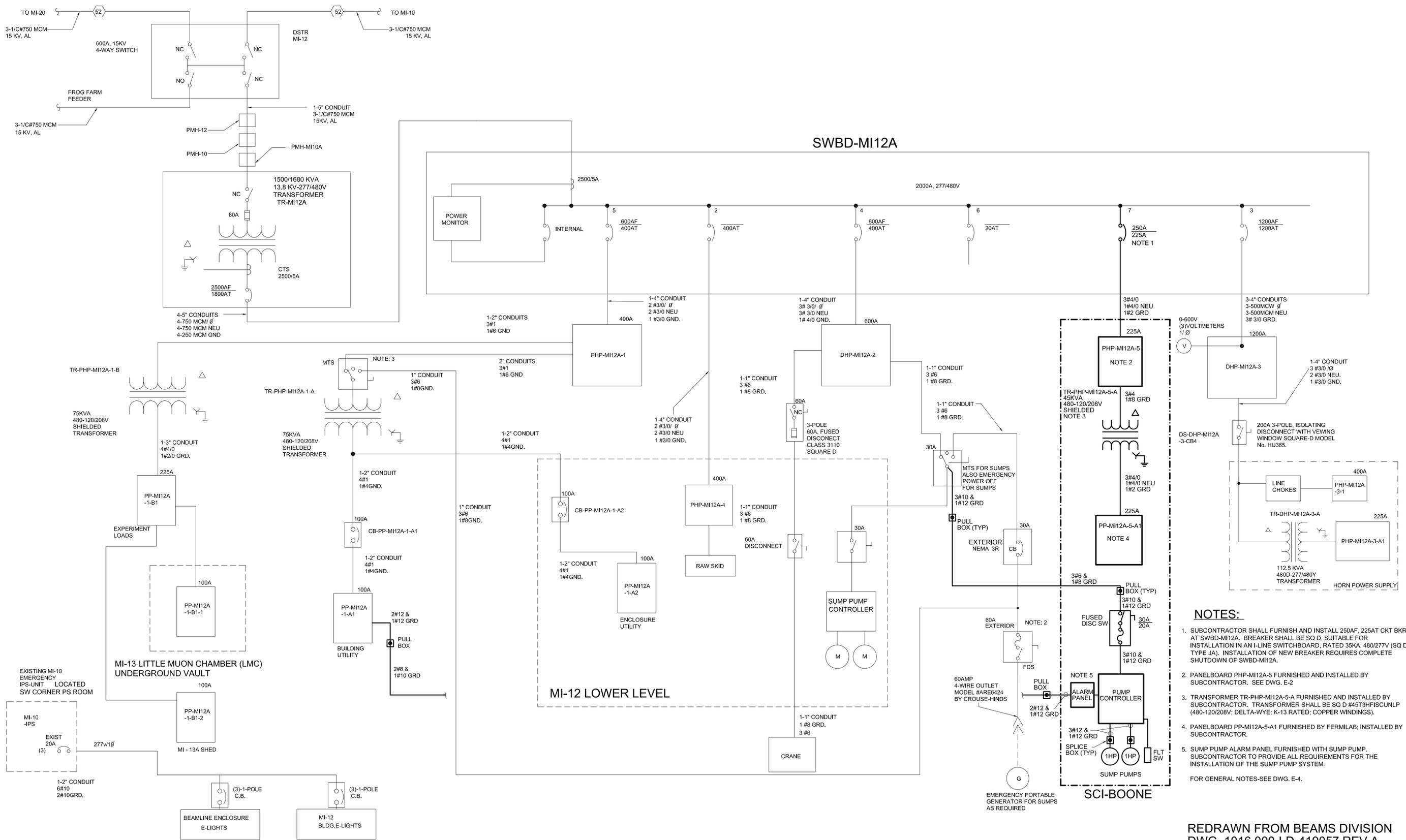
- 16) **TEST AND BALANCE:** Provide for testing, adjusting and balancing of the HVAC system. Adjust balancing dampers to provide for the proper flow as noted. Submit test report.

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS

	NAME	DATE
DESIGNED	E. HUEDEM	06/26/06
DRAWN	E. HUEDEM	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06

**SCALE:**

<b>FERMI NATIONAL ACCELERATOR LABORATORY</b>	
UNITED STATES DEPARTMENT OF ENERGY	
	<b>SciBoONE DETECTOR ENCL.</b>
<b>SCHEDULES, NOTES &amp; DETAILS</b>	
DRAWING NO. <b>6-7-62</b>	<b>M-3</b> REV. <b>0</b>



- NOTES:**
- SUBCONTRACTOR SHALL FURNISH AND INSTALL 250AF, 225AT CKT BKR AT SWBD-MI12A. BREAKER SHALL BE SQ D, SUITABLE FOR INSTALLATION IN AN I-LINE SWITCHBOARD, RATED 35KA, 480/277V (SQ D TYPE JA). INSTALLATION OF NEW BREAKER REQUIRES COMPLETE SHUTDOWN OF SWBD-MI12A.
  - PANELBOARD PHP-MI12A-5 FURNISHED AND INSTALLED BY SUBCONTRACTOR. SEE DWG. E-2
  - TRANSFORMER TR-PHP-MI12A-5-A FURNISHED AND INSTALLED BY SUBCONTRACTOR. TRANSFORMER SHALL BE SQ D #45T3HFISUNLP (480-120/208V; DELTA-WYE; K-13 RATED; COPPER WINDINGS).
  - PANELBOARD PP-MI12A-5-A1 FURNISHED BY FERMLAB; INSTALLED BY SUBCONTRACTOR.
  - SUMP PUMP ALARM PANEL FURNISHED WITH SUMP PUMP. SUBCONTRACTOR TO PROVIDE ALL REQUIREMENTS FOR THE INSTALLATION OF THE SUMP PUMP SYSTEM.
- FOR GENERAL NOTES-SEE DWG. E-4.

