

CODES AND STANDARDS

The work of this contract will be performed in accordance with:

- National Electrical Safety Code (NEC)
- Occupational Health and Safety Act and Regulations (for Construction Projects).
- City Regulations and By-laws
- Owner Safety and Security Regulations
- All codes, rules and regulations referenced in other sections.

The Contractor will comply with all municipal, State and Federal laws, by-laws, rules and regulations of all authorities having jurisdiction.

Whenever a code or standard is referred to in the drawings or specifications it shall be understood to be the latest revision to this code or standard that is intended.

Approvals

It is the Contractor's responsibility to obtain approval for all necessary drawings and documents from the Electrical Authority having Jurisdiction over the installation, before proceeding with the work. Two (2) copies of all approved drawings and documents shall be submitted to the Engineer. After completion of the work, the Contractor shall deliver to the Engineer a Certificate of Inspection and Approval obtained from the Electrical Authority.

The Contractor without cost to the Owner shall implement any changes required by the authorities.

IDENTIFICATION

Equipment and Devices

As a general rule, all electrical equipment shall be clearly identified with its equipment number, function and voltage.

Each power and distribution panelboard, transformer, circuit breaker, etc. shall be identified with white lamicoid nameplate with black engraving, mechanically secured to the front with screws or rivets (but never cement) to indicate function, voltage and equipment number as specified on the drawings.

Each power and distribution panelboard shall be equipped with a directory card, neatly typed with the final circuit designation and placed in the card holder under a transparent cover on the inside of the door of each panelboard. A lamicoid circuit identification nameplate shall be mounted adjacent to the circuit breaker handle for each circuit of the panelboard. Laminated plastic or stainless steel nameplates screwed to the equipment and engraved, to indicate the panel and branch circuit number to which they are connected shall identify all switches and plug outlets.

The Contractor shall install "High Voltage" warning signs and "Danger" signs as called for by the safety regulations in effect at the job site.

Cables and Conductors

All cables in panels; pull boxes; junction boxes and switchboards shall be tagged at both ends with the cable number assigned in the cable schedule/drawings. Tags shall be non-magnetic lamicoid type or approved equal with punched hole and attached to the cables with a nylon tie.

Both ends of all wires of each cable shall be clearly and permanently identified with wire markers, at the terminal to which they connect, with the proper wire number as shown on the drawings. Brady Type or equal non-ageing approved markers, which encircle the cable and cannot be removed unless, cut (i.e. heat shrink labels).

All terminals for external connection shall be plainly and permanently marked, on approved marking strips, to correspond with the wire number and diagram of connections.

CABLING

The Contractor shall provide a complete cable system with all materials, including cables, wire, connectors, lugs, fittings and wire and cable identification, as indicated or as specified on the drawings.

Cable Trays

Cable trays shall be solid/ladder type, fabricated sheet steel, and hot dipped galvanized after fabrication is complete. Cable tray and fittings shall be rated as Class C1.

Cable tray supports and hardware shall be hot dipped galvanized steel. All fittings, such as elbows, risers, tees, expansion joints, etc. shall be cable tray manufacturer's standard. A field-fabricated fitting will be used only if the particular fitting is not standard; the Engineer's approval must be obtained in such a case. The supports and fittings shall be suitable for maximum tray loading at maximum span.

Cable tray supports shall be fabricated using the type of support shown on the drawings. The supports may be modified to suit the particular application and location. Major deviations from the details shown on the drawings shall be submitted to the Engineer for approval. Additional supports shall be provided if the supports shown on the drawings are inadequate.

Conduits

Above ground conduits shall be rigid galvanized steel with threaded fittings. Minimum size shall be 0.75 inch (20 mm).

Conduits shall be installed as shown and detailed on the drawings. Minor deviations in routing to avoid interference will be permitted subject to the approval of the Engineer.

CABLE MATERIAL

13.2 kv Class Power Cables

The cable shall be single conductor 15kv rated, 133% insulation level, UL type, MV-105 with an overall PVC jacket and suitable for wet and dry location.

480 Volt Class Power Cables

Main and general 480 Volt class power cables shall be single or multi-conductor, 1000 Volt, (Armoured cable w/pvc jacket where applicable), stranded copper conductor, with uninsulated copper ground conductor, 90°C rated conductor type "RW 90, XLPE" flame-retardant low acid gas emitting PVC jacket with flame spread rating.

Control Cabling

Low voltage (120 VAC) control cable shall be 600 Volt rated, ((Armoured cable w/pvc jacket where applicable), single or multiple conductors. The minimum size shall be #14 AWG, stranded copper conductor, 90°C rated, PVC insulated with an overall flame retardant low acid gas emitting PVC jacket with FT4 flame spread rating. Conductors shall be colour coded per ICEA S-66-524 Method 1, Table K-2.

Instrumentation and 24VDC Control Cable

Instrumentation cables shall be 300 Volt rated, minimum # 18 AWG stranded tinned copper conductor, flame retardant, 90 °C PVC insulation, twisted pairs, triplets or quads, with aluminium Mylar shield, stranded tinned copper drain wire and overall PVC jackets. Conductors shall be ANSI colour coded. Instrument and signal cabling not installed in conduit, shall be as above, with the addition of metallic armour of interlocking aluminium with PVC jacket.

Thermocouple Cable

Thermocouple cables shall be Type J, solid conductor, and high temperature insulation, complete with aluminium foil/nylon shield with 18 AWG stranded tinned copper drain wire and PVC jacket. Conductors shall be ANSI colour coded.

ELECTRICAL INSTALLATION REQUIREMENTS

General Equipment Installation

The installation of equipment shall be defined as the receiving, off-loading, storing where necessary, moving into its designated location, uncrating, setting up, connection to other equipment and preparing for operation, all in accordance with the Specification and with the Vendor's instructions and Installation Manuals.

The installation of cables shall be defined as the receiving, off-loading, storing where necessary, pulling out of cables, placing in cable trays or conduit as required, fastening to cable trays, entering the cables into panels and terminating.

The Contractor shall ensure that the cables and equipment are kept clean and are protected against damage, dust and moisture.

Before any equipment is closed, it shall be checked to ensure that all foreign matter has been removed.

Cable ends shall be kept sealed to prevent the ingress of moisture.

On all equipment installed, touch up finished surfaces damaged during construction with the manufacturer's supplied touch up paint.

Unless otherwise specified, the Contractor shall supply, fabricate, construct and erect all support brackets on mountings for all equipment supplied by the Contractor.

Main Equipment Installation

Floor-mounted electrical equipment shall be plug welded to embedded channels, where provided, or clamped to finished floors with bolts and cinch anchors or other approved means, to provide an installation that is true, plumb, secure and safe.

Wall and column mounted equipment shall be fastened to steel brackets or plates welded to structural steel, or bolted to concrete walls or columns to provide an installation that is true, plumb, secure and safe.

Damaged electrical equipment shall be replaced or restored to its original shape; dents and marks smoothed; scratches and blemishes cleaned, primed and refinished to match the original finish.

Vendor drawings and instructions for the installation of Owner-furnished equipment will be made available to the Contractor. It shall be the responsibility of the Contractor to follow these documents during the installation, wiring, testing and energization of the said equipment.

Installation of safety signs as required by code regulations or stipulated by the Engineer shall be the responsibility of the Contractor.

Local Device Installation

Such devices include locally-mounted circuit breakers/safety disconnect devices, welding outlets, pushbutton and control stations, motor starters and lighting contactors and other equipment that is necessary to complete the installation of the electrical system.

The above-mentioned devices shall be installed in the proximity of their main equipment on walls; columns, stands or handrails as required and indicated on the drawings.

Pushbutton and control stations shall be installed on a steel channel stand cinch-anchored to the motor concrete pad or slab as shown on the detail drawings.

The top of control station shall be 4 feet (1.2 metres) from grade or floor.

INSTALLATION

The Contractor shall install cable and terminate the instrumentation system as indicated on the drawings and in accordance with the manufacturer's instructions.

DETAILED PROJECT SPECIFIC NOTES

- A. All the protective relays and associated instrument transformers shall be tested, relays programmed, installed and presented to the utility (National Grid) for acceptance. The relay logic and protection settings will be provided to the Contractor by the Owner.
- C. The Contractor to coordinate with National Grid for shutting down the power to Albany VA for installation, testing etc.
- D. The Contractor to coordinate with National Grid for the acceptance and testing of protective Relays that are of National Grid's interest.
- E. The protective relay logic shall be tested and the contractor shall make recommendations such as enhancement to the protective functions. The contractor shall also accommodate any changes in the programming logic.
- F. The contractor to be responsible for the integration of the Gas Generator to the new 480V Switchgear and other pieces of equipment.
- G. This scope of work to be understood and read in conjunction with the drawings and specifications provided.
- H. Generator grounding to be connected to the existing ground grid available in the Yard.
- I. The contractor shall connect NGG skid fire alarm system into the existing Hospital's fire alarm system.
- J. The contractor shall be responsible to coordinate with the Hospital for the proper functionality of the fire alarm system and annunciation where ever required.
- K. A permanent plaque shall be installed at the revenue meters with a warning about the existence of on site parallel generation.
- L. A permanent plaque shall be installed at the generator disconnect which identifies it as a generator disconnect switch. A one-line diagram shall be posted within the electrical room which identifies the generators, the PEC with the utility, and any major system equipment between the generator and the utility.
- M. The contractor to program and test Protective Relays.
- N. The contractor to program and test Direct Transfer Trip communication devices.
- O. The contractor to program and test the RTU.
- P. The contractor to provide a telephone line for the RTU.

