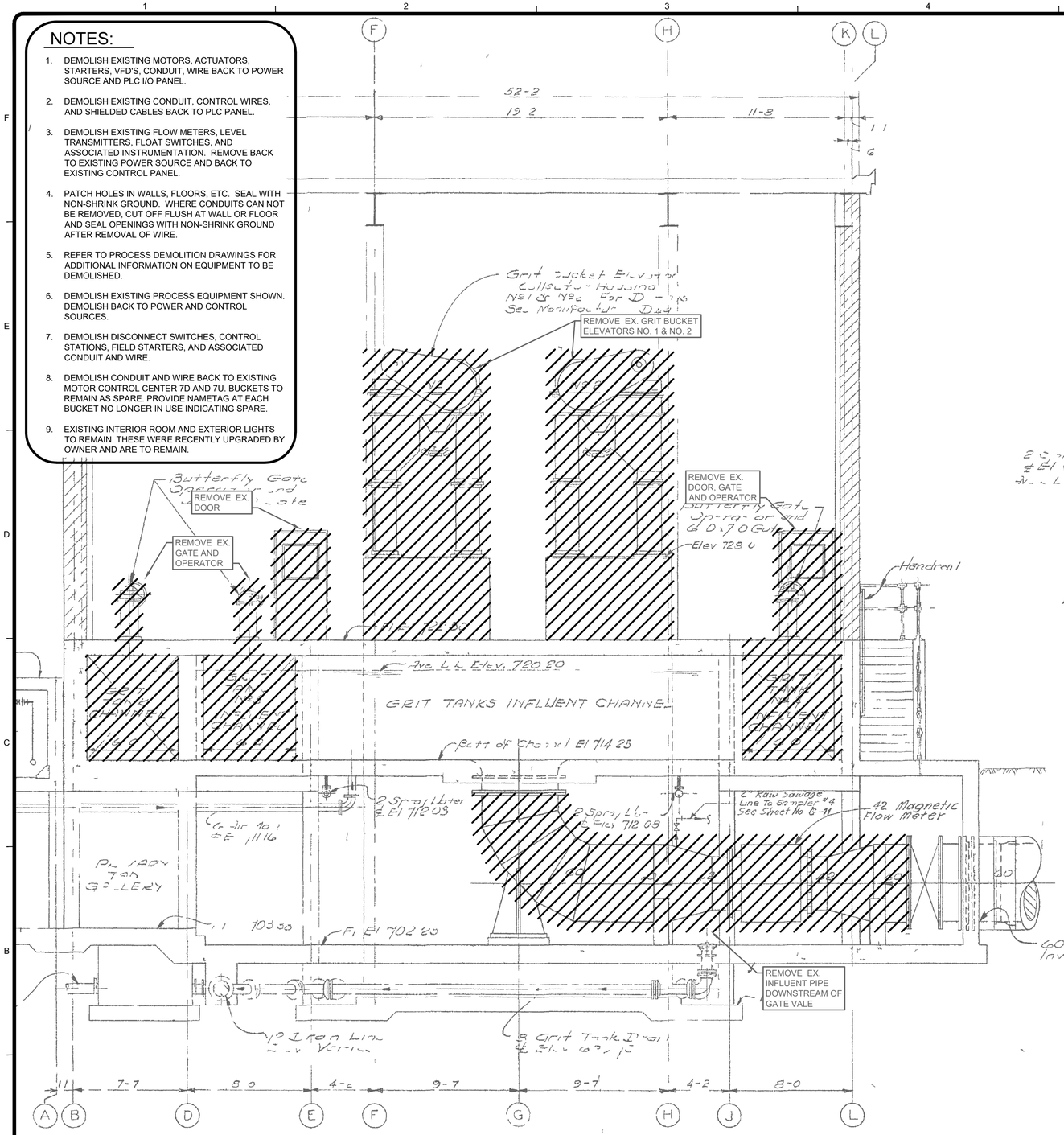
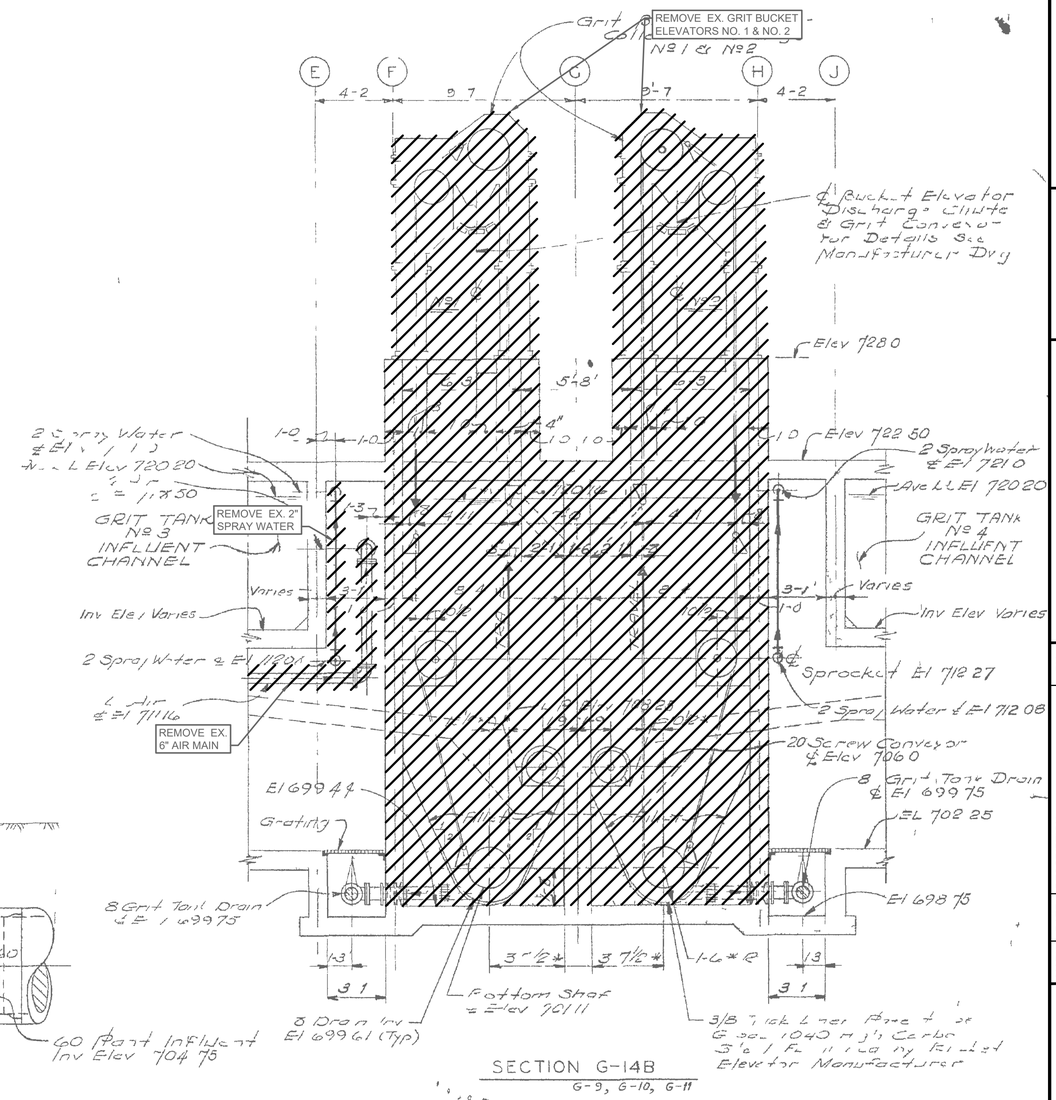
NOTES:

1. DEMOLISH EXISTING MOTORS, ACTUATORS, STARTERS, VFD'S, CONDUIT, WIRE BACK TO POWER SOURCE AND PLC I/O PANEL.
2. DEMOLISH EXISTING CONDUIT, CONTROL WIRES, AND SHIELDED CABLES BACK TO PLC PANEL.
3. DEMOLISH EXISTING FLOW METERS, LEVEL TRANSMITTERS, FLOAT SWITCHES, AND ASSOCIATED INSTRUMENTATION. REMOVE BACK TO EXISTING POWER SOURCE AND BACK TO EXISTING CONTROL PANEL.
4. PATCH HOLES IN WALLS, FLOORS, ETC. SEAL WITH NON-SHRINK GROUND. WHERE CONDUITS CAN NOT BE REMOVED, CUT OFF FLUSH AT WALL OR FLOOR AND SEAL OPENINGS WITH NON-SHRINK GROUND AFTER REMOVAL OF WIRE.
5. REFER TO PROCESS DEMOLITION DRAWINGS FOR ADDITIONAL INFORMATION ON EQUIPMENT TO BE DEMOLISHED.
6. DEMOLISH EXISTING PROCESS EQUIPMENT SHOWN. DEMOLISH BACK TO POWER AND CONTROL SOURCES.
7. DEMOLISH DISCONNECT SWITCHES, CONTROL STATIONS, FIELD STARTERS, AND ASSOCIATED CONDUIT AND WIRE.
8. DEMOLISH CONDUIT AND WIRE BACK TO EXISTING MOTOR CONTROL CENTER 7D AND 7U. BUCKETS TO REMAIN AS SPARE. PROVIDE NAMETAG AT EACH BUCKET NO LONGER IN USE INDICATING SPARE.
9. EXISTING INTERIOR ROOM AND EXTERIOR LIGHTS TO REMAIN. THESE WERE RECENTLY UPGRADED BY OWNER AND ARE TO REMAIN.





