

# WAYNE STATE UNIVERSITY

## ELLIMAN CLINICAL RESEARCH # 629 BUILDING

421 EAST CANFIELD AVE  
DETROIT, MI 48201

## ELECTRICAL RELIABILITY UPGRADES

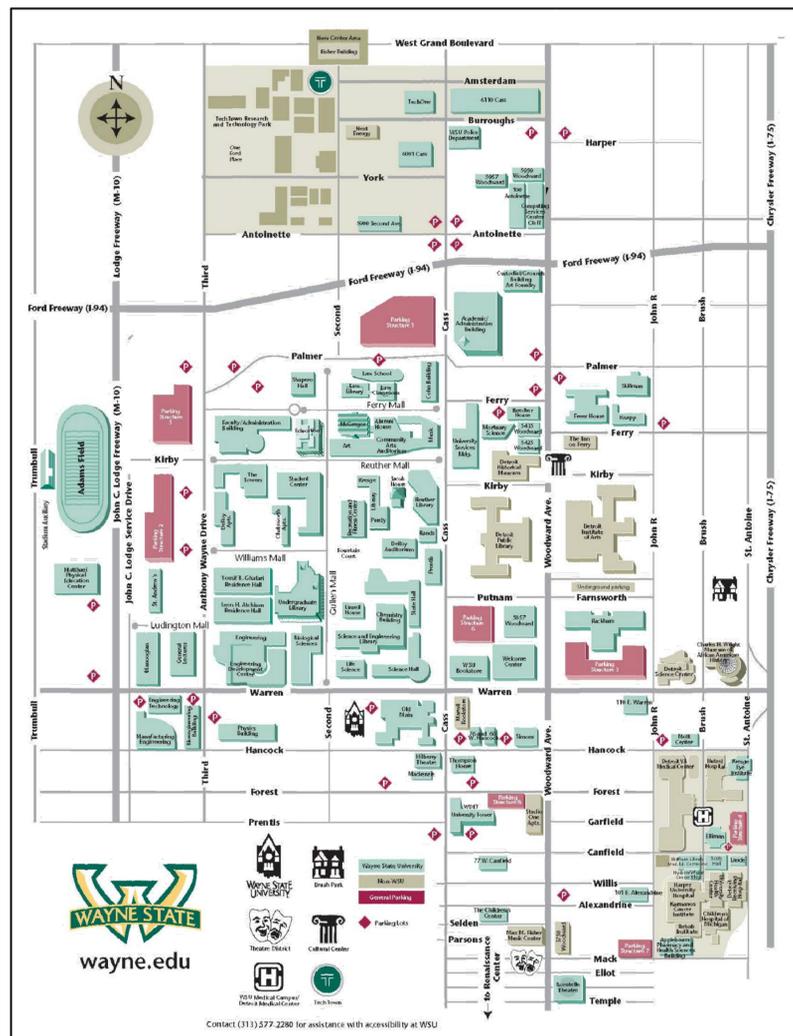
WSU Project Number 629-245283

MEP Project Number 1415-4

DETROIT, MICHIGAN

BID

NOVEMBER 03, 2014



**CAMPUS SITE MAP**

NO SCALE

SHEET INDEX		BID	<<ISSUE NAME>>	<<ISSUE DATE>>	<<ISSUE NAME>>	<<ISSUE DATE>>	<<ISSUE NAME>>	<<ISSUE DATE>>
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S-01	GENERAL STRUCTURAL NOTES & SPECIAL INSPECTIONS	●	○	○	○	○	○	○
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E2-06	ENLARGED ELECTRICAL SITE PLAN	●	○	○	○	○	○	○
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001	SIEMENS GENERATOR/FUEL OIL CONTROLS (FOR REFERENCE ONLY)	●	○	○	○	○	○	○
001A	SIEMENS GENERATOR/FUEL OIL CONTROLS (FOR REFERENCE ONLY)	●	○	○	○	○	○	○
001B	SIEMENS GENERATOR/FUEL OIL CONTROLS (FOR REFERENCE ONLY)	●	○	○	○	○	○	○
001C	SIEMENS GENERATOR ELECTRICAL DIAGRAM (FOR REFERENCE ONLY)	●	○	○	○	○	○	○

ISSUE LEGEND: ○ PREVIOUS ISSUE ● CURRENT ISSUE ○ POTENTIAL FUTURE ISSUE





GENERAL STRUCTURAL NOTES

- 1. The Contractor shall be responsible for means, methods sequences and procedures of construction.
2. Construction shall comply fully with the applicable provisions of OSHA and the local governing codes, current edition, and all requirements specified in the codes shall be adhered to as if they were called for or shown on the drawings. This shall not be construed to mean that requirements set forth on the drawing may be modified because they are more stringent than the code requirements or because they are not specifically required by code.

SHOP DRAWINGS

- 1. Submit shop drawings for review as indicated in material section of general structural notes.
2. Contractor shall verify all relevant dimensions and elevations for equipment installations against purchased manufacturer's certified equipment drawings. Contractor shall coordinate dimensions that depend upon specific equipment, such as mechanical equipment supports, etc. prior to submittal.

MECHANICAL & ELECTRICAL EQUIPMENT

- 1. Mechanical and electrical equipment weights assumed for structural design are shown on the plans. If the equipment weight varies from that listed, consult with the Architect/Structural Engineer prior to steel shop drawing submittal.

EXISTING CONSTRUCTION

- 1. Contractor shall visit the site and become familiar with the existing conditions.
2. Existing building dimensions and conditions shown are based upon original drawings or partial survey and have not been completely field verified. The Owner and Architect/Structural Engineer take no responsibility for the accuracy of existing dimensions shown. Contractor shall field measure existing dimensions prior to shop drawing preparation and fabrication.
3. The existing structure analysis is based upon information shown on original drawings by Smith, Hinchman & Grylls Associates, Inc. architects dated 03/09/1987.
4. Contractor shall verify conditions covering or affecting the structural work; obtain and verify all dimensions and elevations to ensure the proper strength, fit and location of the structural work; report to the Architect/Structural Engineer any and all conditions/discrepancies which may interfere with or otherwise affect or prevent the proper execution and completion of the new work in compliance with the construction documents. All discrepancies shall be fully resolved prior to commencing work.
5. Existing construction not undergoing alteration is to remain undisturbed. Where such construction is disturbed as a result of the operations of this contract, contractor shall repair or replace as required and to the satisfaction of the Architect/Structural Engineer and Owner's Representative.
6. Contractor shall verify the existence, location and elevation of existing utilities, sewers, drains, etc. in demolition areas before proceeding with the work. All discrepancies shall be documented and reported to the Architect/Structural Engineer and Owner's Representative for resolution.
7. Contractor shall provide fire watch during field cutting and welding operations, meeting the Owner's requirements.
8. Contractor shall provide temporary protection of existing equipment during execution of work, satisfying the owner's requirements.
9. Contractor shall coordinate work with the Owner's personnel to avoid any interference in their operations.

POST INSTALLED ANCHORS

- 1. Post installed anchors include all mechanical and adhesive anchors noted on Construction Documents. All post installed anchors shall conform to AC-193 for mechanical anchors and AC-308 for adhesive anchors.
2. Use only code approved anchors with valid ICC-ESR evaluation report for use in base material shown on the Construction Documents. Submit ICC-ESR evaluation report to Structural Engineer and Special Inspection Agent for approval.
3. Installer of post installed anchors shall be trained by anchor manufacturer.
4. Clean existing concrete surface to solid structural concrete. Grind smooth for full steel contact and to prevent gaps between steel and concrete. Alternatively, provide non-shrink grout in all voids between steel and base material.
5. Drill smaller diameter pilot hole in existing concrete and check for existing reinforcing. Do not cut or damage existing reinforcing.
6. If existing reinforcing is found, shift hole to avoid existing reinforcing. Submit location of new hole to Structural Engineer for review.
7. Install mechanical anchors and adhesive anchors in strict accordance with manufacturer's written recommendations and procedure detailed in ICC-ESR evaluation report.
8. Special Inspections are required for all mechanical and adhesive anchors. Inspect and test post installed anchors as specified in ICC-ESR evaluation report.
9. The following anchors are approved. Submittals for alternative equal anchors will be reviewed by Structural Engineer and approved at their discretion.

Table with 4 columns: Anchor Type, Approved Anchor, ICC-ESR Report No., Base Material. Rows include Screw Anchors, Steel Drop-In Anchor, Expansion Anchors, and Adhesive Anchors.

STRUCTURAL STEEL

- 1. Design, fabrication and erection of structural steel shall be in accordance with the American Institute of Steel Construction (AISC) 360 Specification for Structural Steel Buildings and the Steel Construction Manual, Allowable Strength Design ASD.
2. Structural steel shall conform to the following ASTM specifications and minimum yield strength:
W Shapes: A 572 Gr. 50 Fy = 50 KSI
Miscellaneous shapes and plates: A 36 Fy = 36 KSI
3. Checkered plate shall be 36 KSI yield strength steel per ASTM A 786 and have medium raised lug pattern.
4. Structural steel bolting shall be ASTM A 325 type N, 3/4" diameter snug tight except where other size, ASTM A 490 N, pre-tensioned or slip critical type bolts are indicated.
5. Shear connectors shall conform to the requirements of Structural Welding Code - Steel, AWS D1.1, Fu = 65 KSI, as manufactured by Nelson Stud Welding, Div. of TRW, or approved substitute, and welded as per manufacturer's written instructions.
6. Welding shall be done with appropriate E70 series electrodes compatible with the new and existing steel. Welds and welding procedures shall conform to the "Structural Welding Code - Steel" of the American Welding Society ANS/AWS D1.1.
7. Where specifically noted as AESS, steel and connections are Architecturally Exposed Structural Steel. Finish steel in compliance with AISC Code of Standard Practice for Steel Buildings and Bridges, Section 10, Architecturally Exposed Structural Steel.
8. Detailing shall be performed using rational engineering design and standard practice in accordance with the Contract Documents. The Typical Details shown are approximate only and do not indicate the required number of bolts or weld sizes, unless specifically noted.
9. Contractor shall submit for review, typical connection details and calculations sealed by a Professional Engineer registered in the State in which the project is being constructed for proposed connections and for connections not specifically designed and detailed. Follow the details shown where specific connections are detailed.
10. Contractor shall submit for review, engineered drawings showing shop fabrication details, field assembly details and erection diagrams for all structural steel. Show at minimum all details included in these contract documents with additional erection details as required to completely define the interconnection of structural steel pieces.

STRUCTURAL STEEL - CONT.

- 11. Fabricator shall be AISC Certified or have an AISC equivalent Quality Assurance program as certified by a qualified independent testing agency.
12. Contractor shall reference architectural drawings for miscellaneous shapes and plates not shown on structural drawings. These items shall be shop welded to the structural framing sections to minimize field welding.
13. The length, dimension and connection detail from new structural member to existing structures shall be field verified before fabrication. Field modifications to the fabricated member or connection are not allowed without prior approval by the Structural Engineer. Contractor shall submit sketches or shop drawings detailing proposed modifications for approval.
14. Non-Composite beam connections shall be capable of supporting minimum 50% of the Maximum Total Uniform Load, AISC Steel Construction Manual, unless specifically noted on the drawings.
15. Beam connections shall be standard AISC approved connections. Extended shear plate connections protruding from column web only approved where beams/girders on either side of column web have equally loaded bays.
16. Simple shear connections shall be capable of end rotation as per the requirements of the AISC Specification, Simple Connections, Specification Section J1.2 and Manual Part 10.
17. Connections shall be shop welded in accordance with latest AWS Specifications for E70XX electrodes and field bolted with ASTM A 325 or ASTM A 490 bolts.
18. Welding shall be done by welders qualified in accordance with the requirements of the current "Structural Welding Code - Steel," American Welding Society, AWS D1.1.
19. Contractor shall install A325 and A490 bolts in accordance with the "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts." Snug tight condition shall be achieved using an impact wrench, to bring the connected plates into firm contact, except where noted as, slip critical, pre-tensioned or finger tight.
20. Where field welding to existing structural steel is indicated, contractor shall thoroughly clean all surfaces to receive weld, removing rust, paint, dirt and other foreign matter in area of work. Provide fire watch protection acceptable to the owner.
21. Beams shall be fabricated with the natural camber up. Provide cambers as indicated on the drawings.
22. Stiffener plates and bearing stiffeners are to be provided in pairs.
23. Where noted Architecturally Exposed Structural Steel (AESS), contractor shall fabricate and install steel to comply with AISC 303 Code of Standard Practice for Steel Buildings and Bridges Sections 10.
24. Structural steel to remain unpainted except for exposed steel.
25. Contractor shall control erection procedures and sequences with relation to temperature differentials, especially with respect to structural steel framing into concrete walls, beams or columns.
26. Contractor shall provide temporary bracing as required to ensure stability of the structure under full design loads until the permanent bracing is in place. Provide necessary shoring where required during construction.
27. Shop and Field Testing of welds and/or bolts shall be as follows:
a. All welds shall be visually inspected. 15% at random shall be measured.
b. Fillet welds for beam and girder shear connection plates (10% at random) shall be checked by magnetic particle (ASTM E709) for final pass only.
c. Check 100% of continuity plate fillet welds by magnetic particle on last layers.
d. Ultrasonically test 100% of full penetration welds (ASTM E94 & E1032).
e. Ultrasonically test 100% of partially penetration column splice welds.
f. Visually inspect that all bolted connections are made with proper fastener components, are fabricated properly and the bolted joint is drawn into firm contact.
g. Check by calibrated torque wrench 25% of bolts in each slip critical shear connection, but not less than two (2) bolts per connection.
h. Inspect all expansion anchors and adhesive (epoxy) anchors according to manufacturer's recommendations. Pull test minimum 5% and minimum 2 of each application of location and anchor type.
i. Ultrasonically test for laminations in column flanges at moment connections to columns with flanges over 1, 1/2 inch thickness. Test prior to fabrication, after fabrication and after final field welding of beam to column flange.
28. Welding shall be inspected by an AWS Certified Welding Inspector (CWI).
29. Contractor shall schedule work to allow the above testing requirements to be completed.

SPECIAL INSPECTION NOTES

- 1. SPECIAL INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE 2009 MICHIGAN (INTERNATIONAL) BUILDING CODE CHAPTER 17 AND AS MODIFIED HEREIN.
2. DESIGNATIONS
SI: SPECIAL INSPECTOR QUALIFIED WITH DEMONSTRATED COMPETENCE DOCUMENTED BY CERTIFICATIONS FROM RECOGNIZED AGENCIES SUCH AS AWS, ACI, MASONRY INSTITUTE OF MICHIGAN (MIM), ETC., AS SUBMITTED AND APPROVED BY THE BUILDING OFFICIAL. SPECIAL INSPECTOR MAY BE A FIRM WITH MULTIPLE SPECIALISTS AND A PROJECT MANAGER
TA: TESTING AGENCY QUALIFIED TO TEST AND INSPECT MATERIALS AND ASSEMBLIES. TESTING AGENCY SHALL BE UNDER THE SUPERVISION OF THE SPECIAL INSPECTOR.
SE: SPECIALTY ENGINEER RESPONSIBLE FOR DESIGNING ASSEMBLIES SUCH AS PRECAST CONCRETE, STEEL JOISTS, COLD FORMED FRAMING ASSEMBLIES, ETC. SPECIALTY ENGINEER SHALL PROVIDE OBSERVATION OF FABRICATED AND INSTALLED ITEMS OF THEIR DESIGN, IN ADDITION TO THE SPECIAL INSPECTION.
3. TA, AND SE SHALL SUBMIT RECORDS OF THE INSPECTION RESULTS TO THE SI. THE SI SHALL COMPILER AND SUBMIT INSPECTION RECORDS TO THE ARCHITECT/ENGINEER AND BUILDING OFFICIAL. RECORDS SHALL INCLUDE STATEMENTS OF TESTS, WHETHER INSTALLED/FABRICATED ITEM COMPLIES WITH CONTRACT DOCUMENTS, REMEDIAL WORK PERFORMED, RETESTS.
4. SI SHALL PROVIDE A DAILY REPORT OF ANY DISCREPANCIES FROM THE CONTRACT DOCUMENTS FOUND ON THE SAME DAY OF THE INSPECTION TO THE ENGINEER OF RECORD. FORMAL REPORTS OF COMPLIANCE CAN FOLLOW BY A MAXIMUM OF 2 WEEKS. SI SHALL PROVIDE AND SIGN A FINAL REPORT WITH A SUMMARY OF ALL TESTS PERFORMED AND RESULTS TO THE ENGINEER OF RECORD AND BUILDING OFFICIAL.
5. SI, TA SHALL BE PAID BY THE OWNER IN COMPLIANCE WITH THE MICHIGAN (INTERNATIONAL) BUILDING CODE.

SPECIAL INSPECTION REQUIREMENTS - STEEL CONSTRUCTION

Table with 5 main columns: TASK, INSPECTION FREQUENCY (CONTINUOUS, PERIODIC), REFERENCED STANDARD, IBC REFERENCE, RESPONSIBLE AGENT. Rows include inspection of steel fabricator, material verification of high-strength bolts, high-strength bolting, structural steel, and welding.



