

CITY OF ANN ARBOR

# FIRE STATION No.1 GENERATOR REPLACEMENT

111 N. 5TH AVE.

ANN ARBOR, MICHIGAN 48104



**DICLEMENTE SIEGEL DESIGN INC.**

28105 GREENFIELD ROAD  
SOUTHFIELD, MICHIGAN 48076-3046

ENGINEERING AND ARCHITECTURE



**DESAI NASR**

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WEST BLOOMFIELD, MI 48322-4585

DNCE PROJECT No. 9550-03

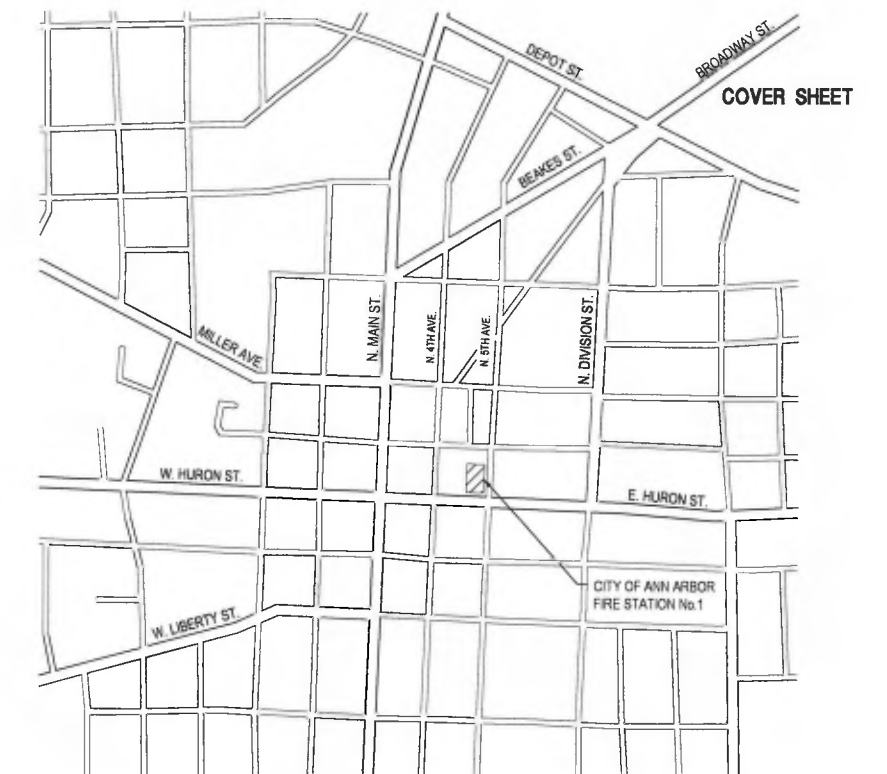
STRUCTURAL SHEET INDEX	
SHEET	DESCRIPTION
S-1	GEN. STRUCTURAL NOTES AND SPECIAL INSPECTION SCHEDULES
S-2	PARTIAL ROOF FRAMING PLAN AND DETAILS

MECHANICAL SHEET INDEX	
SHEET	DESCRIPTION
M-1	MECHANICAL GENERAL INFORMATION AND SPECIFICATIONS
M-2	PARTIAL FLOOR PLANS - MECHANICAL
M-3	PARTIAL FLOOR PLANS - MECHANICAL
M-4	MECHANICAL DETAILS

ELECTRICAL SHEET INDEX	
SHEET	DESCRIPTION
E-1	ELECTRICAL GENERAL INFORMATION & ONE-LINE DIAGRAM
E-2	ELECTRICAL PLANS - DEMOLITION
E-3	ELECTRICAL PLANS - NEW WORK
E-4	DIAGRAMS & DETAILS
E-5	ELECTRICAL SPECIFICATIONS
E-6	ELECTRICAL SPECIFICATIONS



LOCATION MAP  
NOT TO SCALE

SHEET:  
ACAD FILE  
ISSUED FOR  
DATE:

G-1  
17:3046-1  
BBS  
10/2/17

**SPECIAL INSPECTION REQUIREMENTS - STRUCTURAL STEEL**

INSPECTION TASK	INSPECTION FREQUENCY		REFERENCED STANDARD	IBC REFERENCE	RESPONSIBLE AGENT
	CONTINUOUS	PERIODIC			
<b>INSPECTION OF BOLTING</b>					
1. INSPECTION TASKS PRIOR TO BOLTING:					
A. MANUFACTURER'S CERTIFICATIONS AVAILABLE FOR FASTENER MATERIALS.	O	P	AISC 360, SECTION N5, TABLE N5.6-1	1705.2	SVTA
B. FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS.	O	O			
C. PROPER FASTENERS SELECTED FOR THE JOINT DETAIL (GRADE, TYPE, BOLT LENGTH IF THREADS ARE TO BE EXCLUDED FROM SHEAR PLANE).	O	O			
D. PROPER BOLTING PROCEDURE SELECTED FOR JOINT DETAIL.	O	O			
E. CONNECTING ELEMENTS, INCLUDING THE APPROPRIATE PAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS.	O	O			
F. PRE-INSTALLATION VERIFICATION TESTING BY INSTALLATION PERSONNEL OBSERVED AND DOCUMENTED FOR FASTENER ASSEMBLIES AND METHODS USED.	P	O			
G. PROPER STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS AND OTHER FASTENER COMPONENTS.	O	O			
2. INSPECTION TASKS DURING BOLTING:					
A. FASTENER ASSEMBLIES, OF SUITABLE CONDITION, PLACED IN ALL HOLES AND WASHERS (IF REQUIRED) ARE POSITIONED AS REQUIRED.	O	O	AISC 360, SECTION N5, TABLE N5.6-2	1705.2	SVTA
B. JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRE-TENSIONING OPERATION.	O	O			
C. FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTING FROM ROTATING.	O	O			
D. FASTENERS ARE PRE-TENSIONED IN ACCORDANCE WITH THE RCSC SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES.	O	O			
3. INSPECTION TASKS AFTER BOLTING:					
A. DOCUMENT ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS.	P	P	AISC 360, SECTION N5, TABLE N5.6-3	1705.2	SVTA
O: OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS. P: PERFORM THESE TASKS FOR EACH BOLTED CONNECTION.					
<b>INSPECTION OF WELDING:</b>					
1. INSPECTION TASKS PRIOR TO WELDING:					
A. WELDING PROCEDURE SPECIFICATIONS (WPSs) AVAILABLE.	P	P	AISC 360, SECTION N5, TABLE N5.4-1	1705.2	SVTA
B. MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE.	P	P			
C. MATERIAL IDENTIFICATION (TYPE/GRADE).	O	O			
D. WELDER IDENTIFICATION SIGNING.	O	O			
E. FIT-UP OF GROOVE WELDS (INCLUDING JOINT GEOMETRY): - JOINT PREPARATION. - DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL). - CLEANLINESS (CONDITION OF STEEL SURFACES). - TACKING (TACK WELD QUALITY AND LOCATION). - BACKING TYPE AND FIT (IF AVAILABLE).	O	O			
F. CONFIGURATION OF FINISH AND ACCESS HOLES.	O	O			
G. FIT-UP OF FILLET WELDS: - DIMENSIONS (ALIGNMENT, GAPS AT ROOT). - CLEANLINESS (CONDITION OF STEEL SURFACES). - TACKING (TACK WELD QUALITY AND LOCATION).	O	O			
H. CHECK WELDING EQUIPMENT.	O				
2. INSPECTION TASKS DURING WELDING:					
A. USE OF QUALIFIED WELDERS.	O	O	AISC 360, SECTION N5, TABLE N5.4-2	1705.2	SVTA
B. CONTROL AND HANDLING OF WELDING CONSUMABLES: - PACKAGING. - EXPOSURE CONTROL.	O	O			
C. NO WELDING OVER CRACKED TACK WELDS.	O	O			
D. WPS FOLLOWED: - SETTINGS ON WELDING EQUIPMENT. - TRAVEL SPEED. - SELECTED WELDING MATERIALS. - SHIELDING GAS TYPE/FLOW RATE. - PREHEAT APPLIED. - INTERPASS TEMPERATURE MAINTAINED (MIN/MAX). - PROPER POSITION (F, V, H, OH).	O	O			
E. WELDING TECHNIQUES: - INTERPASS AND FINAL CLEANING. - EACH PASS WITHIN PROFILE LIMITATIONS. - EACH PASS MEETS QUALITY REQUIREMENTS.	O	O			
3. INSPECTION TASKS AFTER WELDING:					
A. WELDS CLEANED.	O	O	AISC 360, SECTION N5, TABLE N5.4-3	1705.2	SVTA
B. SIZE, LENGTH AND LOCATION OF WELDS.	P	P			
C. WELDS MEET VISUAL ACCEPTANCE CRITERIA: - CRACK PROHIBITION. - WELD-BASE-METAL FUSION. - CRATER CROSS SECTION. - WELD PROFILES. - WELD SIZE. - UNDERCUT. - POROSITY.	P	P			
D. ARC STRIKES.	P	P			
E. K-AREA.	P	P			
F. BACKING REMOVED AND WELD TABS REMOVED (IF REQUIRED).	P	P			
G. REPAIR ACTIVITY.	P	P			
H. DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT OR MEMBER.	P	P			
O: OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS. P: PERFORM THESE TASKS FOR EACH WELDED JOINT OR MEMBER.					

**GENERAL STRUCTURAL NOTES**

- THE STRUCTURAL NOTES ARE INTENDED TO AUGMENT THE DRAWINGS AND SPECIFICATIONS. SHOULD CONFLICTS EXIST BETWEEN THE DRAWINGS, SPECIFICATIONS AND THE STRUCTURAL NOTES, THE STRICTEST PROVISION SHALL GOVERN.
  - THE STRUCTURAL DRAWINGS FORM AN INTEGRAL PART OF CONTRACT DOCUMENTS, WHICH INCLUDE ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, CIVIL/SITE DRAWINGS AND SPECIFICATIONS. COORDINATE THE STRUCTURAL DRAWINGS WITH THE REQUIREMENTS SHOWN IN THE OTHER COMPONENTS OF THE CONTRACT DOCUMENTS.
  - TYPICAL DETAILS AND OTHER SECTIONS/DETAILS APPLY TO CONDITIONS THAT ARE SIMILAR TO THE CONDITIONS DESCRIBED IN THE SECTIONS/DETAILS, EVEN IF THEY ARE NOT SPECIFICALLY REFERENCED ON THE PLANS.
  - THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEANS, METHODS, SEQUENCES AND PROCEDURES OF CONSTRUCTION.
  - 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 DOES NOT PREVENT THE CONTRACTOR FROM MAKING CHANGES TO THE DRAWINGS MAY BE MODIFIED BECAUSE THEY ARE MORE STRINGENT THAN THE CODE REQUIREMENTS OR BECAUSE THEY ARE NOT SPECIFICALLY REQUIRED BY CODE.
  - GOVERNING BUILDING CODE - MICHIGAN BUILDING CODE 2015. STANDARDS LISTED IN STRUCTURAL NOTE SECTIONS REFER TO THE VERSION AND EFFECTIVE DATE IDENTIFIED IN THE REFERENCED STANDARDS CHAPTER IN THE GOVERNING BUILDING CODE.
  - WORK CONSTRUCTED PER THESE DRAWINGS SHALL BE INSPECTED BY AN INDEPENDENT TESTING AGENCY RETAINED TO ENSURE COMPLIANCE WITH THE REQUIREMENTS SHOWN ON THE DRAWINGS. SPECIAL INSPECTIONS REQUIRED BY THE GOVERNING BUILDING CODE, LOCAL BUILDING DEPARTMENT AND THE CONTRACT DOCUMENTS SHALL BE PERFORMED BY A QUALIFIED SPECIAL INSPECTOR. PROJECT SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE OR REPLACE INSPECTION.
- SHOP DRAWINGS**
- SUBMIT SHOP DRAWINGS FOR REVIEW AS INDICATED IN MATERIAL SECTION OF GENERAL STRUCTURAL NOTES.
  - USE OF ENGINEERING DRAWINGS AS ERECTION DRAWINGS BY THE CONTRACTOR IS STRICTLY PROHIBITED.
  - REVIEW OF SHOP DRAWINGS AND OTHER SUBMITTALS BY THE STRUCTURAL ENGINEER DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO CHECK THE SHOP DRAWINGS PRIOR TO SUBMITTAL. ERRORS AND OMISSIONS ASSOCIATED WITH THE PREPARATION OF SHOP DRAWINGS NOT CONFORMING TO THE CONSTRUCTION DOCUMENTS ARE THE RESPONSIBILITY OF THE SHOP DRAWING PREPARER.
  - CONTRACTOR SHALL PROVIDE A SET OF APPROVED SHOP DRAWINGS BEARING THE REVIEW STAMP OF THE STRUCTURAL ENGINEER, TO THE LOCAL BUILDING DEPARTMENT AND TO THE PROJECT SITE.
  - 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 ELEVATOR OPENINGS, MECHANICAL EQUIPMENT SUPPORTS, ETC. PRIOR TO SUBMITTAL. SUCH DIMENSIONS SHALL BE PROVIDED ON THE SHOP DRAWINGS PRIOR TO SUBMITTAL TO THE STRUCTURAL ENGINEER. CONTRACTOR'S FAILURE TO PROVIDE SUCH DIMENSIONS ON SUBMITTED SHOP DRAWINGS WILL RESULT IN SHOP DRAWING RETURN WITHOUT REVIEW.