GRIT-B BACKGROUND PLAN

NEMA 7 AREA
SCALE: AS SHOWN

- ITEMS TO BE REMOVED

EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD, CROSSHATCHED, AND/OR CIRCLED.

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1	6/22/21	ISSUED FOR BIDS	

CITY OF FLINT, MICHIGAN
FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
GRIT DEWATERING BUILDING DEMOLITION SECTION

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

E-305
OF 46

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Bar Measures 1 inch, otherwise drawing not to scale

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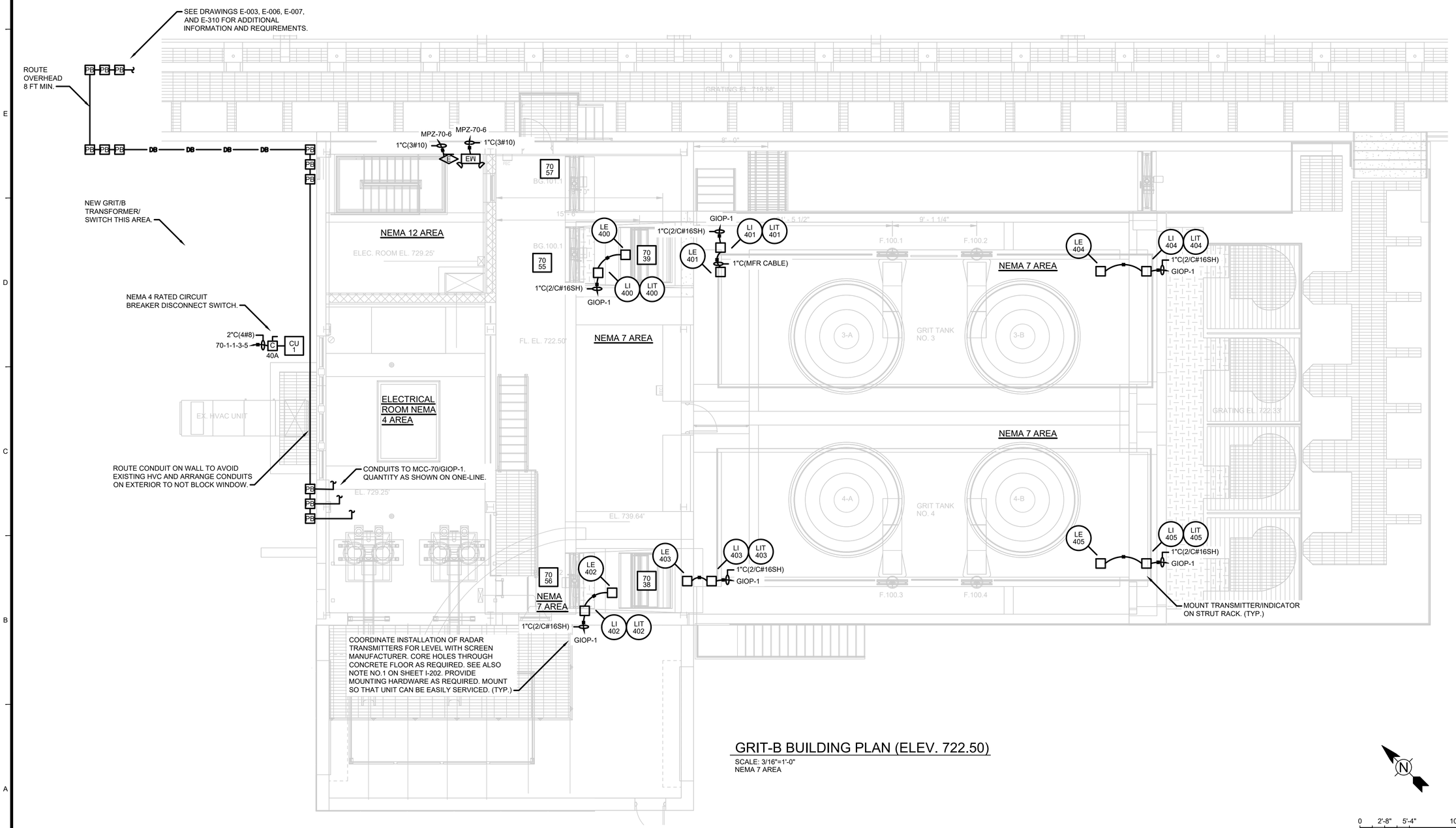