RECIPROCATING GAS ENGINE – GENERAL NOTES SH. 1 OF 3

NOT TO SCALE

NOTICE

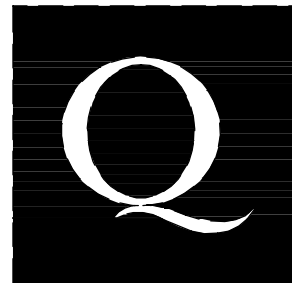
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SITE & PLANNING

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SYRACUSE, NEW YORK 13201-0029
TEL 315 472 7504 FAX 315 472 7500
QPK Job Number: 20080600

Drawing Title

ELECTRICAL - SYSTEM
CONTRACTOR'S GENERAL NOTES
SH. 1 OF 3

Approved Project Director

Project Title

COMBINED HEAT & POWER
PROJECT

Location

VAMC ALBANY, NY

Date

03/27/17

Checked

SK

Drawn

MMH

Project Number

27731

Building Number

Drawing Number

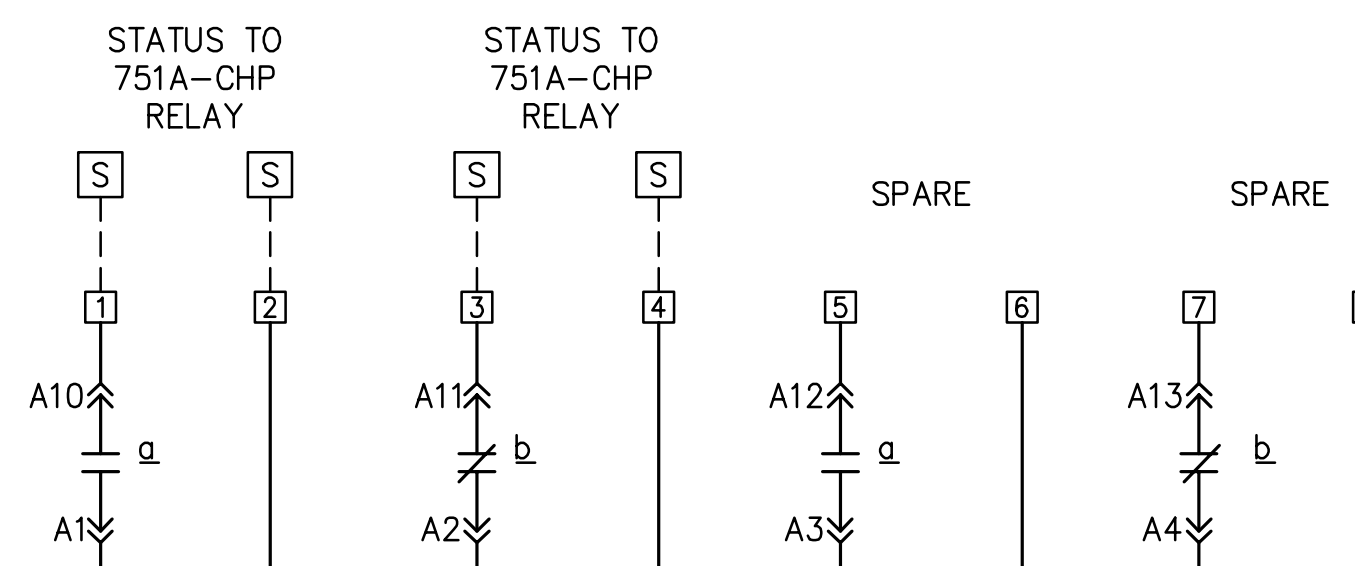
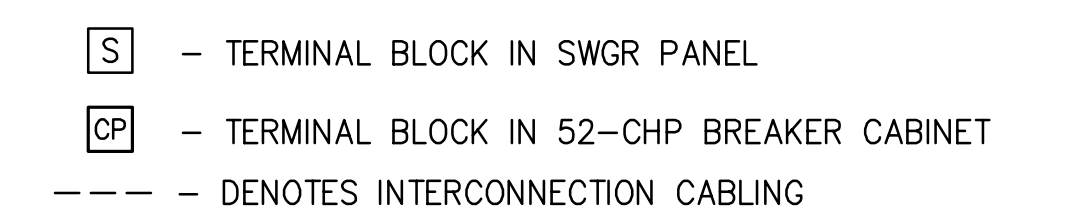
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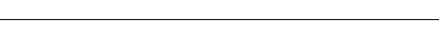


Office of
Facilities
Management



Department of
Veterans Affairs

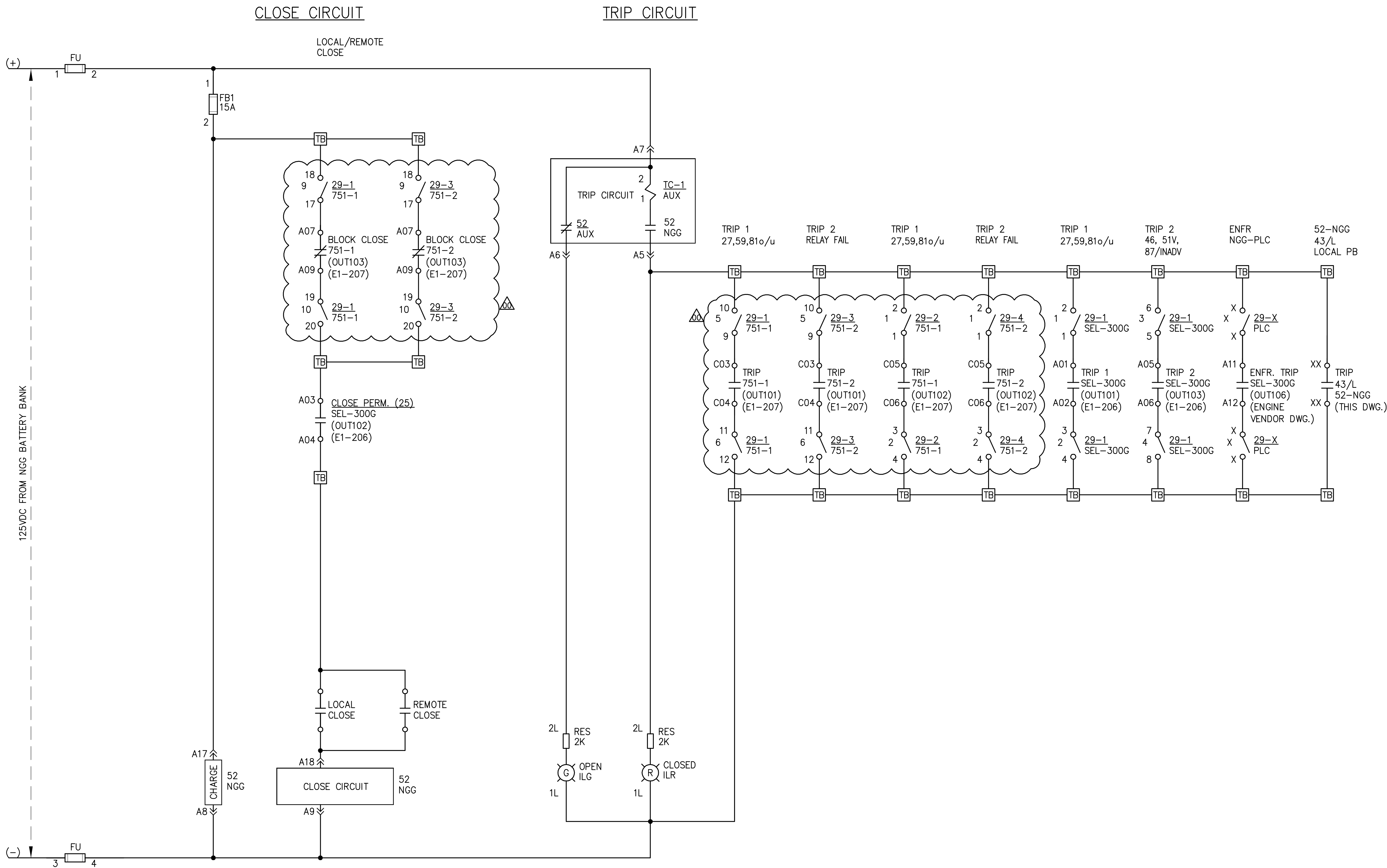


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		CONSULTANTS:				ARCHITECT/ENGINEERS:		Drawing Title CHP ELECTRICAL - AC CONTROL SCHEMATIC 480VAC SWGR MAIN BREAKER 52-CHP TRIP & CLOSE CIRCUIT		Project Title COMBINED HEAT & POWER PROJECT		Project Number 27731		Office of Facilities Management			
		 III Winners Circle, PO Box 5269 - Albany, NY 12205-0269 Main: (518) 453-4500 - www.chacompanies.com				 QPK DESIGN ARCHITECTURE ENGINEERING SITE & PLANNING 455 SO. SALINA STREET F.O. BOX 239 DOWAGIOCH, NEW YORK 13826-0239 (518) 453-4500 QPK Job Number: 2028800		Approved Project Director		Location VAMC ALBANY, NY		Drawing Number E1-203					
(00) ADDENDUM 2		03/27/17								Date 03/27/17		Checked SK		Drawn MMH		Dwg. 01 of 01	
BID SET		06/21/16														 Department of Veterans Affairs	
100% SUBMISSION		04/29/16															
95% SUBMISSION (RECIPROCATING ENGINE DESIGN)		04/06/16															
Revisions:		Date															

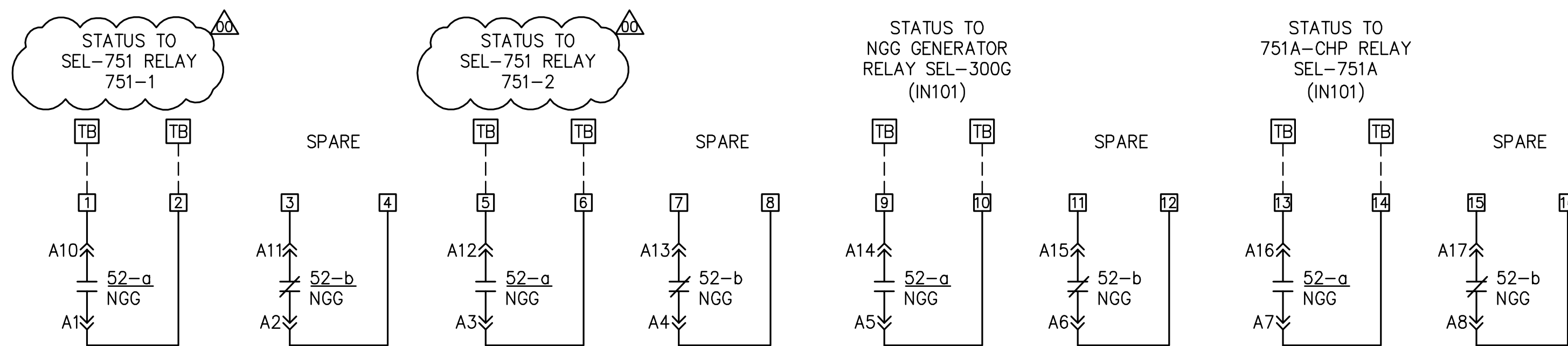
LEGEND

- Terminal Block in Basler Panel
- Terminal Block in 52-NGG Breaker Cabinet
- Denotes Interconnection Cabling
- Engine Failure



480V 52-NGG GENERATOR BREAKER CONTROL CIRCUIT (TYPICAL)

52-NGG BREAKER AUX.



