

MONTANA STATE UNIVERSITY

JOHNSON FAMILY LIVESTOCK FACILITY GENERATOR INSTALLATION

BOZEMAN, MONTANA



MSU-CPDC
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JOHNSON FAMILY
LIVESTOCK FACILITY
GENERATOR INSTALLATION



DRAWN BY:

REVIEWED BY:

REV.	DESCRIPTION	DATE

PPA#21-0049

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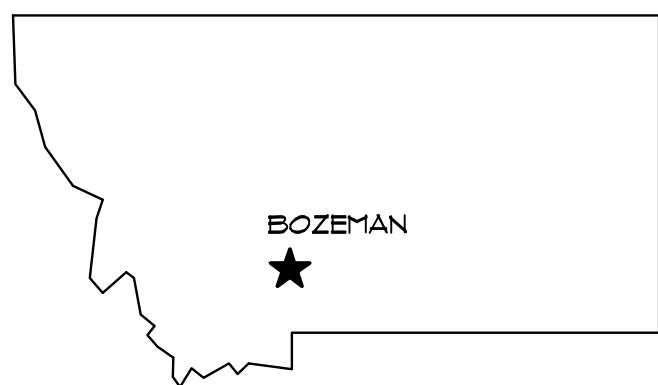
SHEET TITLE
COVER
SHEET

SHEET
G1.0

DATE
08-13-21

PROJECT LOCATION

STATE OF MONTANA MAP



BOZEMAN

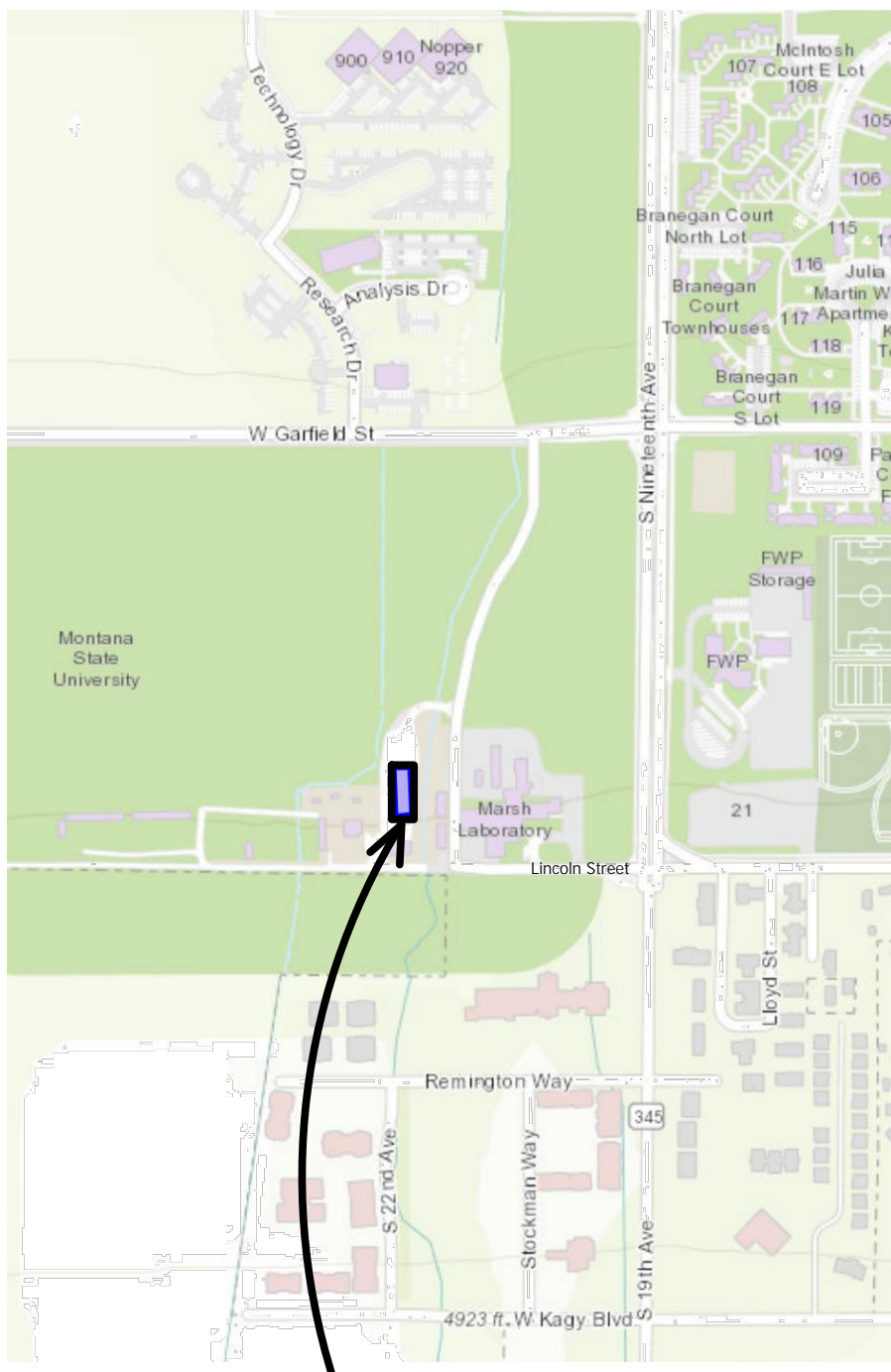
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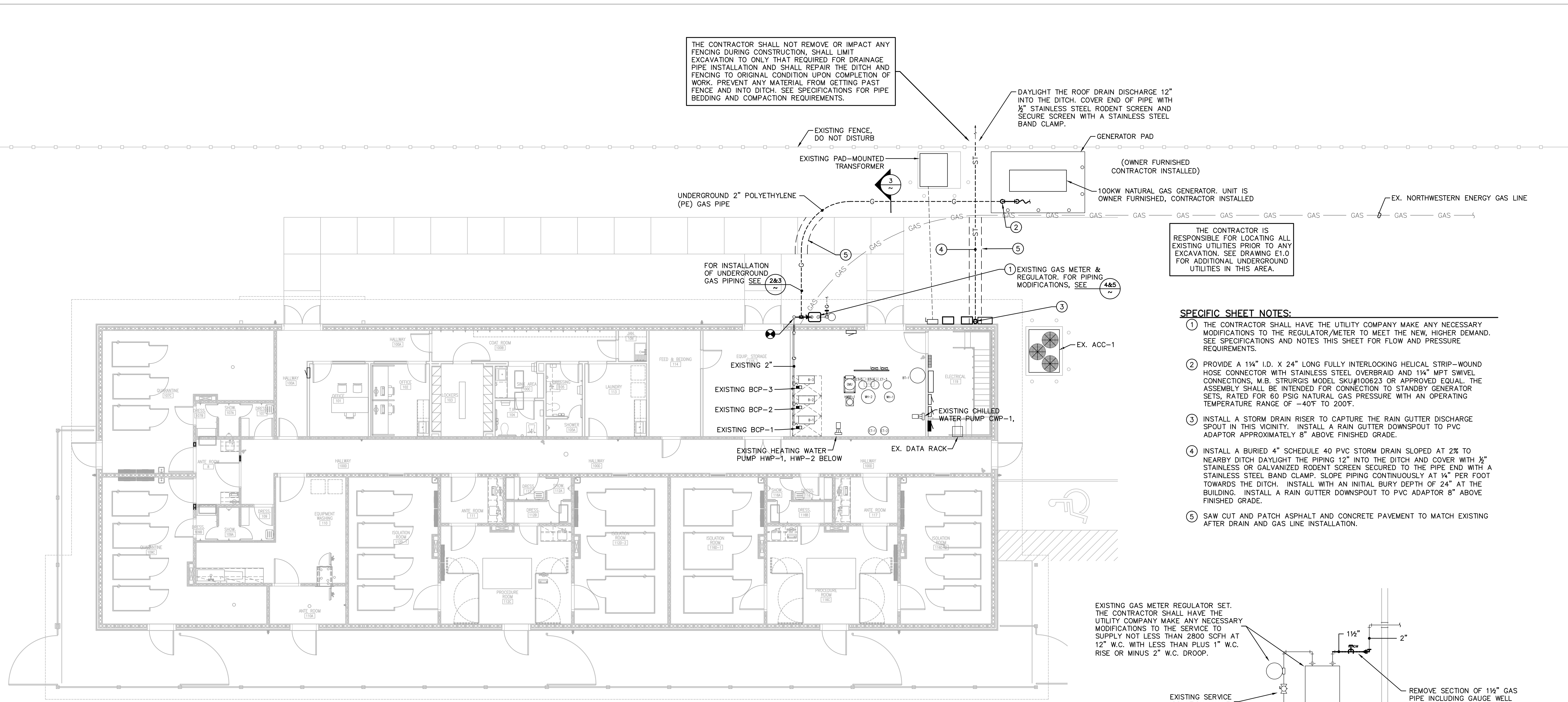
MONTANA STATE UNIVERSITY
JOHNSON FAMILY LIVESTOCK FACILITY
BOZEMAN, MONTANA 59711