REDRAWN FROM BEAMS DIVISION  
DWG. 1016.000-LD-419057 REV A

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS

	NAME	DATE
DESIGNED	J. SANTIC	06/26/06
DRAWN	K. WHITTEN	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06

SCALE:

**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

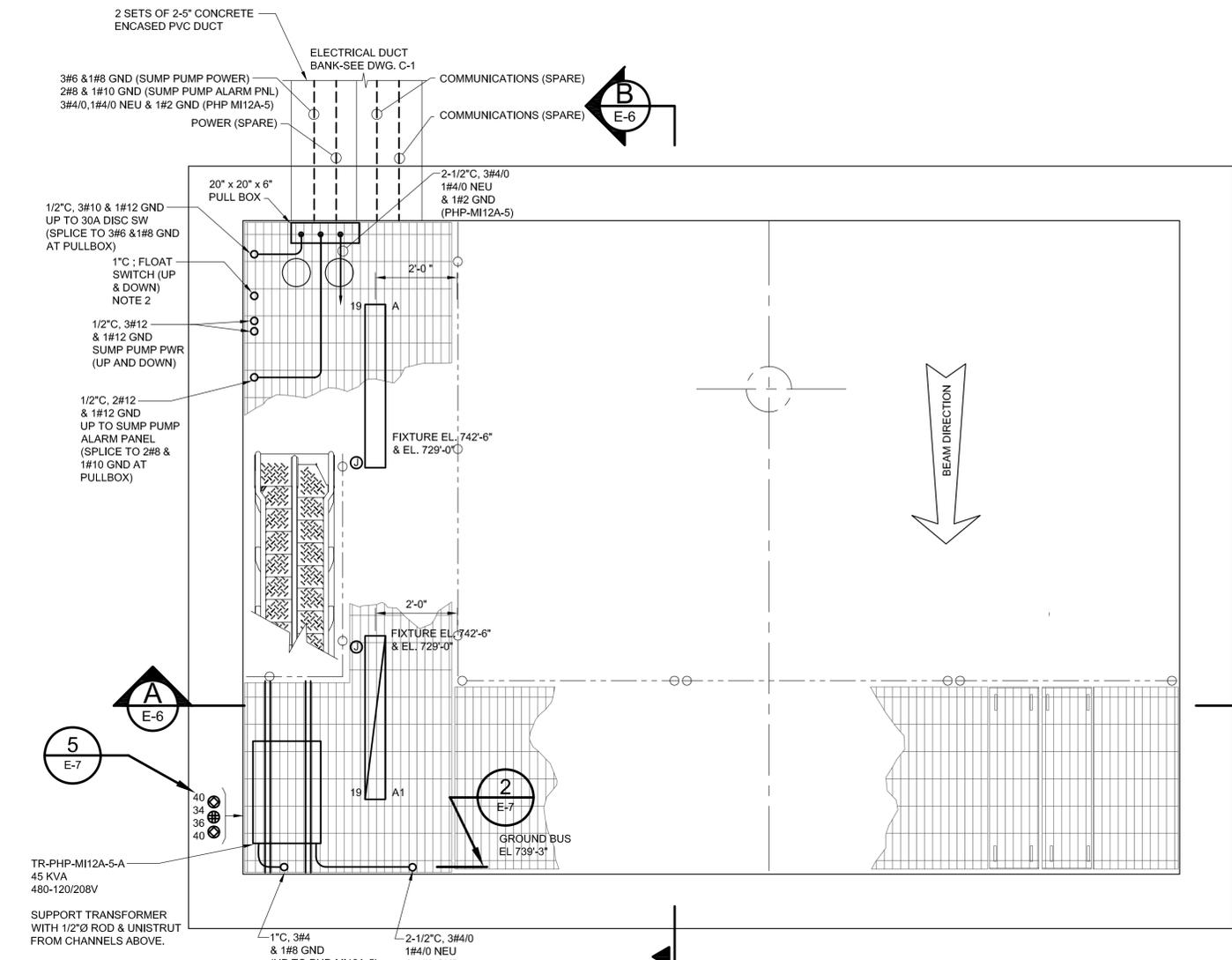
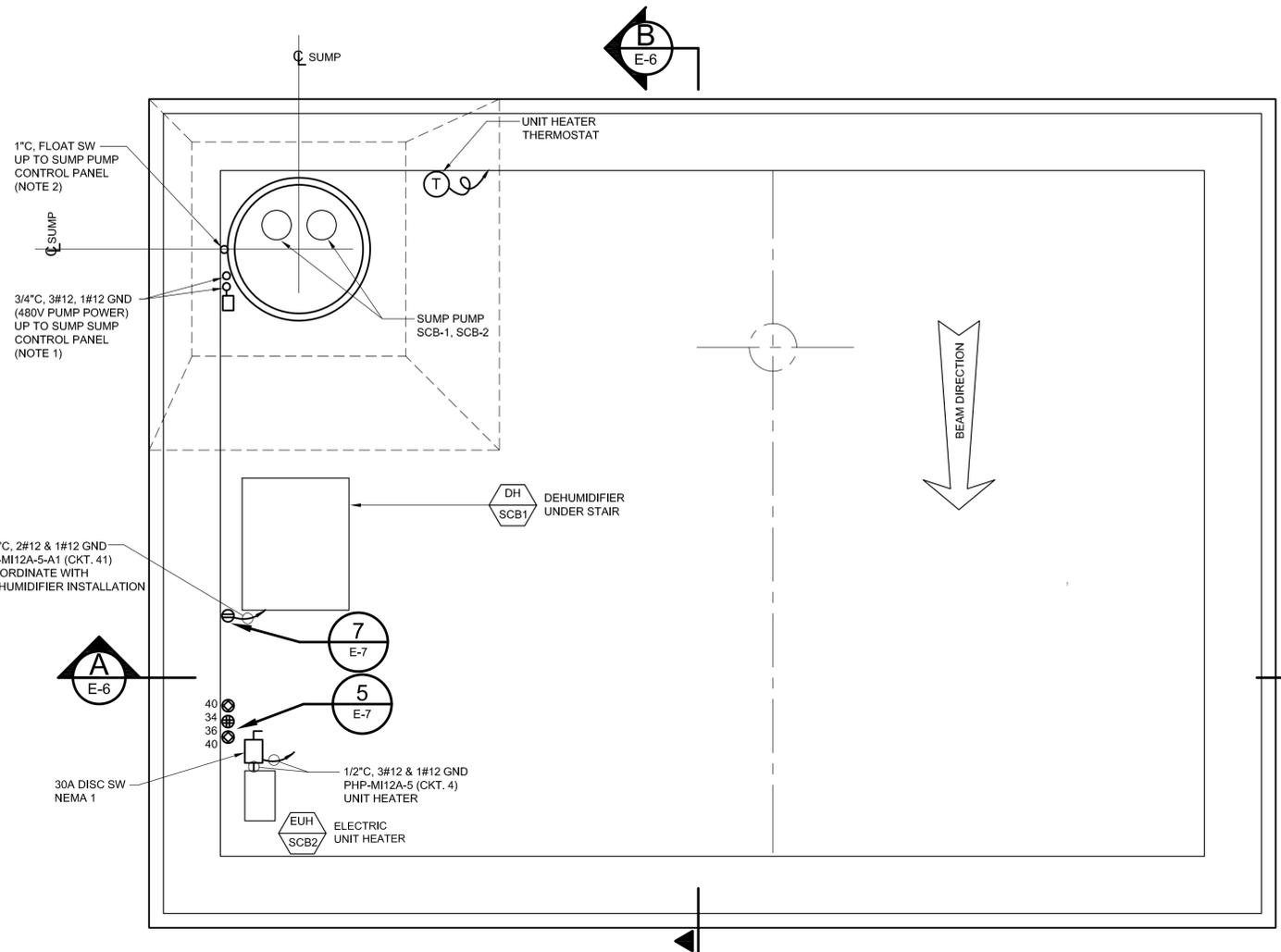
**SciBoONE DETECTOR ENCL.**  
**SINLE LINE DIAGRAM**