NOTICE

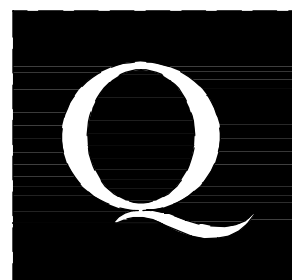
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QPK Job Number: 20080600

Drawing Title
CHP ELECTRICAL - AC CONTROL SCHEMATIC
480VAC GENERATOR BREAKER 52-NGG
TRIP & CLOSE CIRCUIT

Approved: Project Director

Project Title
COMBINED HEAT & POWER
PROJECT

Location
VAMC ALBANY, NY

Date
03/27/17

Checked
SK

Drawn
MMH

Project Number
27731

Building Number

Drawing Number
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Dwg 01 of 01

Office of
Facilities
Management



Department of
Veterans Affairs

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one eighth inch = one foot
one quarter inch = one foot
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one half inch = one foot
one inch = one foot
one and one half inches = one foot
three inches = one foot

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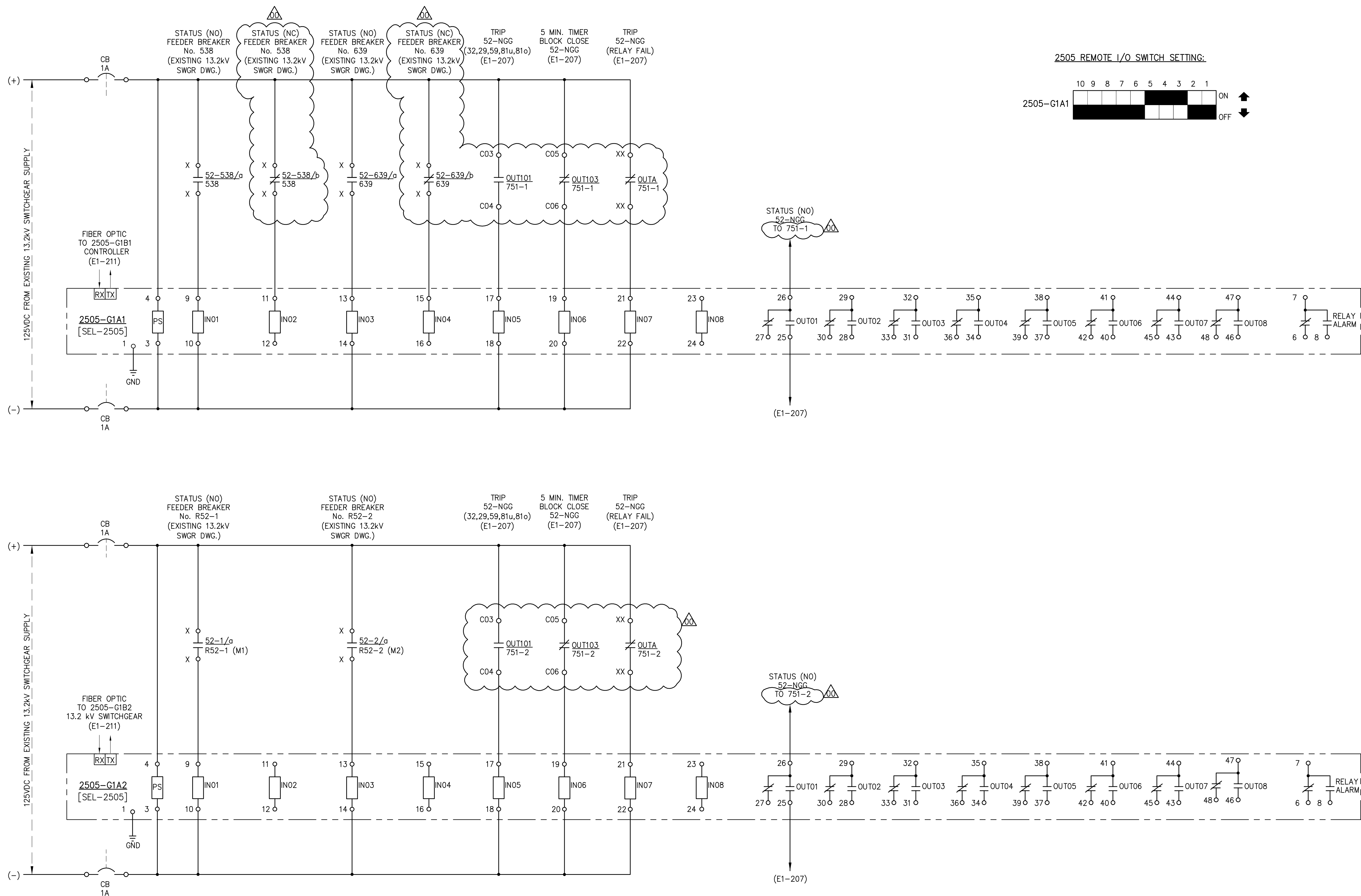
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LEGEND

- ☐ - TRANSMIT SIGNAL
- ☒ - RECEIVE SIGNAL

NOTES

- THIS DRAWING TYPICAL FOR ALL 480VAC SWITCHGEAR. ALL BREAKERS.
- ALL 13.2kV SWITCHGEAR TERMINALS REF. SWITCHGEAR DRAWINGS.
- CONTRACTOR TO TIE ALARMS GOING TO THE EXISTING PLC INTO THE NEAREST TERMINATION POINT OF THE EXISTING JOHNSON CONTROLS SYSTEM.

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CONSULTANTS: CHA 111 Winans Circle, PO Box 5289 - Albany, NY 12205-0289 Main: (518) 453-4500 - www.chacompanies.com		ARCHITECT/ENGINEERS: QPK DESIGN ARCHITECTURE ENGINEERING SITE & PLANNING 450 SO. SALINA STREET SYRACUSE, NEW YORK 13202-0029 TEL: 315.472.7800 FAX: 315.472.7800 QPK Job Number: 20090600		Drawing Title CHP ELECTRICAL - DC CONTROL SCHEMATIC REMOTE I/O MODULES - 13.2kV SWGR 2505-G1A1 & 2505-G1A2 (SEL-2505) Approved: Project Director	Project Title COMBINED HEAT & POWER PROJECT Location VAMC ALBANY, NY Date 03/27/17 Checked SK Drawn MMH	Project Number 27731 Building Number Drawing Number E1-210 Dwg 01 of 01	Office of Facilities Management Department of Veterans Affairs
Revisions: (00) ADDENDUM 2 03/27/17 BID SET 06/21/16 100% SUBMISSION 04/29/16 95% SUBMISSION (RECIPROCATING ENGINE DESIGN) 04/06/16							

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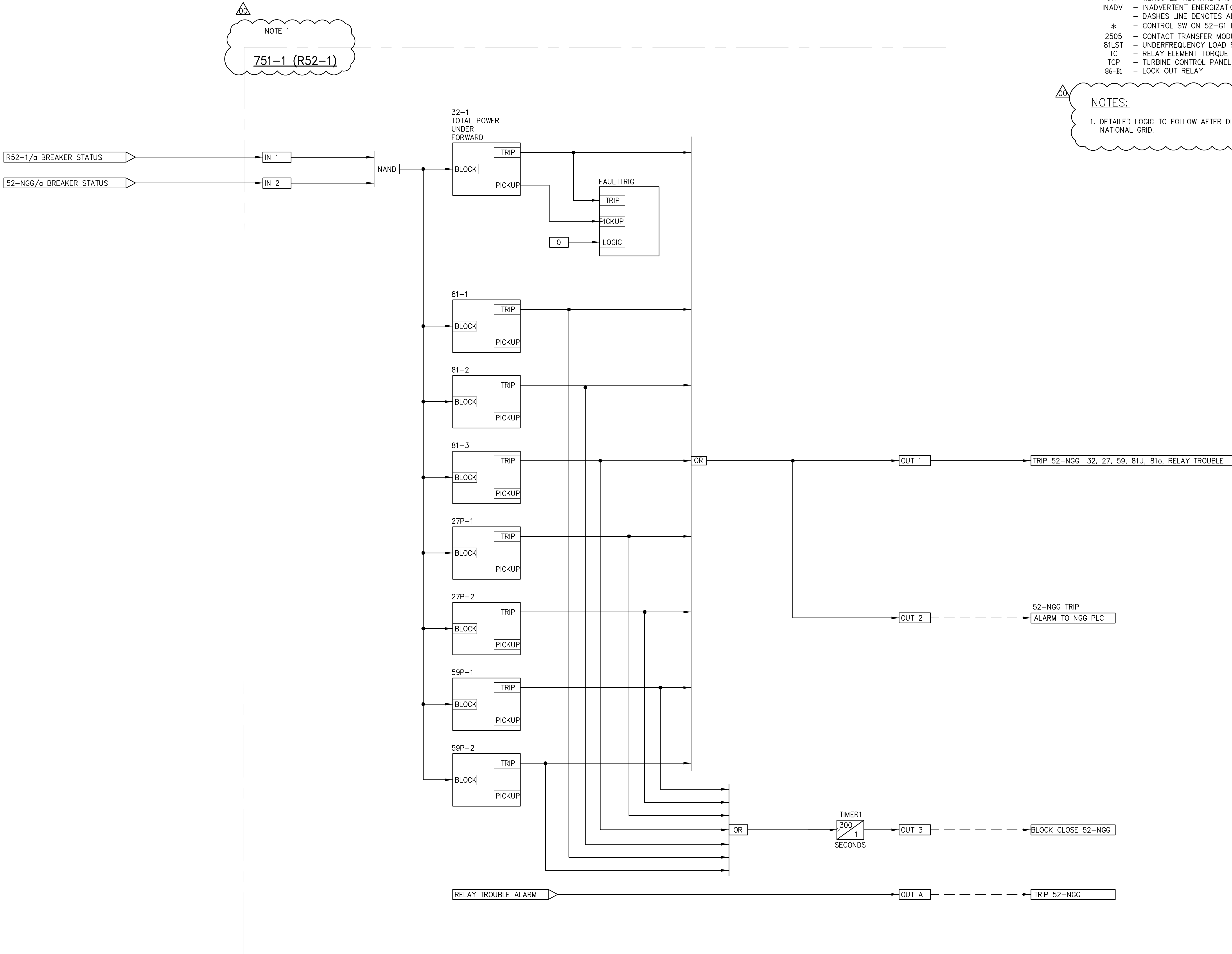
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ninety inches = one foot
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ninety three inches = one foot
ninety four inches = one foot
ninety five inches = one foot
ninety six inches = one foot
ninety seven inches = one foot
ninety eight inches = one foot
ninety nine inches = one foot
one hundred inches = one foot