**EXISTING CONSTRUCTION**

- CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS.
- 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.
- THE ANALYSIS OF THE EXISTING STRUCTURE IS BASED UPON INFORMATION SHOWN ON ORIGINAL DRAWINGS BY ROBERT M. DARVAS ASSOCIATES CONSULTING STRUCTURAL ENGINEERS DATED JUNE 22, 1977.
- 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.
- 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.
- 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.
- CONTRACTOR SHALL PROVIDE FIRE WATCH DURING FIELD CUTTING AND WELDING OPERATIONS, MEETING THE OWNER'S REQUIREMENTS.
- CONTRACTOR SHALL PROVIDE TEMPORARY PROTECTION OF EXISTING EQUIPMENT DURING EXECUTION OF WORK, SATISFYING THE OWNER'S REQUIREMENTS.
- CONTRACTOR SHALL PROVIDE TEMPORARY PROTECTION TO PREVENT DAMAGE FROM THE WEATHER AND VANDALISM.
- CONTRACTOR SHALL COORDINATE WORK WITH THE OWNER'S PERSONNEL TO AVOID ANY INTERFERENCE IN THEIR OPERATIONS.

**STRUCTURAL STEEL**

- 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.
- STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING ASTM SPECIFICATIONS AND MINIMUM YIELD STRENGTH:  
MISCELLANEOUS SHAPES AND PLATES **A36**  $F_y = 36$  KSI
- STRUCTURAL STEEL BOLTING SHALL BE ASTM A325 TYPE N, 3/4" DIAMETER SNUG TIGHT EXCEPT WHERE OTHER SIZE, ASTM A490 N, PRE-TENSIONED OR SLIP-CRITICAL TYPE BOLTS ARE INDICATED.
- WELDING SHALL BE DONE WITH APPROPRIATE E70 SERIES ELECTRODES COMPATIBLE WITH THE NEW AND EXISTING STEEL WELDS AND WELDING PROCEDURES SHALL CONFORM TO, AND WELDERS SHALL BE QUALIFIED IN ACCORDANCE WITH, THE "STRUCTURAL WELDING CODE - STEEL" OF THE AMERICAN WELDING SOCIETY, ANS/AWS D1.1.
- 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.
- 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.
- 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.
- CONNECTIONS SHALL BE SHOP WELDED IN ACCORDANCE WITH LATEST AWS SPECIFICATIONS FOR E70XX ELECTRODES AND FIELD BOLTED WITH ASTM A325 OR ASTM A490 BOLTS.
- CONTRACTOR SHALL INSTALL A325 BOLTS IN ACCORDANCE WITH THE "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS." SNUG TIGHT CONDITION SHALL BE ACHIEVED USING AN IMPACT WRENCH, TO BRING THE CONNECTED PLIES INTO FIRM CONTACT, EXCEPT WHERE NOTED AS SLIP-CRITICAL, PRE-TENSIONED OR FINGER TIGHT.
- 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.
- STRUCTURAL STEEL TO REMAIN UNPAINTED EXCEPT FOR STEEL OUTSIDE THE CONDITIONED SPACE:
- 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. VISUALLY INSPECT THAT ALL BOLTED CONNECTIONS ARE MADE WITH PROPER FASTENER COMPONENTS, ARE FABRICATED PROPERLY AND THE BOLTED JOINT IS DRAWN INTO FIRM CONTACT.
- WELDING SHALL BE INSPECTED BY AN AWS CERTIFIED WELDING INSPECTOR (CWI).
- CONTRACTOR SHALL SCHEDULE WORK TO ALLOW THE ABOVE TESTING REQUIREMENTS TO BE COMPLETED.

**STATEMENT OF SPECIAL INSPECTIONS**

SPECIAL INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE 2015 MICHIGAN (INTERNATIONAL) BUILDING CODE CHAPTER 17 AND AS MODIFIED HEREIN.	
<b>DESIGNATIONS:</b>	
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 PROVIDING REPORTS.
TA	TESTING AGENCY QUALIFIED TO TEST AND INSPECT MATERIALS AND ASSEMBLIES. TESTING AGENCY SHALL BE UNDER THE SUPERVISION OF THE SPECIAL INSPECTOR.
GE	GEOTECHNICAL ENGINEER WHO PROVIDED THE ORIGINAL PROJECT GEOTECHNICAL SOILS INVESTIGATION REPORT.
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, GE AND SE SHALL SUBMIT RECORDS OF THE INSPECTION RESULTS TO THE SI. THE SI SHALL COMPLETE 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 FINAL REPORT WITH A SUMMARY OF ALL TESTS PERFORMED AND RESULTS TO THE ENGINEER OF RECORD AND BUILDING OFFICIAL, IN ACCORDANCE WITH SECTION 1704.2.4.
5	SI, TA & GE SHALL BE PAID BY THE OWNER IN COMPLIANCE WITH THE MICHIGAN (INTERNATIONAL) BUILDING CODE.
6	WHERE FABRICATION OF STRUCTURAL LOAD-BEARING OR LATERAL LOAD-RESISTING MEMBERS OR ASSEMBLIES IS BEING CONDUCTED ON THE PREMISES OF A FABRICATOR'S SHOP, SPECIAL INSPECTIONS OF THE FABRICATED ITEMS SHALL BE PERFORMED DURING FABRICATION. SPECIAL INSPECTIONS DURING FABRICATION ARE NOT REQUIRED WHERE THE FABRICATOR MAINTAINS APPROVED DETAILED FABRICATION AND QUALITY CONTROL PROCEDURES THAT PROVIDE A BASIS FOR CONTROL OF THE WORKMANSHIP AND THE FABRICATOR'S ABILITY TO CONFORM TO APPROVED CONSTRUCTION DOCUMENTS AND THE GOVERNING BUILDING CODE. APPROVAL SHALL BE BASED UPON REVIEW OF FABRICATION AND QUALITY CONTROL PROCEDURES AND PERIODIC INSPECTION OF FABRICATION PRACTICES BY THE BUILDING OFFICIAL. SPECIAL INSPECTIONS ARE NOT REQUIRED WHERE THE FABRICATOR IS REGISTERED AND APPROVED IN ACCORDANCE WITH SECTION 1704.2.5.1.
7	REFER TO SPECIAL INSPECTION SCHEDULES AND GENERAL STRUCTURAL NOTES FOR ADDITIONAL QUALITY CONTROL, TESTING AND INSPECTIONS.



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CITY OF ANN ARBOR  
**FIRE STATION #1  
GENERATOR**  
ANN ARBOR, MICHIGAN

**GENERAL  
STRUCTURAL NOTES  
AND SPECIAL  
INSPECTION  
SCHEDULES**

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ISSUED FOR	DATE
OWNER REVIEW	08-13-17
100% REVIEW	09-27-17
BIDS	10-06-17

DESIGNER: JG
DRAWN: SG
PIV/PIE: JRB/R
CHECKED: TN
ACAD FILE: 17-1241-S1
PROJECT No.:

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I. GENERAL

- A. PROVIDE MATERIALS AND EQUIPMENT AND EXECUTE THE WORK, INCLUDING ALL TESTING AND INSPECTIONS, IN COMPLIANCE WITH THE APPLICABLE PROVISIONS OF FEDERAL, STATE AND LOCAL GOVERNMENT LAWS, ORDINANCES, REFERENCED CODES AND STANDARDS CURRENT AS OF THE ISSUE DATE OF THESE DRAWINGS INCLUDING THE GOVERNING LAWS, ORDINANCES, CODES AND STANDARDS CONSTITUTE MINIMUM REQUIREMENTS. ALL MORE STRINGENT REQUIREMENTS OF THE CONTRACT DOCUMENTS SHALL MODIFY, SUPPLEMENT AND SUPERSEDE APPLICABLE PORTIONS OF GOVERNING LAWS, ORDINANCES, CODES AND STANDARDS.
B. CONTRACTOR SHALL PRESENT CERTIFICATE TO THE OWNER THAT ALL APPLICABLE BUILDING PERMITS HAVE BEEN SECURED PRIOR TO STARTING ANY WORK, AND PROVIDE THE OWNER WITH ALL REQUIRED CERTIFICATES OF FINAL APPROVAL FROM THE GOVERNING JURISDICTIONS AT COMPLETION OF THE WORK. PROVIDE ALL SHOP DRAWINGS AS REQUIRED IN FOLLOWING SECTIONS.
C. MAKE ALL CONNECTIONS TO EXISTING SYSTEMS DURING DESIGNATED PERIODS UPON APPROVAL OF THE OWNER AND AT NO INCREASE IN CONTRACT SUM.
D. COORDINATE EXACT LOCATION OF CONSTRUCTION TO PRECLUDE ANY INTERFERENCES BETWEEN PIPING, WIRING, LIGHTING FIXTURES, DUCTWORK, BUILDING EQUIPMENT, PROCESS EQUIPMENT AND OTHER CONSTRUCTION.
E. PROVIDE ALL LABOR, INCLUDING FIELD ERECTION AND SUPERVISION, TOOLS, MATERIALS, EQUIPMENT AND ANCHLARS, AND COORDINATE, PROCURE, FABRICATE, DELIVER, ERECT OR INSTALL, INTERFACE WITH EXISTING WORK, START, DEBUG AND TEST ALL SYSTEMS AS NECESSARY TO PROVIDE THE OWNER WITH A COMPLETE, OPERATING FACILITY IN CONFORMANCE WITH THE CONTRACT DOCUMENTS.
F. ALL CUTTING AND PATCHING THAT MAY BE NECESSARY FOR THE INSTALLATION OF THE WORK SHALL BE PERFORMED AND REPAIRED BY THE TRADE WHO NORMALLY PERFORMS THAT WORK AND SHALL BE PAID FOR BY THE CONTRACTOR. NO CUTTING OF THE BUILDING STRUCTURAL SYSTEM SHALL BE PERFORMED WITHOUT THE PRIOR WRITTEN CONSENT OF THE ENGINEER.
G. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING HIS BID TO FAMILIARIZE HIMSELF WITH THE ACTUAL PROJECT CONDITIONS AND TO CHECK FOR ANY INTERFERENCES BETWEEN HIS WORK AND THAT OF THE OTHER TRADES, AND/OR ANY APPARENT VIOLATIONS OF LOCAL OR STATE CODES, LAWS, ORDINANCES AND REGULATIONS. SHOULD ANY VIOLATIONS OR INTERFERENCES APPEAR AND DEPARTURE FROM THE DESIGN INTENT OF THE CONTRACT DOCUMENTS IS REQUIRED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO ENTERING INTO A CONTRACT WITH THE OWNER. FAILURE TO PROVIDE THE ENGINEER WITH THE AFOREMENTIONED NOTIFICATION SHALL RESULT IN THE CONTRACTOR BEING HELD RESPONSIBLE TO COMPLETE ALL WORK TO MEET THE INTENT OF THE CONTRACT DOCUMENTS WITH NO ADDITIONAL EXPENSES BEING INCURRED BY THE OWNER.
H. SHOP DRAWINGS
NO APPARATUS OR EQUIPMENT SHALL BE SHIPPED FROM STOCK OR FABRICATED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND STAMPED "NO EXCEPTIONS OR REVISIONS NOTED".
SUBMIT FOR APPROVAL, SHOP DRAWINGS FOR ALL EQUIPMENT, MATERIALS, VALVES, PLUMBING AND HEATING SPECIALTIES, PIPE HANGERS, WIRING DIAGRAMS AND CONTROL DIAGRAMS INCLUDING, BUT NOT LIMITED TO THE ITEMS LISTED BELOW, WHERE ITEMS ARE REFERRED TO BY SYMBOL, NUMBERS ON THE DRAWINGS AND SPECIFICATIONS. ALL SUBMITTALS SHALL BEAR THE SAME SYMBOL NUMBERS. ALL DRAWINGS SHALL CONTAIN THE PROJECT NAME, AND PROJECT NUMBER. NO LOOSE SHEETS SHALL BE SUBMITTED UNLESS A COVER SHEET OR TRANSMITTAL IS ATTACHED.
PROVIDE THE FOLLOWING SHOP DRAWINGS:
NATURAL GAS PIPING, VALVES AND REGULATORS
APPROVAL OF SHOP DRAWINGS DOES NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES TO CONFORM TO THE DESIGN INTENT OF THE CONTRACT DOCUMENTS. APPROVAL OF SHOP DRAWINGS IS INTENDED TO BE FOR GENERAL CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS ONLY. ANY INSTALLED EQUIPMENT WHICH REQUIRES WORK BY OTHER TRADES, SHALL BE COORDINATED WITH THOSE TRADES. REFER TO OTHER TRADES BID DOCUMENTS.
I. CODES, PERMITS AND FEES
UNLESS OTHERWISE INDICATED, ALL REQUIRED PERMITS, LICENSES, INSPECTIONS, APPROVALS AND FEES FOR THE WORK SHALL BE SECURED AND PAID FOR BY THE CONTRACTOR. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES, RULES AND REGULATIONS.
RULES OF LOCAL UTILITY COMPANIES SHALL BE COMPLIED WITH. BEFORE SUBMITTING HIS BID, THE CONTRACTOR SHALL VERIFY WITH EACH UTILITY COMPANY SUPPLYING SERVICE TO THIS PROJECT, THAT ALL VALVES, METER BOXES AND METERS REQUIRED WILL BE PROVIDED. THE CONTRACTOR SHALL INCLUDE THE COST IN HIS BID. (NO ADDITIONAL PAYMENTS WILL BE MADE FOR INSTALLATION OF SUCH ITEMS, EXCEPT IN CASES WHERE THE REQUIREMENTS OF THE UTILITIES COMPANIES MAY CHANGE AFTER THE BID HAS BEEN SUBMITTED).
ALL WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE RULES AND REGULATIONS SET FORTH IN LOCAL AND STATE CODES. (THE CONTRACTORS SHALL PREPARE ANY DETAILED DRAWINGS OR DIAGRAMS WHICH MAY BE REQUIRED BY THE GOVERNING AUTHORITIES.) WHERE THE DRAWINGS AND/OR SPECIFICATIONS INDICATE MATERIALS OR CONSTRUCTION IN EXCESS OF CODE REQUIREMENTS, THE DRAWINGS AND/OR SPECIFICATIONS SHALL GOVERN.
I. BASIC MATERIALS AND METHODS
A. PROVIDE ALL ITEMS, ARTICLES, MATERIALS, OPERATIONS AND METHODS LISTED, MENTIONED OR SCHEDULED ON DRAWINGS AND/OR HEREIN, INCLUDING ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS NECESSARY AND REQUIRED FOR THEIR COMPLETION. THE WORK SHALL INCLUDE INSTALLATION, CLEANING AND TESTING OF COMPLETE AND OPERATING HVAC, PLUMBING, TEMPERATURE CONTROL, AND OTHER SPECIAL SYSTEMS.
B. NATURAL GAS PIPING
NATURAL GAS PIPING 2 1/2" AND LARGER SHALL BE SCHEDULE 40 BLACK STEEL PIPE WITH WELDED JOINTS AND STANDARD WEIGHT BUTT WELDED FITTINGS.
NATURAL GAS PIPING 2" AND SMALLER SHALL BE SAME AS ABOVE, EXCEPT WITH 150 LB. M. THREADED FITTINGS MADE UP WITH TEFLON BASED PIPE THREAD COMPOUND.
C. PIPE HANGERS AND SUPPORTS
THE MECHANICAL CONTRACTOR SHALL PROVIDE PIPE HANGERS AND SUPPORTS AS REQUIRED. APPROVED MANUFACTURERS SHALL BE: GRINNELL, CARPENTER-PATTERSON, FEE-AMASON OR MICHIGAN HANGER CO.
GENERALLY ALL SUPPORT COMPONENTS SHALL CONFORM TO MANUFACTURERS' STANDARDIZATION SOCIETY SPECIFICATION SP-68.
HANGERS SHALL ADEQUATELY SUPPORT THE PIPING SYSTEM. THEY SHALL BE LOCATED NEAR OR AT CHANGES IN PIPING DIRECTION, WITHIN 1'-0" OF EVERY FITTING AND CONCENTRATED LOAD. THEY SHALL PROVIDE VERTICAL ADJUSTMENT TO MAINTAIN PITCH REQUIRED FOR PROPER DRAINAGE, AND/OR VENTING. THEY SHALL ALLOW FOR EXPANSION AND CONTRACTION OF THE PIPING. HANGERS SHALL BE FASTENED TO BUILDING STRUCTURAL MEMBERS WHEREVER PRACTICAL AND HUNG FROM TRUSS OR JOIST PANEL POINTS ONLY.
D. JOINING OF PIPE
THREADED JOINTS SHALL HAVE AMERICAN NATIONAL STANDARD TAPER PIPE THREADS. REAM PIPE ENDS AND REMOVE BURRS AFTER THREADING. MAKE UP JOINTS USING AN APPROVED COMPOUND APPLIED TO THE MALE THREADS ONLY.
SOLDER JOINTS: TUBING OR PIPE SHALL BE CUT SQUARE AND BURRS REMOVED. BOTH INSIDE OF FITTINGS AND OUTSIDE OF TUBING OR PIPE SHALL BE WELL CLEANED WITH STEEL WOOL BEFORE SWEATING. CARE SHALL BE TAKEN TO PREVENT ANNEALING OF FITTINGS AND HARD DRAWN TUBING WHEN MAKING CONNECTIONS. JOINTS SHALL BE MADE WITH 60S TIN-ANTIMONY SOLDER.
WELDING OF PIPE:
SURFACE OF ALL PARTS TO BE WELDED SHALL BE THOROUGHLY CLEANED AND SHALL BE FREE FROM ALL PAINT, OIL, RUST OR SCALE BEFORE BEING WELDED.
FLANGES SHALL BE WELDED TO PIPE BY MEANS OF WELDING NECK FLANGES. BLIND FLANGES SHALL BE MADE WITH WELDING NECK FLANGES AND BLIND FLANGES. CAPS ON SMALLER LINES SHALL BE SCREWED ON FOR EASY REMOVAL.
WELDING SHALL BE DONE IN ACCORDANCE WITH THE WELDING PROCEDURES OF THE NATIONAL CERTIFIED PIPE WELDING BUREAU OR OTHER APPROVED PROCEDURE CONFORMING TO THE REQUIREMENTS OF THE A.S.M.E. BOILER AND PRESSURE VESSEL CODE OR THE A.S.A. CODE FOR THE PRESSURE PIPING. NO WELDER SHALL BE EMPLOYED ON THE

WORK WHO HAS NOT FULLY QUALIFIED UNDER THE ABOVE SPECIFIED PROCEDURE AND SO CERTIFIED BY A MEMBER OF A LOCAL CHAPTER OF THE NATIONAL CERTIFIED PIPE WELDING BUREAU OR SIMILAR LOCALLY RECOGNIZED TESTING AUTHORITY.

ALL FITTINGS SHALL BE SEAMLESS STEEL, WELDED TYPE OF WEIGHT REQUIRED FOR THE SERVICE OR AS HEREIN SPECIFIED. TURNS IN PIPING SHALL BE MADE WITH LONG RADIUS ELBOWS.

BRANCH TANS-OFFS SHALL BE MADE WITH FACTORY MADE STRAIGHT OR REDUCING TEES, OR WELDOLETS OF BUTT, SOCKET OR THREADED TYPE SIMILAR TO THOSE MANUFACTURED BY BONNEY FORGE. WELDOLETS SHALL PROVIDE 100% PIPE STRENGTH FOR ALL SIZES, WEIGHTS AND SCHEDULES.

MITERING, NOTCHING OR DIRECT WELDING OF PIPE TO THE MAIN TO FORM TEES AND ELBOWS OR OTHER SIMILAR TYPE CONSTRUCTION WILL NOT BE PERMITTED.

VALVES AND EQUIPMENT SHALL NOT BE WELDED INTO THE PIPING SYSTEM. SCREWED TYPE UNIONS OR COMPANION FLANGES SHALL BE USED TO ALLOW FOR REMOVAL WITHOUT CUTTING OF PIPE.

PROVIDE A FIRE RESISTANT MAT OR BLANKET TO PROTECT THE STRUCTURE AND ADEQUATE FIRE PROTECTION EQUIPMENT AT ALL LOCATIONS WHERE WELDING IS DONE.

E. CHARACTER OF PIPE WORK

PIPING AND CONDUIT SHALL BE LOCATED OR OFFSET AS REQUIRED TO CLEAR OTHER TRADES WORK, TO AVOID INTERFERENCE WITH OTHER PIPING HAVING PRECEDENCE. TO CONCEAL THEM MORE READILY OR TO ALLOW FOR MAXIMUM HEADROOM, PIPING AND CONDUIT IN FINISHED AREAS SHALL BE CONCEALED (WHEREVER POSSIBLE).

ALL CUT ENDS SHALL HAVE BURRS REMOVED AND ENDS REAMED.

INTERIOR OF ALL SERVICE PIPING SUCH AS WATER, AIR, ETC. SHALL BE CLEANED FREE OF DIRT AND IMPURITIES BEFORE PIPES ARE PUT IN PLACE. PIPING SHALL BE FLUSHED CLEAN AT COMPLETION.

NO PIPING SHALL BE RUN ABOVE ANY ELECTRICAL DEVICE, PANEL, SWITCHGEAR, ETC. PIPING SHALL BE OFFSET TO CONFORM TO THIS REQUIREMENT WHETHER INDICATED ON THE DRAWINGS OR NOT.

ALL PIPING SHALL BE PROPERLY PITCHED FOR DRAINING AND VENTING AS REQUIRED.

CAP ALL OPENINGS WITH SUITABLE PLUGS OR CAPS DURING CONSTRUCTION.

KEEP HOT AND COLD LINES AT LEAST SIX (6) INCHES APART.

EACH TRADE IS WARNED TO MAKE CERTAIN THAT ALL PIPING, FITTINGS, VALVES, THREADS AND JOINTS ARE FREE FROM DEFECTS AND ARE TIGHTLY FITTED. WHERE LEAKS OCCUR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING DEFECTIVE PORTIONS OF THE SYSTEM, AS WELL AS REPAIRING DAMAGES TO FINISH PORTIONS OF THE BUILDING OR ITS CONTENTS AT NO EXTRA COST.

F. MATERIALS TESTS

PERFORM ALL TESTS REQUIRED BY STATE, CITY, COUNTY AND/OR OTHER AGENCIES HAVING JURISDICTION, AND AS INDICATED HEREIN.

PROVIDE ALL MATERIALS, EQUIPMENT, WATER, COMPRESSED AIR, ETC., AND LABOR REQUIRED FOR THE TESTS.

PIPING UNDER HYDROSTATIC PRESSURE TEST SHALL NOT LOSE MORE THAN 2 PSI FOR A PERIOD OF 5 HOURS UNDER TEST PRESSURE. EXAMINE PIPING FOR LEAKAGE.

PIPING UNDER AIR PRESSURE TEST SHALL NOT LOSE MORE THAN 2% OF TEST PRESSURE FOR A PERIOD OF 1 HOUR. TEST SHALL BE PERFORMED WITH AMBIENT TEMPERATURE APPROXIMATELY CONSTANT. TESTS SHALL BE AS REQUIRED BY AGENCIES HAVING JURISDICTION.

G. VALVES

VALVES, NPS 2 AND SMALLER: THREADED ENDS ACCORDING TO ASME B1.20.1 FOR PIPE THREADS.

VALVES, NPS 2-1/2 AND LARGER: FLANGED ENDS ACCORDING TO ASME B16.5 FOR STEEL FLANGES AND ACCORDING TO ASME B16.24 FOR COPPER AND COPPER-ALLOY FLANGES.

GAS STOPS: BRONZE BODY WITH AGA STAMP; PLUG TYPE WITH BRONZE PLUG AND FLAT OR SQUARE HEAD, BALL TYPE WITH CHROME-PLATED BRASS BALL AND LEVER HANDLE, OR BUTTERFLY VALVE WITH STAINLESS-STEEL DISC AND FLUOROCARBON ELASTOMER SEAL AND LEVER HANDLE, 2-PSIG MINIMUM PRESSURE RATING.

GAS VALVES, NPS 2 AND SMALLER: ASME B16.33 AND IAS-LISTED BRONZE BODY AND 125-PSIG PRESSURE RATING.

PLUG VALVES, NPS 2-1/2 AND LARGER: ASME B16.38 AND MSS SP-78 CAST-IRON, LUBRICATED PLUG VALVES, WITH 125-PSIG PRESSURE RATING.

GENERAL-DUTY VALVES, NPS 2-1/2 AND LARGER: ASME B16.38, CAST-IRON BODY, SUITABLE FOR FUEL GAS SERVICE, WITH "WD" INDICATED ON VALVE BODY, AND 125-PSIG PRESSURE RATING.

- 1. GATE VALVES: MSS SP-70, OS&Y TYPE WITH SOLID WEDGE.
2. BUTTERFLY VALVES: MSS SP-67, LUG TYPE WITH LEVER HANDLE.

H. PRESSURE REGULATORS

DESCRIPTION: SINGLE STAGE AND SUITABLE FOR FUEL GAS SERVICE. INCLUDE STEEL JACKET AND CORROSION-RESISTANT COMPONENTS. ELEVATION COMPENSATOR, AND ATMOSPHERIC VENT.