DRAWING NO. **6-7-62** **E-1** REV. **0**

Dwg: E-01\_6-7-62.dwg Plotted: 29 JUN 06 @ 12:16:24a.m.

F.I.M.S. No. 780  
26 JUNE 2006

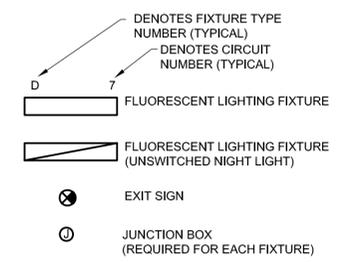




**FIXTURE SCHEDULE**

TYPE	DESCRIPTION	LAMP	BALLAST	MANUFACTURER	CATALOG NUMBER	REMARKS
A	48", 32W, FLUORESCENT FIXTURE, 2-LAMP, 6% UPLIGHT OPEN TYPE, BAKED ENAMEL REFLECTOR	(2) T8 FLUOR.	ELECTR. THD<10% 277V	METALUX	DI232-277-ER8-WG/DI-4FT-U	
A1	SAME AS TYPE "A" EXCEPT INCLUDES BATTERY PACK OPTION	(2) T8 FLUOR.	ELECTR. THD<10%, 277V	METALUX	DI232-277-ER8-EL8-WG/DI-4FT-U	BATTERY PACK OPTION FOR ONE LAMP
B	48", 32W, T-8 FLUORESCENT STRIP FIXTURE, 2-LAMP, SURFACE MOUNT WITH WIRE GUARD	(2) T8 FLUOR.	ELECTR. THD<10%, 277V	METALUX	STN-232-277-ER8-WG/SS-4FT-U	WIRE GUARD-BAKED WHITE ENAMEL FINISH
B1	SAME AS TYPE "B" EXCEPT INCLUDES BATTERY PACK OPTION	(2) T8 FLUOR.	ELECTR. THD<10%, 277V	METALUX	STN-232-277-ER8-EL8-WG/SS-4FT-U	BATTERY PACK OPTION FOR ONE LAMP
C	100W MERCURY VAPOR, HEAVY DUTY, OUTDOOR FIXTURE, WALL MOUNT, INTEGRAL PHOTOCCELL	SYLVANIA H38JA-100/DX	277V	LITHONIA	TWP100H277PE	EXTERIOR LIGHTING ENTRANCE/EXIT
E	EXIT SIGN WITH RED LETTERS, WHITE HOUSING UNIVERSAL MOUNTING WITH BATTERY PACK, ALUMINUM HOUSING-SINGLE FACE	L.E.D.	N/A	DUAL LITE	LEDS1EMRWW	BATTERY PACK

**LEGEND**



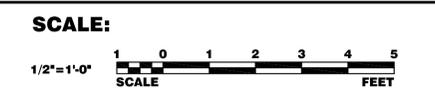
**NOTES**

- INSTALL 8" x 8" x 4", NEMA 1 SCREW COVER BOX NEAR SUMP PUMPS. SPLICE MOTOR PIGTAILS TO #12 AWG CONDUCTORS FROM SUMP PUMP CONTROLLER AT SPLICE BOX WITH WATERPROOF SPLICES. LOCATE SPLICE BOX AS NOT TO INHIBIT MAINTENANCE OR REMOVAL OF SUMP PUMPS.
- INSTALL CONDUIT FROM AREA OF SUMP PUMPS TO SUMP PUMP CONTROL PANEL FOR FLOAT SWITCH CABLES. PROVIDE CONDUIT BUSHING FOR PROTECTION OF CABLES. FLOAT SWITCH CABLES FURNISHED WITH SUMP PUMPS. SUBCONTRACTOR TO VERIFY CONDUIT SIZE WITH CABLES AS FURNISHED.