LEGEND

- (K) - DENOTES CIRCUIT REFERENCE ON CONTINUING DRAWING
- (E-402) - DENOTES REFERENCE DRAWING
- 5IN - MEASURED NEUTRAL GROUND OVERCURRENT ELEMENT
- INADV - INADVERTENT ENERGIZATION
- - - - - DASHES LINE DENOTES ALARM SIGNAL TO EXISTING PLC
- * - CONTROL SW ON 52-G1 IS ONLY ENABLED WHEN BREAKER IN TEST POSITION.
- 2505 - CONTACT TRANSFER MODULE SEL-2505
- 81LST - UNDERFREQUENCY LOAD SHED TRIP
- TC - RELAY ELEMENT TORQUE CONTROL (ie ENABLE/DISABLE)
- TCP - TURBINE CONTROL PANEL
- 86-B1 - LOCK OUT RELAY

NOTES:

1. DETAILED LOGIC TO FOLLOW AFTER DISCUSSIONS WITH NATIONAL GRID.

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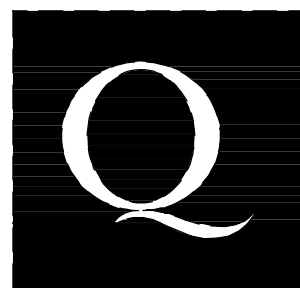
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BID SET	06/21/16
100% SUBMISSION	04/29/16
95% SUBMISSION (RECIPROCATING ENGINE DESIGN)	04/06/16
Revisions:	Date

CONSULTANTS:



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TEL 315.472.7800 FAX 315.472.7900
QPK Job Number: 200908.00

Drawing Title

CHP ELECTRICAL - LOGIC DIAGRAM
13.2kV MAIN BREAKER R52-1
PROTECTION RELAY 751-1 (SEL-751)

Approved: Project Director

Project Title

COMBINED HEAT & POWER
PROJECT

Location

VAMC ALBANY, NY

Date

03/27/17

Checked

SK

Drawn

MMH

Project Number

27731

Building Number

Drawing Number

E1-403

Dwg 01 of 01

Office of
Facilities
Management



Department of
Veterans Affairs

A

B

C

D

E

F

A

B

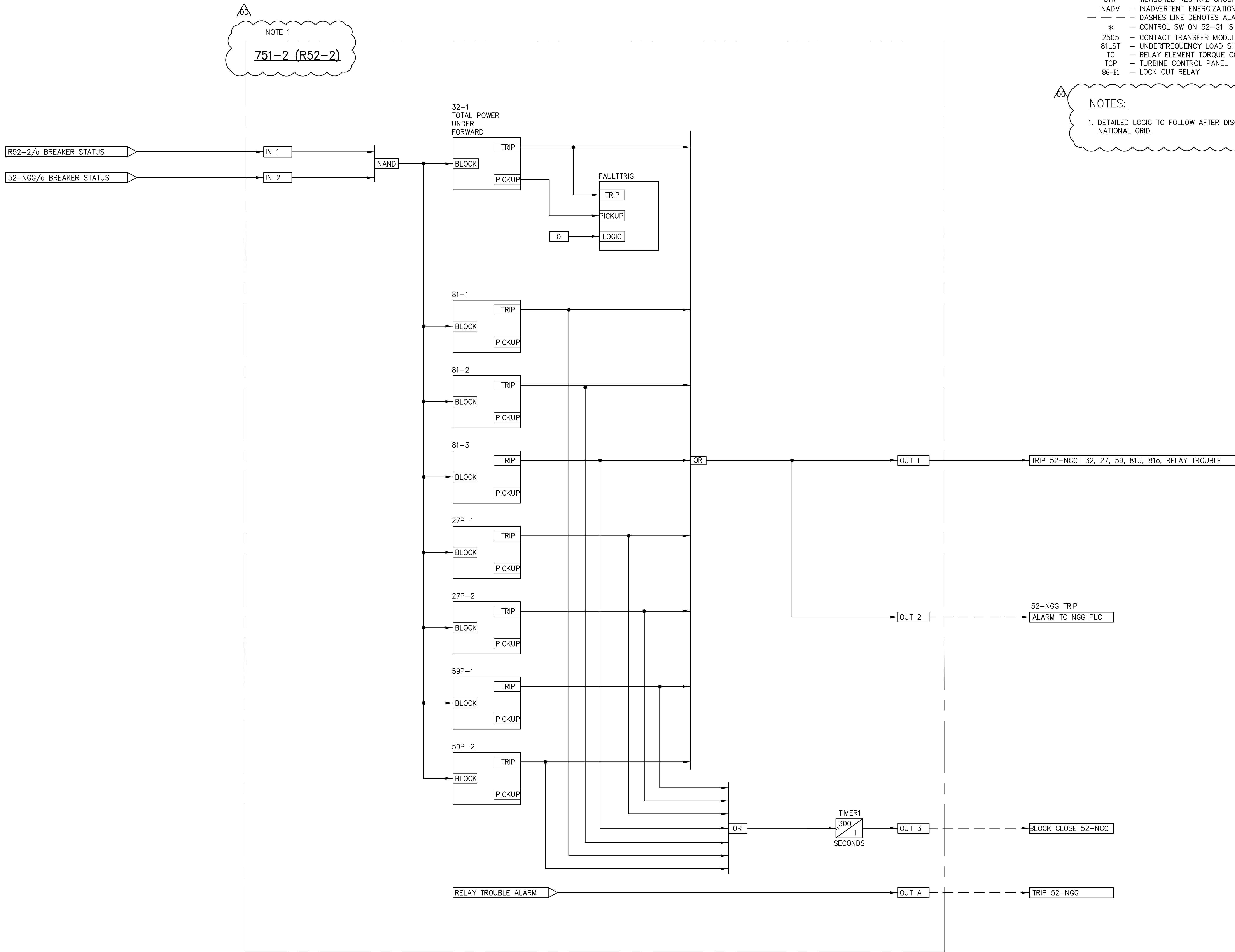
C

D

E

F

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one eighth inch = one foot
one quarter inch = one foot
three eighths inch = one foot
one half inch = one foot
three quarters inch = one foot
one inch = one foot
one and one half inches = one foot
two inches = one foot
three inches = one foot
four inches = one foot



LEGEND


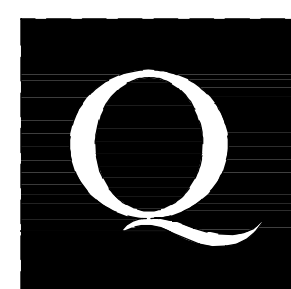

- (K) - DENOTES CIRCUIT REFERENCE ON CONTINUING DRAWING
- (E-402) - DENOTES REFERENCE DRAWING
- 51N - MEASURED NEUTRAL GROUND OVERCURRENT ELEMENT
- INADV - INADVERTENT ENERGIZATION
- - - - - DASHES LINE DENOTES ALARM SIGNAL TO EXISTING PLC
- * - CONTROL SW ON 52-G1 IS ONLY ENABLED WHEN BREAKER IN TEST POSITION.
- 2505 - CONTACT TRANSFER MODULE SEL-2505
- 81LST - UNDERFREQUENCY LOAD SHED TRIP
- TC - RELAY ELEMENT TORQUE CONTROL (ie ENABLE/DISABLE)
- TCP - TURBINE CONTROL PANEL
- 86-81 - LOCK OUT RELAY

NOTES:

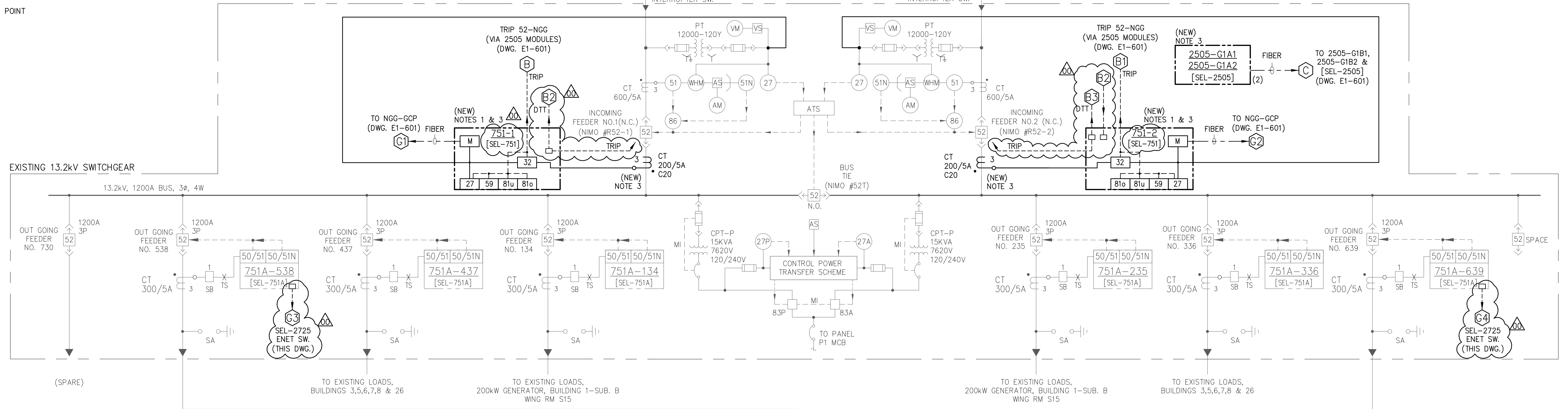
1. DETAILED LOGIC TO FOLLOW AFTER DISCUSSIONS WITH NATIONAL GRID.