GRIT-B BUILDING PLAN (ELEV. 722.50)

SCALE: 3/16"=1'-0"
NEMA 7 AREA

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CITY OF FLINT, MICHIGAN
FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
ELECTRICAL
GRIT-B BUILDING PLAN

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

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Bar Measures 1 inch, otherwise drawing not to scale

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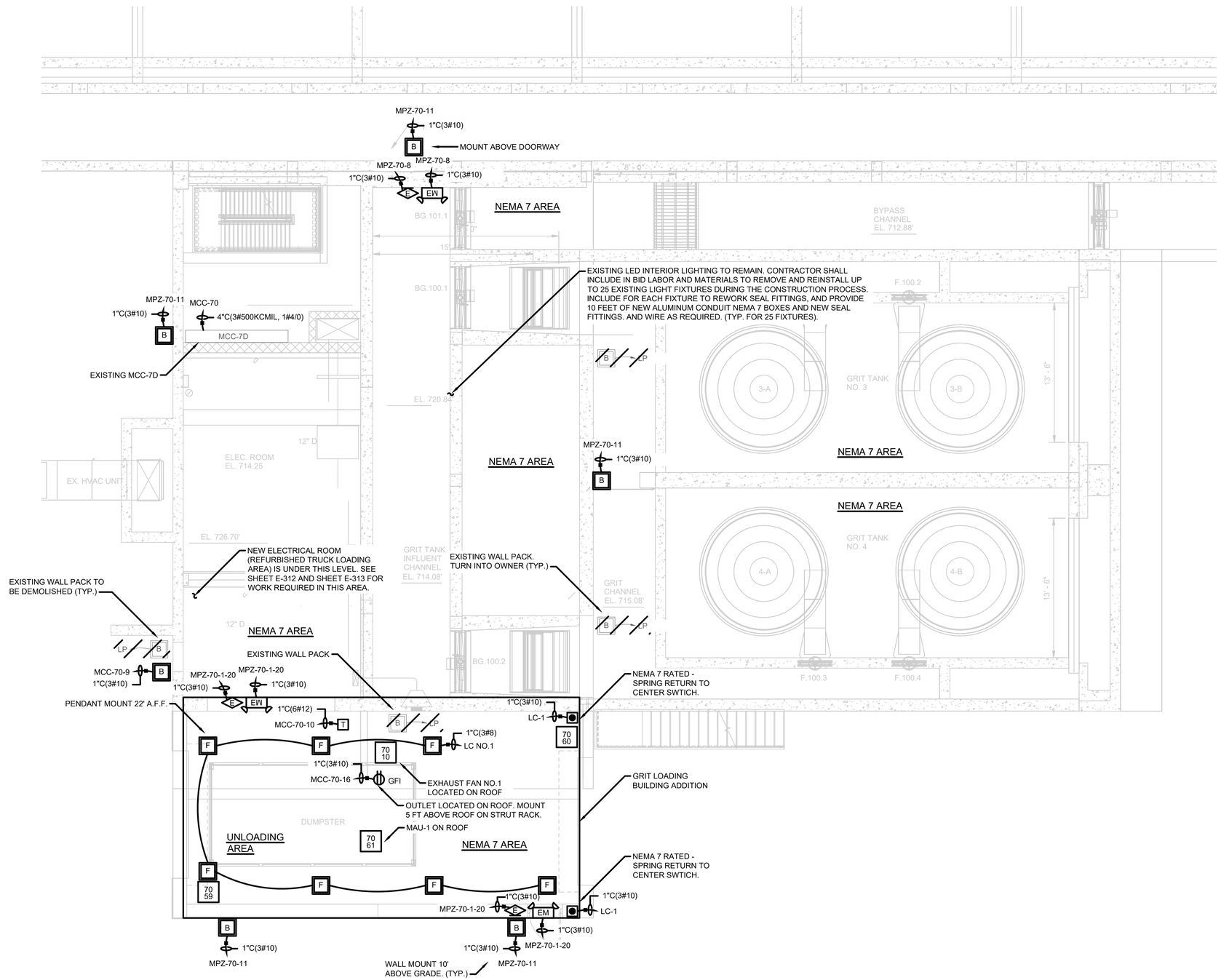