Dwg: E-03\_6-7-62.dwg Plotted: 29 JUN 06 @ 12:18:43a.m.

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS
		REVISIONS

	NAME	DATE
DESIGNED	J. SANTIC	06/26/06
DRAWN	K. WHITTEN	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06



**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

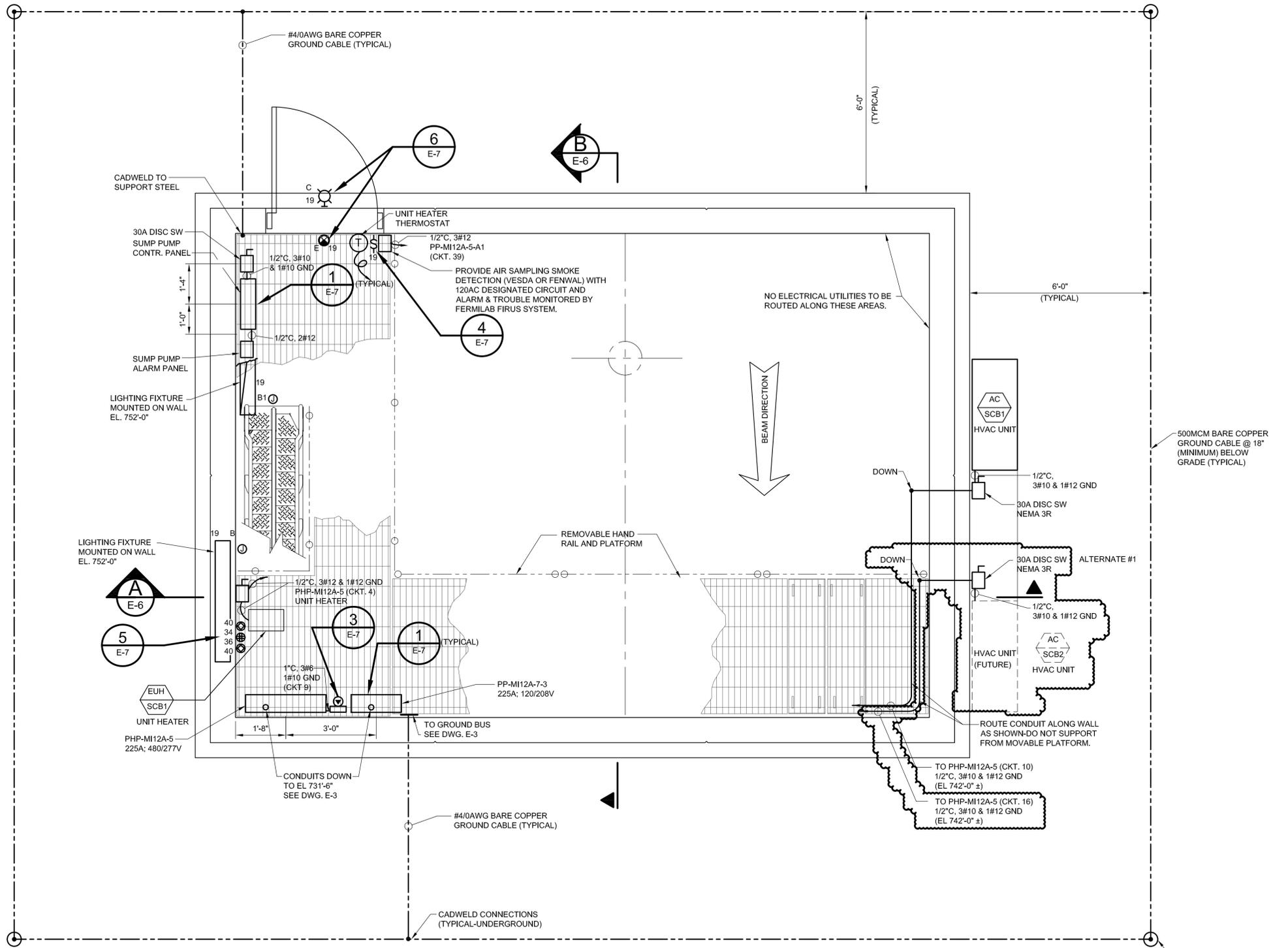
**SciBooNE DETECTOR ENCL.**  
**POWER PLAN EL. 716'-0" & EL. 731'-6"**