MEP Engineers, LLC Mechanical/Electrical Plumbing logo and contact information: 39903-B West 10 Mile Road Farmington Hills, Michigan 48336

PROJECT TITLE

ELLIMAN CLINICAL RESEARCH # 629 BUILDING ELECTRICAL RELIABILITY UPGRADES

421 East Canfield Ave, Detroit, MI 48201

KEY PLAN

SHEET TITLE

GENERAL STRUCTURAL NOTES & SPECIAL INSPECTIONS

11-03-14 BO

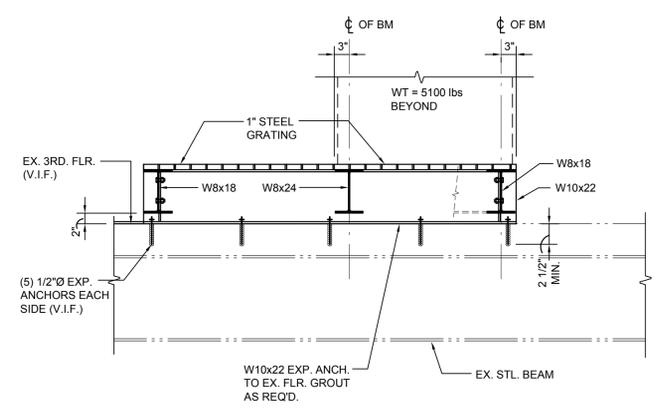
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MEP PROJECT NO. 1415-4

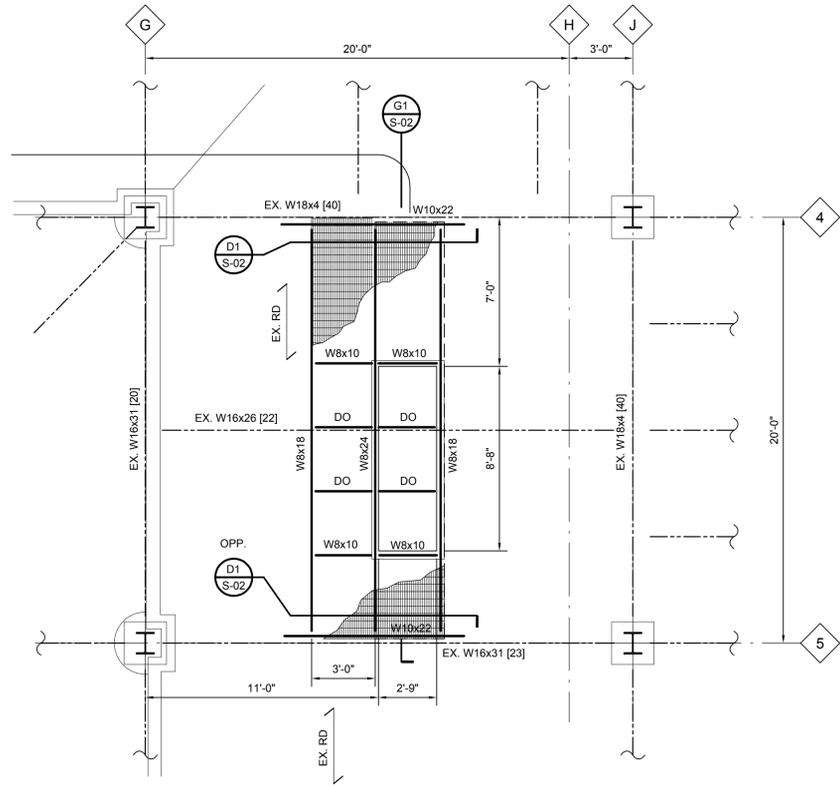
SHEET NO. S-01

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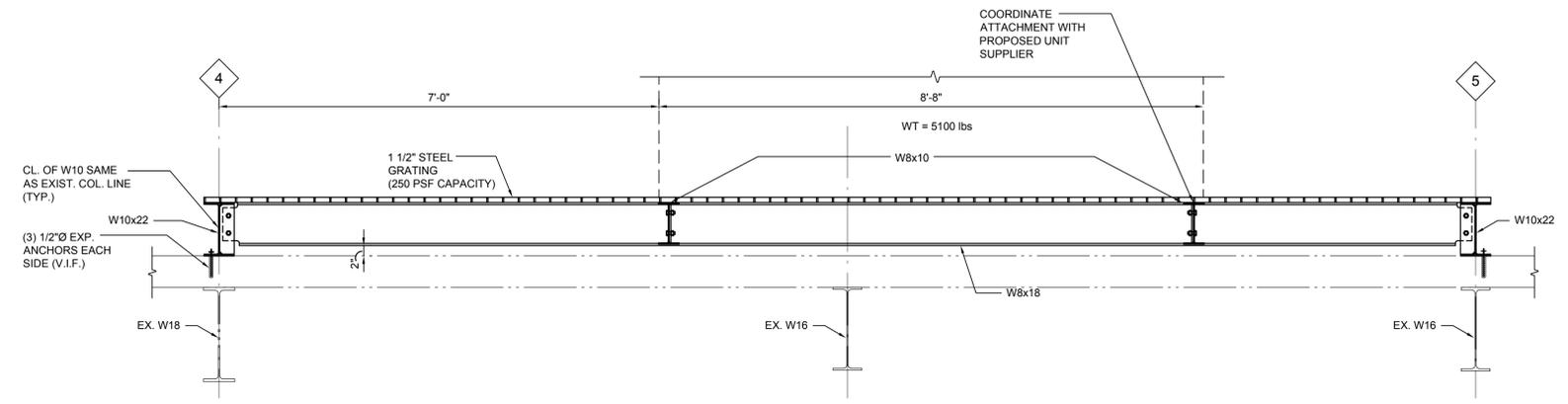
A  
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G  
H



**D1 SECTION**  
S-02 Scale: 3/4" = 1'-0"



**PARTIAL THIRD FLOOR FRAMING PLAN**  
Scale: 1/4" = 1'-0"



**G1 SECTION**  
S-02 Scale: 3/4" = 1'-0"

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

**WAYNE STATE UNIVERSITY**  
WSU PROJECT #629-246283

**MEP**  
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**DESAT / NASR**  
CONSULTING ENGINEERS  
ONE ONLY ROAD  
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TEL: 248.832.2010 / FAX: 248.832.2088  
SINCE PROJECT NO. 1 884 1-91  
Seal/Registration

PROJECT TITLE  
**ELLIMAN CLINICAL RESEARCH # 629 BUILDING ELECTRICAL RELIABILITY UPGRADES**

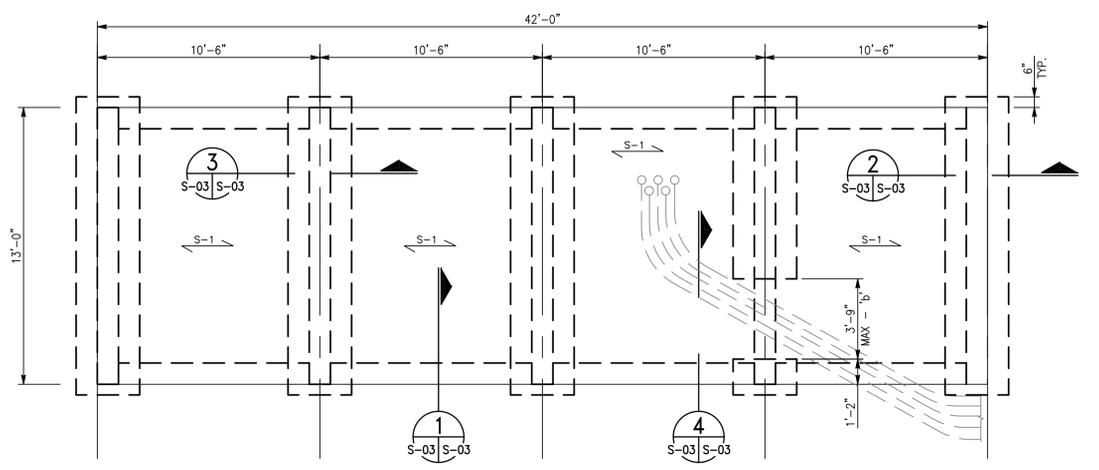
421 East Canfield Ave,  
Detroit, MI 48201

KEY PLAN

SHEET TITLE  
**PARTIAL THIRD FLOOR FRAMING PLAN AND DETAILS**

DATE	ISSUED FOR:
11-03-14	BO
DRAWN	J.S.
CHECKED	A.N.
APPROVED	A.N.

MEP PROJECT NO.  
**1415-4**  
SHEET NO.  
**S-02**



**GENERATOR PAD PLAN**  
 SCALE: 1/4" = 1'-0"

- GENERAL NOTES**
1. THE CONTRACTOR SHALL FIELD CHECK AND VERIFY ALL CONDITIONS AND MEASUREMENTS AT THE SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
  2. ALL DIMENSIONS AND SIZES OF EXISTING CONSTRUCTION INDICATED ON DRAWINGS SHALL BE CONSIDERED APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD.
  3. VARIATIONS BETWEEN ACTUAL FIELD CONDITIONS AND THOSE SHOWN ON THE DRAWINGS SHALL BE REPORTED TO THE ENGINEER.
  4. THE EXCAVATION AND CONSTRUCTION SHALL COMPLY FULLY WITH THE APPLICABLE PROVISIONS OF OSHA AND MISHA AND THE SOIL REPORT INFORMATION.
  5. IF ANY GENERAL NOTE CONFLICTS WITH ANY DETAIL OR NOTE ON THE PLANS OR IN THE SPECIFICATIONS, THE STRICTEST PROVISION SHALL GOVERN.
  6. THE STRUCTURAL DRAWINGS ARE FOR THE PLACEMENT OF THE PROJECT STRUCTURAL COMPONENTS ONLY. REQUIREMENTS MADE BY OSHA, DNR, AND ALL APPLICABLE SAFETY CODES ARE TO BE DETERMINED AND PROVIDED BY THE CONTRACTOR.
  7. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER IT IS FULLY COMPLETED ACCORDING TO THE PLANS AND SPECIFICATIONS. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE CONSTRUCTION /ERECTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES PROVIDING TEMPORARY BRACING, SHORING, GUYS OR TIE-DOWNS. THESE TEMPORARY SUPPORTS SHALL REMAIN IN PLACE UNTIL ALL STRUCTURAL COMPONENTS ARE IN PLACE AND COMPLETED AS THE STRUCTURAL MEMBERS OR SYSTEMS ARE NOT SELF-BRACING UNTIL PERMANENTLY CONNECTED TO THE STRUCTURE.
  8. THE ARCHITECT AND STRUCTURAL ENGINEER ASSUME NO LIABILITY FOR THE STRUCTURE DURING CONSTRUCTION. AS SUCH, THE MEANS AND METHODS OF CONSTRUCTION ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR(S).
  9. USE OF THESE ENGINEERING DRAWINGS, PLANS OR DETAILS USED AS ERECTION PLANS OR SHOP DRAWINGS BY THE CONTRACTOR IS EXPRESSLY PROHIBITED. SUBMITTALS BEARING IMAGES ELECTRONICALLY COPIED FROM THE ENGINEERING DRAWINGS WILL BE REJECTED.

**CONCRETE INSPECTIONS AND TESTING**

WSU SHALL CONDUCT ALL REQUIRED CONCRETE TESTING. CONTRACTOR SHALL COORDINATE WITH WSU DURING CONSTRUCTION ALLOWING ALL REQUIRED TESTS TO BE CONDUCTED IN A TIMELY MANNER.

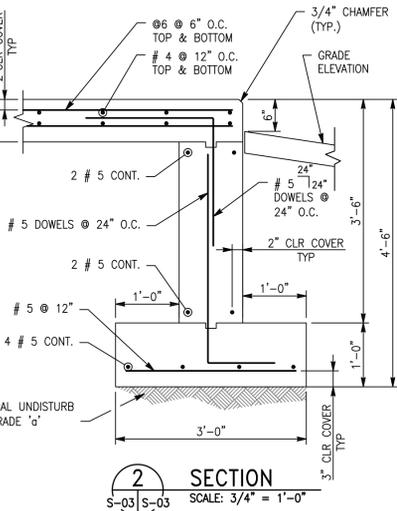
1. INSPECTIONS SHALL NOT BE LIMITED TO:
  - 1.1. STEEL REINFORCEMENT PLACEMENT.
  - 1.2. VERIFICATION OF USE OF REQUIRED DESIGN MIXTURE.
  - 1.3. CONCRETE PLACEMENT, INCLUDING CONVEYING AND DEPOSITING.
  - 1.4. CURING PROCEDURES AND MAINTENANCE OF CURING TEMPERATURE.

**FOUNDATIONS**

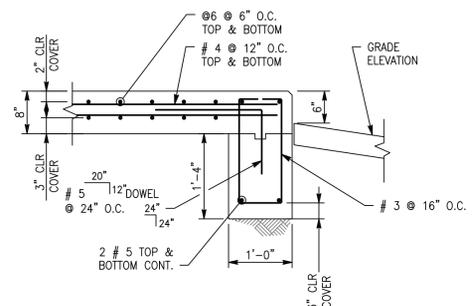
1. FOOTINGS SHALL BEAR ON FIRM, UNDISTURBED SOIL WITH A SAFE NET ALLOWABLE BEARING PRESSURE OF 1500 PSF, IN ACCORDANCE WITH THE PROJECT SOILS REPORT NO. 069961.00, PREPARED BY SOIL AND MATERIALS ENGINEERS, INC. (DATED 07-21-14). IF SOIL OF THIS CAPACITY IS NOT FOUND AT THE ELEVATIONS INDICATED, FOOTINGS SHALL BE ENLARGED OR LOWERED AT THE DIRECTION OF THE ENGINEER. NET ALLOWABLE SOIL BEARING PRESSURE SHALL BE CONFIRMED IN THE FIELD BY A QUALIFIED SOILS ENGINEER.
2. PROVIDE NECESSARY SHEETING, SHORING, FORMING OR BRACING, ETC., DURING EXCAVATION AS REQUIRED TO PROTECT SIDES OF EXCAVATIONS OR AS REQUIRED TO COMPLY WITH SAFETY REGULATIONS. DO NOT BACKFILL BEHIND BASEMENT WALLS UNTIL FLOOR FRAMING OR TEMPORARY BRACING IS IN PLACE.
3. CONTRACTOR SHALL INCLUDE ALL NECESSARY OVER-EXCAVATION, FORMWORK AND BACKFILLING IN BID. ATTEMPTS TO EARTH-FORM FOUNDATIONS ON THIS PROJECT WITHOUT PRIOR DEMONSTRATION AND APPROVAL BY THE ENGINEER WILL BE REJECTED.
4. PREPARATION OF THE SITE AND SLAB SUB-BASE SHALL PROCEED IN COMPLIANCE WITH LOCAL CODES AND THE PROJECT SOILS REPORT IDENTIFIED ABOVE. UNLESS OTHERWISE NOTED OR SPECIFIED, ALL FILL UNDER FLOOR SLABS AND BEHIND FOUNDATION WALLS SHALL BE COMPACTED WITH VIBRATORS, COMPACTORS, ETC. TO 95% MAXIMUM DENSITY (MODIFIED PROCTOR) AT OPTIMUM MOISTURE CONTENT. ONLY SMALL, HAND OPERATED COMPACTION EQUIPMENT SHALL BE ALLOWED WITHIN 8 FEET OF BASEMENT WALLS.
5. THIS TRADE SHALL PROVIDE PUMPS, WELL POINTS, OR OTHER SYSTEMS AS REQUIRED BY THE CONDITIONS IDENTIFIED IN THE PROJECT SOILS REPORT. PUMPS SHALL BE OPERATED AS REQUIRED TO ACCOMPLISH THE ABOVE, ON A 24-HOUR BASIS, IF NECESSARY. UNDER NO CONDITION SHALL WATER BE ALLOWED TO WASH OVER FRESHLY PLACED CONCRETE.

**CONCRETE**

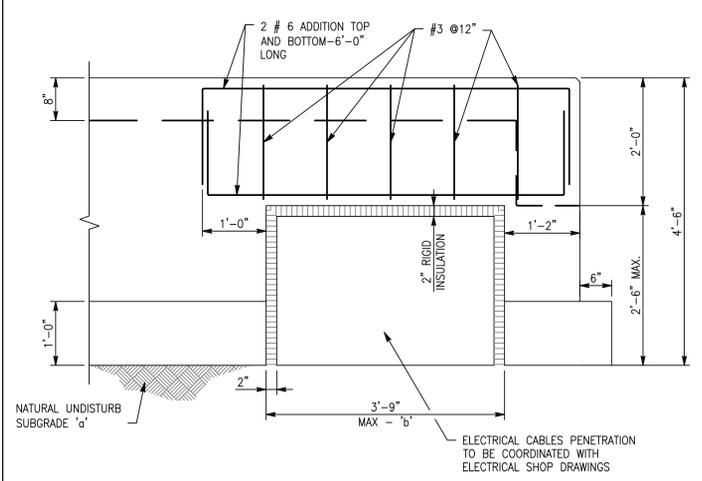
1. STRUCTURAL DESIGN FOR REINFORCED CONCRETE IS BASED ON THE STRENGTH DESIGN METHOD IN ACCORDANCE WITH ACI STANDARD 318-02. THE DETAILING, BENDING, AND PLACING OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ACI STANDARD 318-02/318R-02 CODE, INCLUDING APPENDIX A. FIELD BENDING WILL NOT BE PERMITTED UNLESS APPROVED BY ENGINEER.
2. MINIMUM CONCRETE STRENGTH AT 28 DAYS SHALL BE 4,000 PSI (U.N.O.).
3. ALL REINFORCING BARS, DOWELS AND TIES SHALL CONFORM TO ASTM A615, GRADE 60. ALL REINFORCING STEEL SHALL BE CONTINUOUS AND SHALL HAVE 36 BAR DIAMETER LAP (MIN.) AND SHALL BE FABRICATED AND PLACED IN ACCORDANCE WITH ACI 315 AND ACI 318, LATEST EDITION. HOOK ALL BEAM BARS AT DISCONTINUOUS ENDS.
4. CONCRETE SHALL BE KEPT MOIST OR COVERED FOR AT LEAST 7 DAYS WITH A MOISTURE RETAINING COVER WHICH WILL NOT DISCOLOR EXPOSED SURFACES NOR IMPAIR BOND OR PENETRATION OF SUBSEQUENTLY APPLIED SEALERS OR FINISHES.
5. STEEL REINFORCING SHALL NOT BE SPLICED AT POINTS OTHER THAN SHOWN ON THE PLANS, EXCEPT AS APPROVED BY THE ENGINEER. UNLESS NOTED OTHERWISE, ONLY HALF OF THE SPLICES MAY OCCUR WITHIN THE REQUIRED LAP LENGTH.
6. ALL COLD JOINTS IN CONCRETE STRUCTURES SHALL HAVE A CONTINUOUS PVC WATERSTOP ALONG JOINT UNLESS NOTED OTHERWISE ON DRAWINGS.
7. THE LENGTH OF ALL LAP SPLICES SHALL BE AS SPECIFIED IN "REINFORCING TENSION SPLICE TABLE" ON THIS SHEET, UNLESS OTHERWISE INDICATED IN DRAWINGS. WHEN BARS OF DIFFERENT SIZE ARE BEING LAPPED, THE LENGTH SHALL BE THE SPECIFIED LAP LENGTH OF THE LARGER BAR.
8. BOTTOM AND TOP REINFORCING BARS FOR ALL DISCONTINUOUS ENDS OF BEAMS AND SLABS SHALL HAVE HOOKS AND SPLICES CONFORMING TO ACI MANUAL OF STANDARD PRACTICE, UNLESS NOTED OTHERWISE. FOR PLACEMENT OF CONCRETE DURING COLD WEATHER, FOLLOW REQUIREMENTS OF SPECIFICATIONS.
9. ALL EXPOSED CONCRETE CORNERS AND EDGES SHALL BE CHAMFERED 3/4".