PROJECT LOCATION

DRAWING INDEX

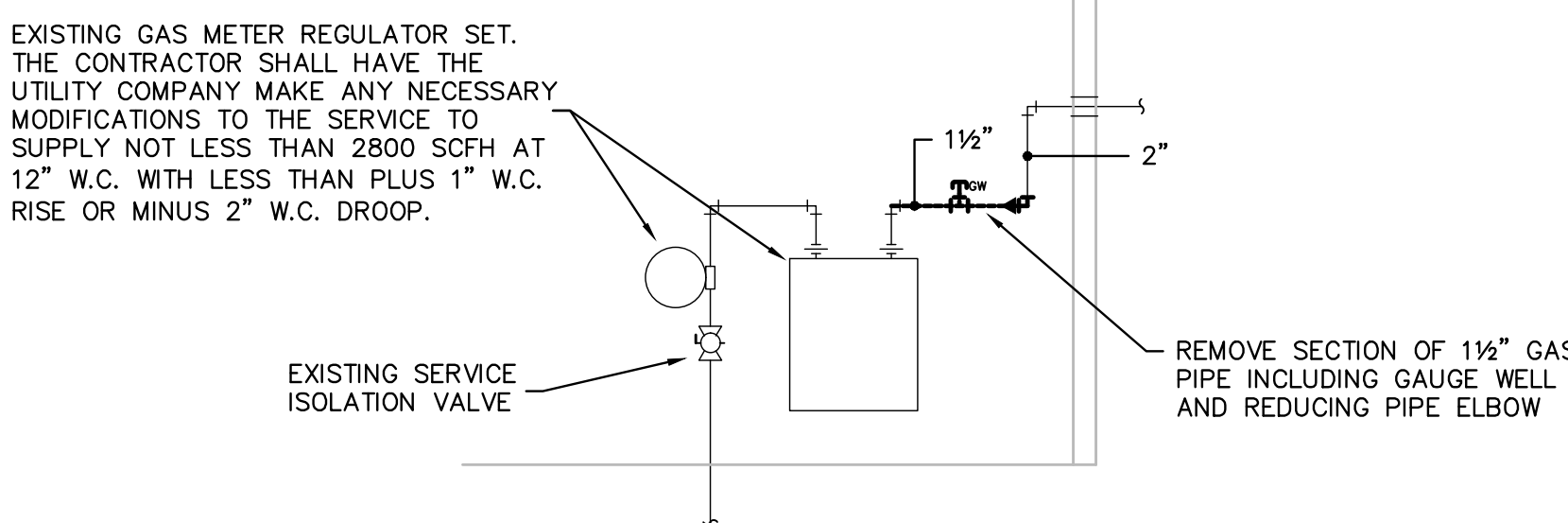
<u>GENERAL</u>	
G1.0	COVER SHEET
<u>MECHANICAL</u>	
M1.0	MECHANICAL PLAN
<u>ELECTRICAL</u>	
E1.0	ELECTRICAL PLAN
E2.0	ELECTRICAL DIAGRAMS, DETAILS, AND SCHEDULES



THE CONTRACTOR SHALL NOT REMOVE OR IMPACT ANY FENCING DURING CONSTRUCTION. SHALL LIMIT EXCAVATION TO ONLY THAT REQUIRED FOR DRAINAGE PIPE INSTALLATION AND SHALL REPAIR THE DITCH AND FENCING TO ORIGINAL CONDITION UPON COMPLETION OF WORK. PREVENT ANY MATERIAL FROM GETTING PAST FENCE AND INTO DITCH. SEE SPECIFICATIONS FOR PIPE BEDDING AND COMPACTION REQUIREMENTS.