DRAWING NO. **6-7-62** **E-3** REV. 0

F.I.M.S. No. 780  
26-JUNE 2006

**GENERAL NOTES:**

1. DESCRIPTIONS, MANUFACTURER'S NAMES AND CATALOG NUMBERS OF LIGHTING FIXTURES ARE SPECIFIED TO ACHIEVE DESIRED LIGHTING LEVELS.
2. LOCATION OF FIXTURES, PANELBOARDS AND OTHER PIECES OF ELECTRICAL EQUIPMENT AS SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED IN THE FIELD WITH THE LOCATION OF PIPES, VENTILATION DUCTS AND MECHANICAL EQUIPMENT TO AVOID INTERFERENCES. ANY CONFLICTS DERIVING FROM EQUIPMENT INSTALLATION SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE FERMILAB CONSTRUCTION COORDINATOR.
3. ALL CONDUITS SHALL BE INTERMEDIATE METAL CONDUIT, EXEMPT AS NOTED OTHERWISE. ALL CONDUITS SHALL CONTAIN AN INSULATED, GREEN COLORED GROUND WIRE CONDUCTOR.
4. ALL WIRING SHALL BE COPPER, 600 VOLTS, TYPE THHN INSULATION. MINIMUM SIZE SHALL BE #12 AWG FOR POWER AND #14 AWG FOR CONTROL, UNLESS NOTED OTHERWISE.
5. ALL SIMILAR TYPES OF EQUIPMENT SHALL BE OF THE SAME MANUFACTURER: I.E. ALL SAFETY SWITCHES, ALL PANELBOARDS, ETC.
6. FINAL CONNECTION TO TRANSFORMERS, MOTORS OR OTHER VIBRATION GENERATING DEVICES SHALL BE MADE WITH USE OF STRANDED CONDUCTORS IN LIQUID TIGHT FLEXIBLE CONDUIT.
7. ALL EQUIPMENT SHALL BE GROUNDED USING AN INSULATED GREEN COLORED OR BARE COPPER GROUND WIRE.
8. ALL PULL BOXES AND JUNCTION BOXES SHALL BE SIZED PER THE LATEST EDITION OF THE NEC. SUBCONTRACTOR SHALL SIZE, FURNISH AND INSTALL ALL PULLBOXES OR JUNCTION BOXES AS REQUIRED BY THE NEC.
9. ALL MATERIAL AND ELECTRICAL EQUIPMENT SHALL BE LISTED BY UNDERWRITERS LABORATORIES, INC. ALL INSTALLATIONS SHALL COMPLY WITH THE RULES AND REGULATIONS OF THE LATEST EDITION OF THE NEC AND OSHA.
10. MAXIMUM NUMBER OF WIRES (#12AWG, CU, THHN) IN CONDUITS WHERE SIZE IS NOT SHOWN:  
 1/2" C 8#12  
 3/4" C 14#12  
 1" C 23#12
11. ALL ELECTRICAL INSTALLATIONS SHALL BE SUBJECT TO THE REVIEW AND APPROVAL OF THE FERMILAB CONSTRUCTION COORDINATOR. ANY ELECTRICAL INSTALLATION NOT MEETING THE APPROVAL OF THE FERMILAB CONSTRUCTION COORDINATOR SHALL BE REMOVED AND REINSTALL TO THE SATISFACTION OF THE FERMILAB CONSTRUCTION COORDINATOR, AT NO COST TO FERMILAB.

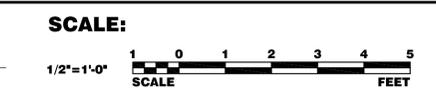
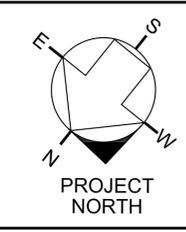


**PLAN @ T/GRTG. EL. 744'-0"**  
 1/2"=1'-0"

Dwg: E-04\_6-7-62.dwg Plotted: 29 JUN 06 @ 12:19:34a.m.