- 1. NPS 2 AND SMALLER: THREADED ENDS ACCORDING TO ASME B1.20.1 FOR PIPE THREADS.
2. NPS 2-1/2 AND LARGER: FLANGED ENDS ACCORDING TO ASME B16.5 FOR STEEL FLANGES AND ACCORDING TO ASME B16.24 FOR COPPER AND COPPER-ALLOY FLANGES.
3. SERVICE PRESSURE REGULATORS: ANSI Z21.80. INCLUDE 100-PSIG MINIMUM INLET PRESSURE RATING.
4. LINE PRESSURE REGULATORS: ANSI Z21.80 WITH 2 PSIG MINIMUM INLET PRESSURE RATING.
5. LINE PRESSURE REGULATORS: ANSI Z21.80 WITH 10-PSIG (88.9-KPA) INLET PRESSURE RATING, UNLESS OTHERWISE INDICATED.

I. LABELING AND IDENTIFYING

EQUIPMENT NAMEPLATES AND SIGNS: INSTALL ENGRAVED PLASTIC-LAMINATE EQUIPMENT NAMEPLATE OR SIGN ON OR NEAR EACH SERVICE METER, PRESSURE REGULATOR, AND SPECIALTY VALVE.

- 1. TEXT: IN ADDITION TO NAME OF IDENTIFIED UNIT, DISTINGUISH BETWEEN MULTIPLE UNITS, INFORM OPERATOR OF OPERATIONAL REQUIREMENTS, INDICATE SAFETY AND EMERGENCY PRECAUTIONS, AND WARN OF HAZAROUS AND IMPROPER OPERATIONS.

J. PAINTING

PAINT EXTERIOR SERVICE METERS, PRESSURE REGULATORS, AND SPECIALTY VALVES.

- 1. COLOR: GRAY.
PAINT INTERIOR PIPING, PIPING RUN EXPOSED ON ROOF AND ASSOCIATED FITTINGS.
1. COLOR: YELLOW.

SYMBOL LEGEND table with columns for SCHEMATIC SYMBOLS and DESCRIPTION. Includes symbols for EXISTING TO REMAIN, EXCAVATION REQUIRED, NEW WORK, NEW CONNECTION TO EXISTING, PIPING ELBOW, PIPING ELBOW UP, PIPING ELBOW DOWN, PIPING TEE, PIPING TEE UP, PIPING TEE DOWN, GATE VALVE, BALL VALVE, and SHUT-OFF VALVE RATED FOR USE WITH NATURAL GAS.

PIPING LEGEND table with columns for SYMBOL and DESCRIPTION. Includes symbol for NG NATURAL GAS.

MECHANICAL SHEET INDEX table with columns for SHEET and DESCRIPTION. Lists sheets M-1 (MECHANICAL GENERAL INFORMATION AND SPECIFICATIONS), M-2 (PARTIAL FLOOR PLANS - MECHANICAL), M-3 (PARTIAL FLOOR PLANS - MECHANICAL), and M-4 (MECHANICAL DETAILS).

OVERVIEW OF MECHANICAL SCOPE

THIS OVERVIEW OF SCOPE IS INCLUDED TO GIVE THE CONTRACTOR A GENERAL OVERVIEW OF THE PROJECT REQUIREMENTS. THE OVERVIEW IS NOT ALL INCLUSIVE AND IS NOT INTENDED TO, AND SHOULD NOT BE USED TO, ESTABLISH CONTRACT LIMITS OR PRICING INCLUSIONS. THE CONTRACT DOCUMENTS SHALL BE USED TO ESTABLISH CONSTRUCTION CONTRACT SCOPE.

THIS OVERVIEW OF SCOPE INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

- MECHANICAL
1. CONTRACTOR TO COORDINATE WITH LOCAL MUNICIPALITY AND LOCAL UTILITY COMPANY FOR UPGRADES TO EXISTING NATURAL GAS SERVICE METER AND PRESSURE REGULATOR NOTED ON DRAWINGS.
2. EXTEND NATURAL GAS SERVICE PIPING FROM MODIFIED NATURAL GAS SERVICE METER TO NEW NATURAL GAS GENERATOR.
3. PROVIDE NATURAL GAS PIPING, FITTINGS, HANGERS AND SUPPORTS.

PROJECT REQUIREMENTS

PROVIDE ALL NECESSARY PERMITS. ALL WORK SHALL BE INSTALLED TO COMPLY WITH THE OWNER'S STANDARDS, STATE AND LOCAL CODES INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING CODES AND THEIR RELATED REFERENCES.

- 2015 MICHIGAN MECHANICAL CODE
2015 MICHIGAN PLUMBING CODE
2015 INTERNATIONAL FIRE CODE (AS REFERENCED)
2015 INTERNATIONAL FUEL GAS CODE
NFPA 101 LIFE SAFETY CODE 1997 AND 2006 (AS REFERENCED)
MICHIGAN ENERGY CODE-ASHRAE 90.1-2013
2014 NATIONAL ELECTRICAL CODE AS AMENDED BY THE 2014 MICHIGAN ELECTRICAL CODE RULES, PART 8.
2015 MICHIGAN REHABILITATION CODE FOR EXISTING BUILDINGS

MANUFACTURER AND MODEL NUMBER LISTED REPRESENTS THE BASIS OF DESIGN FOR THIS PROJECT. THE MECHANICAL CONTRACTOR SHALL BEAR ALL ADDITIONAL COST ASSOCIATED WITH USING EQUIPMENT BY OTHER APPROVED MANUFACTURERS INCLUDING ADDITIONAL COSTS BY OTHER TRADES.

ALL EQUIPMENT INSTALLED SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. WHERE FIELD OR PROJECT CONDITIONS DO NOT ALLOW ALL MANUFACTURER'S RECOMMENDATIONS TO BE MET, THE INSTALLING CONTRACTOR SHALL SUBMIT IN WRITING TO THE ENGINEER THE PROPOSED DEVIATION, IN A SKETCH FORM, ACCOMPANIED BY THE MANUFACTURER'S CONCURRENCE.

GENERAL MECHANICAL NOTES:

- 1. COORDINATE SHUT-DOWN OF ANY EXISTING SYSTEMS WITH THE BUILDING SERVICES PERSONNEL.
2. COORDINATE NEW PIPING WITH EXISTING SITE CONDITIONS, EQUIPMENT MANUFACTURERS AND ALL OTHER TRADES TO AVOID INTERFERENCES.
3. DRAWINGS ARE DIAGRAMMATIC. THE MECHANICAL WORK SHALL BE FIELD VERIFIED BEFORE PROCEEDING, AND THE WORK SHALL BE COORDINATED PER THIS VERIFICATION.



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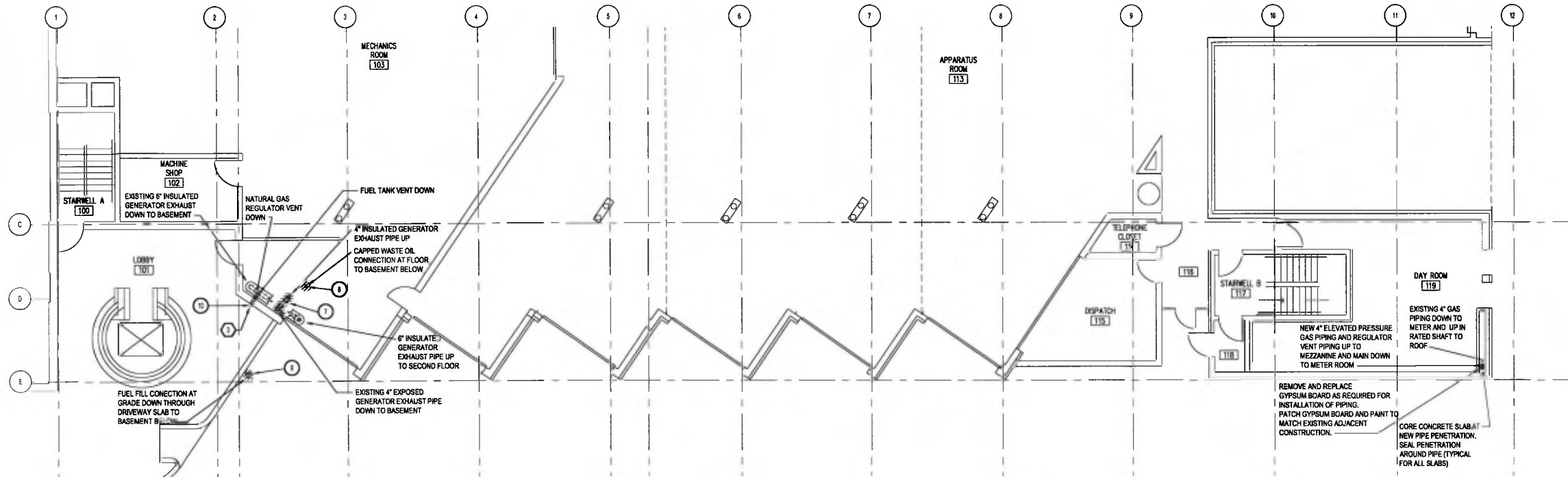
CITY OF ANN ARBOR
FIRE STATION #1
GENERATOR
ANN ARBOR, MICHIGAN

MECHANICAL GENERAL INFORMATION AND SPECIFICATIONS
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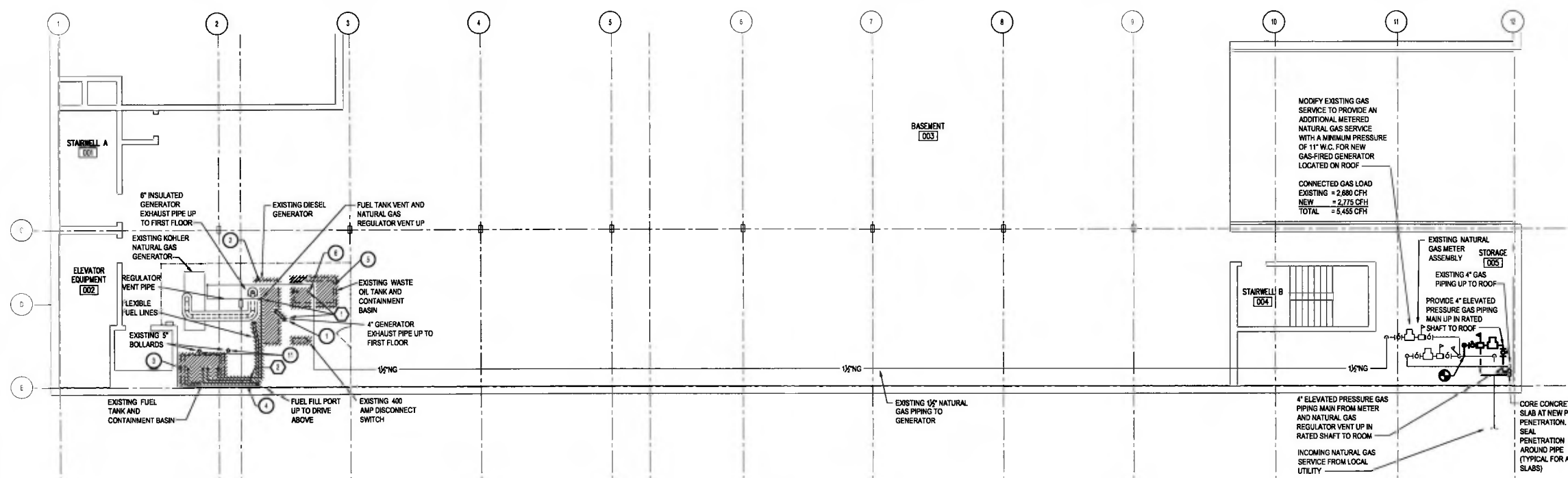
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Table with columns for ISSUED FOR and DATE. Shows 100% REVIEW on 05/21/17, BOS on 10/06/17, and other empty rows.

DESIGNER: WAG
DRAWN: WAG
PM / PTC: SRSM
CHECKED: DCM
ADOPTED: 17-1304H
PROJECT NO. 17-1304
M-1



**PARTIAL FIRST FLOOR PLAN - MECHANICAL**  
SCALE 1/8" = 1'-0"



**PARTIAL BASEMENT PLAN - MECHANICAL**  
SCALE 1/8" = 1'-0"

**GENERAL NOTES:**

- REMOVE EXISTING MECHANICAL SERVICES AND EQUIPMENT AS INDICATED AND/OR DESCRIBED ALONG WITH SUPPORTS, HANGERS, CONTROLS AND ALL RELATED ACCESSORIES.
- ALL ITEMS ON DEMOLITION PLAN SHALL BE CONSIDERED TO BE EXISTING UNLESS OTHERWISE NOTED.
- FIELD VERIFY EXACT SIZE AND LOCATION OF ALL EXISTING SERVICES PRIOR TO DEMOLITION.
- COORDINATE SHUT-DOWN OF ANY EXISTING SYSTEMS WITH THE BUILDING SERVICES PERSONNEL.
- WHERE DUCT AND/OR PIPE INSULATION HAS BEEN DAMAGED, THE CONTRACTOR SHALL REPAIR INSULATION AS REQUIRED TO MATCH EXISTING.
- ALL ITEMS DEMOLISHED SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY.
- LIMITS OF DEMOLITION ARE INDICATED ON THE DRAWINGS. SHOULD EXISTING FIELD CONDITIONS REQUIRE MODIFICATIONS OF THESE LIMITS FOR THE PROPER INSTALLATION OF NEW WORK, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUCH MODIFICATIONS.
- MECHANICAL TRADES SHALL COORDINATE ROUTING OF PIPING WITH OTHER TRADES PRIOR TO INSTALLATION.
- AREAS WITH EXISTING PLASTER (HARD) CEILINGS OR WALLS TO BE CUT, REMOVED AND PATCHED BY ARCH. TRADES, COORDINATE AS REQUIRED.
- PROPERLY AND DISPOSE OF WASTE OIL AND DIESEL FUEL ASSOCIATED WITH TANKS AND PIPING TO BE REMOVED, PER EPA STANDARDS.