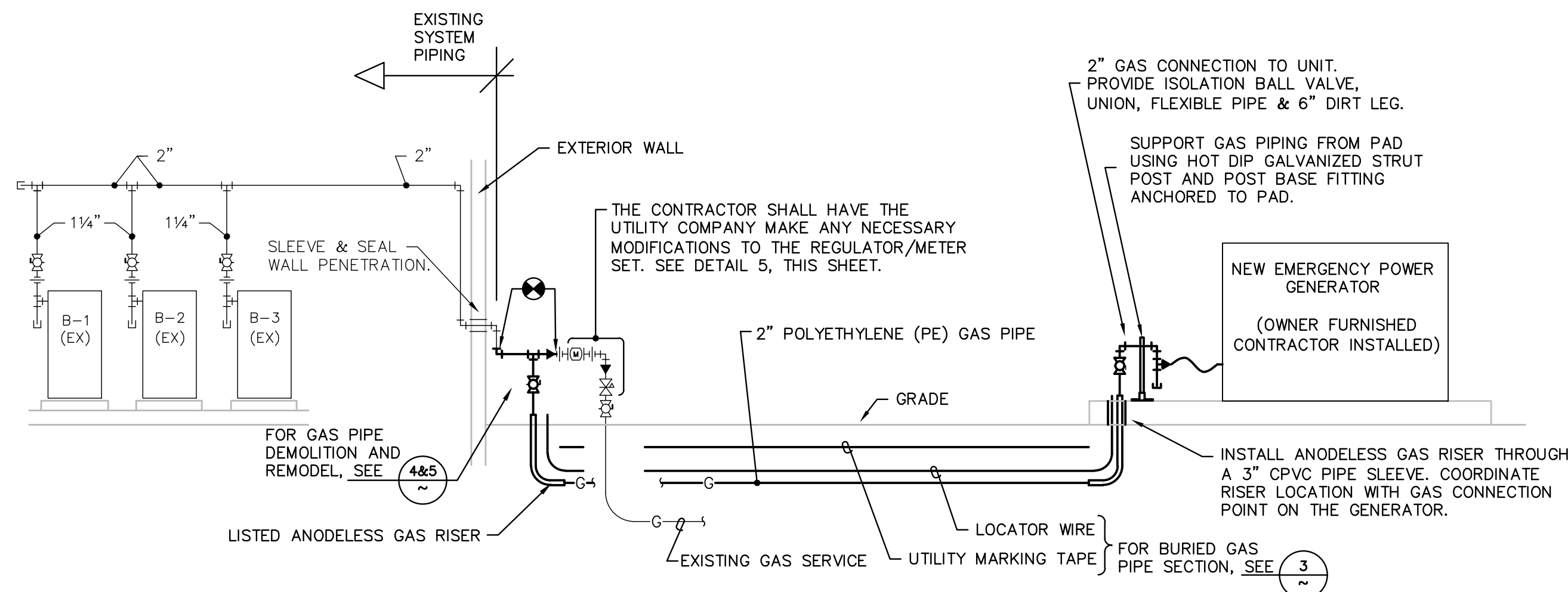
THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL EXISTING UTILITIES PRIOR TO ANY EXCAVATION. SEE DRAWING E1.0 FOR ADDITIONAL UNDERGROUND UTILITIES IN THIS AREA.

- SPECIFIC SHEET NOTES:**
- THE CONTRACTOR SHALL HAVE THE UTILITY COMPANY MAKE ANY NECESSARY MODIFICATIONS TO THE REGULATOR/METER TO MEET THE NEW, HIGHER DEMAND. SEE SPECIFICATIONS AND NOTES THIS SHEET FOR FLOW AND PRESSURE REQUIREMENTS.
 - PROVIDE A 1 1/4" I.D. X 24" LONG FULLY INTERLOCKING HELICAL STRIP-WOUND HOSE CONNECTOR WITH STAINLESS STEEL OVERBRAID AND 1 1/4" MPT SWIVEL CONNECTIONS, M.B. STRURGIS MODEL SKU#100623 OR APPROVED EQUAL. THE ASSEMBLY SHALL BE INTENDED FOR CONNECTION TO STANDBY GENERATOR SETS, RATED FOR 60 PSIG NATURAL GAS PRESSURE WITH AN OPERATING TEMPERATURE RANGE OF -40°F TO 200°F.
 - INSTALL A STORM DRAIN RISER TO CAPTURE THE RAIN GUTTER DISCHARGE SPOUT IN THIS VICINITY. INSTALL A RAIN GUTTER DOWNSPOUT TO PVC ADAPTOR APPROXIMATELY 8" ABOVE FINISHED GRADE.
 - INSTALL A BURIED 4" SCHEDULE 40 PVC STORM DRAIN SLOPED AT 2% TO NEARBY DITCH DAYLIGHT THE PIPING 12" INTO THE DITCH AND COVER WITH 2" STAINLESS OR GALVANIZED RODENT SCREEN SECURED TO THE PIPE END WITH A STAINLESS STEEL BAND CLAMP. SLOPE PIPING CONTINUOUSLY AT 1/4" PER FOOT TOWARDS THE DITCH. INSTALL WITH AN INITIAL BURY DEPTH OF 24" AT THE BUILDING. INSTALL A RAIN GUTTER DOWNSPOUT TO PVC ADAPTOR 8" ABOVE FINISHED GRADE.
 - SAW CUT AND PATCH ASPHALT AND CONCRETE PAVEMENT TO MATCH EXISTING AFTER DRAIN AND GAS LINE INSTALLATION.