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS

	NAME	DATE
DESIGNED	J. SANTIC	06/26/06
DRAWN	K. WHITTEN	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06

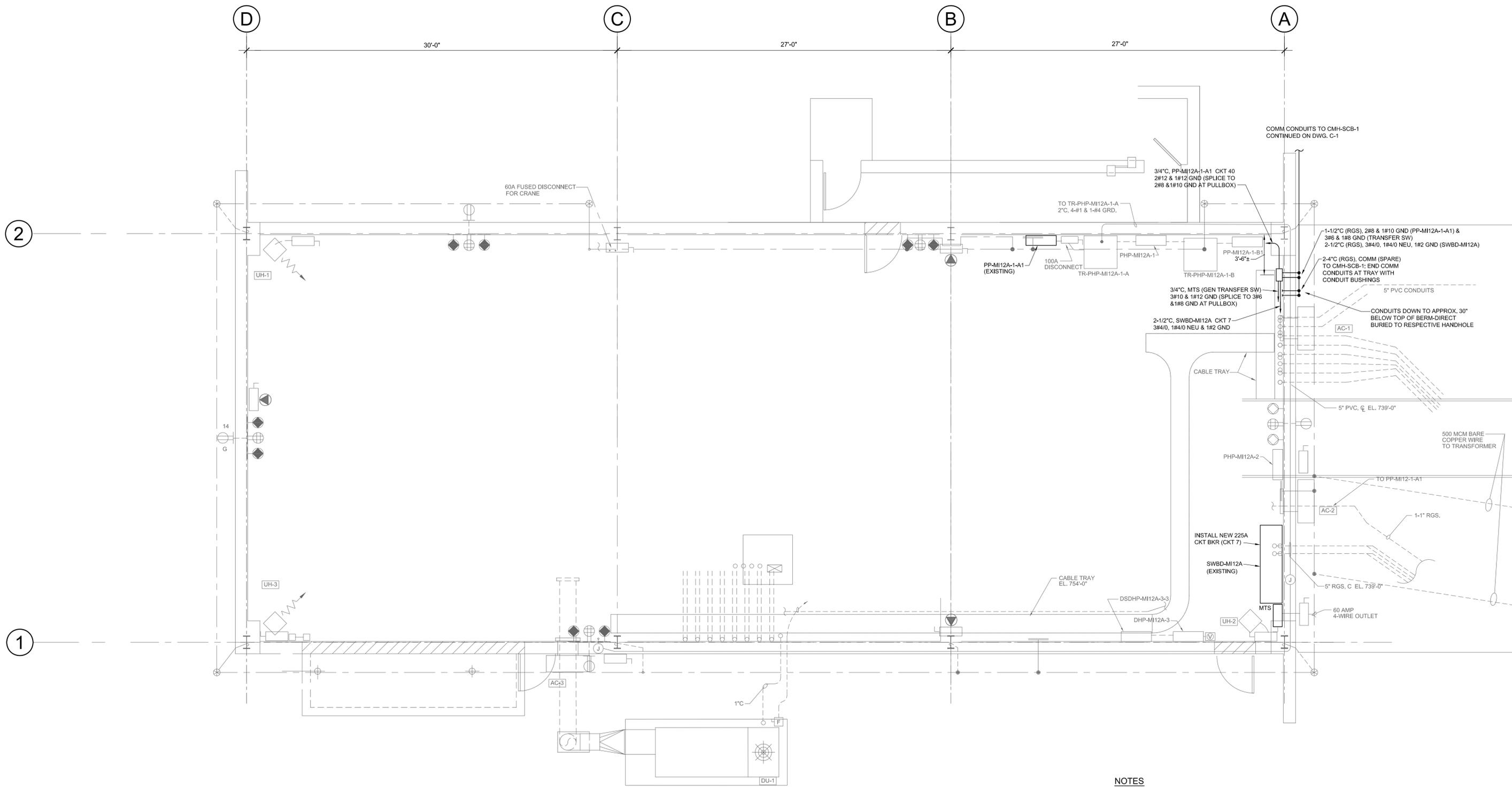


**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY

**SciBooNE DETECTOR ENCL.**  
**POWER PLAN EL. 744'-0"**

DRAWING NO. **6-7-62** **E-4** REV. **0**

F.I.M.S. No. 780  
 26 JUNE 2006



**UPPER LEVEL MI-12 POWER PLAN**

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

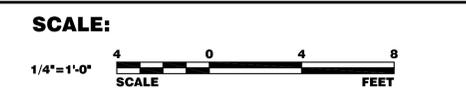
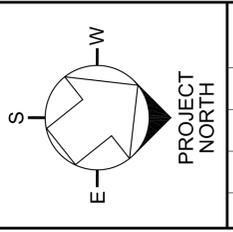
**NOTES**

- PENETRATE EXISTING BUILDING SIDING APPROXIMATELY 9'-6" AFF FOR COMM. CONDUITS. EXTEND COMM. CONDUITS TO EXISTING CABLE TRAY AND TERMINATE WITH END BUSHINGS.
- PENETRATE EXISTING BUILDING SIDING APPROXIMATELY 10'-6" AFF FOR POWER CONDUITS. PROVIDE NEMA 12, HINGED COVER PULLBOX 16" x 16" x 6" HOFFMAN #A161606LP OR EQUAL. SPLICE CONDUCTORS AT PULLBOX AND EXTEND CONDUIT/CABLE TO RESPECTIVE TERMINATION POINT.

Dwg: E-05\_6-7-62.dwg Plotted: 29 JUN 06 @ 12:20:38a.m.

REV.	DATE	DESCRIPTIONS REVISIONS
0	06/26/06	ISSUED FOR BIDS

	NAME	DATE
DESIGNED	<b>J. SANTIC</b>	<b>06/26/06</b>
DRAWN	<b>K. WHITTEN</b>	<b>06/26/06</b>
CHECKED	<b>T. LACKOWSKI</b>	<b>06/26/06</b>
APPROVED	<b>V. KUCHLER / E. CRUMPLEY</b>	<b>06/26/06</b>
SUBMITTED	<b>R. TESAREK</b>	<b>06/26/06</b>