NOTICE

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CONSULTANTS:		ARCHITECT/ENGINEERS:		Drawing Title CHP ELECTRICAL - LOGIC DIAGRAM 13.2KV MAIN BREAKER R52-2 PROTECTION RELAY 751-2 (SEL-751)	Project Title COMBINED HEAT & POWER PROJECT	Project Number 27731	Office of Facilities Management																	
 111 Winners Circle, PO Box 5289 - Albany, NY 12205-0289 Main: (918) 453-4500 - www.chacompanies.com		 QPK DESIGN ARCHITECTURE ENGINEERING SITE & PLANNING 450 S. SALINA STREET STANFORD, NEW YORK 13150-0001 TEL: 315.472.7800 FAX: 315.472.7800 QPK Job Number: 20708.00		Approved: Project Director	Location VAMC ALBANY, NY	Drawing Number E1-404		 Department of Veterans Affairs																
<table><tr><td>(00) ADDENDUM 2</td><td>03/27/17</td></tr><tr><td>BID SET</td><td>06/21/16</td></tr><tr><td>100% SUBMISSION</td><td>04/29/16</td></tr><tr><td>95% SUBMISSION (RECIPROCATING ENGINE DESIGN)</td><td>04/06/16</td></tr><tr><td>Revisions:</td><td>Date</td></tr></table>		(00) ADDENDUM 2	03/27/17	BID SET	06/21/16	100% SUBMISSION			04/29/16	95% SUBMISSION (RECIPROCATING ENGINE DESIGN)	04/06/16	Revisions:	Date				<table><tr><td>Date 03/27/17</td><td>Checked SK</td><td>Drawn MMH</td></tr></table>	Date 03/27/17	Checked SK	Drawn MMH	<table><tr><td>Dwg.</td><td>01</td><td>of</td><td>01</td></tr></table>	Dwg.	01	of
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BID SET	06/21/16																							
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Revisions:	Date																							
Date 03/27/17	Checked SK	Drawn MMH																						
Dwg.	01	of	01																					

- LEGEND:**
- BOP - BALANCE OF PLANT
 - CHP - COMBINED HEAT AND POWER PLANT
 - MCCB - MOLDED CASE CIRCUIT BREAKER
 - INTERCONNECTION CABLING
 - FIBER
 - AM - AMMETER
 - AS - AMMETER SWITCH
 - ATS - AUTOMATIC TRANSFER SWITCH
 - CPT-A - CONTROL POWER TRANSFORMER-ALTERNATE SOURCE
 - CPT-P - CONTROL POWER TRANSFORMER-PREFERRED SOURCE
 - CT - CURRENT TRANSFORMER
 - DTT - DIRECT TRANSFER TRIP
 - K - KIRK KEY LOCK
 - L.C. - LOCK CLOSED
 - M - METER
 - M.I. - MECHANICAL INTERLOCK
 - N.C. - NORMALLY CLOSED
 - N.O. - NORMALLY OPEN
 - NGGCP - NATURAL GAS GENERATOR CONTROL PANEL
 - PT - POTENTIAL TRANSFORMER
 - RTU - REMOTE TERMINAL UNIT
 - SA - SURGE ARRESTORS
 - VM - VOLTMETER
 - VS - VOLTMETER SWITCH
 - WHM - WATT HOUR METER
 - 52 - DIRECTIONAL POWER RELAY
 - 51 - PHASE TIME OVERCURRENT RELAY
 - 51N - NEUTRAL TIME OVERCURRENT RELAY
 - 50/51 - PHASE INSTANTANEOUS & TIME OVERCURRENT RELAY
 - 50/51N - NEUTRAL INSTANTANEOUS & TIME OVERCURRENT RELAY
 - 52 - AC CIRCUIT BREAKER
 - 27 - UNDERVOLTAGE RELAY
 - 27A - UNDERVOLTAGE RELAY FOR CPT-A
 - 27P - UNDERVOLTAGE RELAY FOR CPT-P
 - 43 - MANUAL TRANSFER SWITCH
 - 83A - AUTOMATIC TRANSFER CONTACTOR - ALTERNATE SOURCE
 - 83P - AUTOMATIC TRANSFER CONTACTOR - PREFERRED SOURCE
 - 86 - LOCKOUT RELAY
 - (X) - CIRCUIT REFERENCE ON CONTINUING DRAWING
 - ▽ - CONNECTION POINT

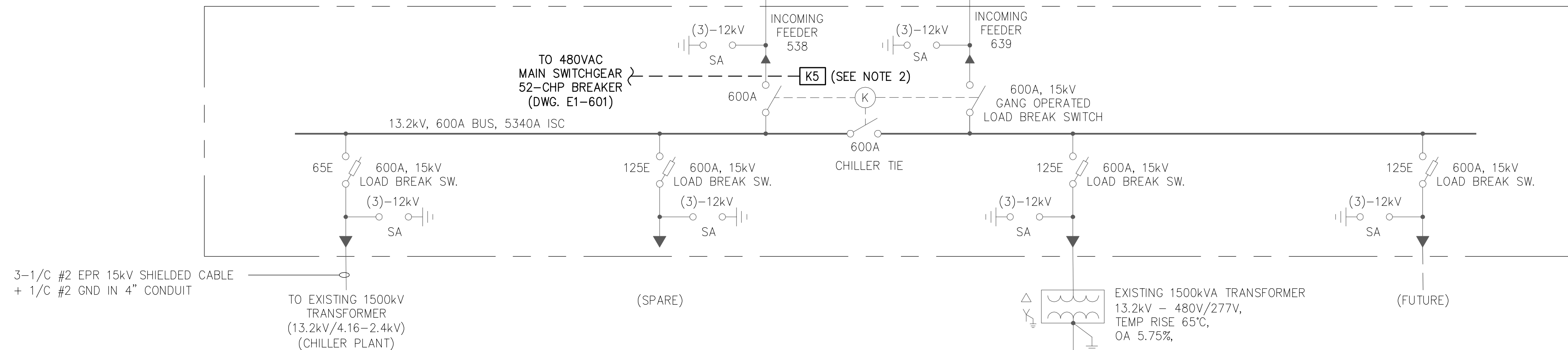


- NOTES:**
- (2) NEW BASLER PROTECTION & CONTROL RELAYS.
 - KIRK KEY "K5". CONTRACTOR TO SUPPLY, INSTALL AND COMMISSION. SEE NOTE 4 ON DWG. E1-601.
 - SUPPLIED INSTALLED & COMMISSIONED BY THE CONTRACTOR.
 - WIRELESS TRANSMITTER-RECEIVER TO BE SUPPLIED INSTALLED AND PROGRAMMED/TESTED BY THE CONTRACTOR.
 - RTU TO BE SUPPLIED BY NATIONAL GRID, BUT INSTALLED AND PROGRAMMED/TESTED BY THE CONTRACTOR.

NOTICE

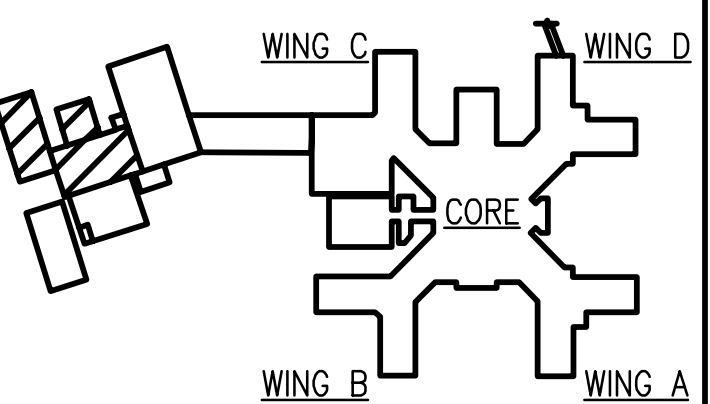
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13.2kV SWITCHGEAR - CHILLER PLANT, BLDG. 54


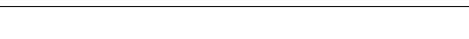



EXISTING NORMAL POWER - ONE LINE
NOT TO SCALE

KEY PLAN



BUILDING KEY PLAN
NO SCALE

		CONSULTANTS:				ARCHITECT/ENGINEERS:		Drawing Title ELECTRICAL - ONE LINE DIAGRAM 13.2KV OUTDOOR METAL-CLAD SWITCHGEAR		Project Title COMBINED HEAT & POWER PROJECT		Project Number 27731		<div>Office of Facilities Management</div> <div> Department of Veterans Affairs</div>	
								<div>Approved Project Director</div> <div></div>		Location VAMC ALBANY, NY		Drawing Number E1-600			
		III Winners Circle, PO Box 5269 • Albany, NY 12205-0269 Main: (518) 463-4500 • www.chacompanies.com				Date 03/27/17				Checked SK		Drawn MMH			
(00) ADDENDUM 2		03/27/17													
BID SET		06/21/16													
100% SUBMISSION		04/29/16													
95% SUBMISSION (RECIPROCATING ENGINE DESIGN)		04/06/16													
Revisions:		Date													