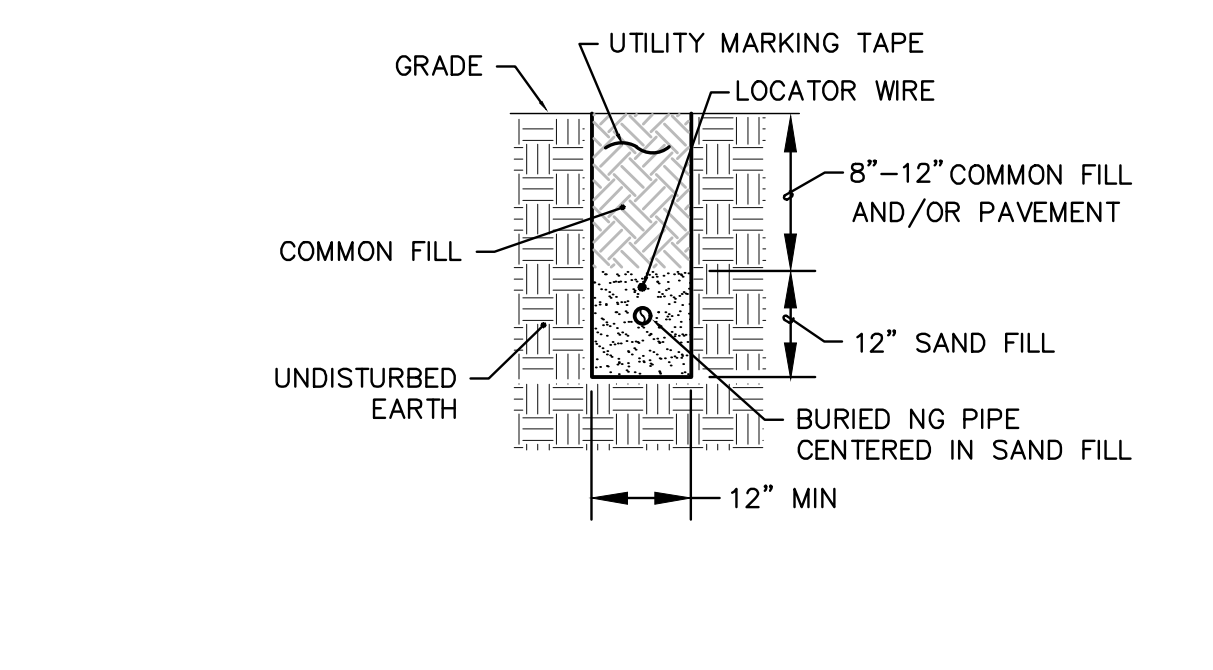


4 GAS METER PIPING DEMOLITION
NO SCALE

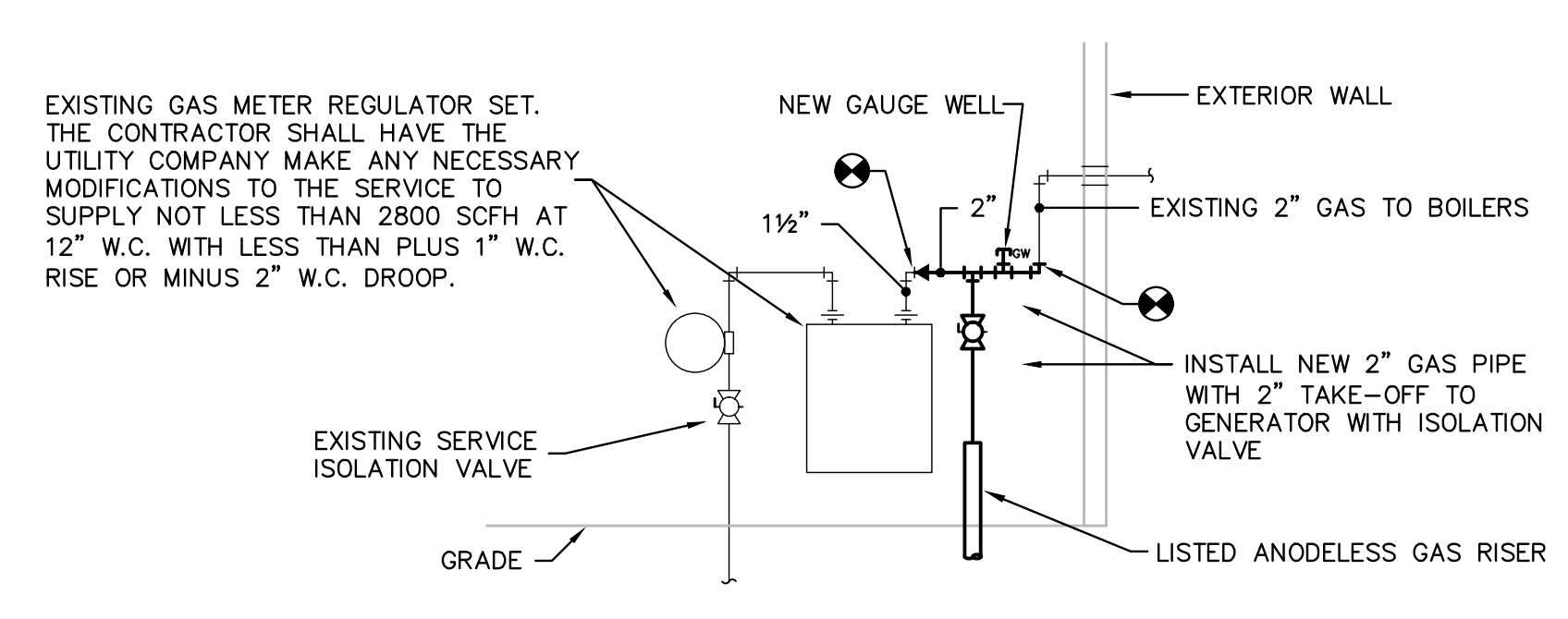
1 MECHANICAL PLAN
SCALE: 1/8"=1'-0"