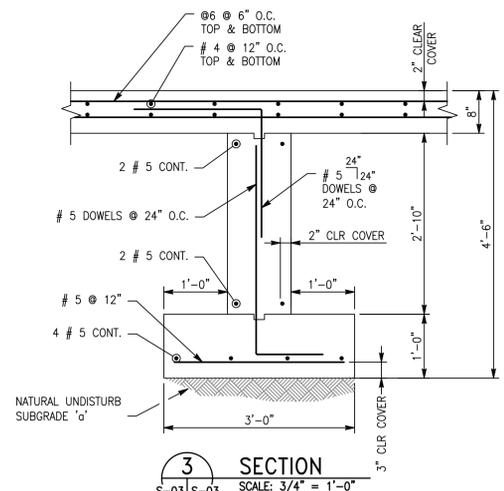
**SECTION 1**  
 S-03 | S-03 SCALE: 3/4" = 1'-0"



**SECTION 2**  
 S-03 | S-03 SCALE: 3/4" = 1'-0"



**SECTION 3**  
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**SECTION 4**  
 S-03 | S-03 SCALE: 3/4" = 1'-0"

**STRUCTURAL ABBREVIATIONS**

B.	BOTTOM	I.D.	INSIDE DIAMETER
BLDG.	BUILDING	I.E.	INVERT ELEVATION
BM.	BEAM	I.F.	INSIDE FACE
CJ	CONSTRUCTION JOINT	IN	INCHES
CL	CENTERLINE	INT	INTERIOR
CLR	CLEAR	JT	JOINT
COL	COLUMN	KIP	THOUSAND POUNDS
CONC	CONCRETE	LP	LOW POINT
CONSTR	CONSTRUCTION	LGTH	LENGTH
CONT	CONTINUOUS	LLH	LONG LEG HORIZONTAL
COR	CORNER	LLV	LONG LEG VERTICAL
CY	CUBIC YARD	LW	LIGHT WEIGHT
DET	DETAIL	MAX	MAXIMUM
DIA	DIAMETER	MFR	MANUFACTURER
DIAG	DIAGONAL	MIN	MINIMUM
DISC	DISCONTINUOUS	NTS	NOT TO SCALE
DIST	DISTANCE	O.C.	ON CENTER
DWLS	DOWELS	OD	OUTSIDE DIAMETER
EJ	EXPANSION JOINT	OF	OUTSIDE FACE
EF	EACH FACE	OPNG	OPENING
ES	EACH SIDE	PSF	POUNDS PER SQ FOOT
EW	EACH WAY	REINF	REINFORCEMENT
EA	EACH	RE:	REFER TO
EL	ELEVATION	SHTS	SHEETS
EQ	EQUAL	SIM	SIMILAR
EX	EXISTING	SJ	SLAB CONTROL JOINT
EXT	EXTERIOR/ EXTENSION	SQ	SQUARE
FIN	FINISH	SS	STAINLESS STEEL
FL	FLOOR	STIR	STIRRUPS
FRP	FIBER REINFORCED PLASTIC	THK	TOP OF CONCRETE
FND	FOUNDATION	TOC	TOP OF CONCRETE
FT	FEET	TOS	TOP OF STEEL
GALV	GALVANIZED	TYP	TYPICAL
GR	GRADE	T&B	TOP AND BOTTOM
HOR	HORIZONTAL	UNO	UNLESS NOTED OTHERWISE
HSS	HIGH STRENGTH STEEL	V	VERTICAL
HP	HIGH POINT	VIF	VERIFY IN FIELD
HK	HOOK	WP	WORK POINT
HT	HEIGHT	WWF	WELDED WIRE FABRIC

**REINFORCING TENSION SPLICE TABLE**

BAR SIZE	TENSION LAP LENGTH	* TOP BARS
#3	16"	24"
#4	25"	32"
#5	31"	40"
#6	37"	48"
#7	54"	70"
#8	62"	80"
#9	70"	90"
#10	78"	102"
#11	87"	113"

- NOTES:**
1. ABOVE TABLE IS FOR NORMAL WEIGHT CONCRETE;  $f_c=4,000$  PSI AND REINFORCING STEEL;  $f_y=60,000$  PSI.
  2. ALL SPLICES SHALL BE CONSIDERED TENSION SPLICES USING LAP LENGTHS IN TABLE ABOVE UNLESS SPECIFICALLY SHOWN OTHERWISE ON THE DRAWINGS.
  3. LENGTHS ARE BASED ON LAP CLASS B SPLICES WITH CENTER TO CENTER SPACING OF BARS GREATER THAN 6 DIAMETERS.
  4. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST UNDER THEM.
  5. USE TENSION LAP LENGTHS FOR HORIZ & VERT. WALL BARS.

**DESIGN LOAD**

- EQUIPMENT PADS ARE DESIGNED FOR THE FOLLOWING MAXIMUM EQUIPMENT WEIGHT:
1. DIESEL GENERATOR =112,300 LBS
  2. AUTOMATIC TRANSFER SWITCH (ATS-1) =17,600 LBS
  3. PRIMARY SWITCH GEAR =7,740 LBS



**ABBREVIATIONS**

SYM.	DESCRIPTION
A	AMPERES
AC	ALTERNATING CURRENT
AF	AMPERES FRAME (BREAKER RATING)
AFF	ABOVE FINISH FLOOR
AT	AMPERES TRIP (BREAKER SETTING)
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
BRKR	BREAKER
C	CONDUIT
CKT	CIRCUIT
CLF	CURRENT LIMITING FUSE
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
DB	DISTRIBUTION BOX
DSC	DISCONNECT
DP	POWER DISTRIBUTION PANEL
DWG	DRAWING
EG	EQUIPMENT GROUND
ELEC	ELECTRIC/ELECTRICAL
EM	EMERGENCY
EMERG	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EO	ELECTRICALLY OPERATED
F	FUSE
FDR	FEEDER
FL	FLOOR
G	GROUND
GRD	GROUND
HH	HAND HOLE
HP	HORSE POWER
JB	JUNCTION BOX
KV	KILOVOLTS
KVA	KILOVOLTS-AMPERES
KVAR	KILOVOLTS-AMPERES-REACTIVE
KW	KILOWATTS
KWH	KILOWATT-HOURS
LA	LIGHTNING ARRESTOR
MAX	MAXIMUM
MEGB	MAIN ELECTRICAL GROUND BUS
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MTD	MOUNTED
MTG	MOUNTING
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NF	NON-FUSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NO.	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OL'S	OVERLOADS
P	POLE
P-X	PUMP - "X" DENOTES PUMP NUMBER
PB	PUSH BUTTON
PH	PHASE
PT	POTENTIAL TRANSFORMER
RCPT	RECEPTACLE
RSC	RIGID STEEL CONDUIT
SCHED	SCHEDULE
SW	SWITCH
SWBD	SWITCHBOARD
TB	TERMINAL BLOCK
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLTS
W	WIRE

**ELECTRICAL LEGEND & SYMBOLS**

SYM.	DESCRIPTION
	SWITCH - SINGLE THROW
	FUSED DISCONNECT
	TRANSFORMER
	POTENTIAL TRANSFORMER
	CONTROL POWER TRANSFORMER
	CURRENT TRANSFORMER
	DELTA CONNECTION
	WYE CONNECTION - SOLID GROUND
	ELECTRIC INTERLOCK SYSTEM
	KEY INTERLOCKING SYSTEM
	MANUALLY OPERATED DRAWOUT TYPE, AIR CIRCUIT BREAKER
	STATIONARY CIRCUIT BREAKER
	FUSE
	AUTOMATIC TRANSFER SWITCH
	SURGE ARRESTERS
	GROUND
	COMBINATION POWER MONITORING SYSTEM PROGRAMMING AND DISPLAY UNIT
	ELECTRONIC METERING UNIT
	AMMETER, RANGE AS INDICATED
	AMMETER SWITCH
	VOLTMETER, RANGE AS INDICATED
	VOLTMETER SWITCH
	KILOWATT HOURS METER WITH DEMAND REGISTER
	TEST BLOCK
	GENERATOR
	POWER DISTRIBUTION PANELBOARD (PDP) - 480/277V, 3PH, 4W & GRD, UON
	AUTOMATIC TRANSFER SWITCH
	BATTERY/INVERTER UNIT
	CONDUIT RUN CONCEALED IN FINISHED AREAS, EXPOSED IN UNFINISHED AREAS OR BELOW ACCESS FLOORS
	CONDUIT CAST IN CONCRETE OR BELOW SLAB
	UNDERGROUND CONDUIT/DUCT/BANK
	GROUND CABLE, SIZE AS INDICATED
	CONDUIT TURNED UP
	CONDUIT TURNED DOWN
	ELECTRIC MANHOLE
	GROUND ROD
	MOTOR
	DISCONNECT SWITCH, NON-FUSED PROVIDE SWITCH AMPACITY EQUAL TO OR GREATER THAN FEEDER AMPACITY, UON
	DISCONNECT SWITCH, FUSED PROVIDE SWITCH AND FUSE AMPACITY EQUAL TO OR GREATER THAN FEEDER AMPACITY, UON
	COMBINATION MOTOR STARTER WITH DISCONNECT SWITCH
	3000A, 480V, 3PH, 4W FEEDER BUS DUCT

**FEEDER & BRANCH CIRCUIT SIZING SCHEDULE  
GENERAL PURPOSE**

OVERCURRENT DEVICE RATING (AMPERES)	WIRE SIZE - AWG OR KCMIL	CONDUIT SIZE			NOTE
		PHASE & NEUTRAL	E.G.	4 WIRE (3PH & 1N)	
15-20	12	3/4"	3/4"	3/4"	
25-30	10	3/4"	3/4"	3/4"	
35-40	8	3/4"	3/4"	3/4"	
45-50	8(6)	3/4"	3/4"	3/4"(1")	
60	6(4)	3/4"(1")	3/4"(1")	1"(1 1/4")	
70	6(4)	3/4"(1")	3/4"(1")	1"(1 1/4")	
80-90	4(2)	8	1"	1"(1 1/4")	
100	3(2)	8	1"(1 1/4")	1 1/4"	
110	2(1)	6	1 1/4"	1 1/4"(1 1/2")	
125	1(1/0)	6	1 1/4"	1 1/2"	
150	1/0	6	1 1/4"	1 1/2"	
175	2/0	6	1 1/2"	2"	
200	3/0	6	1 1/2"	2"	
225	4/0	4	2"	2"	
250	250	4	2"	2 1/2"	
300	350	4	2 1/2"	3"	
350	500	3	3"	3"	
400	500	3	3"	3 1/2"	
450	2-4/0	2-2	2-2"	2-2"	
500	2-250	2-2	2-2"	2-2 1/2"	
600	2-350	2-1	2-2 1/2"	2-3"	
700	2-500	2-1/0	2-3"	2-3"	
800	2-500	2-1/0	2-3"	3-3 1/2"	
1000	3-400	3-2/0	3-2 1/2"	3-3"	
1200	4-350	4-3/0	4-2 1/2"	4-3"	
1600	5-400	5-4/0	5-2 1/2"	5-3"	
2000	6-400	6-250	6-2 1/2"	6-3"	
3000	9-400	9-400	9-2 1/2"	9-3"	
4000	12-400	12-500	12-2 1/2"	12-3"	

**CIRCUIT SIZING SCHEDULES NOTES:**

- BASED ON THHN/THWN, 90°, 600V., INSULATED, COPPER WIRE APPLIED AT 75° FOR TERMINATIONS RATED AT 60°C/75°C AND 75°C. FOR TERMINATIONS RATED AT 60°C PROVIDE WIRE AND CONDUIT SIZES INDICATED IN PARENTHESIS.
- BASED ON WIRE OUTSIDE DIAMETERS AND RIGID METALLIC CONDUIT INSIDE DIAMETERS AS PROVIDED IN THE NEC. DO NOT REDUCE CONDUIT SIZE FOR NON-RIGID METALLIC APPLICATION. REFER TO NEC FOR CONDUIT TYPES MORE RESTRICTIVE THAN RIGID METALLIC.
- BASED ON MOTOR FULL LOAD AMPERES AS PROVIDED BY THE N.E.C.
- BASED ON MOTOR RUNNING OVERLOAD PROTECTION PROVIDED BY THERMAL OVERLOAD RELAYS.
- MOTOR STARTING TYPE BASED ON 460V., 3 PHASE, FULL VOLTAGE NON-REVERSING.
- NUMBER OF WIRES IN "FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE" APPLIES TO CURRENT CARRYING CONDUCTORS INCLUDING NEUTRALS. IN ADDITION TO THE INDICATED NUMBER OF WIRES, AN EQUIPMENT GROUNDING WIRE SHALL BE PROVIDED.

**GENERAL NOTES:**

- CONTRACTOR SHALL VISIT THE SITE TO BECOME FAMILIAR WITH THE WORK AREA PRIOR TO BIDDING.
- RUN FEEDERS AND BRANCH CIRCUIT WIRING IN DEDICATED CONDUITS.
- IN AREAS WITH FINISHED CEILINGS, ALL BRANCH CIRCUIT AND DATA/SECURITY SYSTEM WIRING SHALL BE CONCEALED ABOVE CEILINGS UNLESS SPECIFICALLY APPROVED BY WSU PRIOR TO STARTING WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND REINSTALLING CEILING TILES AS REQUIRED TO COMPLETE THE WORK; ANY CEILING TILE DAMAGED WHILE COMPLETING THE WORK, SHALL BE REPLACED BY THE CONTRACTOR WITH NEW CEILING TILE TO MATCH EXISTING. IN AREAS WITH EXPOSED CEILINGS, WHERE PAINTED, PAINT NEW CONDUIT AND BOXES TO MATCH EXISTING WALL OR CEILING COLOR.

**480V THREE PHASE MAXIMUM DISTANCE IN FEET**

BREAKER AMPACITY (AMPS)	MAX. CIRCUIT LOAD (AMPS)	480V THREE PHASE MAXIMUM DISTANCE IN FEET																								
		NO.12	NO.10	NO.8	NO.6	NO.4	NO.2	NO.1	1/0	2/0	3/0	4/0	250	350	500	2-3/0	2-4/0	2-250	2-350	2-500	3-300	3-400	4-350	4-500	5-500	6-500
20	16	253	403	642	1019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	24	-	269	428	679	1079	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	32	-	-	321	509	809	1293	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	40	-	-	-	408	648	1034	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	48	-	-	-	-	540	862	1083	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70	56	-	-	-	-	-	739	928	1169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80	64	-	-	-	-	-	646	812	1023	1286	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90	72	-	-	-	-	-	574	722	909	1143	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100	80	-	-	-	-	-	-	650	818	1029	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
125	100	-	-	-	-	-	-	-	655	823	1043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150	120	-	-	-	-	-	-	-	546	689	869	1107	-	-	-	-	-	-	-	-	-	-	-	-	-	-
175	140	-	-	-	-	-	-	-	-	588	745	949	1110	-	-	-	-	-	-	-	-	-	-	-	-	-
200	160	-	-	-	-	-	-	-	-	-	652	830	971	1360	-	-	-	-	-	-	-	-	-	-	-	-
225	180	-	-	-	-	-	-	-	-	-	738	863	1209	1743	-	-	-	-	-	-	-	-	-	-	-	-
250	200	-	-	-	-	-	-	-	-	-	-	777	1088	1569	1043	-	-	-	-	-	-	-	-	-	-	-
300	240	-	-	-	-	-	-	-	-	-	-	-	907	1307	869	1107	-	-	-	-	-	-	-	-	-	-
350	280	-	-	-	-	-	-	-	-	-	-	-	-	1120	745	949	1110	-	-	-	-	-	-	-	-	-
400	320	-	-	-	-	-	-	-	-	-	-	-	-	-	980	652	830	971	1360	-	-	-	-	-	-	-
450	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	738	863	1209	-	-	-	-	-	-	-	-
500	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	777	1088	1569	-	-	-	-	-	-	-
600	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	907	1307	1165	-	-	-	-	-	-
700	560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1120	999	1346	-	-	-	-	-
800	640	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	874	1177	1360	-	-	-	-
1000	800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	942	1088	1569	-	-	-
1200	960	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	785	907	1307	-	-
1600	1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	980	1226	1307	-
1800	1440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1089	1177	-
2000	1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	980	1137	-

**CIRCUIT MAXIMUM DISTANCE TABLES**

- NOTES:
- CIRCUIT MAXIMUM DISTANCE IS BASED ON NEC CHAPTER 9, TABLE 8 CONDUCTOR PROPERTIES FOR COATED COPPER CONDUCTORS AT 75 DEGREES CELSIUS.
  - MAXIMUM CIRCUIT LOAD FOR DISTANCE IS BASED ON NEC 220-10(b)

**EXTERIOR LIGHTING FIXTURES SCHEDULE**

TYPE	FIXTURE DESCRIPTION	LAMP	VOLTAGE	MANUFACTURER AND MODEL NUMBER
S1	LED WALL PACK WITH DIE CAST ALUMINUM HOUSING, IMPACT RESISTANT TEMPERED GLASS LENS, FULLY GASKETED, DARK BORNZE FINISH, TYPE III DISTRIBUTION. FUSED. WITH INTEGRAL PHOTOCELL.	10 LEDs	120V	LITHONIA TWH LED SERIES. OR PHILIPS WPM LED SERIES, OR COOPER WP SERIES.
S2	POLE MOUNTED LED FLOOD LIGHT WITH DIE CAST ALUMINUM HOUSING, GLASS LENS, FULLY GASKETED, HINGED DOOR FRAME, DARK BORNZE FINISH. WITH INTEGRAL PHOTOCELL. PROVIDE 20' HIGH SQUARE STEEL POLE WITH BASE, AND YOKE FOR FLOOD LIGHT MOUNTING AT THE TOP OF POLE. DA	40 LEDs (70mA)	120V	INVUE VFS SERIES, OR WIDELIGHT UF3 SERIES, OR GARDCO DLF SERIES.