LEGEND:

DMMF	-	DIGITAL MULTIFUNCTION METER
NGR	-	NEUTRAL GROUND RESISTOR
T/CI	-	TRIP & CLOSE INHIBIT CONTACTS
24	-	VOLTS/FREQUENCY
25	-	SYNC CHECK
27	-	UNDERVOLTAGE
32	-	DIRECTIONAL POWER RELAY
46	-	REVERSE PHASE CURRENT
50	-	INSTANTANEOUS OVERCURRENT
51	-	TIME DELAY OVERCURRENT
51G	-	GROUND TIME DELAY OVERCURRENT
51V	-	TIME OVERCURRENT VOLTAGE RESTRAINED
59	-	OVERVOLTAGE
81	-	FREQUENCY
86	-	LOCKOUT RELAY
87	-	DIFFERENTIAL PROTECTION
GCP	-	GENERATOR CONTROL PANEL
NGG	-	NATURAL GAS GENERATOR
PRP	-	PROTECTION PANEL
L.S.I.G.	-	LONG, SHORT, INSTANTANEOUS (INST. CAN BE TURNED OFF), GROUND SETTINGS
E.O.D.O.	-	ELECTRICALLY OPERATED DRAW OUT
BOP	-	BALANCE OF PLANT
CHP	-	COMBINED HEAT AND POWER PLANT
MCCB	-	MOLDED CASE CIRCUIT BREAKER
- - -	-	INTERCONNECTION CABLING
- - -	-	FIBER
(A)	-	CIRCUIT REFERENCE ON CONTINUING DRAWING
(ST)	-	SHUNT TRIP
(25A)	-	AUTOMATIC SYNCHRONIZATION
(T)	-	TRIP
(VFD)	-	VARIABLE FREQUENCY DRIVE
(V)	-	CONNECTION POINT

NOTES:

1. RELAY TYPE AND MANUFACTURE ARE SHOWN AS TYPICAL..
2. RELAY PROTECTION & METERING PART OF 480VAC SWITCHGEAR LINE UP.
3. SUPPLIED, INSTALLED AND COMMISSIONED BY THE CONTRACTOR.
4. KIRK KEY TO PROHIBIT OPERATION OF KIRK KEY 600A LOAD BREAK SWITCHES IN CHILLER PLANT 13.2kV SWITCHGEAR UNTIL 52-CHP BREAKER IS OPENED.
5. 52-CHP KIRK KEY MUST BE REMOVED AND INSERTED INTO THE LOAD BREAK SWITCH KIRK KEY. SEE DRAWING E1-600, NOTE 2.
6. TO BE SUPPLIED INSTALLED AND COMMISSIONED BY THE GENERATOR VENDOR.
7. CONTRACTOR SHALL RETERMINATE ALL EXISTING AND NEW CONNECTIONS TO THE NEW 480V SWITCHGEAR. REFERENCE DRAWING ED-601 DEMOLISHON DRAWING FOR INFORMATION.

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480VAC MAIN SWITCHGEAR

2000A MAIN BUS,
480/277VAC, 3Ø, 4W, 60HZ, 65KAIC

2000A MAIN BUS, 480V, 3Ø, 4W, 60HZ, 65KAIC

TO EXISTING LOADS
(DWG. E1-603)

5-4" RGS CONDUITS FOR (5) #500MCM Cu/Ph +GND
W/ 1 SPARE 4" CONDUIT
(INSTALLED IN DUCT BANK)

RECIPROCATING GAS ENGINE - ONE LINE
NOT TO SCALE

FROM EXISTING 1500kVA
TRANSFORMER
(DWG. E1-600)

NGG SKID SUPPLY

NGG
480VAC
1253kVA
PF: 0.8
60 HZ

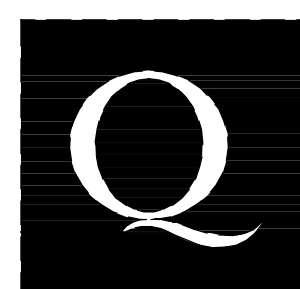
CT 2000/5A
C200

CT 2000/5A
C200

NGR
5A
55.4 OHMS
10sec
CT 15/5A
C10

NATURAL GAS
GENERATOR
CONTROL
(GCP-NGG)

ARCHITECT/ENGINEERS



QPK DESIGN
ARCHITECTURE
ENGINEERING
SITE & PLANNING
480 S. SALINA STREET
SYRACUSE, NEW YORK 13202-5029
TEL 315.472.7800 FAX 315.472.7800
QPK Job Number: 20090600

Drawing Title

ELECTRICAL - ONE LINE DIAGRAM
480VAC SWITCHGEAR &
GENERATOR CONTROL

Approved: Project Director

Project Title

COMBINED HEAT & POWER
PROJECT

Location

VAMC ALBANY, NY

Date

03/27/17

Checked

SK

Drawn

MMH

Project Number

27731

Building Number

Drawing Number

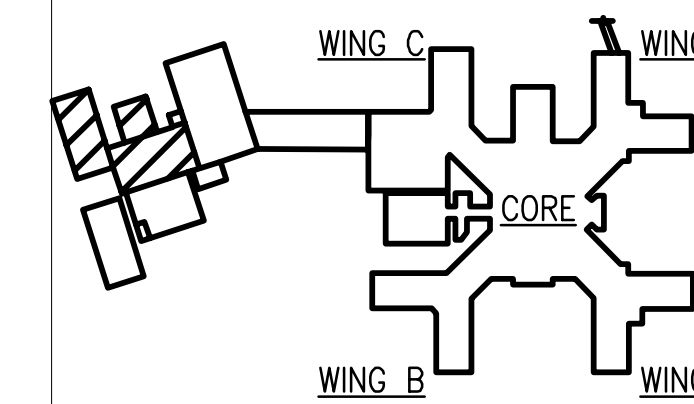
E1-601

Dwg. 02 of 04

Office of
Facilities
Management



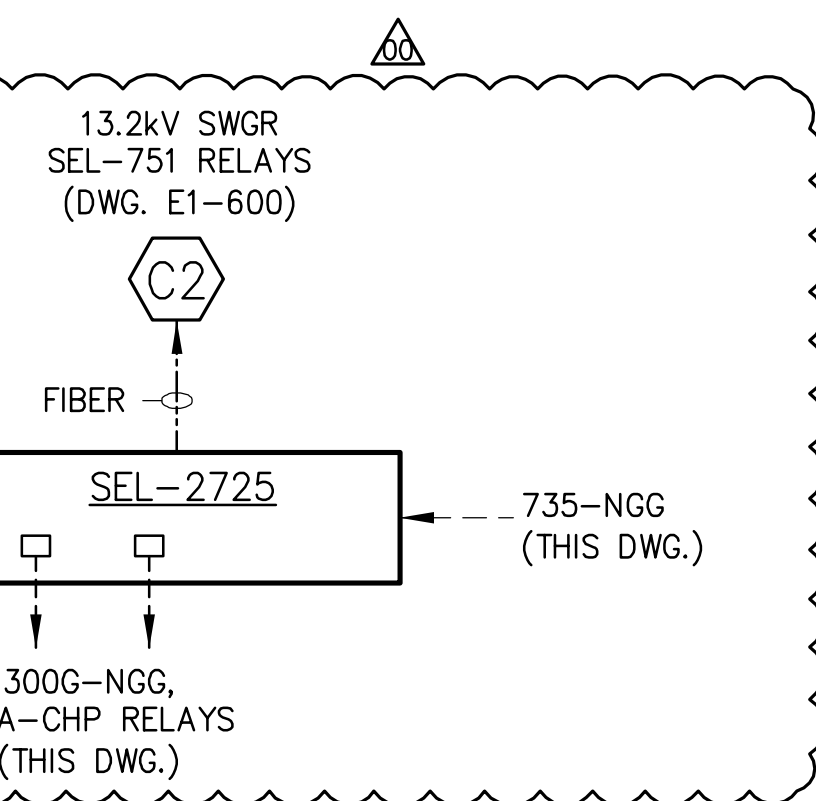
KEY PLAN



BUILDING KEY PLAN
NO SCALE

NGG SKID
CONTINUED
(DWG. E1-602)

MAIN SWITCHGEAR
CONTINUED
(DWG. E1-602)



SECT 52-CHP

NOTE 2

NOTE 3

GENERATOR PROTECTION RELAY 300G-NGG [SEL-300G]