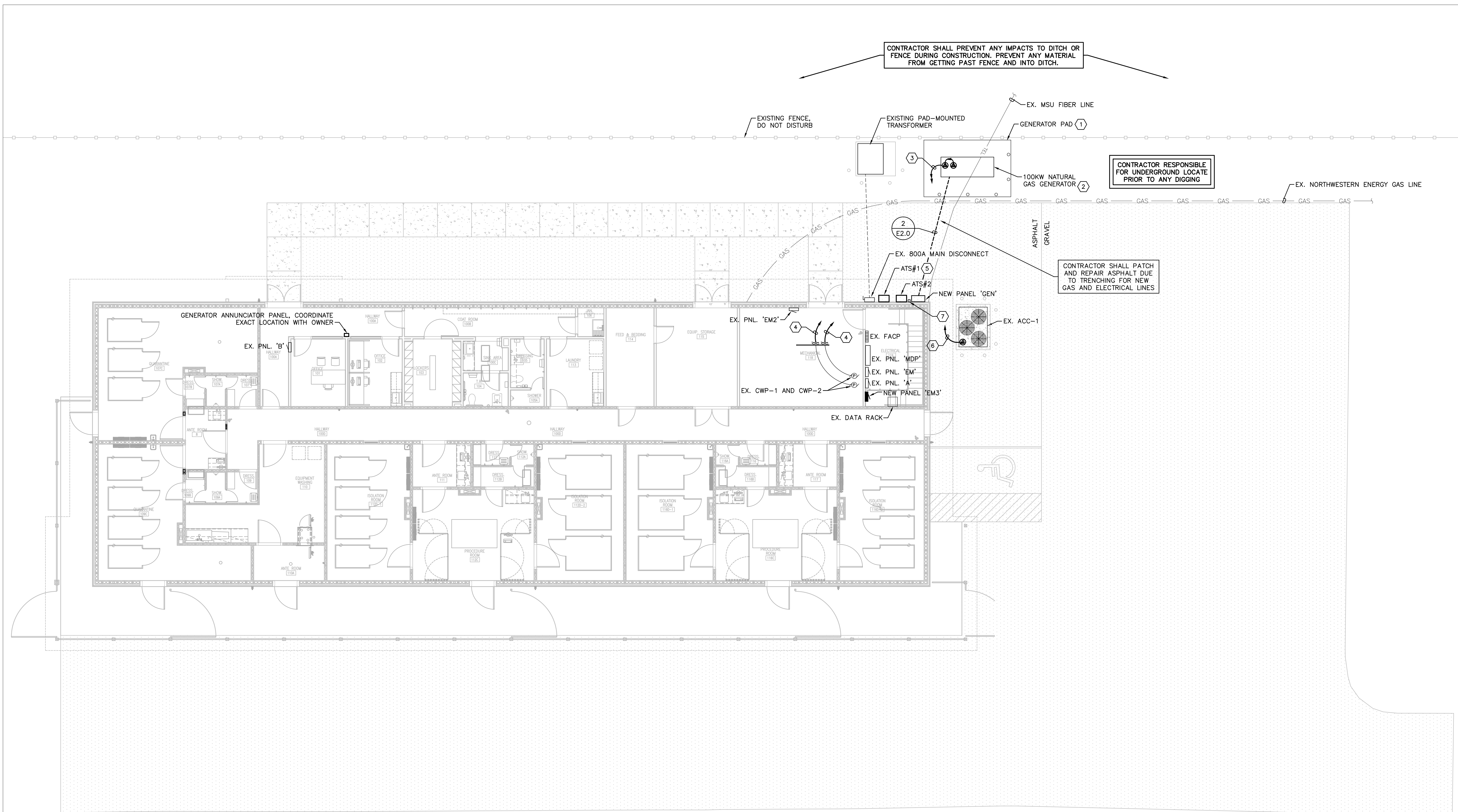
2 NATURAL GAS PIPING
NO SCALE



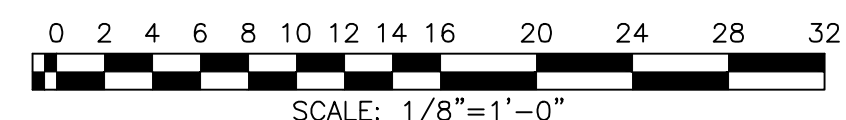
3 NATURAL GAS BURIED PIPING SECTION
NO SCALE



5 GAS METER PIPING REMODEL
NO SCALE



1 ELECTRICAL PLAN

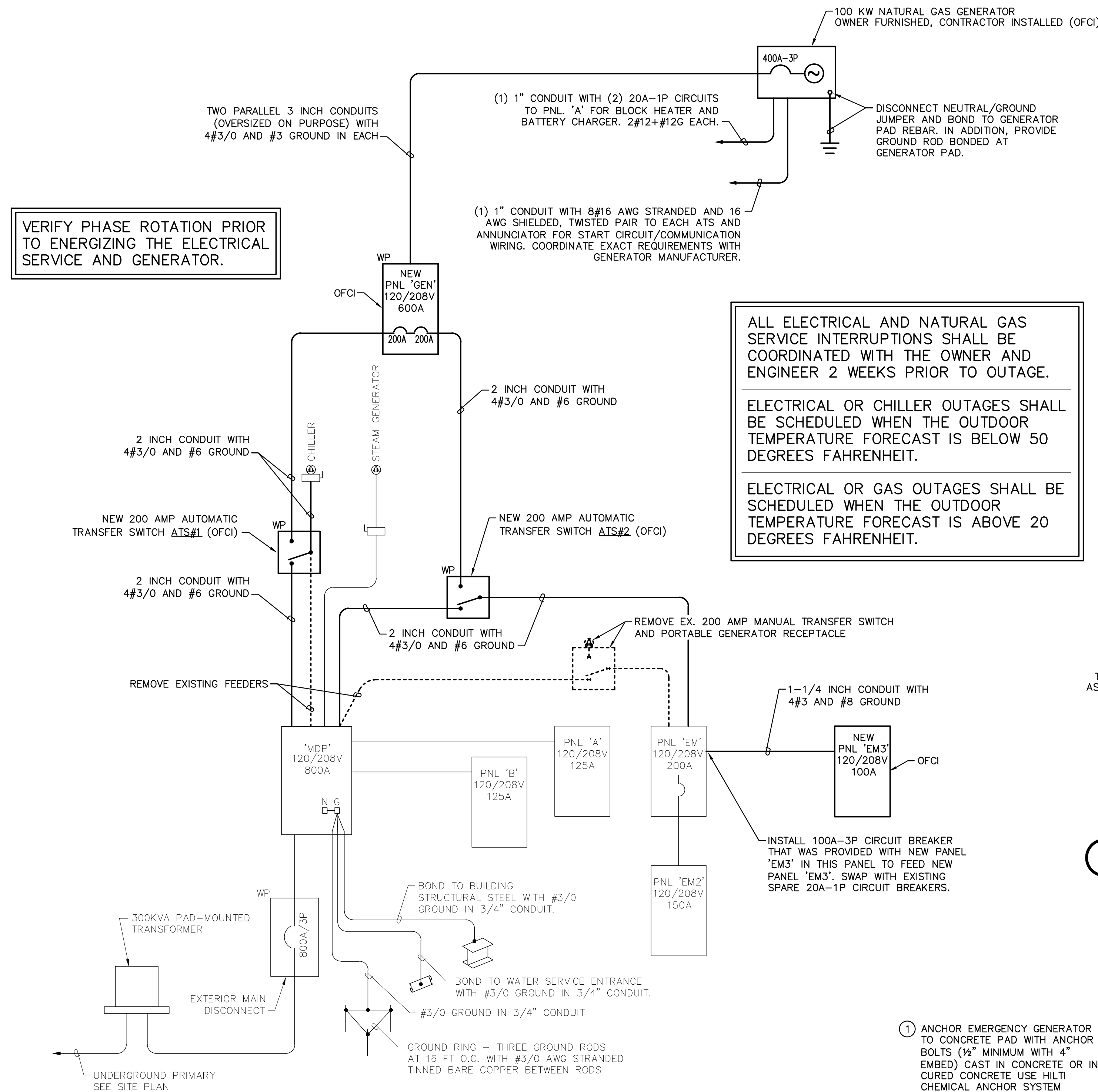


GENERAL PROJECT NOTES:

- CONTRACTOR IS RESPONSIBLE FOR ALL WORK TO COMPLETE PROJECT, INCLUDING, BUT NOT LIMITED TO: PERMITS, ELECTRICAL WORK, EARTHWORK, CONCRETE, FENCING, CORE-DRILLING, PATCHING/PAINTING AND GAS PIPING.
- INSTALLATION OF ALL ELECTRICAL EQUIPMENT TO BE IN ACCORD WITH THE NATIONAL ELECTRICAL CODE AND OTHER APPLICABLE LOCAL CODES. THE CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED FOR THIS PROJECT.
- ALL ELECTRICAL AND NATURAL GAS SERVICE INTERRUPTIONS SHALL BE COORDINATED WITH THE OWNER AND ENGINEER 2 WEEKS PRIOR TO OUTAGE. SEE ONE-LINE DIAGRAM ON SHEET E2.0 FOR ADDITIONAL TEMPERATURE/WEATHER REQUIREMENTS.
- GENERATOR, TRANSFER SWITCHES, AND PANELBOARDS ARE OWNER FURNISHED/CONTRACTOR INSTALLED. CONTRACTOR SHALL PROVIDE MEANS FOR MOVING ALL EQUIPMENT FROM MSU CAMPUS STORES TO SITE AND TO PLACE GENERATOR ONTO CONCRETE PAD.
- CONTRACTOR SHALL ASSIST GENERATOR VENDOR WITH START UP AND TESTING (ALLOW FOR 8 HOURS OF ON-SITE TESTING SUPPORT).

SPECIFIC SHEET NOTES:

- PROVIDE CONCRETE PAD FOR GENERATOR, SIZED AT 10'-0" X 15'-4", AND LOCATE 5 FEET FROM TRANSFORMER PAD. PROVIDE WITH (5) 6" DIAMETER STEEL BOLLARDS FILLED WITH CONCRETE AND PAINTED YELLOW. LOCATE BOLLARDS AS TO NOT INTERFERE WITH GENERATOR ENCLOSURE DOORS. IN ADDITION, PROVIDE GROUND ROD AT PAD AND BOND TO REBAR AND GENERATOR FRAME.
- PROVIDE ALL NATURAL GAS PIPING AND CONNECTIONS TO NEW GENERATOR. SEE SHEET M1.0.
- PROVIDE 120V CONNECTIONS TO GENERATOR BLOCK HEATER AND BATTERY CHARGER. CONNECT TO SPARE 20A-1P CIRCUIT BREAKERS IN PANEL 'A' IN VIA 4#12 AND #12G IN 1" CONDUIT.
- DISCONNECT EXISTING CHILLED WATER PUMP FROM PANEL 'A' AND CONNECT TO NEW PANEL 'EM3' VIA 3#12 AND #12G IN 3/4" CONDUIT. REUSE EXISTING CONDUIT AND WIRE AS MUCH AS POSSIBLE.
- REMOVE EX. MANUAL TRANSFER SWITCH AND GENERATOR RECEPTACLE. RETURN TO OWNER. REPLACE WITH NEW AUTOMATIC TRANSFER SWITCH #1.
- REFEED EXISTING CHILLER FROM NEW ATS#2. INTERCEPT CONDUIT AND WIRE IN ELECTRICAL ROOM. SEE ONE-LINE DIAGRAM FOR CONDUIT AND WIRE SIZING.
- PROVIDE NEW SELF-REGULATING HEAT TAPE FROM BOTTOM OF DOWNSPOUT INTO NEW UNDERGROUND PVC DRAIN PIPE. PROVIDE 30 FEET OF RAYCHEM HTV SERIES, 10 W/FT AT 120 VOLTS. CONNECT TO SPARE 20A-1P CIRCUIT BREAKER IN PANEL 'A'.



1 POWER ONE-LINE DIAGRAM
SCALE: NONE

PANELBOARD SCHEDULE - OFCI					
PANEL: EM3		MAIN BREAKER: MLO		MOUNTING: SURFACE	
CHARACTERISTICS: 120/208 VOLT, 3Ø, 4WIRE		FEEDERS: SEE ONE-LINE		FEED LOCATION: TOP	
MISCELLANEOUS: OWNER FURNISHED, CONTRACTOR INSTALLED		MINIMUM AIC: 10 KAMPS		MAIN BUS: 125 AMP	
WIRE SIZE	LOAD DESCRIPTION	CIRCUIT BREAKER #	WIRE SIZE	LOAD DESCRIPTION	WIRE SIZE
SPARE		100A-3P 1		SPARE	
		3			
		4			
		5			
SPARE		30A-3P 7		CHILLED WATER PUMP, CWP-1	#12
		9			
		11			
SPARE		20A-3P 13		CHILLED WATER PUMP, CWP-2	#12
		15			
		17			
SPARE		20A-1P 19		SPARE	
SPARE		20A-1P 21		SPARE	
SPARE		20A-1P 23		SPARE	
SPARE		20A-1P 25		SPARE	
SPARE		20A-1P 27		SPARE	
SPARE		20A-1P 29		SPARE	

ELECTRICAL PROJECT NOTES

- THE COMPLETE ELECTRICAL INSTALLATION SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, THE LATEST RULES AND REGULATIONS OF THE SAFETY ORDERS ISSUED BY THE DIVISION OF INDUSTRIAL SAFETY, THE NATIONAL BOARD OF FIRE UNDERWRITERS AND ALL APPLICABLE STATE AND LOCAL CODES ISSUED BY THE AUTHORITIES HAVING JURISDICTION.
- ELECTRICAL CONTRACTOR SHALL DIRECT, PROVIDE, & SUPERVISE ALL ELECTRICAL WORK AND SHALL COORDINATE ALL WORK WITH OTHER TRADES. THE CONTRACTOR SHALL CONSULT THE ARCHITECTURAL, MECHANICAL, AND OTHER DRAWINGS RELATED TO THIS PROJECT FOR OTHER ELECTRICAL WORK TO BE DONE, WHICH MAY NOT BE SHOWN ON ELECTRICAL PLANS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING ALL REQUIRED PERMITS AND INSPECTIONS.
- ELECTRICAL CONTRACTOR SHALL DETERMINE METHODS, PHASING, & SEQUENCE OF ELECTRICAL WORK TO SATISFY CONTRACT DOCUMENT REQUIREMENTS.
- ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL BE TOTALLY SEALED TO PREVENT THE SPREAD OF SMOKE, FIRE, TOXIC GASES, AND WATER THROUGH THE PENETRATION BEFORE, DURING AND AFTER A FIRE CONDITION. THE FIRE RATING OF THE SEALED PENETRATION SHALL BE AT LEAST THAT OF THE WALL INTO WHICH IT IS INSTALLED. THE SEAL SHALL PERMIT THE VIBRATION, EXPANSION AND/OR CONTRACTION OF THE CONDUIT PASSING THROUGH THE PENETRATION WITHOUT THE SEAL CRACKING OR CRUMBLING. CONSULT & REFERENCE ARCHITECTURAL PLANS FOR FIRE STOP SPECIFICATIONS. ALL FIRE STOPPING PRODUCTS SHALL BE APPROVED BY THE GENERAL CONTRACTOR SO THAT ONE COMMON PRODUCT LINE WILL BE USED ON THIS JOB.
- GREEN INSULATED GROUND CONDUCTORS SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUIT CONDUIT.
- ELECTRICAL EQUIPMENT AND FEEDERS SHALL BE SUPPORTED AND/OR ANCHORED IN ACCORDANCE WITH ALL LOCAL SEISMIC REQUIREMENTS.
- ELECTRICAL CONTRACTOR SHALL REVIEW & VERIFY ALL DIMENSIONS PRIOR TO WORK. REPORT ANY OBSERVED AMBIGUITY, OMISSION, OR ERROR, IN WRITING, AT ONCE, TO THE GENERAL CONTRACTOR.
- ELECTRICAL CONTRACTOR SHALL COORDINATE ALL BACKER, CONCRETE PADS, & STRUCTURAL RELATED FRAMING ISSUES, WITH THE GENERAL CONTRACTOR, PRIOR TO ROUGH-IN. CONDUIT WHICH SPAN STRUCTURAL SEISMIC JOINTS REQUIRE 12" MINIMUM FLEXIBLE JOINT & SUPPORT.