**DEMOLITION KEYED NOTES:**  
(APPLICABLE THIS SHEET ONLY)

- DISCONNECT AND REMOVE DIESEL GENERATOR EXHAUST FLUE AND REPAIR THROUGH FLOOR PENETRATION TO FIRST FLOOR
- DISCONNECT AND REMOVE DIESEL GENERATOR AND ASSOCIATED PIPING, FLUE AND FITTINGS
- DISCONNECT AND REMOVE DIESEL FUEL TANK AND ASSOCIATED CONTAINMENT BASIN AND PIPING
- DISCONNECT AND REMOVE DIESEL FUEL PIPING, FUEL VENT AND FUEL FILL PIPING AND FITTINGS ASSOCIATED WITH DIESEL GENERATOR AND FUEL TANK
- DISCONNECT AND REMOVE WASTE OIL TANK AND ASSOCIATED PIPING AND FITTINGS
- REMOVE OIL PIPING DRAIN CONNECTION TO FLOOR ABOVE
- DISCONNECT AND REMOVE DIESEL GENERATOR EXHAUST FLUE AND ASSOCIATED INSULATION AND FITTINGS IN VEHICLE GARAGE AREA. CAP FLUE NEAR CEILING AT THROUGH FLOOR PENETRATION TO SECOND FLOOR ABOVE
- DISCONNECT AND REMOVE CAPPED OIL PIPING DRAIN CONNECTION AT FLOOR
- DISCONNECT AND REMOVE EXISTING FUEL FILL CONNECTION IN DRIVEWAY AT GRADE
- DISCONNECT AND REMOVE FUEL TANK VENT PIPING
- CUT EXISTING BOLLARD FLUSH WITH CONCRETE SLAB AND GRIND FLUSH WITH FINISH FLOOR

**NEW WORK KEYED NOTES:**  
(APPLICABLE THIS SHEET ONLY)

- FILL AND SEAL OPENING IN EXISTING CONCRETE GARAGE FLOOR TO MATCH EXISTING
- FILL AND SEAL OPENING IN CONCRETE DRIVEWAY WATER TIGHT TO MATCH EXISTING
- FILL AND SEAL OPENING IN EXTERIOR WALL WATER TIGHT TO MATCH EXISTING

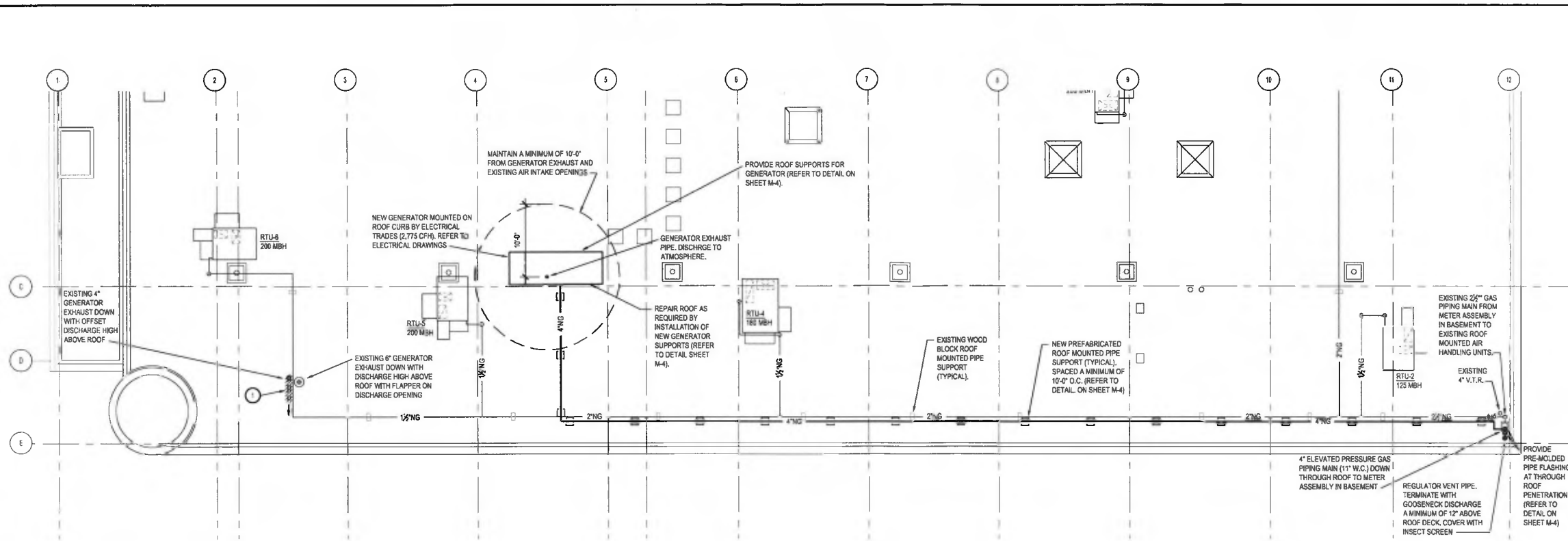
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CITY OF ANN ARBOR  
**FIRE STATION #1 GENERATOR**  
ANN ARBOR, MICHIGAN  
**PARTIAL FLOOR PLANS - MECHANICAL**  
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ISSUED FOR	DATE
100% REVISION	08/21/17
BIDS	10/06/17

DESIGNER	WAG
DRAWN BY	WAG
PM / PIC	JSR/SJM
CHECKED	DCM
ACAD FILE	17-1004M2
PROJECT No.	17-1004
<b>M-2</b>	



**PARTIAL ROOF PLAN - MECHANICAL**  
 SCALE: 1/8" = 1'-0"  
 0 4 8 16 32

- GENERAL NOTES:**
- REMOVE EXISTING MECHANICAL SERVICES AND EQUIPMENT AS INDICATED AND/OR DESCRIBED ALONG WITH SUPPORTS, HANGERS, CONTROLS AND ALL RELATED ACCESSORIES.
  - ALL ITEMS ON DEMOLITION PLAN SHALL BE CONSIDERED TO BE EXISTING UNLESS OTHERWISE NOTED.
  - FIELD VERIFY EXACT SIZE AND LOCATION OF ALL EXISTING SERVICES PRIOR TO DEMOLITION.
  - COORDINATE SHUT-DOWN OF ANY EXISTING SYSTEMS WITH THE BUILDING SERVICES PERSONNEL.
  - WHERE DUCT AND/OR PIPE INSULATION HAS BEEN DAMAGED, THE CONTRACTOR SHALL REPAIR INSULATION AS REQUIRED TO MATCH EXISTING.
  - ALL ITEMS DEMOLISHED SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY.
  - LIMITS OF DEMOLITION ARE INDICATED ON THE DRAWINGS. SHOULD EXISTING FIELD CONDITIONS REQUIRE MODIFICATIONS OF THESE LIMITS FOR THE PROPER INSTALLATION OF NEW WORK, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUCH MODIFICATIONS.
  - MECHANICAL TRADES SHALL COORDINATE ROUTING OF PIPING WITH OTHER TRADES PRIOR TO INSTALLATION.
  - AREAS WITH EXISTING PLASTER (HARD) CEILINGS OR WALLS TO BE CUT, REMOVED AND PATCHED BY ARCH. TRADES. COORDINATE AS REQUIRED.
  - PROPERLY AND DISPOSE OF WASTE OIL AND DIESEL FUEL ASSOCIATED WITH TANKS AND PIPING TO BE REMOVED, PER EPA STANDARDS.

- DEMOLITION KEYED NOTES:**  
 (APPLICABLE THIS SHEET ONLY)
- DISCONNECT AND REMOVE GENERATOR EXHAUST FLUE DOWN TO BELOW ROOF LINE. CAP AND SEAL FLUE BELOW ROOF LINE AND REPAIR ROOF. REFER TO DETAIL.

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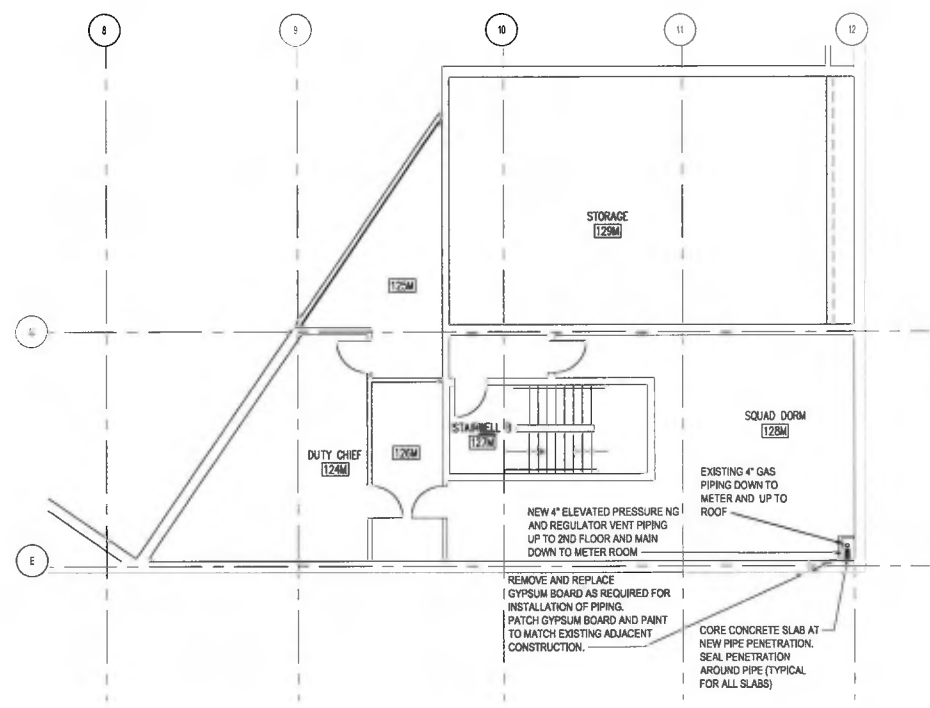
CITY OF ANN ARBOR  
**FIRE STATION #1 GENERATOR**  
 ANN ARBOR, MICHIGAN

**PARTIAL FLOOR PLANS - MECHANICAL**  
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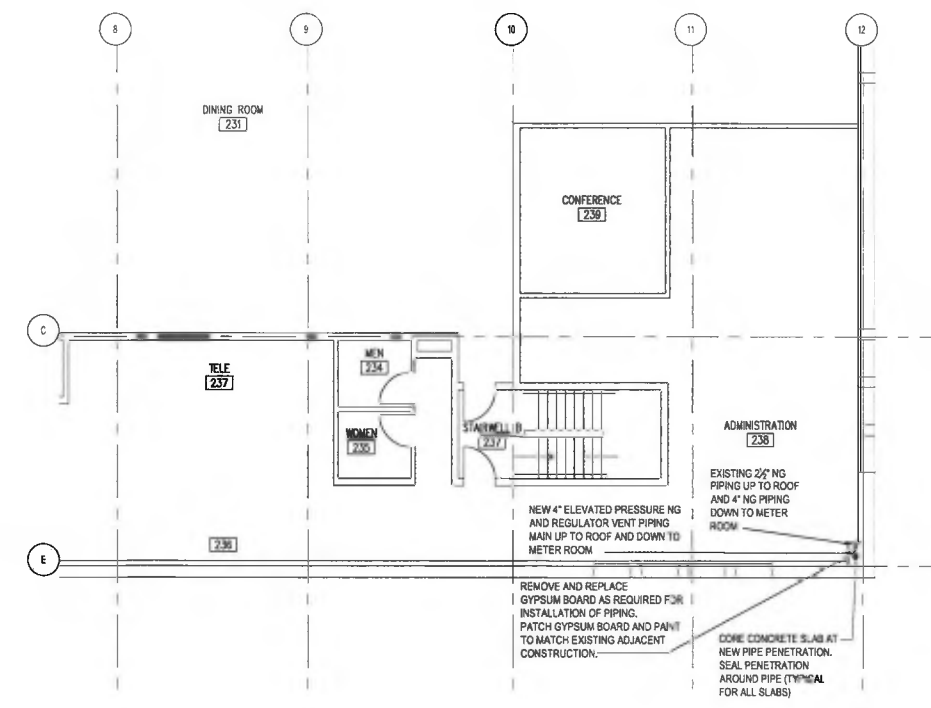
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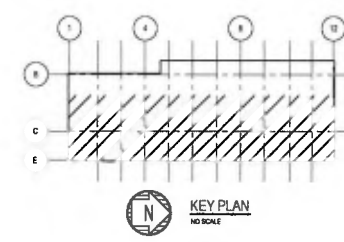
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100% REVIEW	09/21/17
BDS	10/06/17



**PARTIAL MEZZANINE PLAN - MECHANICAL**  
 SCALE: 1/8" = 1'-0"  
 0 4 8 16 32



**PARTIAL SECOND FLOOR PLAN - MECHANICAL**  
 SCALE: 1/8" = 1'-0"  
 0 4 8 16 32



DESIGNER	WAG
DRAWN	WAG
PM / PIC	JRS/SM
CHECKED	DCM
ACAD FILE	17-1304-M3
PROJECT No.	17-1304
<b>M-3</b>	







**SHEET NOTES:**

1. PERFORM ALL WORK IN ACCORDANCE WITH THE 2014 NATIONAL ELECTRICAL CODE AS AMENDED BY THE 2014 STATE OF MICHIGAN ELECTRICAL CODE RULES, PART 8.
2. DISCONNECT ALL ELECTRICAL CONNECTIONS TO EQUIPMENT BEING REMOVED.
3. REMOVE ALL CIRCUITS BEING DEMOLISHED BACK TO SOURCE OR LAST ACTIVE DEVICE.