WSU PROJECT #629-245283



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Seal/Registration

PROJECT TITLE

**ELLIMAN CLINICAL RESEARCH # 629 BUILDING ELECTRICAL RELIABILITY UPGRADES**

421 East Canfield Ave,  
Detroit, MI 48201

KEY PLAN

SHEET TITLE

**ELECTRICAL SCHEDULES, SYMBOLS & ABBREVIATIONS**

11-03-14 80  
DATE: ISSUED FOR:

DRAWN H.G.  
CHECKED H.G.  
APPROVED H.G.

MEP PROJECT NO.  
**1415-4**

SHEET NO.



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**ROOF ELECTRICAL POWER DEMOLITION PLAN**

11-03-14  
 DATE: ISSUED FOR:

DRAWN H.G.  
 CHECKED H.G.  
 APPROVED H.G.

MEP PROJECT NO.

**1415-4**

SHEET NO.

**ED-02**

**GENERAL NOTES:**

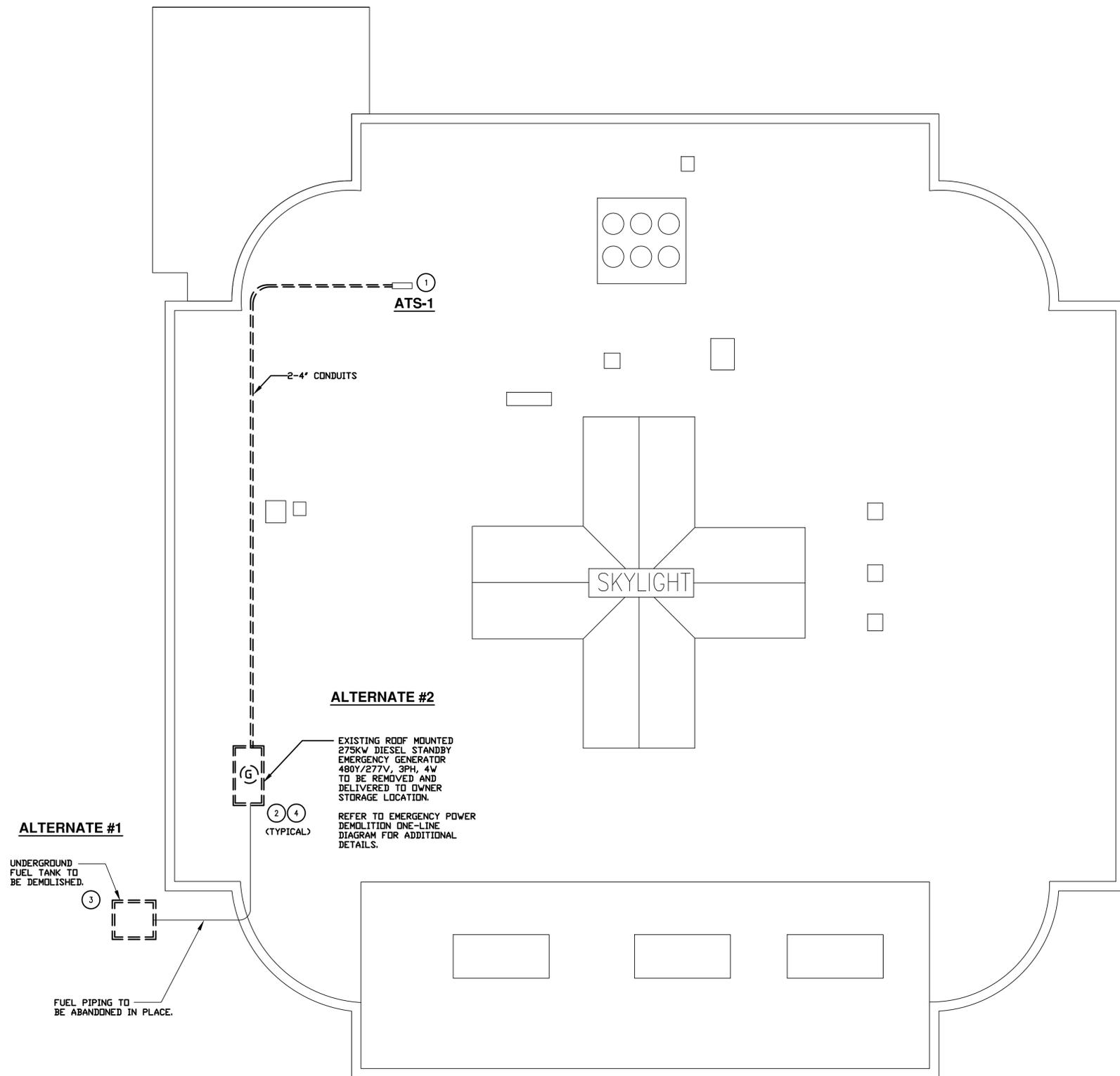
- A. UNLESS OTHERWISE NOTED, ALL WORK SHOWN ON THIS SHEET IS EXISTING TO BE DEMOLISHED.
- B. SUBMIT A SEPARATE BID PRICE FOR ALTERNATE #1 & ALTERNATE #2 INDICATED ON THIS DRAWING.

**KEYED NOTES:**

- ① EXISTING ATS-1 TO REMAIN AND TO BE REUSED AS A JUNCTION BOX. REFER TO THIRD FLOOR UPS POWER PLAN SHEET E2-07 FOR LOCATION.
- ② FIELD VERIFY ROOF TYPE. PROTECT ROOF DURING DEMOLITION WORK. PATCH AND REPAIR, AS REQUIRED, OPENINGS AND AREAS EXPOSED DUE TO DEMOLITION WORK.
- ③ RESTORE LANDSCAPING COMPROMISED DUE TO THE REMOVAL OF UNDERGROUND FUEL TANK.
- ④ RESTORE INTERIOR FINISHES COMPROMISED DUE TO DEMOLITION WORK.

**ALTERNATES:**

- #1 PROVIDE COST FOR COMPLETE WORK LABOR AND MATERIAL TO REMOVE AND DISPOSE OFF WSU SITE EXISTING UNDERGROUND 10,000 GALLONS DIESEL FUEL TANK. FIELD VERIFY AND NOTIFY OWNER OF ANY FUEL LEAKAGE. REMOVE ALL HORIZONTAL PIPING AND CUT AND CAP ALL ENDS.
- #2 PROVIDE COST FOR COMPLETE WORK LABOR AND MATERIAL TO REMOVE AND TURN OVER TO OWNER EXISTING ROOF MOUNTED 275KVA STANDBY DIESEL EMERGENCY GENERATOR. DELIVER GENERATOR TO OWNER'S STORAGE. REMOVE ASSOCIATED CONDUIT AND WIRING BACK TO ATS-1 LOCATED ON THIRD FLOOR MECHANICAL ROOM. ABANDON IN PLACE ASSOCIATED FUEL PIPING. CAP PIPE AT BOTH ENDS.



**ROOF ELECTRICAL POWER DEMOLITION PLAN**  
 SCALE: 3/32" = 1'-0"



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KEY PLAN

SHEET TITLE

**ELECTRICAL POWER DEMOLITION ONELINE DIAGRAM**

DATE: ISSUED FOR:

DRAWN H.G.  
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**1415-4**

SHEET NO.

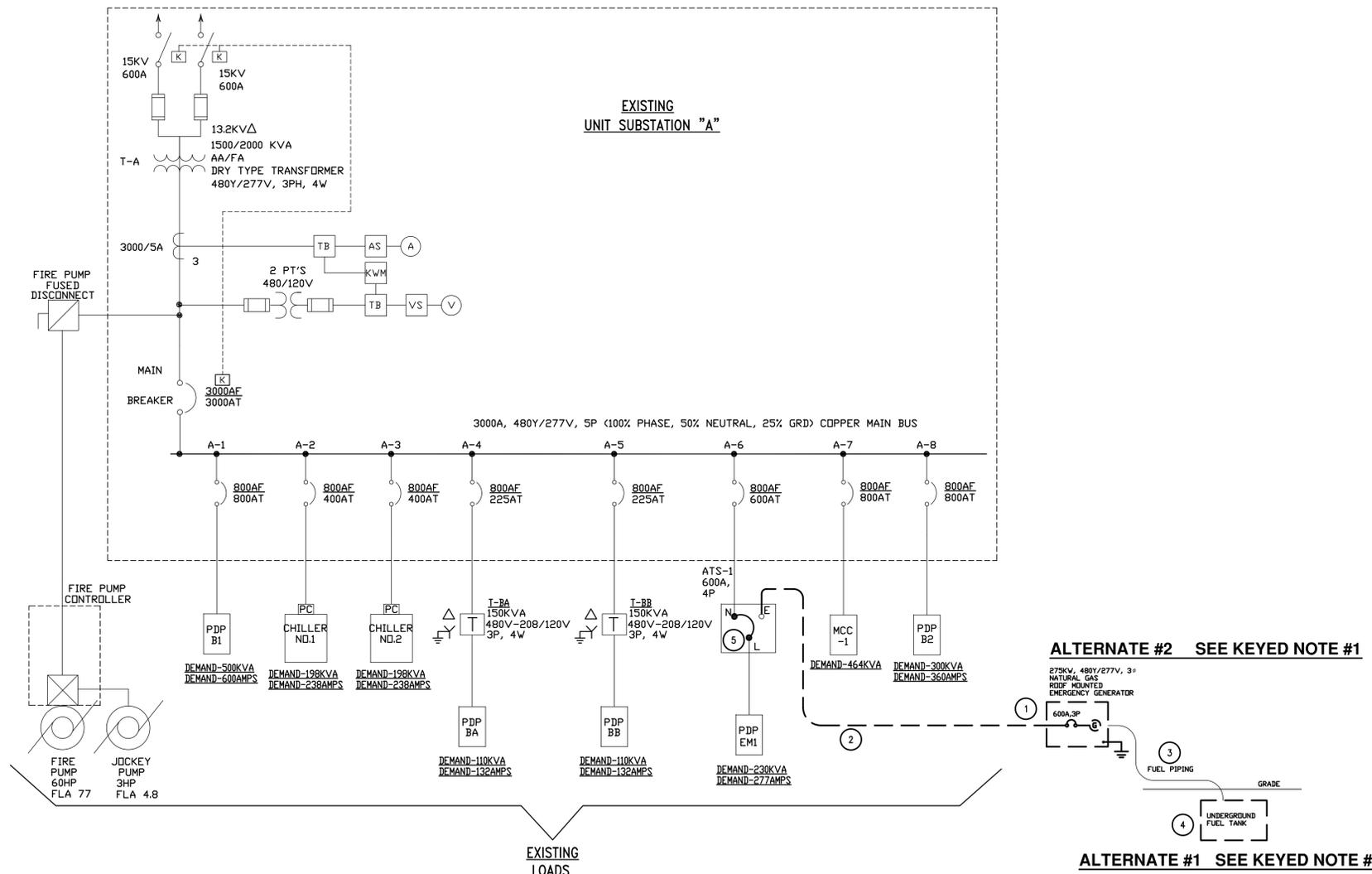
**ED-03**

**GENERAL NOTES:**

- A. UNLESS OTHERWISE NOTED, ALL WORK SHOWN ON THIS SHEET IS EXISTING TO REMAIN.
- B. SUBMIT A SEPARATE BID PRICE FOR ALTERNATE #1 & ALTERNATE #2 INDICATED ON THIS DRAWING.

**ALTERNATE KEYED NOTES:**

- 1 DISCONNECT, REMOVE, AND TURN OVER TO OWNER EXISTING ROOF MOUNTED DIESEL GENERATOR. GENERATOR TO BE TRUCKED TO WSU'S 1200 HOLDEN WAREHOUSE BY CONTRACTOR.
- 2 REMOVE GENERATOR CONDUIT AND WIRING BACK TO ATS-1.
- 3 ABANDON IN PLACE GENERATOR FUEL PIPING. CAP BOTH ENDS.
- 4 REMOVE AND LEGALLY DISPOSE OF UNDERGROUND TANK. REFER TO SHEET ED-02. OWNER WILL TEST SPOILS AND IF DIRECTED CONTRACTOR SHALL REMOVE SPOILS AND PROVIDE COMPACTED BACKFILL BASED ON UNIT PRICING PROVIDED AS A PART OF ALTERNATE #1.
- 5 REMOVE CONTROL ELEMENTS OF ATS-1. PROVIDE JUMPERS AND MAKE SOLID/PERMANENT CONNECTION BETWEEN NORMAL AND LOAD CONDUCTORS. ATS-1 SHALL BE USED AS A JUNCTION BOX. PROVIDE NEW LABEL.



**ELECTRICAL POWER DEMOLITION ONELINE DIAGRAM**





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KEY PLAN

SHEET TITLE

**BASEMENT FLOOR POWER PARTIAL PLAN**

11-03-14 BB  
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APPROVED H.G.

MEP PROJECT NO.

**1415-4**

SHEET NO.

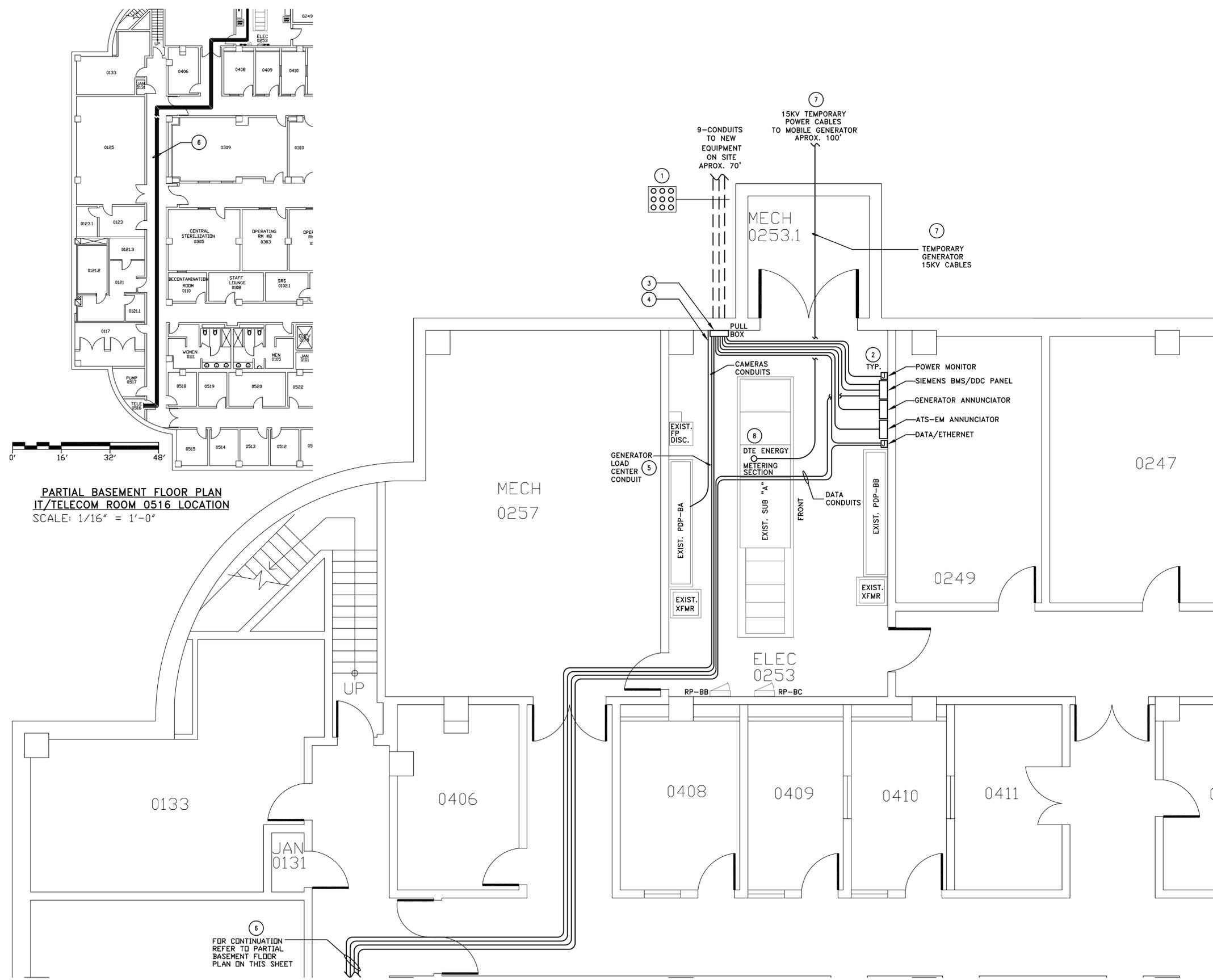
**E2-05**

**GENERAL NOTES:**

- A. UNLESS OTHERWISE NOTED, EXISTING EQUIPMENT, PANELS, FEEDERS, AND DEVICES LOCATED IN BASEMENT SUBSTATION/ELECTRICAL AND MECHANICAL ROOMS SHOWN OR NOT SHOWN ON THIS DRAWING, ARE TO REMAIN AND SHALL REMAIN ENERGIZED DURING THE INSTALLATION OF NEW WORK.
- B. COORDINATE WITH OWNER FOR REMOVAL (BY OTHERS) OF EXISTING ABANDONED PANELS/PULL BOX/AND CONDUITS USED TO SERVE OLD OUTDOOR GENERATOR TO CLEAR SPACE AND ALLOW INSTALLATION OF NEW ELECTRICAL DEVICES/PANELS/BOXES AND CONDUITS.
- C. COORDINATE WITH OWNER ELECTRICAL POWER SHUTDOWN FOR TEMPORARY GENERATOR CONNECTION AT DTE ENERGY METERING SECTION IN SUBSTATION 'A'. REFER TO DETAIL ON SHEET E6-11.
- D. FIELD VERIFY EXISTING MAIN SERVICE AND OLD EMERGENCY POWER UNDERGROUND CONDUITS TERMINATED AT THE NORTH WALL OF THE BASEMENT SUBSTATION/ELECTRICAL ROOM. COORDINATE NEW WORK TO AVOID POWER INTERRUPTION TO THE BUILDING.
- E. REFER TO ONLINE DIAGRAM SHEET E5-08 FOR ADDITIONAL DETAILS.