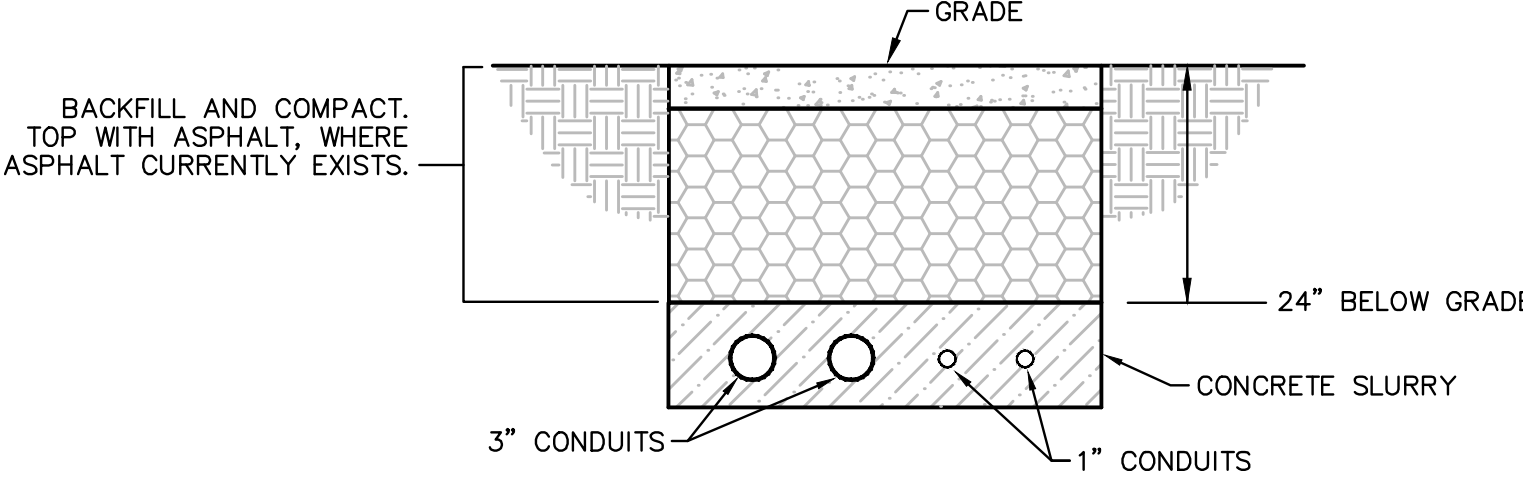
ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	POWER PANEL - 208Y/120 VOLT, 3Ø 4 WIRE
	VARIABLE FREQUENCY DRIVE
	DISCONNECT SWITCH
	BRANCH CIRCUIT CONCEALED IN WALL OR CEILING
	BRANCH CIRCUIT CONCEALED IN OR UNDER FLOOR
	CONDUIT RUN - NUMBER OF ARROWHEADS INDICATES THE NUMBER OF CIRCUITS REQUIRED.
	CONDUIT STUB
	DUPLEX CONVENIENCE RECEPTACLE
	MOTOR (M - MOTOR, F - FAN, P - PUMP)
	SPECIAL EQUIPMENT CONNECTION OR OUTLET AS NOTED
ABBREVIATIONS	DESCRIPTION
AIC	AMPS INTERRUPTING CURRENT
ATS	AUTOMATIC TRANSFER SWITCH
C	CONDUIT
EX	EXISTING
G, GRD	GROUND
GFI	GROUND FAULT CIRCUIT INTERRUPTER
HP	HORSEPOWER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
XFMR	TRANSFORMER
VFD	VARIABLE FREQUENCY DRIVE
WP	WEATHERPROOF
W/	WITH
GUIDE TO LINE	WEIGHTS FOR ELECTRICAL ITEMS
	ITEMS SHOWN LIGHT ARE EXISTING AND TO REMAIN
	ITEMS SHOWN BOLD AND SOLID ARE NEW
	ITEMS SHOWN BOLD AND DASHED ARE TO BE REMOVED

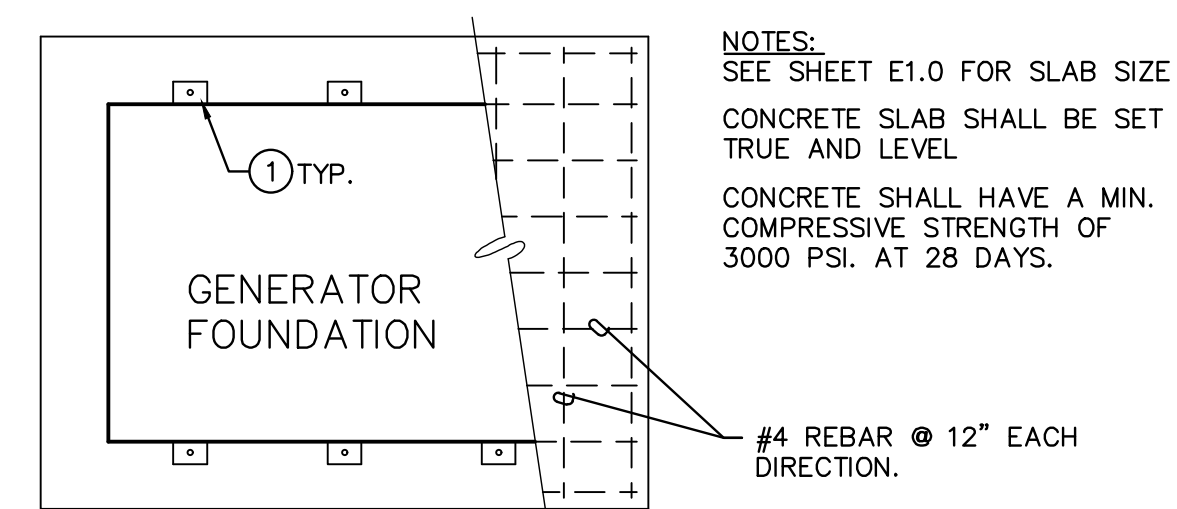
ALL ELECTRICAL AND NATURAL GAS SERVICE INTERRUPTIONS SHALL BE COORDINATED WITH THE OWNER AND ENGINEER 2 WEEKS PRIOR TO OUTAGE.