**DEMOLITION KEYED NOTES:**  
(APPLICABLE THIS SHEET ONLY)

1. DISCONNECT EXISTING DIESEL ENGINE GENERATOR DISCONNECT AND REMOVE AUXILIARY POWER AND CONTROL CIRCUITS.
2. DISCONNECT AND REMOVE EXISTING 800A AUTOMATIC TRANSFER SWITCH AND ASSOCIATED NORMAL, STAND-BY, AND OUTPUT POWER FEEDERS AND AUXILIARY CONTROL CIRCUITS.



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CITY OF ANN ARBOR  
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**ELECTRICAL PLANS  
- DEMOLITION**

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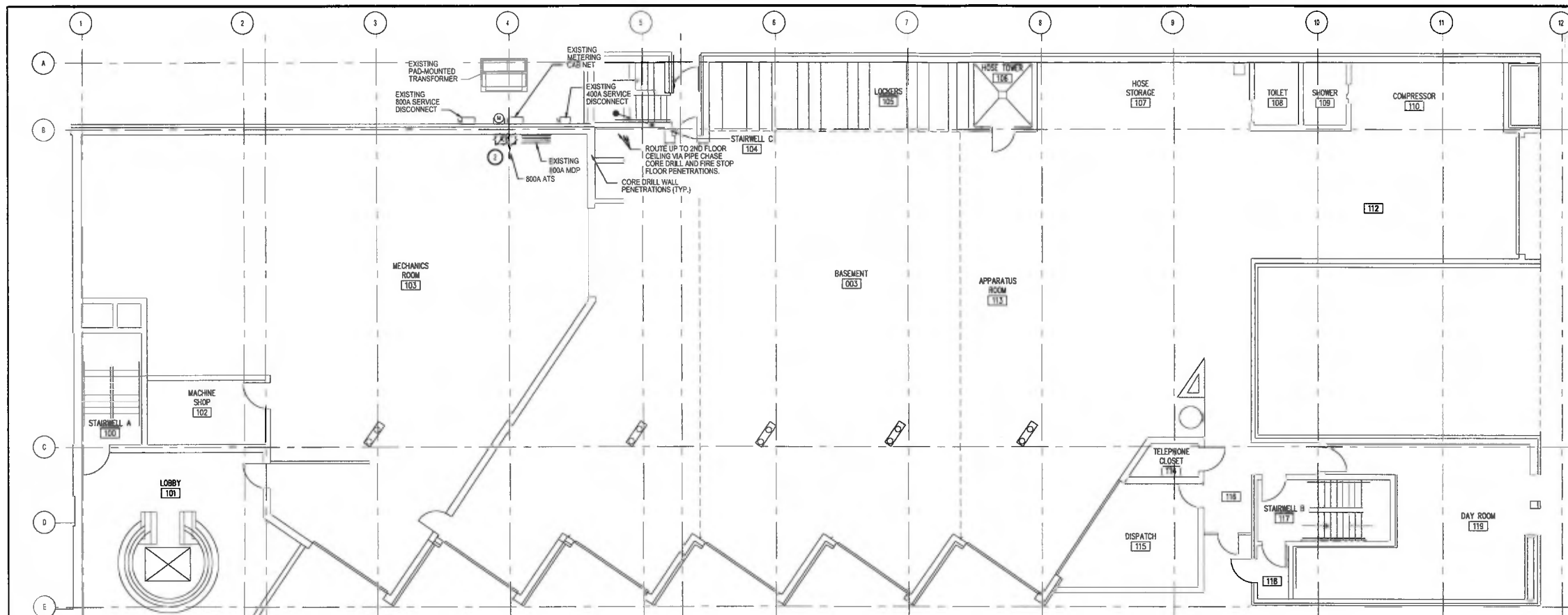
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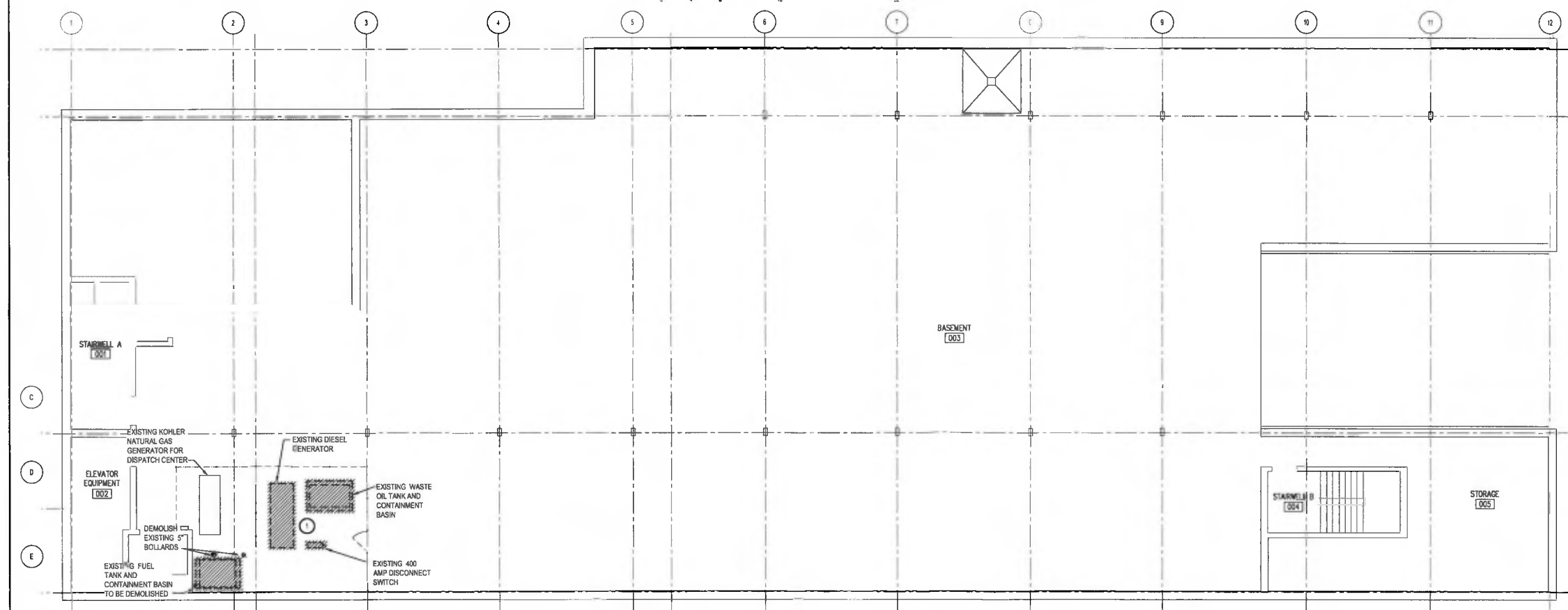
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OWNER REVIEW	08/21/17
100% REVIEW	08/21/17
BIDS	10/05/17

DESIGNER	JJD
DRAWN	DA
PM / PIC	JRSJM
CHECKED	SM
ACAD FILE	17-1304E2
PROJECT NO.	<b>17-1304</b>

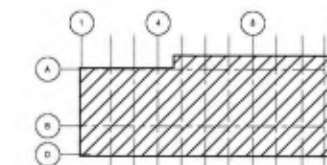
**E-2**



**PARTIAL FIRST FLOOR PLAN - ELECTRICAL DEMOLITION**  
SCALE: 1/8" = 1'-0"



**PARTIAL BASEMENT PLAN - ELECTRICAL DEMOLITION**  
SCALE: 1/8" = 1'-0"



**KEY PLAN**  
N

**SHEET NOTES:**

- 1 PERFORM ALL WORK IN ACCORDANCE WITH THE 2014 NATIONAL ELECTRICAL CODE AS AMENDED BY THE 2014 STATE OF MICHIGAN ELECTRICAL CODE RULES, PART 8.
- 2 PROVIDE TEMPORARY POWER DURING EQUIPMENT INSTALLATION TO MAINTAIN BUILDING SERVICES.
- 3 COORDINATE ALL OUTAGES OF NORMAL BUILDING SERVICES WITH OWNER.

**NEW WORK KEYED NOTES:**  
(APPLICABLE THIS SHEET ONLY)

- 1 PROVIDE 200KW/250KVA, 208Y/120V LEVEL 1 NATURAL GAS ENGINE GENERATOR WITH WEATHER PROTECTIVE HOUSING FOR STAND-BY SERVICE TO BUILDING LOADS. PROVIDE 800A OUTPUT CIRCUIT BREAKER AS INDICATED.
- 2 PROVIDE REMOTE ANNUNCIATOR FOR INDICATION OF ENGINE GENERATOR STATUS AND ALARM. PROVIDE ALL SIGNAL WIRING TO ENGINE GENERATOR.
- 3 PROVIDE 800A, 480V 3-POLE WITH SOLID NEUTRAL SERVICE RATED AUTOMATIC TRANSFER SWITCH ATS IN NEMA 1 ENCLOSURE FOR SERVICE TO BUILDING STAND-BY LOADS. ATS TO INCLUDE ENGINE START/RUN COMMAND SIGNAL AND PROGRAMMABLE ENGINE EXERCISER.
- 4 PROVIDE 208Y/120V, 800A 3-PHASE, 4-WIRE NORMAL FEED TO BUILDING STAND-BY POWER ATS FROM EXISTING 800A SERVICE DISCONNECT. REFER TO SHEET E-1 FOR ONE-LINE DIAGRAM.
- 5 PROVIDE 208Y/120V, 800A, 3-PHASE, 4-WIRE STAND-BY SERVICE FEEDER FROM GENERATOR ON ROOF TO ATS. REFER TO SHEET E-1 FOR ONE-LINE DIAGRAM.
- 6 PROVIDE GROUNDING ELECTRODE CONDUCTOR FROM GENERATOR TO EXISTING BUILDING STEEL. CONNECT TO STEEL USING EXOTHERMIC WELD.
- 7 PROVIDE BREAK-GLASS TYPE GENERATOR E-STOP PUSHBUTTON STATION FOR EMERGENCY GENERATOR SHUTDOWN.
- 8 PROVIDE ENGINE START/RUN SIGNALS FROM ATS TO STAND-BY GENERATOR.
- 9 PROVIDE 120V, 20A BATTERY CHARGING CIRCUIT FROM PANEL LP-D.
- 10 PROVIDE 120V, 20A CIRCUIT FOR ENGINE BLOCK HEATER FROM PANEL LP-D. REFER TO SHEET E-4 FOR PANEL SCHEDULE.
- 11 PROVIDE 120V, 20A BATTERY HEATING CIRCUIT FROM PANEL LP-D. REFER TO SHEET E-4 FOR PANEL SCHEDULE.
- 12 PROVIDE 120V, 20A ALTERNATOR STRIP HEATER CIRCUIT FROM PANEL LP-D. REFER TO SHEET E-4 FOR PANEL SCHEDULE.
- 13 PROVIDE 120V, 20A SERVICE AND 5-20R DUPLEX GFCI OUTLET WITH WEATHERPROOF "IN USE" COVER AND BRANCH CIRCUIT FROM PANEL LP-D.
- 14 REMOVE AND REINSTALL EXISTING CEILING AND LIGHTING AS REQUIRED TO ACCOMMODATE INSTALLATION OF GENERATOR CONDUITS.