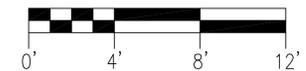
**KEYED NOTES:**

- 1 UNDERGROUND CONDUITS FROM EQUIPMENT (ON GRADE LEVEL) TO INDICATED EQUIPMENT IN THE BASEMENT SUBSTATION/ELECTRICAL/TELECOM ROOMS. REFER TO ELECTRICAL POWER SITE PLANS SHEET ES-04 & E2-06 AND ONLINE DIAGRAM SHEET E5-08 FOR DETAILS.
- 2 PROVIDE INDICATED JUNCTION BOXES AND PANELS. FIELD COORDINATE EXACT LOCATION ON INDICATED WALL.
- 3 PROVIDE 18"x18"x6" PULL BOX WITH HINGED COVER FOR LOW VOLTAGE CONTROL AND DATA WIRING.
- 4 RUN INDICATED 1 1/2" POWER CONDUIT OUTSIDE PULL BOX.
- 5 FIELD VERIFY EXISTING POWER DISTRIBUTION PANELBOARD (PDP-BA), PROVIDE 100A 3P SWITCH AND 100A SET FUSES IN EXISTING SPACE TO MATCH EXISTING FEED GENERATOR LOAD CENTER.
- 6 RUN INDICATE DATA/SECURITY SYSTEM WIRING IN CONDUITS TO NEAREST BASEMENT CORRIDOR THEN RUN WIRES EXPOSED ON J-HOOKS ABOVE CEILING TILES. TERMINATE WIRING IN ROOM 0516 AS INDICATED. COORDINATE WITH OWNER.
- 7 REFER TO SHEET E6-11 FOR TEMPORARY GENERATOR 15KV CABLES ROUTING AND ELEVATION DETAIL.
- 8 REFER TO SHEET E6-11 FOR TEMPORARY GENERATOR 15KV CABLES TERMINATION AT DTE ENERGY METERING SECTION DETAIL.



**PARTIAL BASEMENT FLOOR PLAN  
IT/TELECOM ROOM 0516 LOCATION**  
SCALE: 1/16" = 1'-0"

**BASEMENT FLOOR POWER PARTIAL PLAN**  
SCALE: 1/4" = 1'-0"



6  
FOR CONTINUATION  
REFER TO PARTIAL  
BASEMENT FLOOR  
PLAN ON THIS SHEET



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PROJECT TITLE

**ELLIMAN CLINICAL RESEARCH # 629 BUILDING ELECTRICAL RELIABILITY UPGRADES**

421 East Canfield Ave,  
 Detroit, MI 48201

KEY PLAN

SHEET TITLE

**ENLARGED ELECTRICAL SITE PLAN**

11-03-14  
 DATE: ISSUED FOR:  
 DRAWN H.G.  
 CHECKED H.G.  
 APPROVED H.G.

MEP PROJECT NO.

**1415-4**

SHEET NO.

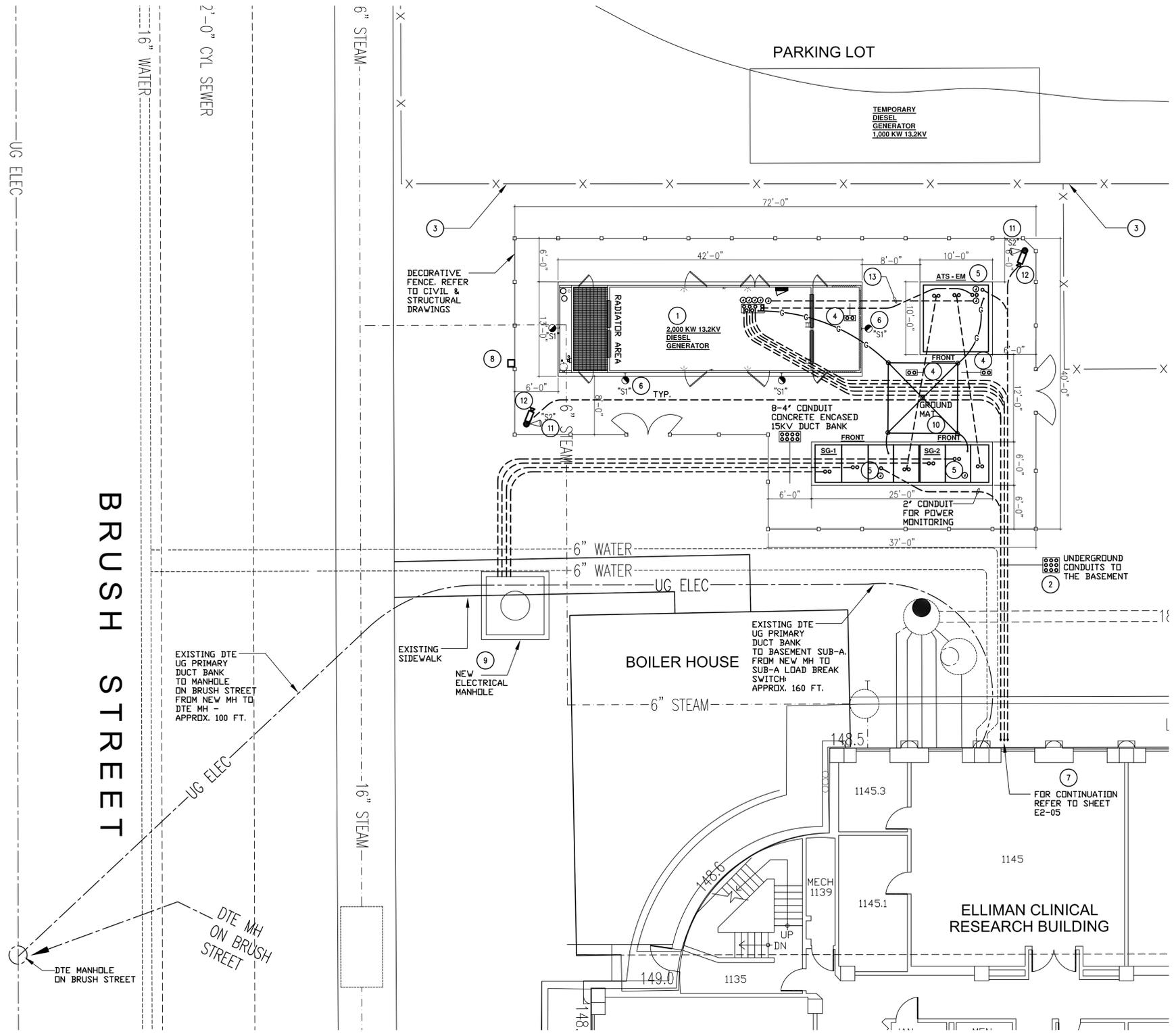
**E2-06**

**GENERAL NOTES:**

- A. FIELD VERIFY UNDERGROUND UTILITIES CALL (811) PRIOR TO DIGGING.
- B. HAND DIG NEAR EXISTING UTILITIES.
- C. COORDINATE NEW UNDERGROUND CONDUIT ROUTING WITH EXISTING UTILITIES. REVISE ROUTING AS REQUIRED TO AVOID ANY CONFLICT.
- D. FIELD VERIFY EXISTING DTE MAIN SERVICE AND OLD EMERGENCY POWER UNDERGROUND CONDUITS TERMINATED AT THE EXTERIOR NORTH WALL OF THE BASEMENT ELECTRICAL ROOM. COORDINATE NEW WORK TO AVOID POWER INTERRUPTION TO THE BUILDING.
- E. UNLESS OTHERWISE NOTED, INSTALL UNDERGROUND CONDUITS AT 42" TOP OF CONDUIT BELOW GRADE.
- F. PROVIDE SPARE UNDERGROUND CONDUITS (NOT SHOWN ON THIS DRAWING) WITH PULL STRING, CAPPED AT BOTH ENDS. REFER TO ONLINE DIAGRAM ON SHEET E5-08 FOR DETAILS.
- G. RESTORE LANDSCAPING COMPROMISED DUE TO UNDERGROUND DUCT BANK & CONDUITS INSTALLATION. REFER TO CIVIL DRAWINGS.
- H. DIMENSIONS SHOWN ARE BASED ON CATERPILLAR POWER GENERATION FOR GENERATOR, ASCO & EATON/CUTLER-HAMMER FOR ATS-EM, AND S&C AND EATON/CUTLER-HAMMER FOR PRIMARY SWITCHGEAR. IF THE CONTRACTOR ELECTS TO PROVIDE EQUIPMENT FROM OTHER APPROVED MANUFACTURERS, THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE EQUIPMENT LAYOUT AND ACHIEVE CODE CLEARANCES WITHIN THE SPACE PROVIDED.

**KEYED NOTES:**

- 1 NEW DIESEL GENERATOR. PROVIDE NEW INDICATED CONCRETE PAD. REFER TO TYPICAL 2MW DIESEL GENERATOR PLAN AND ELEVATION DETAILS ON SHEET E6-11. REFER TO CIVIL AND STRUCTURAL DRAWINGS FOR DETAILS.
- 2 RUN UNDERGROUND CONDUITS TO THE BASEMENT. REFER TO BASEMENT POWER PARTIAL PLAN SHEET E2-05 AND ONLINE DIAGRAM SHEET E5-08 FOR DETAILS.
- 3 EXISTING CHAIN LINK FENCE TO REMAIN.
- 4 PROVIDE 2-4" CONCRETE ENCASED 15KV DUCT BANK REFER TO DETAIL ON SHEET E6-10.
- 5 PROVIDE JUNCTION BOX FOR STRIP HEATER. PROVIDE 120V BRANCH CIRCUIT FROM GENERATOR LOAD CENTER.
- 6 PROVIDE "S1" SURFACE MOUNTED WALL PACK LED LIGHT FIXTURE. MOUNT FIXTURE ON GENERATOR ENCLOSURE AT 10' ABOVE FINISH GRADE. PROVIDE BRANCH CIRCUIT WIRING TO GENERATOR LOAD CENTER. REFER TO EXTERIOR LIGHTING FIXTURES SCHEDULE ON SHEET E1-01.
- 7 PROVIDE CORING OF EXTERIOR PRECAST WALL AS REQUIRED. PROVIDE SEAL TIGHT AND SEAL SPRAY FOR A WATER AND MOISTURE TIGHT PENETRATION.
- 8 DIESEL GENERATOR LOCKABLE REMOTE FILL STATION. REFER TO DETAIL ON SHEET E6-10.
- 9 PROVIDE NEW 8'X8' CONCRETE MANHOLE. INTERCEPT DTE TWO PRIMARY FEEDERS DUCT BANK. CUT AND SPLICE CONDUCTORS INSIDE MANHOLE AS INDICATED. REFER TO ONLINE DIAGRAM SHEET E5-08 AND MANHOLE DETAIL ON SHEET E6-10. REFER TO CIVIL DRAWINGS FOR ADDITIONAL DETAILS. SUBMIT FOR APPROVAL DETAILED SHOP DRAWINGS FOR THIS WORK.
- 10 PROVIDE GROUND MAT AND GROUNDING AS INDICATED. REFER TO DETAIL ON SHEET E6-10.
- 11 PROVIDE "S2" LED FLOOD LIGHT AND 20' HIGH SQUARE STEEL POLE. PROVIDE BRANCH CIRCUIT WIRING TO GENERATOR LOAD CENTER. REFER TO POLE BASE DETAIL ON SHEET E6-10. REFER TO EXTERIOR LIGHTING FIXTURES SCHEDULE ON SHEET E1-01.
- 12 PROVIDE JUNCTION BOX AND 1" CONDUIT FOR SECURITY SYSTEM CAMERA. MOUNT JUNCTION BOX ON LIGHTING POLE AS HIGH AS POSSIBLE. PROVIDE PULL STRING FROM JUNCTION BOX TO TELECOM ROOM 0516 IN THE BASEMENT. CAMERA AND CABLING PROVIDED BY OWNER.
- 13 PROVIDE JUNCTION BOX AND 1 1/4" UNDERGROUND CONDUIT AND WIRING FOR CONTROLS BETWEEN GENERATOR AND ATS-EM. COORDINATE REQUIREMENTS WITH GENERATOR & ATS MANUFACTURERS. REFER TO ONLINE DIAGRAM SHEET E5-08.



**ENLARGED ELECTRICAL SITE PLAN**  
 SCALE: 1/8" = 1'-0"

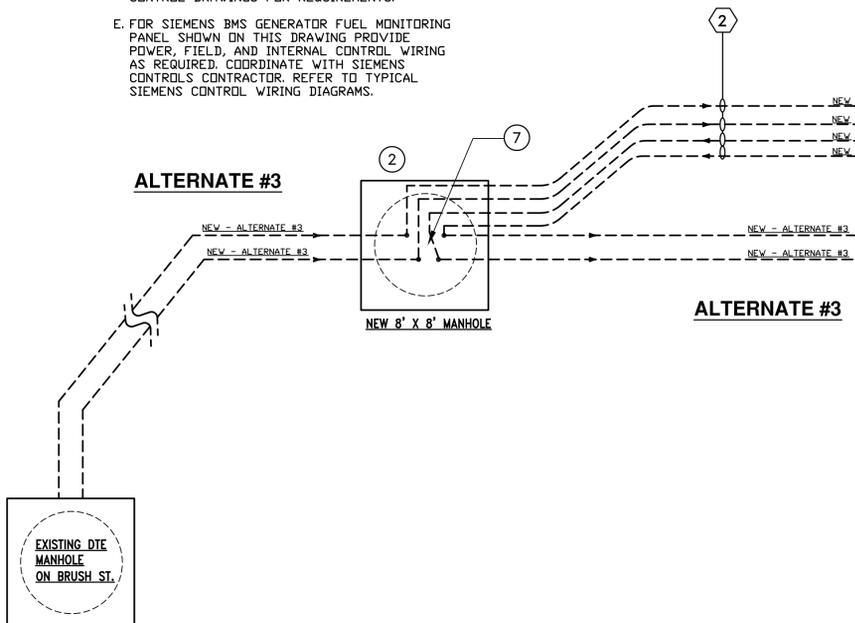




**GENERAL NOTES:**

- A. UNLESS OTHERWISE NOTED ELECTRICAL WORK SHOWN ON THIS DRAWING IS NEW.
- B. UNLESS OTHERWISE NOTED, PROVIDE UNDERGROUND CONCRETE ENCASED DUCT BANK FOR NEW 15KV CABLES SHOWN ON THIS DRAWING. REFER TO DUCT BANK DETAIL ON SHEET E6-10.
- C. TYPICAL FOR NEW SIEMENS BMS/DDC PANEL, NEW GENERATOR REMOTE ANNUNCIATOR PANEL, AND NEW ATS REMOTE ANNUNCIATOR PANEL, PROVIDE 120V POWER FROM SPARE 20A 1P BREAKERS IN EXISTING BASEMENT PANELBOARD (RP-BA OR RP-BB).
- D. FOR SIEMENS BMS/DDC PANEL PROVIDE ETHERNET DATA DROP AND JUNCTION BOX INSIDE INDICATED BMS PANEL. TERMINATE DATA WIRING IN IT/COMM ROOM 0516. REFER TO SIEMENS CONTROL DRAWINGS FOR REQUIREMENTS.
- E. FOR SIEMENS BMS GENERATOR FUEL MONITORING PANEL SHOWN ON THIS DRAWING PROVIDE POWER, FIELD, AND INTERNAL CONTROL WIRING AS REQUIRED. COORDINATE WITH SIEMENS CONTROLS CONTRACTOR. REFER TO TYPICAL SIEMENS CONTROL WIRING DIAGRAMS.