ELECTRICAL OR CHILLER OUTAGES SHALL BE SCHEDULED WHEN THE OUTDOOR TEMPERATURE FORECAST IS BELOW 50 DEGREES FAHRENHEIT.

ELECTRICAL OR GAS OUTAGES SHALL BE SCHEDULED WHEN THE OUTDOOR TEMPERATURE FORECAST IS ABOVE 20 DEGREES FAHRENHEIT.

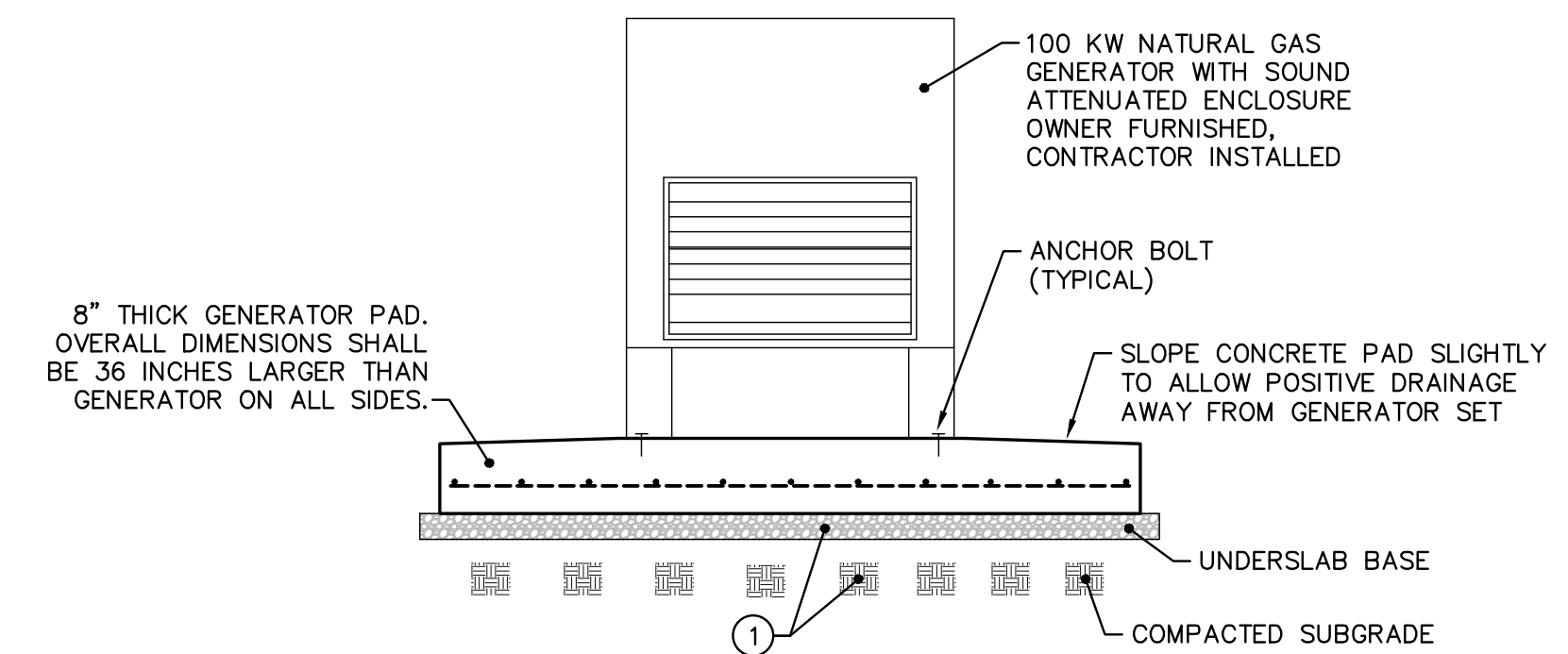


2 ELECTRICAL TRENCH DUCT DETAIL
SCALE: NONE



3 GENERATOR FOUNDATION PLAN
NO SCALE

PANELBOARD SCHEDULE - OFCI					
PANEL: GEN		MAIN BREAKER: MLO		MOUNTING: SURFACE	
CHARACTERISTICS: 120/208 VOLT, 3Ø, 4WIRE		FEEDERS: SEE ONE-LINE		FEED LOCATION: TOP	
MISCELLANEOUS: OWNER FURNISHED, CONTRACTOR INSTALLED		MINIMUM AIC: 22 KAMPS		MAIN BUS: 600 AMP	
WIRE SIZE	LOAD DESCRIPTION	CIRCUIT BREAKER #	WIRE SIZE	LOAD DESCRIPTION	WIRE SIZE
ATS#1 - PANELS 'EM', 'EM2', 'EM3'		200A-3P 1		ATS#2 - CHILLER	
		3			
		4			
		5			
SPARE		125A-3P 7		SPARE	
		9			
		11			
PROVISION		13		PROVISION	
		15			
		17			



4 GENERATOR FOUNDATION SECTION DETAIL
NO SCALE

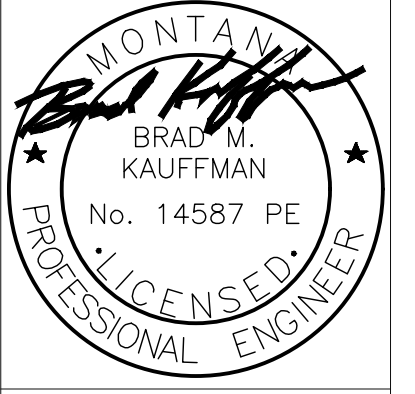


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SHEET TITLE
ELECTRICAL DIAGRAMS, DETAILS & SCHEDULES

SHEET
E2.0

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