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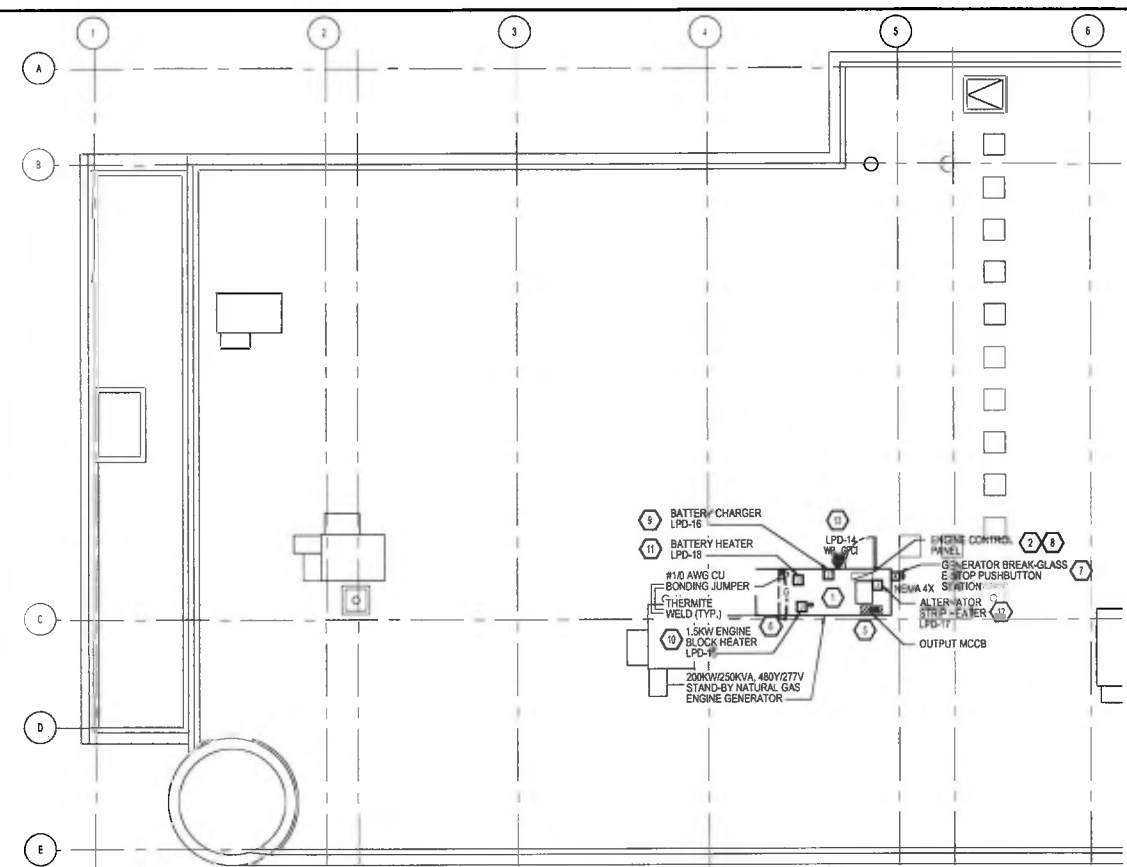
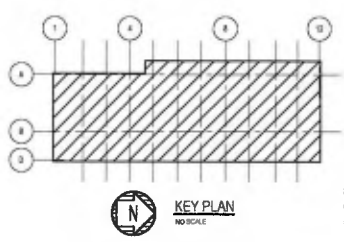
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**CITY OF ANN ARBOR  
FIRE STATION #1  
GENERATOR**  
ANN ARBOR, MICHIGAN

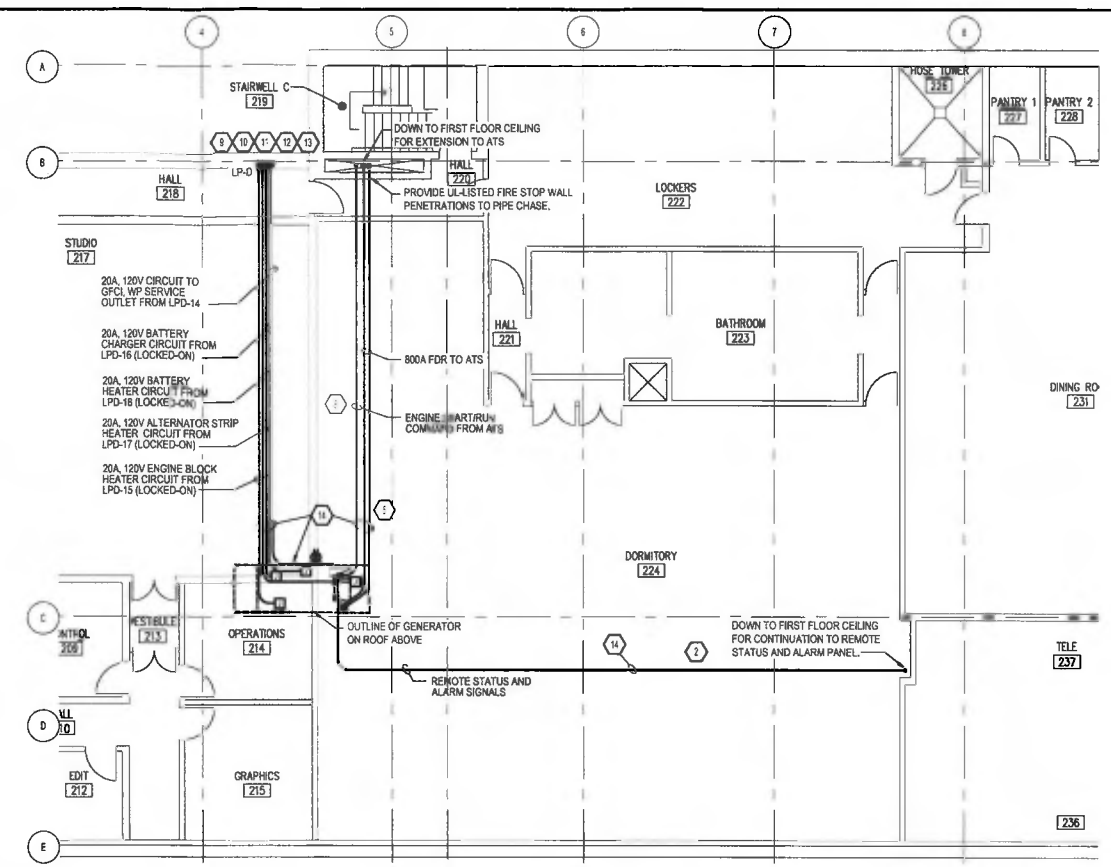
**ELECTRICAL PLANS  
- NEW WORK**  
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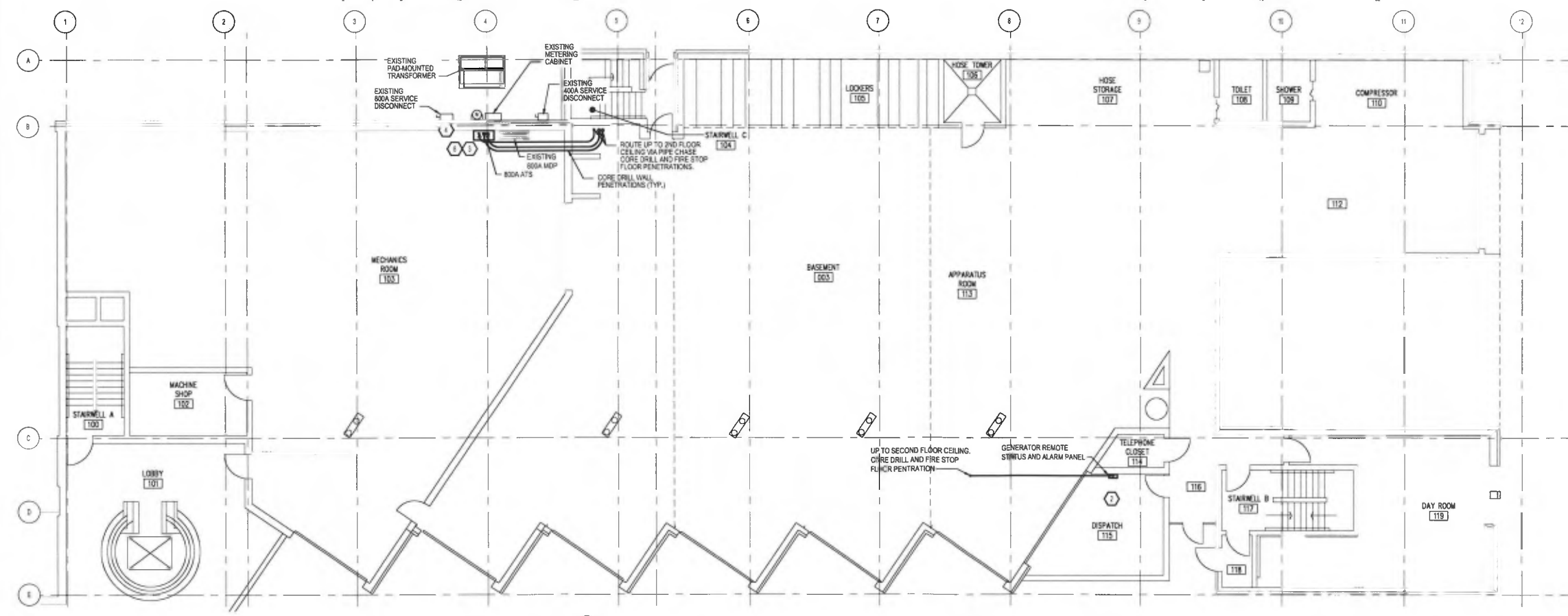
ISSUED FOR	DATE
OWNER REVIEW	08/21/17
100% REVIEW	08/21/17
BIDS	10/05/17



**PARTIAL ROOF PLAN - ELECTRICAL**  
SCALE: 1/8" = 1'-0"



**PARTIAL SECOND FLOOR PLAN - ELECTRICAL**  
SCALE: 1/8" = 1'-0"



**PARTIAL FIRST FLOOR PLAN - ELECTRICAL**  
SCALE: 1/8" = 1'-0"

DESIGNER	JCD
DRAWN	DA
PM / PIC	JRS/SH
CHECKED	SM
ACAD FILE	17-1304E3
PROJECT NO.	17-1304

**EXISTING**

**120/208VOLT-3PHASE-4WIRE+GRND PANELBOARD SCHEDULE**

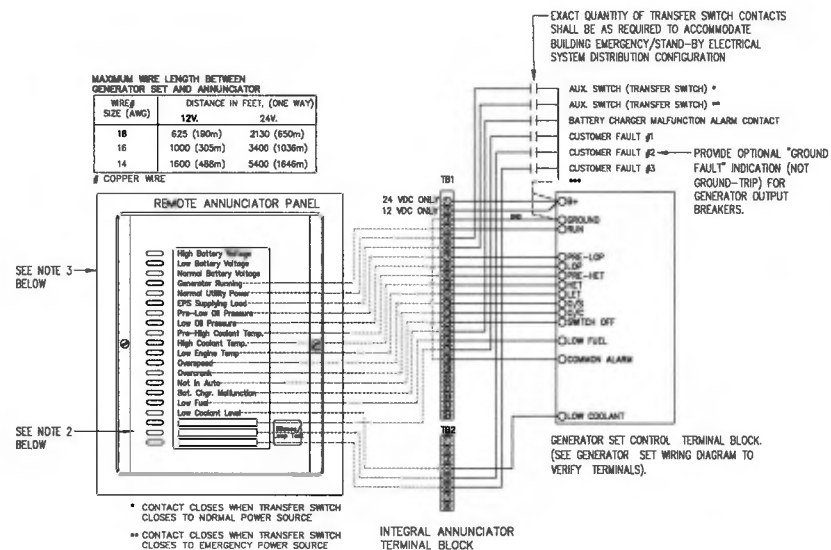
NO	VA	LOAD TYPE	A	B	C	LOAD TYPE	VA	NO
1	1100	LIGHTS				(8) RECEPTACLES	1080	2
3	1600	LIGHTS				(5) RECEPTACLES	900	4
5	1600	LIGHTS				(8) RECEPTACLES	1080	6
7	300	LIGHTS				(7) RECEPTACLES	1260	8
9	1400	LIGHTS				SPARE		10
11	-	SPARE				SPARE		12
13	-	SPARE				GFCI ROOF SERVICE OUTLET	180	14
15	1500	STAND-BY GENERATOR COOLANT JACKET HEATER				STAND-BY GENERATOR BATTERY CHARGER	300	16
17	750	STAND-BY GENERATOR ALTERNATOR STRIP HEATER				STAND-BY GENERATOR BATTERY HEATER	750	18
19	1,200	EXISTING LOAD				EXISTING LOAD	1,200	20
21	1,200	EXISTING LOAD				EXISTING LOAD	1,200	22
23		SPACE				SPACE		24

LIGHTING	8,000 VA	AT 100 %	=	8,000 VA
RECEPTACLE	4,500 VA	AT 100 %	=	4,500 VA
RECEPTACLE	VA	AT 50 %	=	VA
MISC.	8,100 VA	AT 100 %	=	8,100 VA
TOTAL	18,600 VA	TOTAL DEMAND	=	18,600 VA

**NOTES:**

- CONTRACTOR TO UPDATE THE PANEL DIRECTORY.
- ALL BREAKERS ARE EXISTING 20A-1P.
- CONTRACTOR TO FIELD VERIFY PANEL CONDITIONS PRIOR TO COMMENCEMENT OF WORK.
- CIRCUIT NUMBERS SHOWN ARE FOR DESIGN INTENT ONLY.