RELAY TROUBLE ALARM

TRIP

TRIP

TRIP

TRIP

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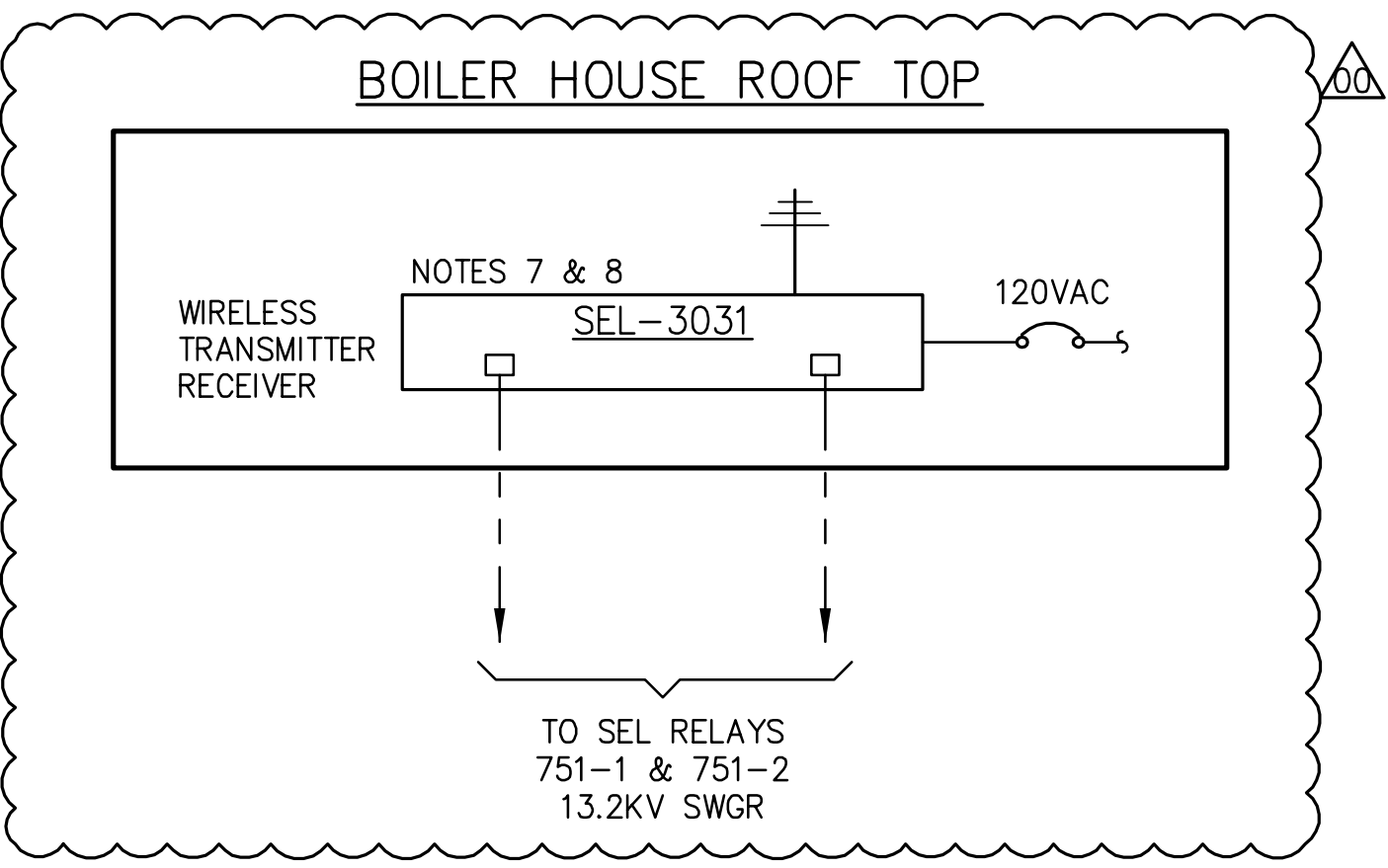
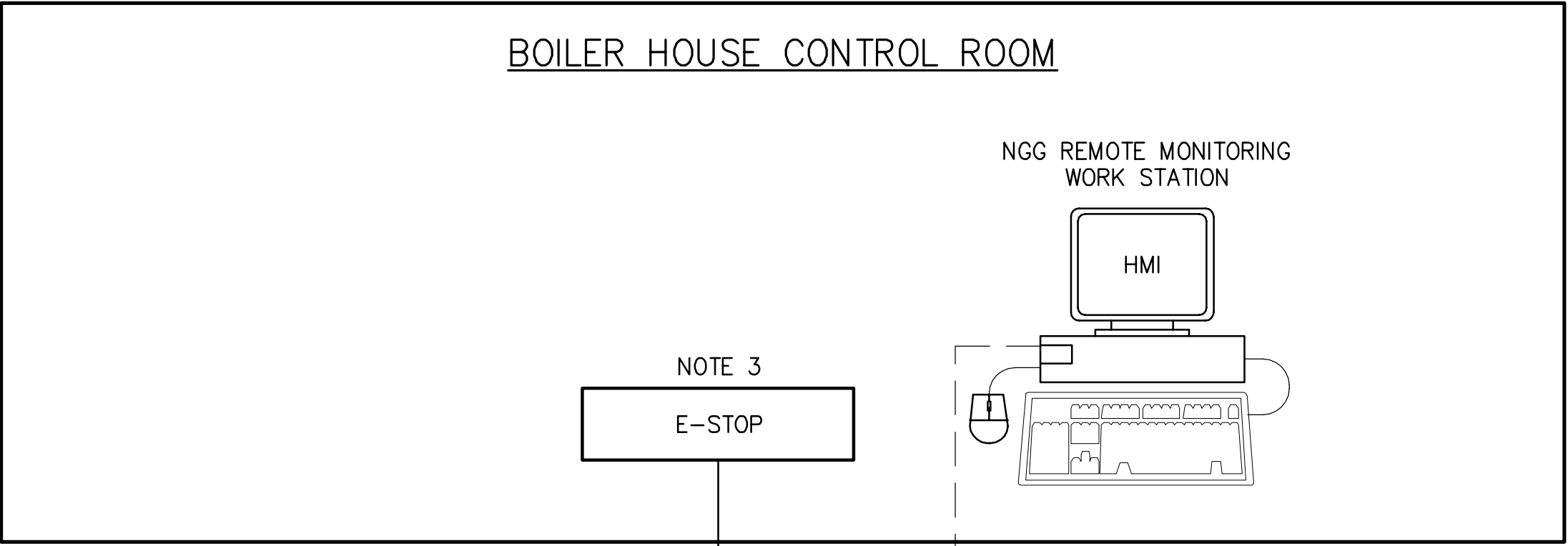
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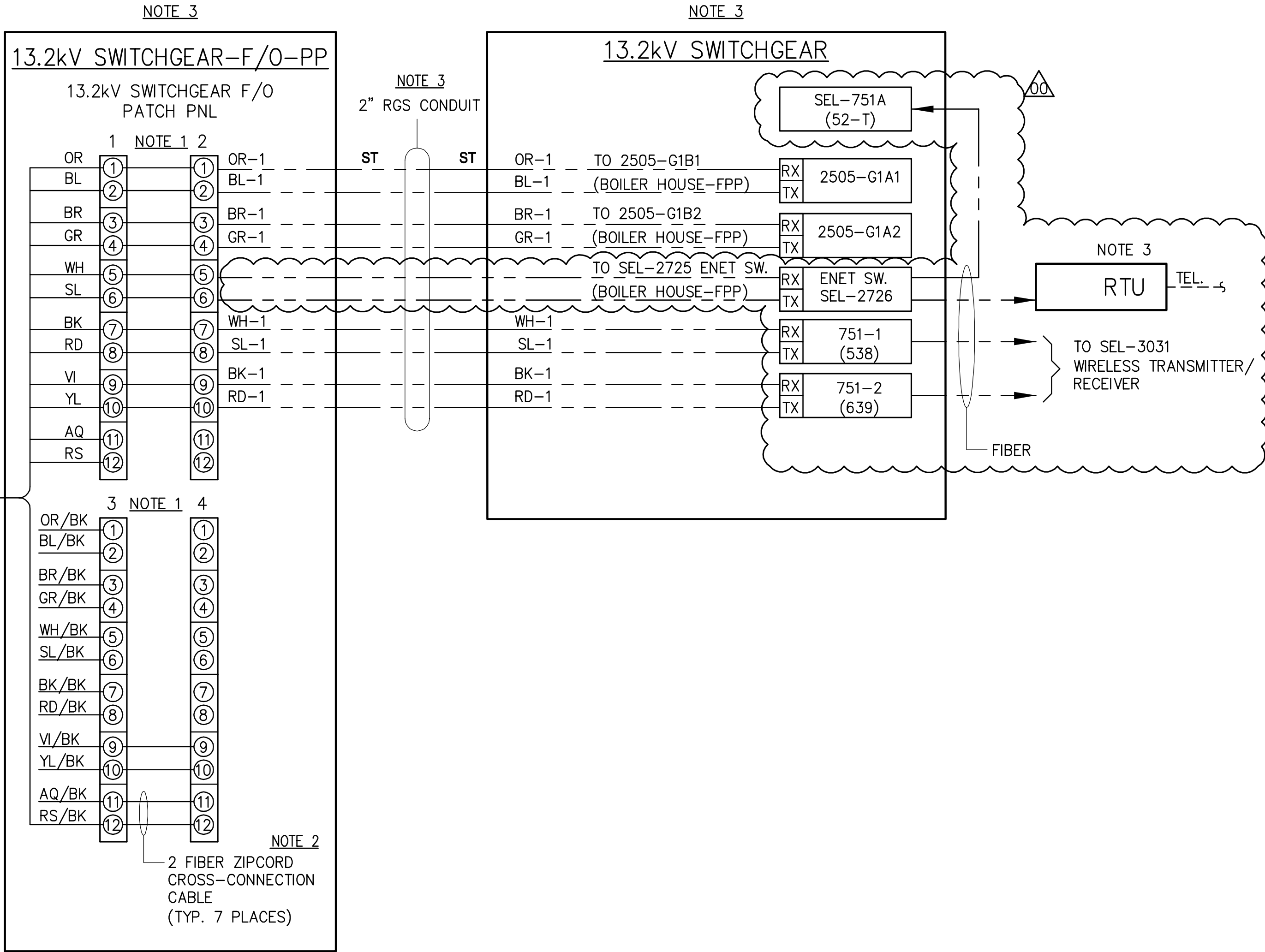
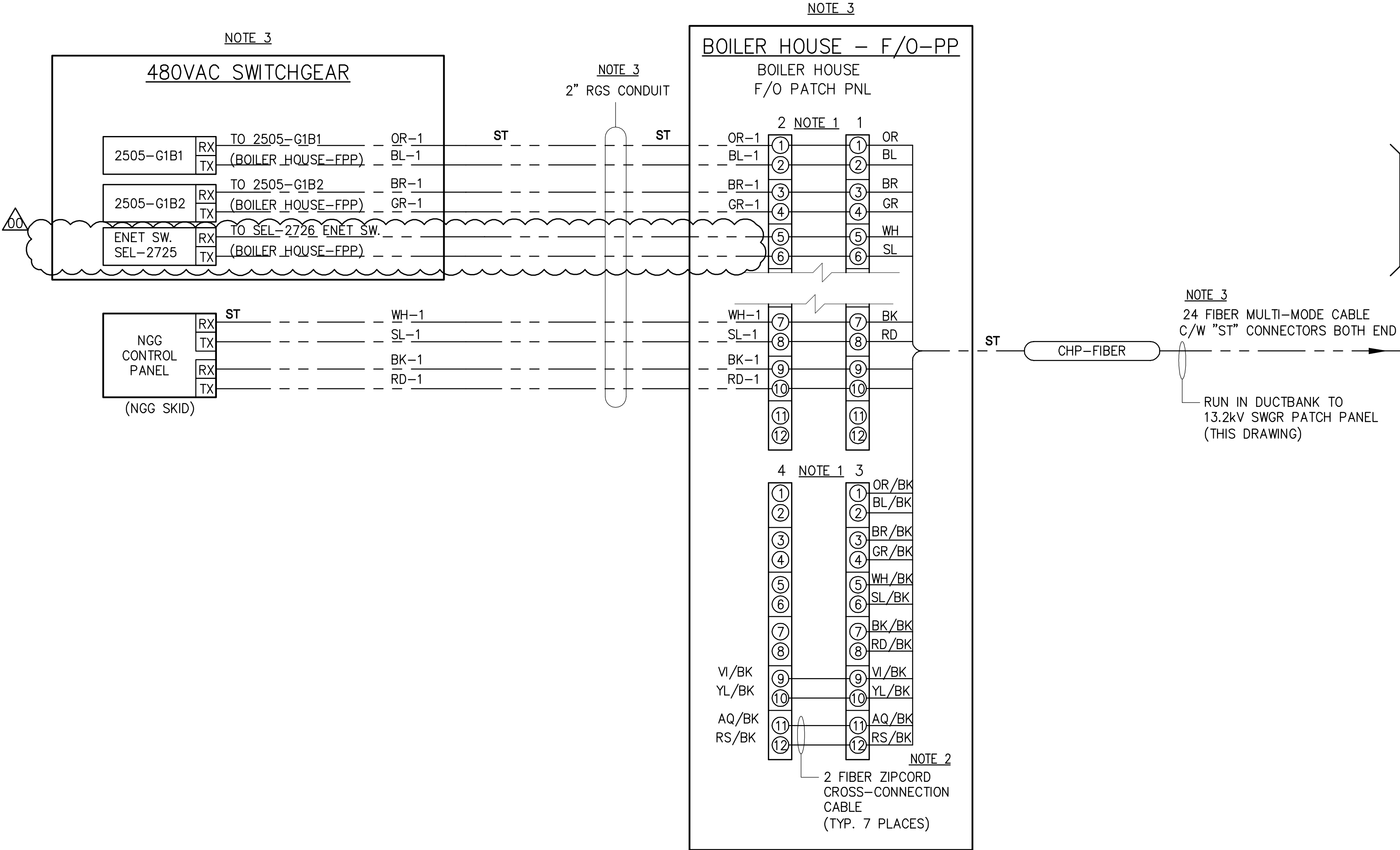
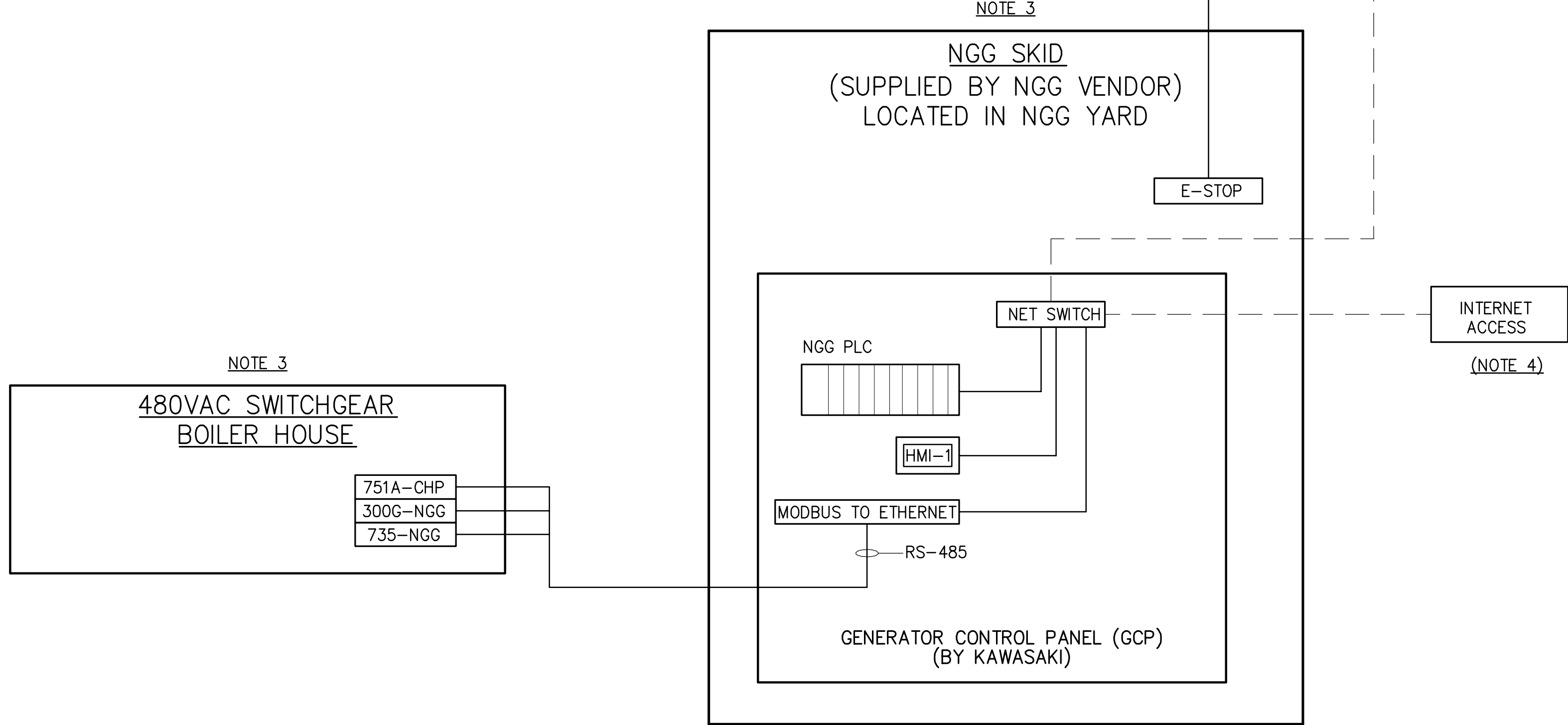
NOTE 6
SUPPLIED BY GENERATOR VENDOR