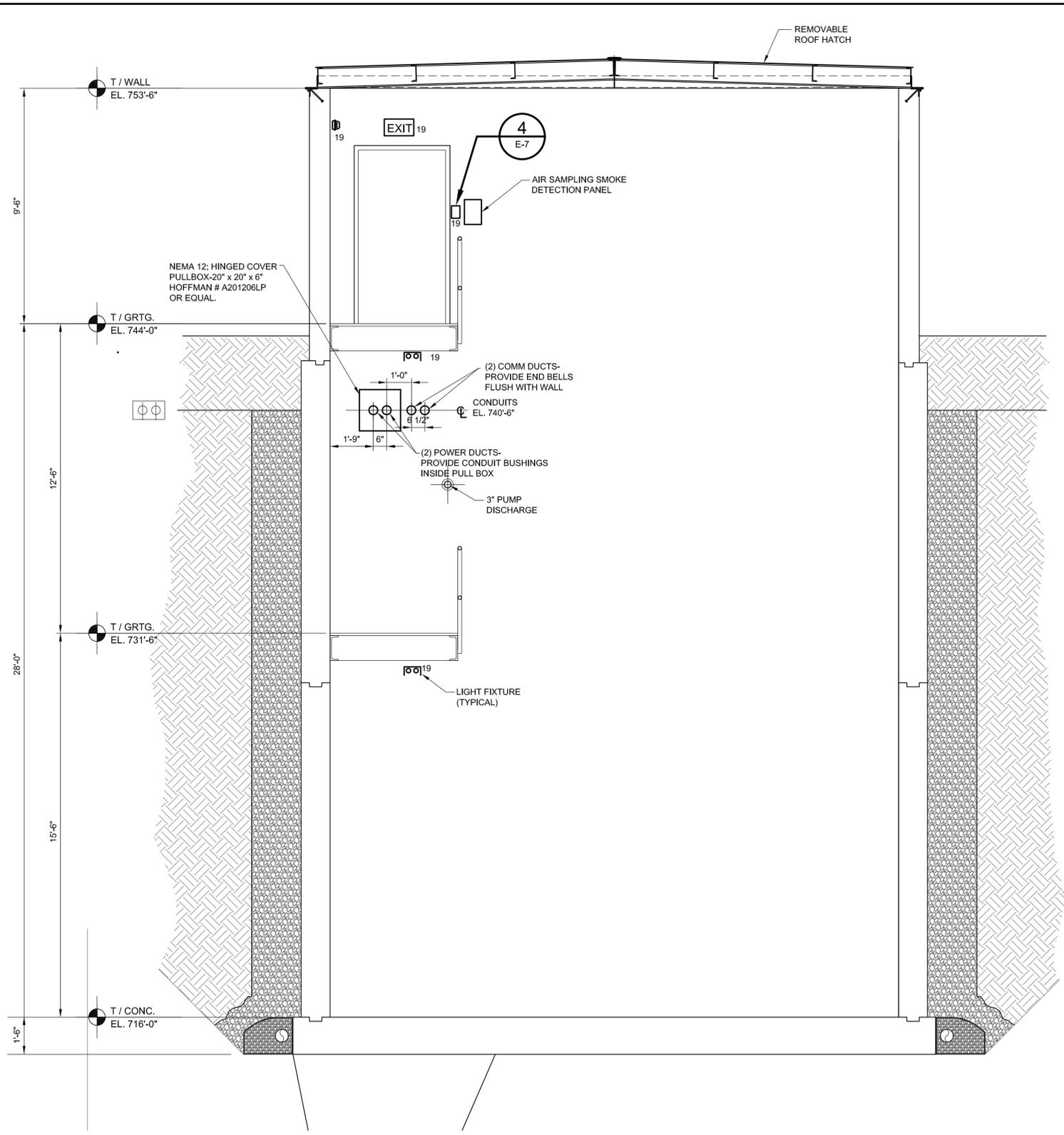


**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

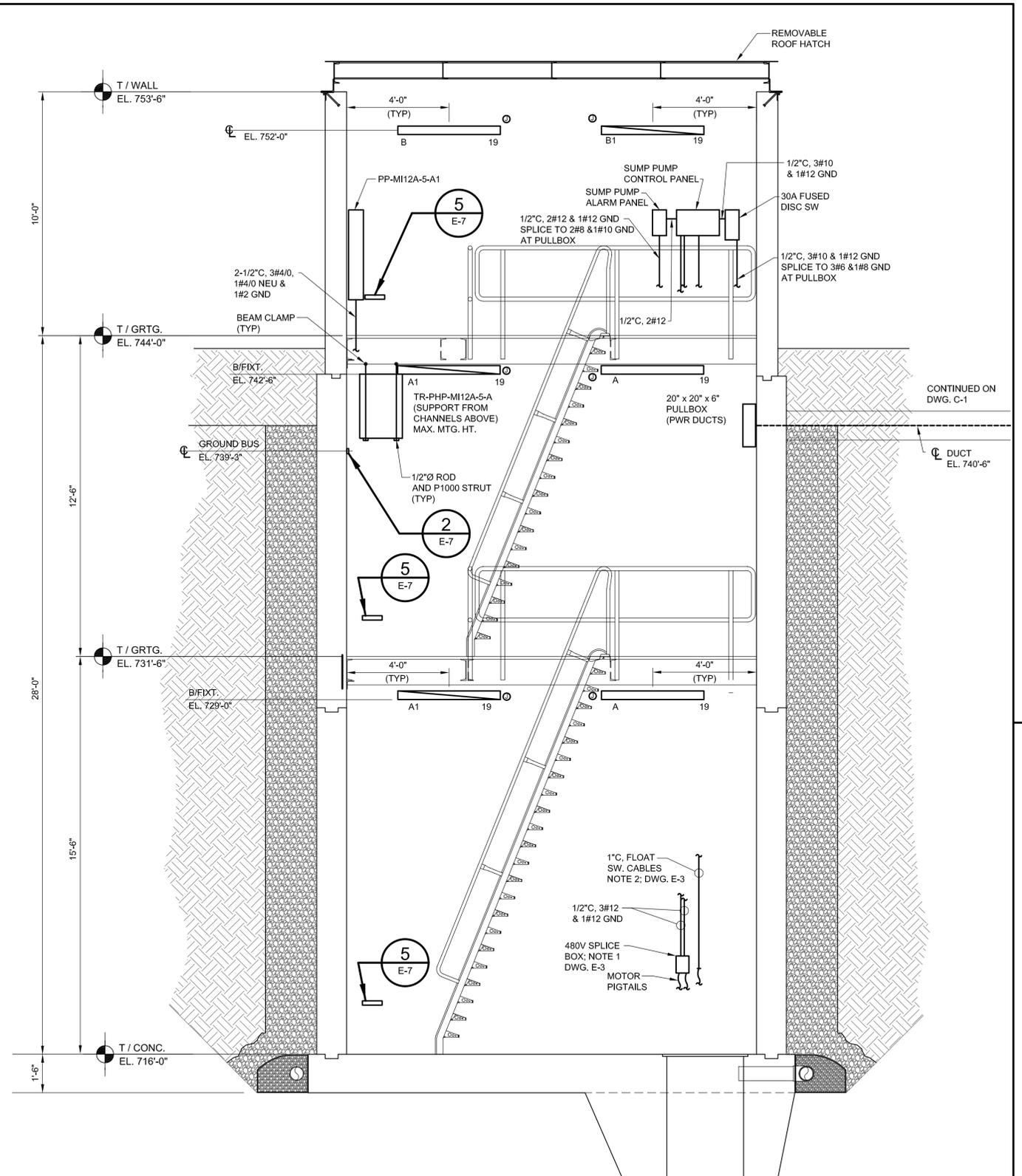
**SciBooNE DETECTOR ENCL.**  
**M-12 POWER PLAN**

DRAWING NO. **6-7-62** **E-5** REV. **0**

26-JUNE 2006 F.I.M.S. No. 780



**SECTION**  
SCALE: 3/8"=1'-0"  
**A**  
E-3 E-4

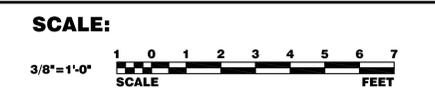


**SECTION**  
SCALE: 3/8"=1'-0"  
**B**  
E-3 E-4

Dwg: E-06\_6-7-62.dwg Plotted: 29JUN06 @ 12:21:12a.m.