**ALTERNATE #3**

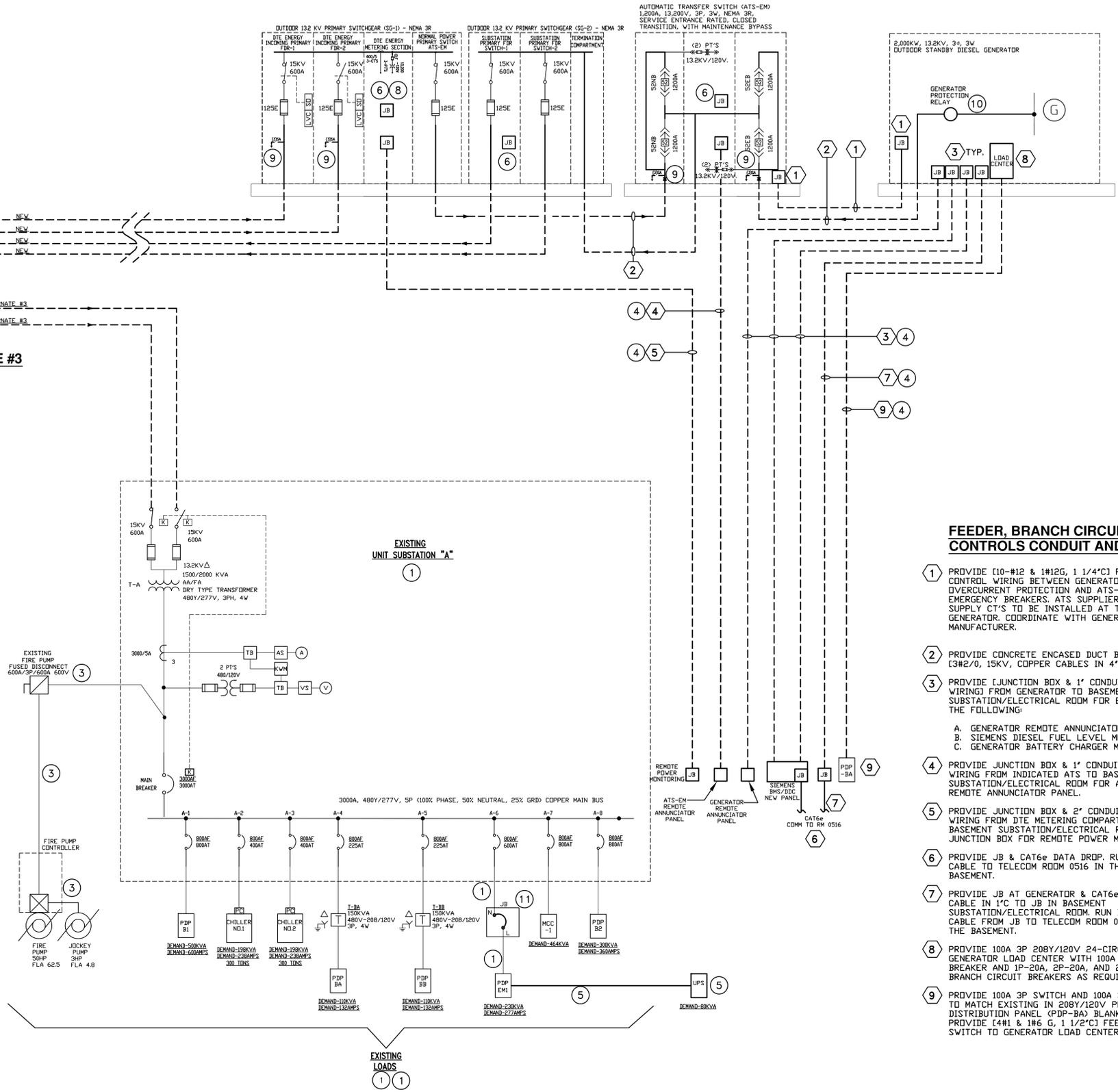


**KEYED NOTES:**

- 1. EXISTING EQUIPMENT, FEEDER, OR DEVICE.
- 2. PROVIDE NEW MANHOLE. REFER TO SITE PLAN SHEET ES-04 FOR LOCATION AND SHEET E6-10 FOR MANHOLE DETAILS.
- 3. EXISTING FIRE PUMP CONTROLLER, FEEDER, AND FUSED DISCONNECT TO REMAIN. MAINTAIN ELECTRICAL CONTINUITY DURING THE INSTALLATION OF NEW WORK.
- 4. PROVIDE UNDERGROUND PVC CONDUITS WITH GALVANIZED RIGID STEEL ELBOWS & SWEEPS.
- 5. FOR UPS FEEDER AND ADDITIONAL DETAILS, REFER TO UPS POWER ONELINE DIAGRAM SHEET ES-09.
- 6. PROVIDE JUNCTION BOX AND 120V BRANCH CIRCUIT WIRING FROM GENERATOR LOAD CENTER FOR INDICATED EQUIPMENT STRIP HEATER.
- 7. FIELD VERIFY INDICATED DTE 15KV PAPER AND LEAD PRIMARY FEEDERS AFTER EXPOSURE INSIDE NEW MANHOLE. CUT AND TEST FOR MOISTURE. IF TEST RESULT INDICATES PRESENCE OF MOISTURE OR WATER IN THE CABLE INSULATION ALTERNATE #3 SHALL BE IMPLEMENTED. PROVIDE FEEDER SPLICING AS INDICATED.  
REFER TO ALTERNATE #3 (ON THIS SHEET) PROVIDE A SEPARATE COST PRICE MATERIAL AND LABOR TO REPLACE THE TWO 15KV FEEDERS CABLES IN EXISTING DUCT BANK FROM NEW MANHOLE TO SUBSTATION LOAD BREAK SWITCHES, AND TO PULL DTE FURNISHED 15KV FEEDERS CABLES FROM DTE MANHOLE ON BRUSH STREET TO NEW ELECTRICAL MANHOLE.
- 8. FOR DTE METERING SECTION CT'S & PT'S ARE PROVIDED BY DTE ENERGY. COORDINATE WITH DTE.
- 9. PROVIDE DISTRIBUTION CLASS 10KV SURGE ARRESTERS IN EACH BAY OR SECTION AS INDICATED.
- 10. GENERATOR PROTECTIVE RELAY. PROVIDED BY GENSET SUPPLIER. COORDINATE CT'S WITH ATS-EM MANUFACTURER. REFER TO SPECIFICATIONS FOR PROTECTIVE RELAY CHARACTERISTICS.
- 11. REMOVE CONTROL ELEMENTS OF EXISTING ATS-1. PROVIDE JUMPERS (SIZE TO MATCH EXISTING) AND MAKE SOLID/PERMANENT CONNECTION BETWEEN NORMAL AND LOAD CONDUCTORS. PROVIDE 'JUNCTION BOX' LABEL.

**ALTERNATE #3:**

- 1. PULL EXISTING CABLES FROM NEW ELECTRICAL MANHOLE BACK TO BASEMENT SUBSTATION-A LOAD BREAK SWITCHES APPROXIMATELY 160 FT.
  - 2. PULL EXISTING PAPER AND LEAD CABLES FROM NEW ELECTRICAL MANHOLE BACK TO DTE MANHOLE (ON BRUSH STREET) APPROXIMATELY 100 FT. NOTE: DTE SHALL OPEN EXISTING Y-SPLICES IN MANHOLE AND MAKE CABLES AVAILABLE FOR PULLING.
  - 3. PROVIDE NEW 15KV EPR INSULATED CABLES IN EXISTING DUCT BANK FROM SUBSTATION-A LOAD BREAK SWITCHES TO NEW ELECTRICAL MANHOLE.
  - 4. PULL NEW DTE FURNISHED 15KV EPR INSULATED CABLES FROM DTE MANHOLE TO NEW ELECTRICAL MANHOLE.
- NOTE-1: DTE SHALL COMPLETE THE SPLICING WORK IN DTE MANHOLE ON BRUSH STREET.
- NOTE-2: CABLE SPLICING IN NEW ELECTRICAL MANHOLE COST SHALL BE PART OF THE BASE BID WORK. REFER TO KEYED NOTE NO. 7 ON THIS SHEET.



**FEEDER, BRANCH CIRCUIT, & CONTROLS CONDUIT AND WIRING:**

- 1. PROVIDE [10-#12 & #12G, 1 1/4" C] FOR CONTROL WIRING BETWEEN GENERATOR OVERCURRENT PROTECTION AND ATS-EM EMERGENCY BREAKERS. ATS SUPPLIER SHALL SUPPLY CT'S TO BE INSTALLED AT THE GENERATOR. COORDINATE WITH GENERATOR MANUFACTURER.
- 2. PROVIDE CONCRETE ENCASED DUCT BANK [3#2/0, 15KV, COPPER CABLES IN 4"C].
- 3. PROVIDE [JUNCTION BOX & 1' CONDUIT AND WIRING] FROM GENERATOR TO BASEMENT SUBSTATION/ELECTRICAL ROOM FOR EACH OF THE FOLLOWING:  
A. GENERATOR REMOTE ANNUNCIATOR PANEL.  
B. SIEMENS DIESEL FUEL LEVEL MONITORING.  
C. GENERATOR BATTERY CHARGER MONITORING.
- 4. PROVIDE JUNCTION BOX & 1' CONDUIT AND WIRING FROM INDICATED ATS TO BASEMENT SUBSTATION/ELECTRICAL ROOM FOR ATS REMOTE ANNUNCIATOR PANEL.
- 5. PROVIDE JUNCTION BOX & 2' CONDUIT AND WIRING FROM DTE METERING COMPARTMENT TO BASEMENT SUBSTATION/ELECTRICAL ROOM JUNCTION BOX FOR REMOTE POWER MONITORING.
- 6. PROVIDE JB & CAT6e DATA DROP, RUN DATA CABLE TO TELECOM ROOM 0516 IN THE BASEMENT.
- 7. PROVIDE JB AT GENERATOR & CAT6e DATA CABLE IN 1" C TO JB IN BASEMENT SUBSTATION/ELECTRICAL ROOM. RUN DATA CABLE FROM JB TO TELECOM ROOM 0516 IN THE BASEMENT.
- 8. PROVIDE 100A 3P 208Y/120V 24-CIRCUIT GENERATOR LOAD CENTER WITH 100A 3P MAIN BREAKER AND 1P-20A, 2P-20A, AND 2P-30A BRANCH CIRCUIT BREAKERS AS REQUIRED.
- 9. PROVIDE 100A 3P SWITCH AND 100A SET FUSES TO MATCH EXISTING IN 208Y/120V POWER DISTRIBUTION PANEL (PDP-BA) BLANK SPACE. PROVIDE [4#1 & #6 G, 1 1/2" C] FEEDER FROM SWITCH TO GENERATOR LOAD CENTER.



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Seal/Registration

PROJECT TITLE

**ELLIMAN CLINICAL RESEARCH # 629 BUILDING ELECTRICAL RELIABILITY UPGRADES**

421 East Canfield Ave,  
 Detroit, MI 48201

KEY PLAN

SHEET TITLE

**UPS POWER ONELINE DIAGRAM**

DATE: 11-03-14 80  
 ISSUED FOR:  
 DRAWN: H.G.  
 CHECKED: H.G.  
 APPROVED: H.G.

MEP PROJECT NO.

1415-4

SHEET NO.

**E5-09**

**GENERAL NOTES:**

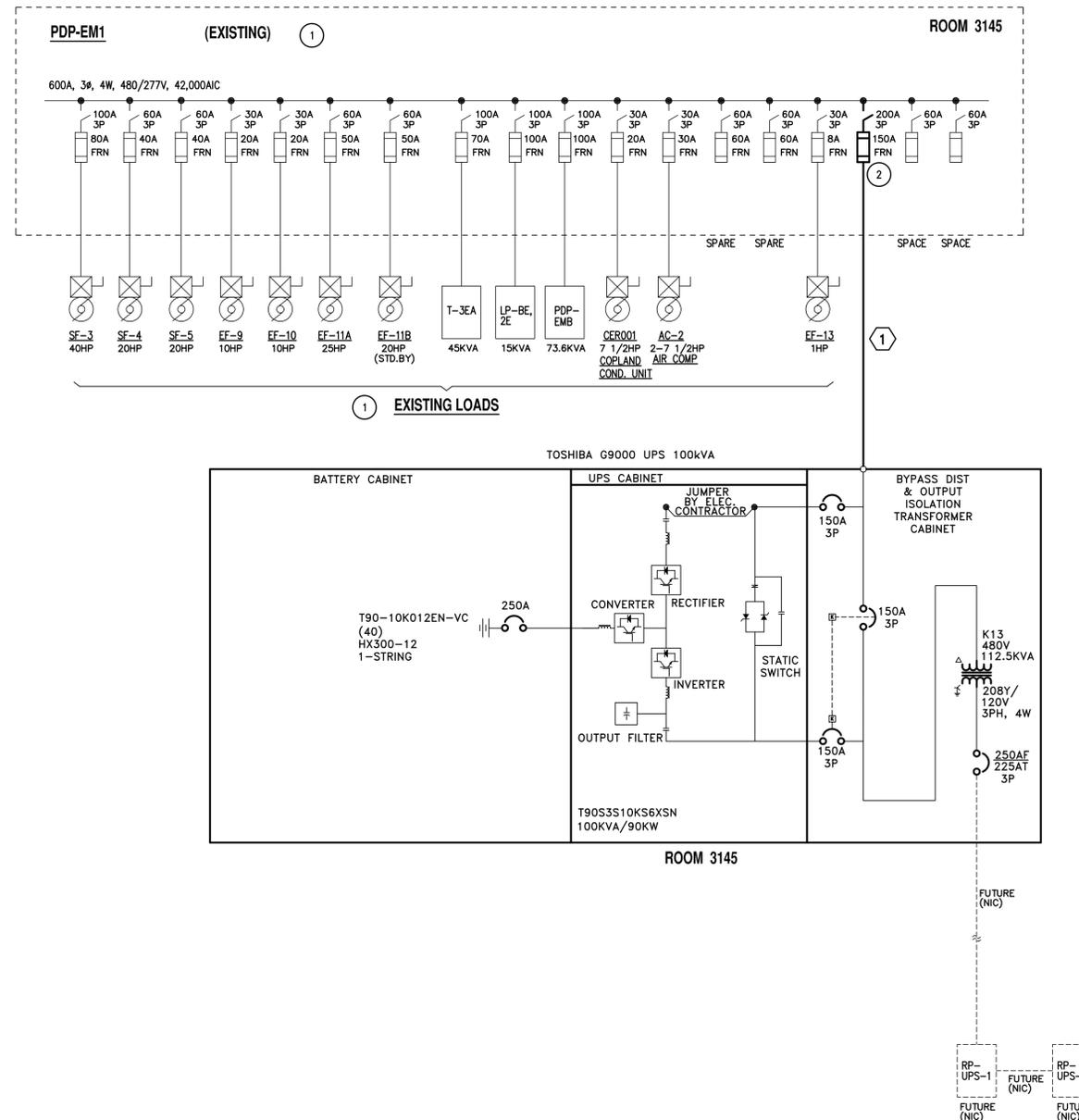
- A. UNLESS OTHERWISE NOTED, EXISTING PANEL, EQUIPMENT, AND FEEDER SHOWN LIGHT LINE WEIGHT ARE EXISTING. NEW UPS WORK SHOWN ON THIS SHEET HEAVY LINE WEIGHT.
- B. FUTURE PANELS AND FEEDERS SHOWN ON THIS SHEET LIGHT LINE WEIGHT DASHED WILL BE BY OTHERS (NIC).

**KEYED NOTES:**

- ① EXISTING EQUIPMENT, FEEDER, OR DEVICE.
- ② FIELD VERIFY EXISTING POWER DISTRIBUTION PANEL (PDP-EM1). PROVIDE INDICATED SWITCH AND FUSE IN EXISTING SPACE TO MATCH EXISTING.

**FEEDER & BRANCH CIRCUIT SIZES:**

- ① 1-SET [3-#2/0 & 1-#6 G, 2°C]



**UPS POWER ONELINE DIAGRAM**



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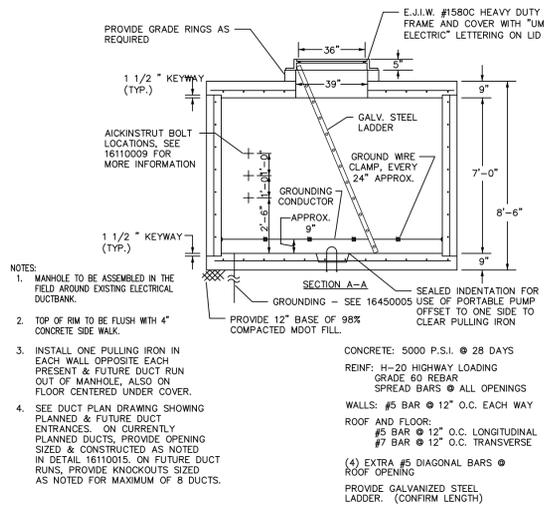
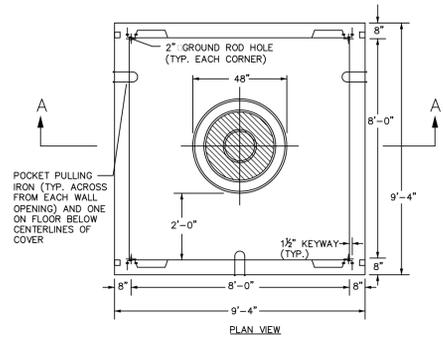
**ELECTRICAL DETAILS**

DATE: 11-03-14 8:00  
 ISSUED FOR:

DRAWN H.G.  
 CHECKED H.G.  
 APPROVED H.G.