**TYPICAL UTILITY BACKUP GENERATOR  
REMOTE ANNUNCIATOR PANEL DETAIL**

NOT TO SCALE

**NOTES:**

- DIAGRAM IS SHOWN FOR REFERENCE ONLY. EXACT QUANTITY AND TYPE OF INTERCONNECTION WIRING SHALL BE DETERMINED BY MANUFACTURER'S REQUIREMENTS.
- "GROUND FAULT" CONDITION (NOT GROUND-TRIP) OF GENERATOR OUTPUT BREAKERS SHALL BE MONITORED AT THE REMOTE ANNUNCIATOR.
- LOCATE REMOTE ANNUNCIATOR PANEL AT FIRST FLOOR, ROOM 115 (OLD DISPATCH OFFICE).



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**CITY OF ANN ARBOR  
FIRE STATION #1  
GENERATOR**  
ANN ARBOR, MICHIGAN

**DIAGRAMS &  
DETAILS**

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ISSUED FOR	DATE
OWNER REVIEW	09/21/17
100% REVIEW	09/21/17
BIDS	10/06/17

DESIGNER	JJD
DRAWN	DA
PM / PIC	JRSW
CHECKED	SM
ACAD FILE	17-1304-E
PROJECT NO.	<b>17-1304</b>



ENGINE

FUEL: NATURAL GAS.
RATED ENGINE SPEED: 1800 RPM.
LUBRICATION SYSTEM: ENGINE OR SKID MOUNTED.
JACKET COOLANT HEATER: ELECTRIC-IMMERSION TYPE, FACTORY INSTALLED IN COOLANT JACKET SYSTEM...

STARTING SYSTEM: 24-V ELECTRIC, WITH NEGATIVE GROUND.
COMPONENTS: SIZED SO THEY ARE NOT DAMAGED DURING A FULL ENGINE-CRANKING CYCLE, WITH MAXIMUM SPECIFIED AMBIENT.
CRANKING CYCLE: AS REQUIRED BY NFPA 110 FOR SYSTEM LEVEL SPECIFIED.
BATTERY: SEALED LEAD-CALCIUM AGM TYPE WITH CAPACITY WITHIN AMBIENT TEMPERATURE RANGE...

ENGINE FUEL SYSTEM - GAS TRAIN: COMPLY WITH NFPA 37.
ENGINE FUEL SYSTEM - NATURAL GAS, WITH SECONDARY GAS REGULATOR AND NRTL-LISTED, NORMALLY CLOSED FUEL SAFETY SHUTOFF SOLENOID VALVE, FUEL FILTER, MANUAL FUEL SHUTOFF VALVE, AND FLEXIBLE FUEL CONNECTOR.

CONTROL AND MONITORING
AUTOMATIC STARTING SEQUENCE OF OPERATION: WHEN MODE-SELECTOR SWITCH ON THE CONTROL AND MONITORING PANEL IS IN THE AUTOMATIC POSITION, REMOTE-CONTROL CONTACTS IN ONE OR MORE SEPARATE AUTOMATIC TRANSFER SWITCHES INITIATE STARTING AND STOPPING OF ENGINE GENERATOR...

CONFIGURATION: OPERATING AND SAFETY INDICATIONS, PROTECTIVE DEVICES, BASIC SYSTEM CONTROLS, AND ENGINE GAGES SHALL BE GROUPED IN A COMMON CONTROL AND MONITORING PANEL MOUNTED ON THE ENGINE GENERATOR. MOUNTING METHOD SHALL ISOLATE THE CONTROL PANEL FROM ENGINE GENERATOR VIBRATION. PANEL SHALL BE POWERED FROM THE ENGINE GENERATOR BATTERY.

INSTRUMENTS: LOCATED ON THE CONTROL AND MONITORING PANEL, AND VIEWABLE DURING OPERATION.
1. ENGINE LUBRICATING-OIL PRESSURE GAGE.
2. ENGINE-COOLANT TEMPERATURE GAGE.
3. DC VOLTMETER (ALTERNATOR BATTERY CHARGING).

INDICATION AS REQUIRED BY NFPA 110 FOR LEVEL 1 SYSTEM, INCLUDING THE FOLLOWING:
1. CRANKING CONTROL EQUIPMENT.
2. RUN-OFF-AUTO SWITCH.
3. CONTROL SWITCH NOT IN AUTOMATIC POSITION ALARM.
4. OVERCRANK ALARM.
5. OVERCRANK SHUTDOWN DEVICE.
6. LOW WATER TEMPERATURE ALARM.
7. HIGH ENGINE TEMPERATURE PRE-ALARM.
8. HIGH ENGINE TEMPERATURE.
9. HIGH ENGINE TEMPERATURE SHUTDOWN DEVICE.
10. OVERSPEED ALARM.
11. OVERSPEED SHUTDOWN DEVICE.
12. COOLANT LOW-LEVEL ALARM.
13. COOLANT LOW-LEVEL SHUTDOWN DEVICE.
14. BATTERY HIGH-VOLTAGE ALARM.
15. LOW-CRANKING VOLTAGE ALARM.
16. BATTERY-CHARGER MALFUNCTION ALARM.
17. BATTERY LOW-VOLTAGE ALARM.
18. LAMP TEST.
19. CONTACTS FOR LOCAL AND REMOTE COMMON ALARM.
20. REMOTE MANUAL-STOP SHUTDOWN DEVICE.
21. GENERATOR OVERCURRENT-PROTECTIVE-DEVICE NOT-CLOSED ALARM.
22. COMMON REMOTE PANEL WITH COMMON ALARM. COMPLY WITH NFPA 110 REQUIREMENTS FOR LEVEL 1 SYSTEMS.

SUPPORTING ITEMS: INCLUDE SENSORS, TRANSDUCERS, TERMINALS, RELAYS, AND OTHER DEVICES AND INCLUDE WIRING REQUIRED TO SUPPORT SPECIFIED ITEMS. LOCATE SENSORS AND OTHER SUPPORTING ITEMS ON ENGINE OR GENERATOR UNLESS OTHERWISE INDICATED.

OVERCURRENT PROTECTIVE DEVICES FOR THE ENTIRE EPSS SHALL BE COORDINATED TO OPTIMIZE SELECTIVE TRIPPING WHEN A SHORT CIRCUIT OCCURS. COORDINATION OF PROTECTIVE DEVICES SHALL CONSIDER BOTH UTILITY AND EPSS AS THE VOLTAGE SOURCE.
OVERCURRENT PROTECTIVE DEVICES FOR THE EPSS SHALL BE ACCESSIBLE ONLY TO AUTHORIZED PERSONNEL.

GENERATOR CIRCUIT BREAKER: MOLDED-CASE, ELECTRONIC-TRIP TYPE; 100 PERCENT RATED; COMPLYING WITH UL 489.
TRIPPING CHARACTERISTICS: ADJUSTABLE LONG-TIME AND SHORT-TIME DELAY AND INSTANTANEOUS.
TRIP SETTINGS: SELECTED TO COORDINATE WITH GENERATOR THERMAL DAMAGE CURVE.

GROUND-FAULT INDICATION: COMPLY WITH NFPA 70 ARTICLE 700, "EMERGENCY SYSTEM" SIGNALS FOR GROUND FAULT.
INDICATE GROUND FAULT WITH OTHER ENGINE GENERATOR ALARM INDICATIONS.
TRIP GENERATOR PROTECTIVE DEVICE ON GROUND FAULT.

GENERATOR, EXCITER, AND VOLTAGE REGULATOR
COMPLY WITH NEMA MG 1.
DRIVE: GENERATOR SHAFT SHALL BE DIRECTLY CONNECTED TO ENGINE SHAFT. EXCITER SHALL BE ROTATED INTEGRALLY WITH GENERATOR ROTOR.

ELECTRICAL INSULATION: CLASS H.
CONSTRUCTION SHALL PREVENT MECHANICAL, ELECTRICAL, AND THERMAL DAMAGE DUE TO VIBRATION, OVERSPEED UP TO 125 PERCENT OF RATING, AND HEAT DURING OPERATION AT 110 PERCENT OF RATED CAPACITY.

1. ADJUSTING RHEOSTAT ON CONTROL AND MONITORING PANEL: PROVIDE PLUS OR MINUS 5 PERCENT ADJUSTMENT OF OUTPUT-VOLTAGE OPERATING BAND.
2. MAINTAIN VOLTAGE WITHIN 15 PERCENT ON ONE STEP, FULL LOAD.
3. PROVIDE ANTI-LIMIT PROVISION TO STABILIZE VOLTAGE.

WINDINGS: TWO-THIRDS PITCH STATOR WINDING AND FULLY LINKED AMORTISSEUR WINDING.
SUBTRANSIENT REACTANCE: 12 PERCENT, MAXIMUM.

VIBRATION ISOLATION DEVICES
ELASTOMERIC ISOLATOR PADS: OIL- AND WATER-RESISTANT ELASTOMER OR NATURAL RUBBER, ARRANGED IN SINGLE OR MULTIPLE LAYERS, MOLDED WITH A NONSLIP PATTERN AND GALVANIZED-STEEL BASEPLATES OF SUFFICIENT STIFFNESS FOR UNIFORM LOADING OVER PAD AREA, AND FACTORY CUT TO SIZES THAT MATCH REQUIREMENTS OF SUPPORTED EQUIPMENT.

INSTALLATION
INTERRUPTION OF EXISTING ELECTRICAL SERVICE: DO NOT INTERRUPT ELECTRICAL SERVICE TO FACILITIES OCCUPIED BY OWNER OR OTHERS UNLESS PERMITTED UNDER THE FOLLOWING CONDITIONS AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY ELECTRICAL SERVICE ACCORDING TO REQUIREMENTS INDICATED.

1. NOTIFY OWNER NO FEWER THAN TWO WORKING DAYS IN ADVANCE OF PROPOSED INTERRUPTION OF ELECTRICAL SERVICE.
2. DO NOT PROCEED WITH INTERRUPTION OF ELECTRICAL SERVICE WITHOUT OWNER'S WRITTEN PERMISSION.
COMPLY WITH NECA 1 AND NECA 404.

FIELD QUALITY CONTROL
MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TEST AND INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS.
ENGAGE A QUALIFIED TESTING AGENCY TO PERFORM TESTS AND INSPECTIONS.

PERFORM TESTS AND INSPECTIONS WITH THE ASSISTANCE OF A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE.
PERFORM TESTS RECOMMENDED BY MANUFACTURER AND EACH VISUAL AND MECHANICAL INSPECTION AND ELECTRICAL AND MECHANICAL TEST AS SPECIFIED IN NET/ATS. CERTIFY COMPLIANCE WITH TEST PARAMETERS.

NFPA 110 ACCEPTANCE TESTS: PERFORM TESTS REQUIRED BY NFPA 110 THAT ARE ADDITIONAL TO THOSE SPECIFIED HERE INCLUDING, BUT NOT LIMITED TO, SINGLE-STEP FULL-LOAD PICKUP TEST. PROVIDE A LOAD BANK FOR FULL LOAD TEST.
BATTERY-CHARGER TESTS: VERIFY SPECIFIED RATES OF CHARGE FOR BOTH EQUALIZING AND FLOAT-CHARGING CONDITIONS.

SYSTEM INTEGRITY TESTS: METHODICALLY VERIFY PROPER INSTALLATION, CONNECTION, AND INTEGRITY OF EACH ELEMENT OF ENGINE GENERATOR SYSTEM BEFORE AND DURING SYSTEM OPERATION. CHECK FOR AIR, EXHAUST, AND FLUID LEAKS.
COORDINATE TESTS WITH TESTS FOR TRANSFER SWITCHES AND RUN THEM CONCURRENTLY.

OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION FOR GENERATOR AND ASSOCIATED EQUIPMENT.
TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN PACKAGED ENGINE GENERATORS.



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ELECTRICAL
SPECIFICATIONS
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Table with 2 columns: ISSUED FOR, DATE. Rows include OWNER REVIEW (08/21/17), 100% REVIEW (08/21/17), BIDS (10/06/17).

Table with 2 columns: DESIGNER, DRAWN, PM / PIC, CHECKED, ACAD FILE, PROJECT No. Values include JCO, DA, JSR/SM, SM, 17-1304-66, 17-1304.