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS

	NAME	DATE
DESIGNED	<b>J. SANTIC</b>	<b>06/26/06</b>
DRAWN	<b>K. WHITTEN</b>	<b>06/26/06</b>
CHECKED	<b>T. LACKOWSKI</b>	<b>06/26/06</b>
APPROVED	<b>V. KUCHLER / E. CRUMPLEY</b>	<b>06/26/06</b>
SUBMITTED	<b>R. TESAREK</b>	<b>06/26/06</b>

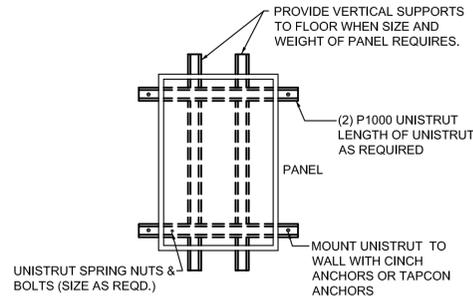


**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

**SciBooNE DETECTOR ENCL.**  
**ELECTRICAL SECTIONS**

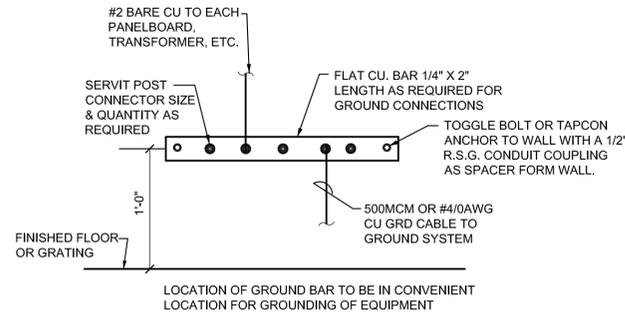
DRAWING NO. **6-7-62** **E-6** REV. **0**

26-JUNE 2006 F.I.M.S. No. 780



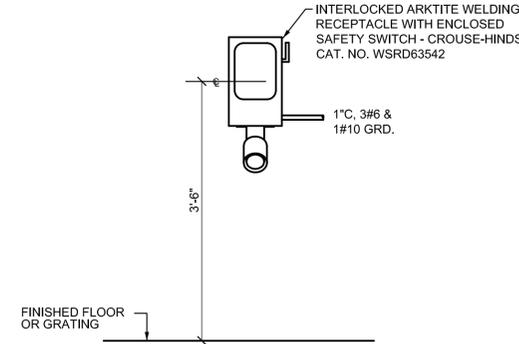
**TYPICAL PANELBOARD MOUNTING BOARD**

N.T.S. **1** E-4



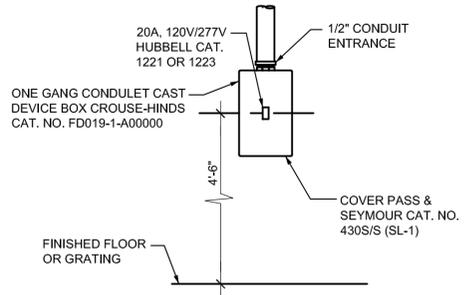
**GROUND BAR DETAIL**

N.T.S. **2** E-3 E-6



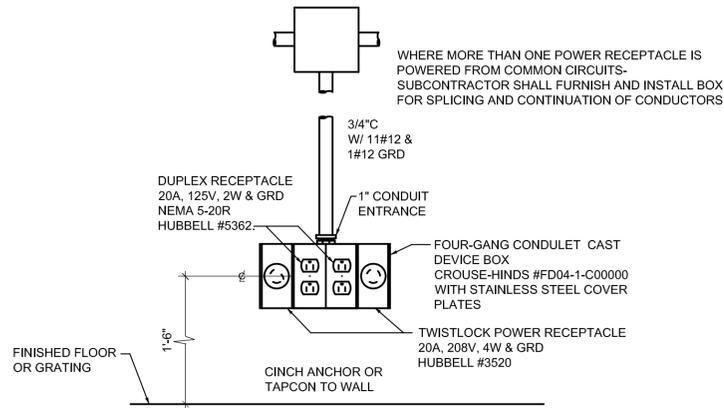
**WELDING RECEPTACLE DETAIL**

N.T.S. **3** E-4



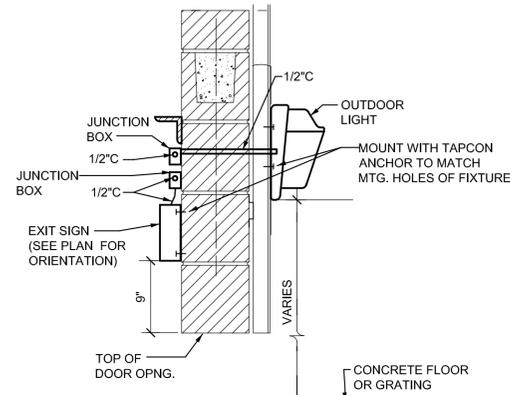
**SWITCH DETAIL**

N.T.S. **4** E-4 E-6



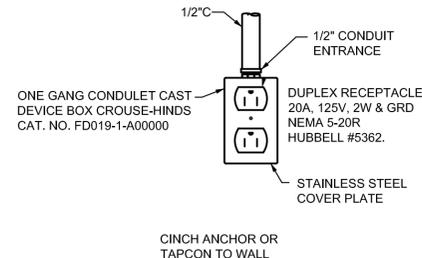
**POWER RECEPTACLE DETAIL**

N.T.S. **5** E-3 E-4, E-6



**MOUNTING DETAIL FOR OUTDOOR LIGHT & EXIT SIGN ON EXTERIOR WALL**

N.T.S. **6** E-4



**RECEPTACLE DETAIL**

N.T.S. **7** E-3

Dwg: E-07\_6-7-62.dwg Plotted: 29 JUN 06 @ 12:22:07a.m.

REV.	DATE	DESCRIPTIONS
0	06/26/06	ISSUED FOR BIDS

	NAME	DATE
DESIGNED	J. SANTIC	06/26/06
DRAWN	K. WHITTEN	06/26/06
CHECKED	T. LACKOWSKI	06/26/06
APPROVED	V. KUCHLER / E. CRUMPLEY	06/26/06
SUBMITTED	R. TESAREK	06/26/06

SCALE:

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



**SciBooNE DETECTOR ENCL. SECTIONS AND DETAILS**

DRAWING NO. **6-7-62**

**E-7**

REV. 0

26-JUNE 2006 F.I.M.S. No. 780