MEP PROJECT NO.  
**1415-4**

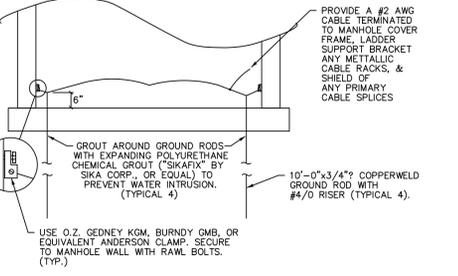
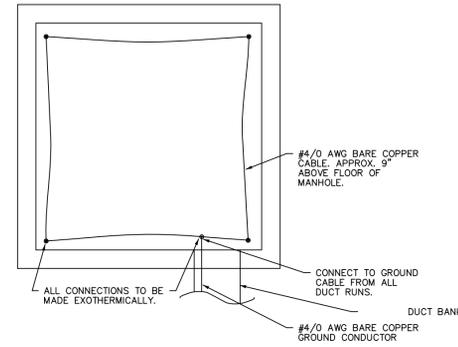
SHEET NO.  
**E6-10**



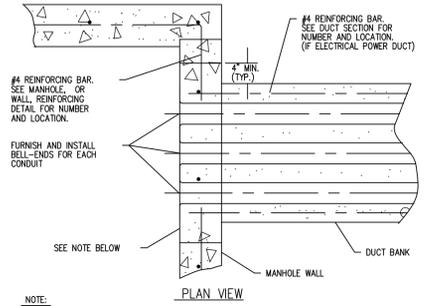
CONCRETE: 5000 P.S.I. @ 28 DAYS  
 REINF: H-20 HIGHWAY LOADING  
 GRADE 60 REBAR  
 SPREAD BARS @ ALL OPENINGS  
 WALLS: #5 BAR @ 12" O.C. EACH WAY  
 ROOF AND FLOOR:  
 #5 BAR @ 12" O.C. LONGITUDINAL  
 #7 BAR @ 12" O.C. TRANSVERSE  
 (4) EXTRA #5 DIAGONAL BARS @ ROOF DRAINING  
 PROVIDE GALVANIZED STEEL LADDER. (CONFIRM LENGTH)

- NOTES:  
 1. MANHOLE TO BE ASSEMBLED IN THE FIELD AROUND EXISTING ELECTRICAL DUCTBANK.  
 2. TOP OF RIM TO BE FLUSH WITH 4" CONCRETE SIDE WALK.  
 3. INSTALL ONE PULLING IRON IN EACH WALL OPPOSITE EACH PRESENT & FUTURE DUCT RUN OUT OF MANHOLE. ALSO ON FLOOR CENTERED UNDER COVER.  
 4. SEE DUCT PLAN DRAWING SHOWING PLANNED & FUTURE DUCT ENTRANCES. ON CURRENTLY PLANNED DUCTS, PROVIDE OPENING SIZED & CONSTRUCTED AS NOTED IN DETAIL 16110015. ON FUTURE DUCT RUNS, PROVIDE KNOCKOUTS SIZED AS NOTED FOR MAXIMUM OF 8 DUCTS.

**1 8'x8' SECTIONAL CONCRETE MANHOLE**  
 SCALE: NONE

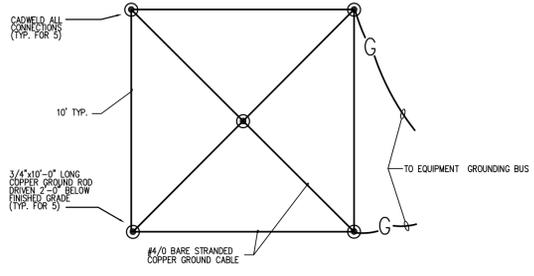


**2 ELECTRICAL MANHOLE GROUNDING WITH AICKINSTRUT RACKS**  
 SCALE: NONE

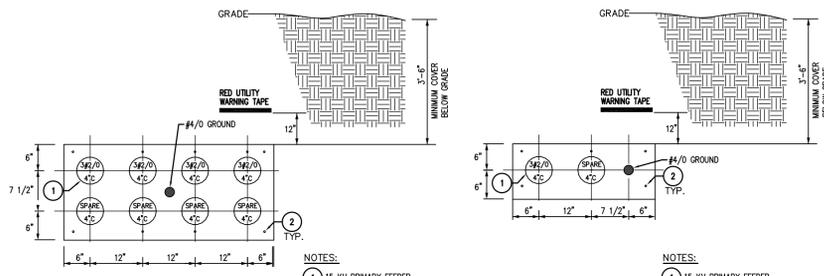


NOTE:  
 DUCTS ENTERING MANHOLES/VAULTS SHALL BE CONSTRUCTED AS INTEGRAL PARTS OF THE WALL LEAVE AN OVERSIZE (ABOUT 4" ALL AROUND) OPENING INTO WALL TO RECEIVE DUCT. PROJECT WALL REINFORCING INTO/TROUGH THE DUCTS CROSS SECTION WITHOUT TOUCHING THE CONDUIT'S SURFACES.

**3 DUCT REINFORCING AT MANHOLES, VAULTS, BUILDINGS**  
 SCALE: NONE

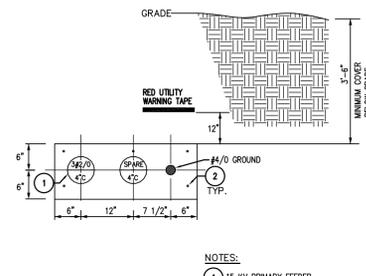


**4 GROUND MAT DETAIL**  
 SCALE: NONE



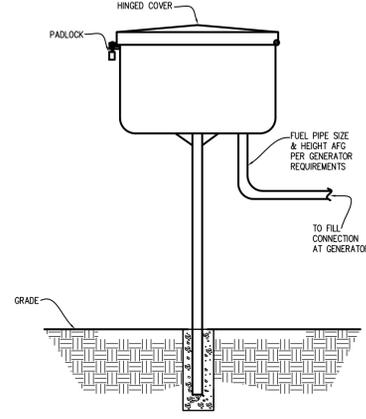
NOTES:  
 1 15 KV PRIMARY FEEDER.  
 2 #4 REINFORCED BARS IN DUCT RUN.

**5a 8-4"C PRIMARY POWER DUCT BANK**  
 SCALE: NONE



NOTES:  
 1 15 KV PRIMARY FEEDER.  
 2 #4 REINFORCED BARS IN DUCT RUN.

**5b 2-4"C PRIMARY POWER DUCT BANK**  
 SCALE: NONE

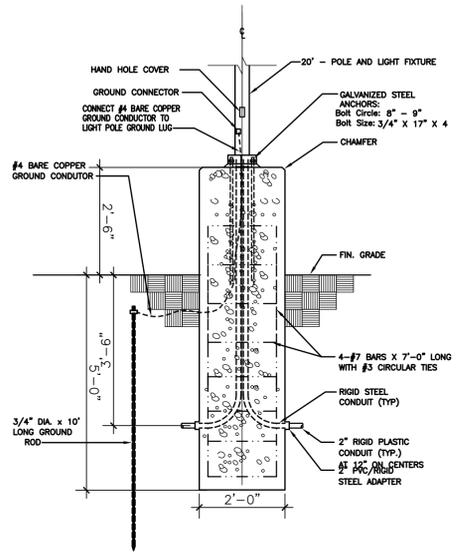


**6a REMOTE FUEL FILL STATION DETAIL**  
 SCALE: NONE



NOTE:  
 PROVIDE REMOTE FILL STATION, LOCKABLE, FREE STANDING ON PIPE SUPPORT, WITH CAPACITY AND SHAPE SIMILAR TO TYPICAL WSU WALL MOUNTED TYPE SHOWN IN PHOTO

**6b TYPICAL WSU REMOTE FUEL FILL STATION**  
 SCALE: NONE



**7 POLE BASE FOUNDATION DETAIL**  
 SCALE: NONE



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**ELECTRICAL DETAILS**

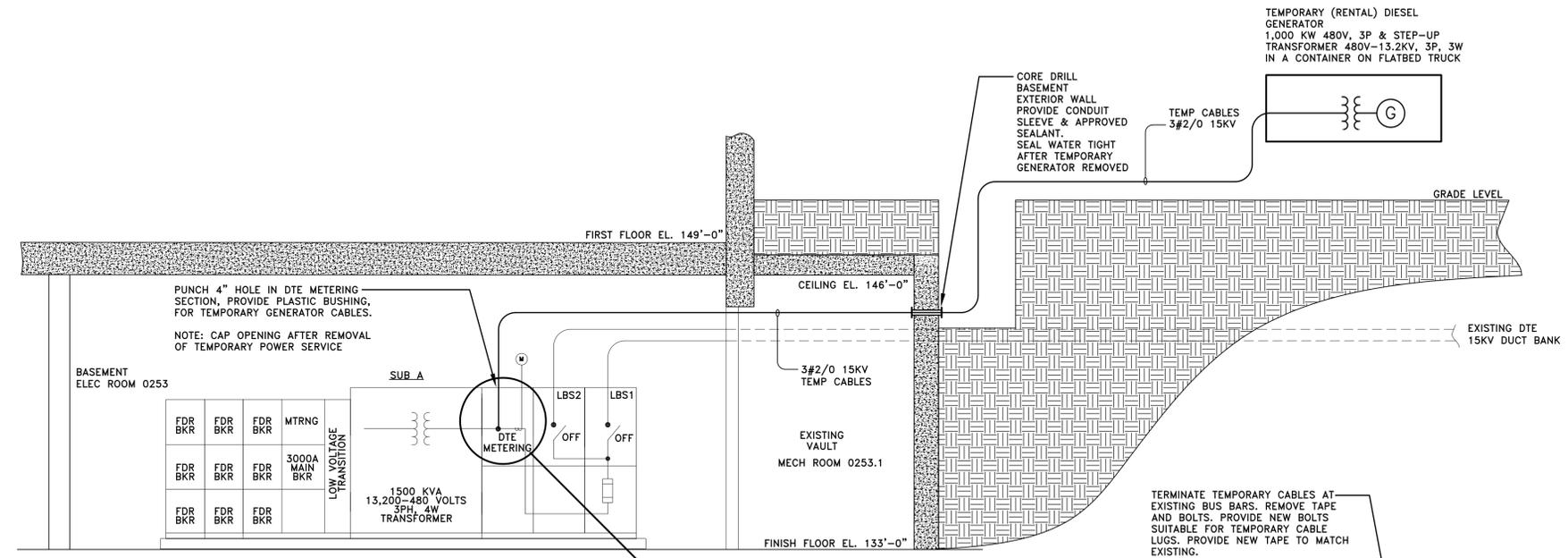
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 APPROVED H.G.

MEP PROJECT NO.

**1415-4**

SHEET NO.

**E6-11**



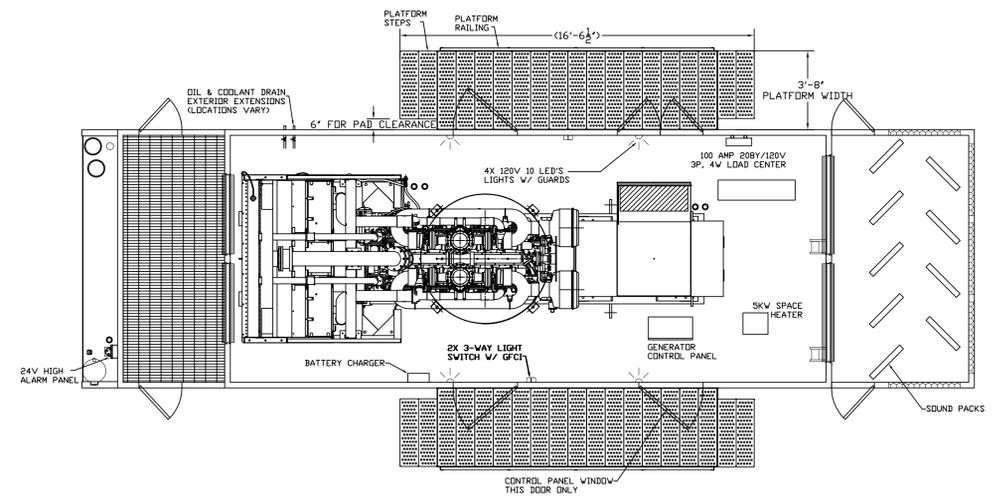
**1a 1,000 KW TEMPORARY GENERATOR CABLES ROUTING DETAIL**  
 SCALE: NONE



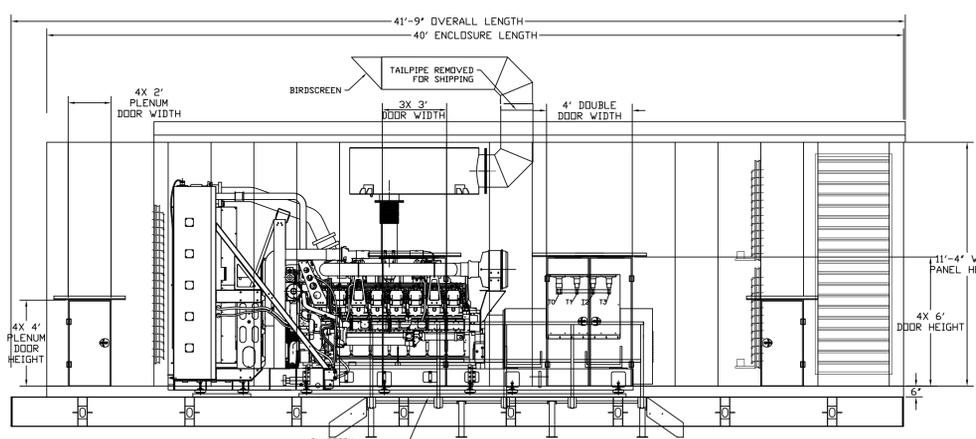
**1b DTE ENERGY METERING SECTION**  
 SCALE: NONE



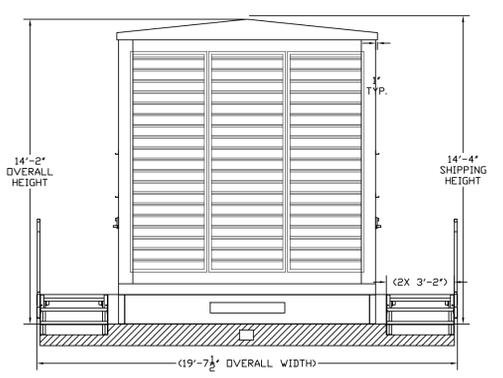
**1c DTE METERING SECTION TEMPORARY CABLES TERMINATION LOCATION**  
 SCALE: NONE



**2a 2,000 KW DIESEL GENERATOR-TYPICAL LAYOUT**  
 SCALE: NONE



**2b 2,000 KW DIESEL GENERATOR - TYPICAL NORTH ELEVATION**  
 SCALE: NONE



**2c 2,000 KW DIESEL GEN-TYPICAL SIDE ELEVATION**  
 SCALE: NONE

Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
TCP 14	1	567-352	SIEMENS	567-352	#3 PNEU PANEL 24X24X9
Panel Mounted Devices					
AD 1	1	AD-2001	UNITED SECURITY	AD-2001	AUTO VOICE/PAGER DIALER
	1	AC-2P	UNITED SECURITY		AC/DC ADAPTER 12V W/PLUG
	1	IR-1	UNITED SECURITY		ISOLATION RELAY
	1	PP-1	UNITED SECURITY		POWER PACK FOR AVD
PS 1	1	SLS-12-017T	EMERSON		POWER SUPPLY, 120V, 12-15VDC, DIN RAIL
PTES 1	3	9001KR1U	SQUARE D		PUSH BUTTON, MOMENTARY, 30MM, 7 COLOR
		9001KA2	SQUARE D		CONTACT BLOCK 30MM N.O. 10A
RE 1	1	5YR26	DAYTON		RELAY,GP 4PDT, 12VDC 3A W/LED
		2A584	DAYTON		SOCKET-4P, SQUARE, 14 PIN
RE 2	1	5YR26	DAYTON		RELAY,GP 4PDT, 12VDC 3A W/LED
		2A584	DAYTON		SOCKET-4P, SQUARE, 14 PIN
RE 3	1	5YR26	DAYTON		RELAY,GP 4PDT, 12VDC 3A W/LED
		2A584	DAYTON		SOCKET-4P, SQUARE, 14 PIN
SB 1	1	4A238	RACO		UTILITY BOX 4"X2.125"X1.875"
		52835	HUBBELL		DUPLEX RECEPTACLE 20A, 125VAC
		4A241	RACO		DUPLEX RECEPTACLE COVER PLATE
UPS 1	1	PW5125 1500	POWERWARE	PW51251500	UPS, 1500VA, 1050 WATTS
		1FD93	CCI		POWER SUPPLY CORDS 12/3, 8 FT

SEQUENCE OF OPERATIONS FOR TESTING GENERATOR CONDITIONS MONITORED VIA THE SIEMENS APOGEE SYSTEM.

TESTING WILL PROVIDE GENERATOR "RUN" ALARM, "FAULT" ALARM, FUEL "RUPTURE" ALARM, FUEL "50%" ALARM, FUEL "80%" ALARM. EACH ALARM ONCE TRIGGERED WILL PROVIDE A SIEMENS RENO PAGING ALARM AND GRAPHICAL COMMAND CENTER ALARM.

ADDITIONALLY, THE FUEL DIALER SYSTEM AND PHONE LINE WILL ALSO BE TESTED AND VERIFIED FOR PROPER OPERATION.