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one eighth inch = one foot
one quarter inch = one foot
three eighths inch = one foot
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three quarters inch = one foot
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five inches = one foot
six inches = one foot
seven inches = one foot
eight inches = one foot
nine inches = one foot
ten inches = one foot
eleven inches = one foot
twelve inches = one foot
thirteen inches = one foot
fourteen inches = one foot
fifteen inches = one foot
sixteen inches = one foot
seventeen inches = one foot
eighteen inches = one foot
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thirty inches = one foot
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forty six inches = one foot
forty seven inches = one foot
forty eight inches = one foot
forty nine inches = one foot
fifty inches = one foot
fifty one inches = one foot
fifty two inches = one foot
fifty three inches = one foot
fifty four inches = one foot
fifty five inches = one foot
fifty six inches = one foot
fifty seven inches = one foot
fifty eight inches = one foot
fifty nine inches = one foot
sixty inches = one foot
sixty one inches = one foot
sixty two inches = one foot
sixty three inches = one foot
sixty four inches = one foot
sixty five inches = one foot
sixty six inches = one foot
sixty seven inches = one foot
sixty eight inches = one foot
sixty nine inches = one foot
seventy inches = one foot
seventy one inches = one foot
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seventy five inches = one foot
seventy six inches = one foot
seventy seven inches = one foot
seventy eight inches = one foot
seventy nine inches = one foot
eighty inches = one foot
eighty one inches = one foot
eighty two inches = one foot
eighty three inches = one foot
eighty four inches = one foot
eighty five inches = one foot
eighty six inches = one foot
eighty seven inches = one foot
eighty eight inches = one foot
eighty nine inches = one foot
ninety inches = one foot
ninety one inches = one foot
ninety two inches = one foot
ninety three inches = one foot
ninety four inches = one foot
ninety five inches = one foot
ninety six inches = one foot
ninety seven inches = one foot
ninety eight inches = one foot
ninety nine inches = one foot
one hundred inches = one foot



- LEGEND
- ETHERNET CABLE CAT 6
 - FIBER OPTIC CABLE 24 MULTIMODE
 - TERMINATED WITH "ST" CONNECTORS
 - HARD WIRED CONNECTION
- CHP-FIBER - CABLE No.
- "ST" - TERMINATION CONNECTORS

- NOTES
- VPN REMOTE ACCESS FOR EQUIPMENT MONITORING/DIAGNOSTICS.
 - F/O ZIPCORD CABLE WITH "ST" CONNECTOR ON BOTH ENDS.
 - SUPPLIED BY CONTRACTOR.
 - WIRELESS INTERNET CELL WITH 12 MONTHS OF SERVICE.
 - RTU SUPPLIED BY OTHER.
 - RTU INSTALLED BY CONTRACTOR.
 - SUPPLIED BY UTILITY.
 - INSTALLED BY THE CONTRACTOR ON BOILERHOUSE ROOF TOP.



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CHA		QPK DESIGN		CHP ELECTRICAL - INSTRUMENTATION & SYSTEM ARCHITECTURE BLOCK DIAGRAM		COMBINED HEAT & POWER PROJECT		27731		
111 Winans Circle, PO Box 5289 - Albany, NY 12205-0289 Main: (518) 453-4500 - www.chacompanies.com		450 100 Main Street Albany, NY 12202 Tel: 518 472-7800 Fax: 518 472-7801 QPK Job Number: 20080600		Approved: Project Director		Location VAMC ALBANY, NY		Building Number		
Revisions: 001 ADDENDUM 2 03/27/17 100% SUBMISSION 06/21/16 95% SUBMISSION (RECIPROCATING ENGINE DESIGN) 04/06/16 Date						Date 03/27/17		Drawing Number E1-640		