TEST #1: NORMAL RUNNING ALARM

START AND RUN GENERATOR FOR NORMAL MONTHLY TESTING. ONCE GENERATOR STARTED, GENERATOR INTERLOCK RELAY PROVIDES SIEMENS RENO PAGING AND GRAPHIC ALARMS AS SHOWN. "GENERATOR RUN STATUS = ON" AND "GENERATOR RUN STATUS = OFF"

TEST #2: ALARM FAULT TEST

GENERATOR OFF AND PANEL SELECTOR SWITCH IN "AUTO". MOVE SELECTOR SWITCH TO "MANUAL RUN", (DELAY OCCURS THEN GENERATOR STARTS) NOW PUSH IN RED STOP BUTTON. THIS WILL FORCE GENERATOR INTO AN ALARM CONDITION. GENERATOR INTERLOCK RELAY PROVIDES SIEMENS RENO PAGING AND GRAPHIC ALARMS AS SHOWN. TO RESET ALARM, PULL OUT RED STOP BUTTON, SWITCH SELECTOR SWITCH TO "AUTO". NOTE THAT GENERATOR SELECTOR SWITCH SHOULD ALWAYS BE IN THE "AUTO" POSITION. "GENERATOR ALARM = ALARM" AND "GENERATOR ALARM = NORMAL"

TEST #3: TANK RUPTURE ALARM

PRESS AND HOLD THE MOMENTARY WALL MOUNTED "RUPTURE" PUSH BUTTON (PB). GENERATOR INTERLOCK RELAY PROVIDES SIEMENS RENO PAGING AND GRAPHIC ALARMS AS SHOWN. NOTE THAT THE RENO ALARM SHOULD BE BROADCASTED WITHIN 1 MINUTE. RELEASE PB ONCE COMPLETED. "FUEL TANK RUPTURE = ON" AND "FUEL TANK RUPTURE = OFF"

TEST #4: 50% FUEL LEVEL ALARM

FUEL LEVEL 50% TEST ACTIVATES BOTH THE LOCAL PHONE DIALER AND SIEMENS SYSTEM. CONTACT FUEL SUPPLY COMPANY REPRESENTATIVE (SEE ANALOG PHONE DIALER INFORMATION). INFORM FUEL SUPPLY COMPANY REPRESENTATIVE THAT THEY WILL RECEIVE A 50% FUEL CALL OUT FROM THE RESPECTIVE BUILDING. FUEL SUPPLY COMPANY REPRESENTATIVE WILL BE STANDING BY AND WILL NEED TO CALL BACK THE WSU ONSITE PERSON ONCE EACH ALARM HAS BEEN RECEIVED. TEST PROCEDURE AS FOLLOWS: PRESS AND HOLD THE MOMENTARY WALL MOUNTED "50% TEST" PUSH BUTTON (PB). GENERATOR INTERLOCK RELAY PROVIDES PHONE DIALER, SIEMENS RENO PAGING AND GRAPHIC ALARMS AS FOLLOWS: NOTE THAT ALARM SHOULD BE BROADCASTED WITHIN 1 MINUTE. CONTINUE TO HOLD PB UNTIL FUEL SUPPLY COMPANY REPRESENTATIVE RECEIVES, ACCEPTS AND THEN RETURNS THEIR CONFIRMATION CALL THAT PHONE DIALER WAS RECEIVED. PHONE MESSAGE READS... WSU RESPECTIVE BUILDING GENERATOR STARTED, DELIVER FUEL WITHIN 4 HOURS. "50% FUEL LEVEL = ALARM" AND "50% FUEL LEVEL = NORMAL" NOTE: 2 MINUTE DELAY BEFORE RETURN TO NORMAL ON RENO ALARM.

TEST #5: 80% FUEL LEVEL ALARM

FUEL LEVEL 80% TEST ACTIVATES BOTH THE LOCAL PHONE DIALER AND SIEMENS SYSTEM. CONTACT FUEL SUPPLY COMPANY REPRESENTATIVE (SEE ANALOG PHONE DIALER INFORMATION). INFORM FUEL SUPPLY COMPANY REPRESENTATIVE THAT THEY WILL BE RECEIVING A 80% FUEL CALL OUT FROM THE RESPECTIVE BUILDING. FUEL SUPPLY COMPANY REPRESENTATIVE WILL BE STANDING BY AND WILL NEED TO CALL BACK THE WSU ONSITE PERSON ONCE EACH ALARM HAS BEEN RECEIVED. TEST PROCEDURE AS FOLLOWS: PRESS AND HOLD THE MOMENTARY WALL MOUNTED "80% TEST" PUSH BUTTON (PB). GENERATOR INTERLOCK RELAY PROVIDES PHONE DIALER, SIEMENS RENO PAGING AND GRAPHIC ALARMS AS FOLLOWS: NOTE THAT ALARM SHOULD BE BROADCASTED WITHIN 1 MINUTE. CONTINUE TO HOLD PB UNTIL FUEL SUPPLY COMPANY REPRESENTATIVE RECEIVES, ACCEPTS AND THEN RETURNS HIS CONFIRMATION CALL THAT PHONE DIALER WAS RECEIVED. PHONE MESSAGE READS... WSU RESPECTIVE BUILDING GENERATOR FUEL LEVEL LOW, DELIVER FUEL IMMEDIATELY. "80% FUEL LEVEL = ALARM" AND "80% FUEL LEVEL = NORMAL" NOTE: 2 MINUTE DELAY BEFORE RETURN TO NORMAL ON RENO ALARM.

DDC MONITORING POINTS PER GENERATOR:

GENERATOR RUN DIGITAL INPUT VIA DRY CONTACT  
GENERATOR FAULT DIGITAL INPUT VIA DRY CONTACT

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WSU Elliman Generator

Detroit, MI **FOR REFERENCE ONLY**

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
SFM	TAJ		08/07/14	09/03/14

GENERATOR/FUEL OIL CONTROL

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**001**

BATTERY CHARGER FAULT      DIGITAL INPUT VIA DRY CONTACT

DDC MONITORING POINTS FOR FUEL STORAGE TANK:

FUEL LEVEL 80%      DIGITAL INPUT VIA DRY CONTACT  
FUEL LEVEL 50%      DIGITAL INPUT VIA DRY CONTACT  
TANK RUPTURE ALARM      DIGITAL INPUT VIA DRY CONTACT  
LOW DETECTION ALARM      DIGITAL INPUT VIA DRY CONTACT  
TANK LEVEL      ANALOG INPUT VIA 4-20MA SIGNAL

RENO – REMOTE ENUNCIATION THRU APOGEE

SET UP RENO GROUP FOR GENERATORS. "(RESPECTIVE BUILDING) GENERATOR"

1. SUPERVISOR PAGE (COMMAND CENTRAL)
2. OWNER DEFINED
3. OWNER DEFINED
4. OWNER DEFINED

DEFINE THE FOLLOWING POINTS FOR RENO

GENERATOR RUN – "GEN # IS RUNNING" (USE RUNNING AND OFF AS CHANGE OF STATES)  
RETURN TO NORMAL – "GEN # IS OFF"

GENERATOR ALARM – "GEN # FAILED TO START"

LOW FUEL LEVEL (DAY TANK) – "GEN # (ARE DAY TANKS NUMBERED)"

50% FUEL LEVEL – "FUEL TANK 50% ALARM"

80% FUEL LEVEL – "FUEL TANK 80% ALARM"

NO ATS POINTS DEFINED FOR RENO

ANALOG PHONE DIALER INFORMATION

THE FOLLOWING FOUR NUMBERS TO BE PROGRAMMED INTO THE "DIALER" PANEL

1. ATLAS OIL COMPANY (FUEL DELIVERY) 800-878-2000
2. KATIE WELLMAN (ACCOUNT REPRESENTATIVE)-(OFFICE) 313-662-3621  
(CELL) 313-932-6893
3. WSU SUPERVISOR (COMMAND CENTER) 313-577-4844
4. WSU PUBLIC SAFETY (NON-EMERGENCY) 313-577-2224

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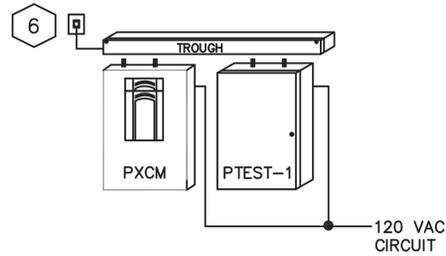
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**GENERATOR/FUEL OIL CONTROL**

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**PANEL INSTALLATION NOTES:**

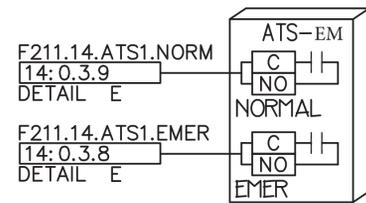
- \*DDC PANELS PROVIDED BY SIEMENS.
- \*TROUGH PROVIDED BY INSTALLING ELECTRICAL CONTRACTOR.
- \*120VAC CIRCUITS PROVIDED BY DIV. 16 ELECTRICAL
- \*SEE JOB DOCUMENTS FOR CIRCUIT LOCATIONS AND NUMBERS.
- \*120VAC SHALL BE WIRE INTO THE PANELS WITHOUT RUNNING IN THE WIRING TROUGH.
- \*HIGH VOLTAGE & LOW VOLTAGE CABLE SHALL NOT MIX IN WIRING TROUGH.
- \*DDC PANELS TO BE MOUNTED AND TERMINATED BY INSTALLING ELECTRICAL CONTRACTOR.
- \*INSTALLING ELECTRICAL CONTRACTOR TO PROVIDE MINIMUM OF (2) 1" NIPPLES BETWEEN EACH PANEL AND TROUGH.
- \*REFER TO ALTRM DRAWING FOR WIRING TAGGING REQUIREMENTS.
- \*USE ONLY SIEMENS APPROVED WIRING.



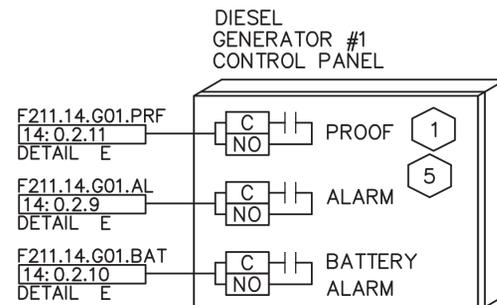
**INSTALLATION NOTES:**

- 1 ALL CONTACTS PROVIDED BY EQUIPMENT VENDORS ARE TO DRY.
- 2 NEW 120 VAC POWER FROM EMERGENCY POWER PANEL PROVIDED BY INSTALLING ELECTRICAL CONTRACTOR.
- 3 NEW DEDICATED PHONE LINE TO BE PROVIDED BY INSTALLING ELECTRICAL CONTRACTOR.
- 4 FUEL OIL STORAGE TANK TO BE PROVIDED WITH AN ANALOG LEVEL SENSOR TO REPORT TO DDC SYSTEM.
- 5 ALL TERMINATION PENDING VENDOR EQUIPMENT SUBMITTALS.
- 6 ETHERNET DROP BY OTHERS.

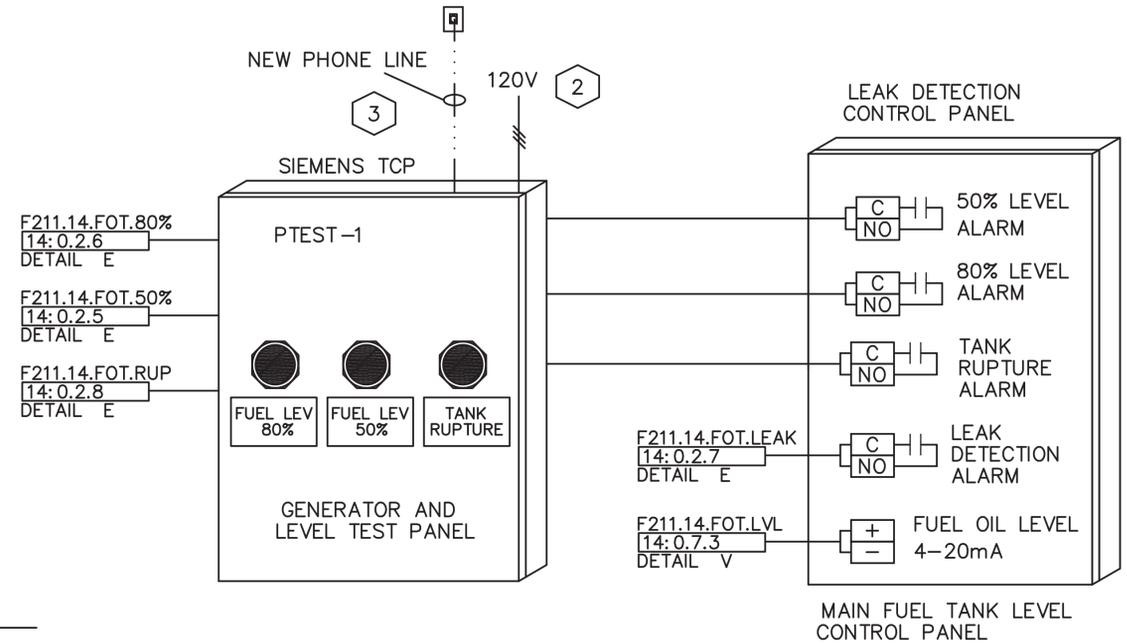
	IP ADDRESS	SUBNET MASK	GATEWAY
PXCM-X	XX.X.X.XX	XXX.XXX.XXX.X	XX.X.X.X



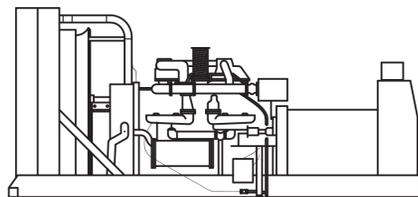
1  
001B  
ATS



2  
001B  
GENERATOR MONITORING



3  
001B  
FUEL OIL STRG. TANK MONITORING



4  
001B  
DIESEL GENERATOR MONITORING

COORDINATE FINAL EQUIPMENT TERMINATIONS WITH GENERATOR & FUEL OIL VENDOR.

**Reference Only**

This drawing is for reference only. This drawing must be used only to add additional detail to what is being provided by the engineer of record. Not all terminations, wire pulls or interlocks are shown in these diagrams as this will be dependent on the equipment purchased by others. Once equipment submittals are secured, the final drawings will reflect all work necessary to provide a full and functioning control system as outline in the plans and spec. It is the bidders responsibly to review all contract documents provided by engineer of record to ensure that a complete scope is bid. Quantity of items and location of devices/panels that are not clearly spelled out in the drawings must be field verified to ensure that the project is properly bid. It is assumed that the bidder of the temperature controls electrical installation is knowledgeable in such work and requires minimal guidance. Siemens assumes no responsibility or risk for bidders not fully understanding the scope or extend of the work required.

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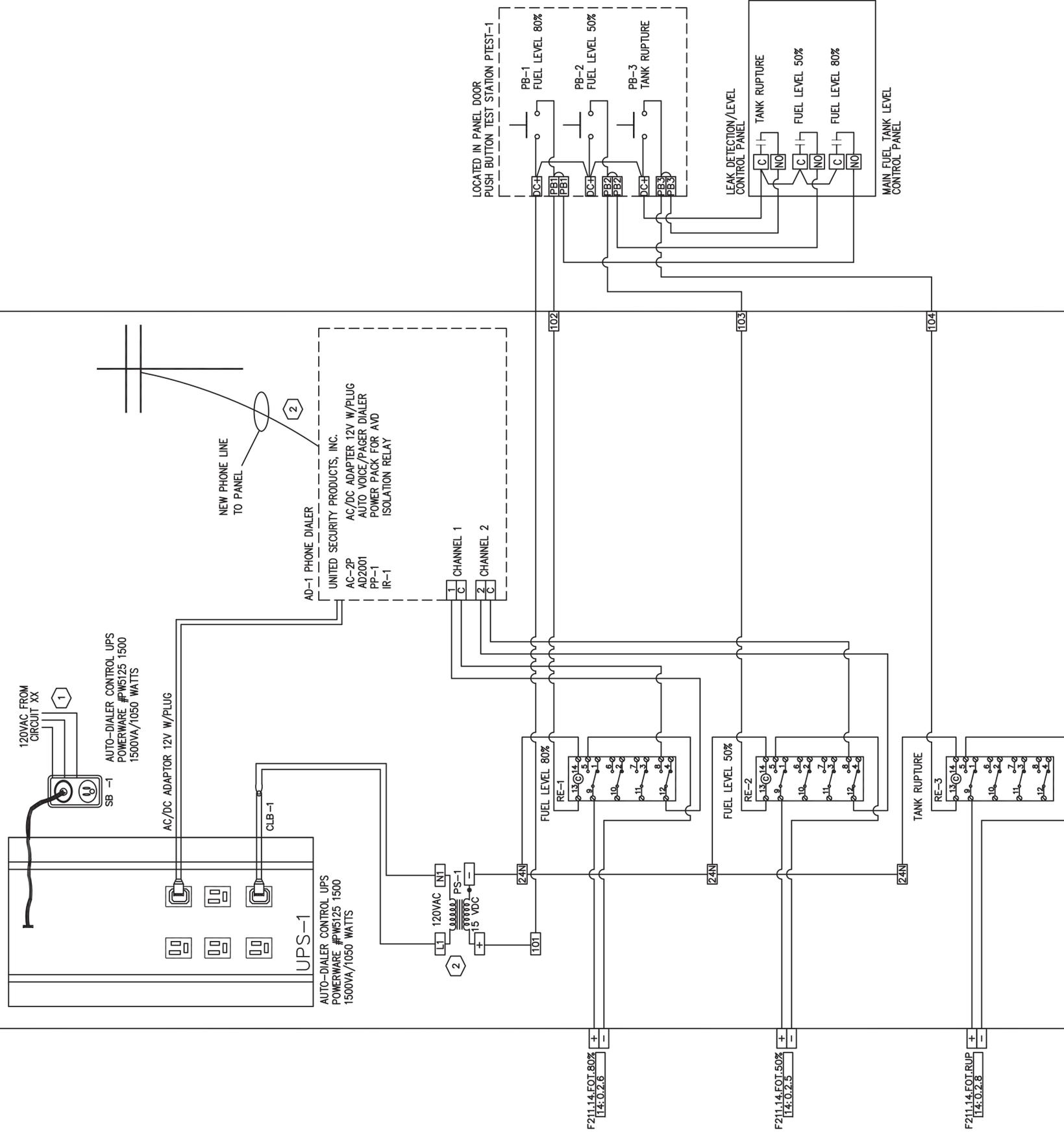
**GENERATOR/FUEL OIL CONTROL**

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**001B**

FIELD PANEL PXCM-XX

TEMPERATURE CONTROL PANEL TCP-XX

FIELD WIRING



**Reference Only**

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**INSTALLATION NOTES:**

- 1 120VAC POWER CIRCUIT NUMBER TO BE VERIFIED.
- 2 PROVIDE DEDICATED PHONE LINE FOR DIAL-OUT TO FUEL DELIVERY SYSTEM.
- 3 ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1 FUEL OIL DELIVERY TEST SYSTEM  
001C

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LAST EDIT DATE 09/03/14  
**GENERATOR ELECTRICAL DIAGRAM**

001C