GRIT-B BUILDING GRADE PLAN

SCALE: 3/16"=1'-0"
NEMA 7 AREA

0 2'-8" 5'-4" 10'-8"
SCALE: 3/16" = 1'-0"

Bar Measures 1 inch, otherwise drawing not to scale

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CITY OF FLINT, MICHIGAN
FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
ELECTRICAL
GRIT-B BUILDING
GRADE PLAN

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

E-307
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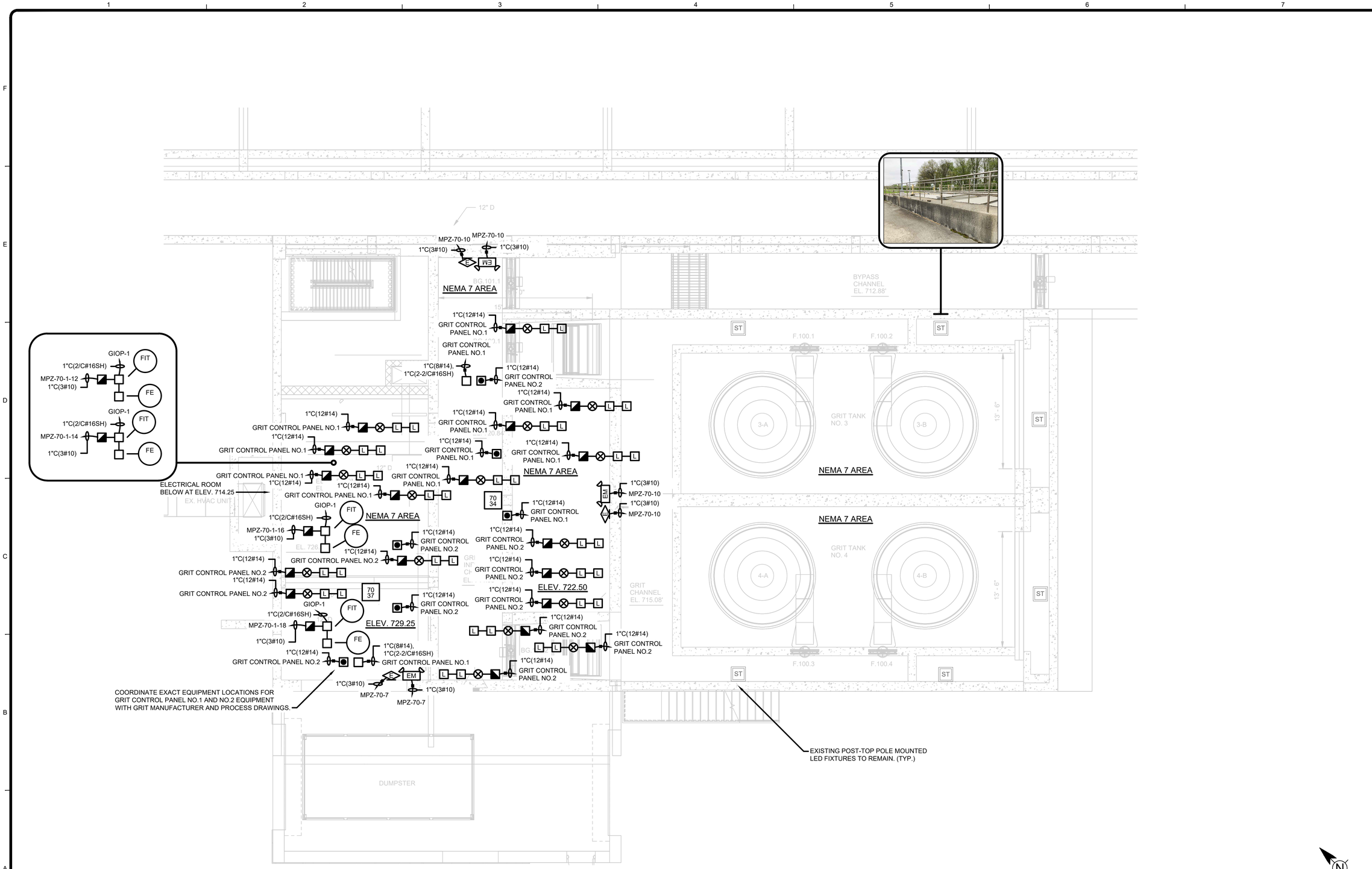

GRIT-B BUILDING GRADE PLAN

SCALE: 3/16"=1'-0"
NEMA 7 AREA

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CITY OF FLINT, MICHIGAN
FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

ELECTRICAL GRIT-B BUILDING GRADE PLAN

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

E-308
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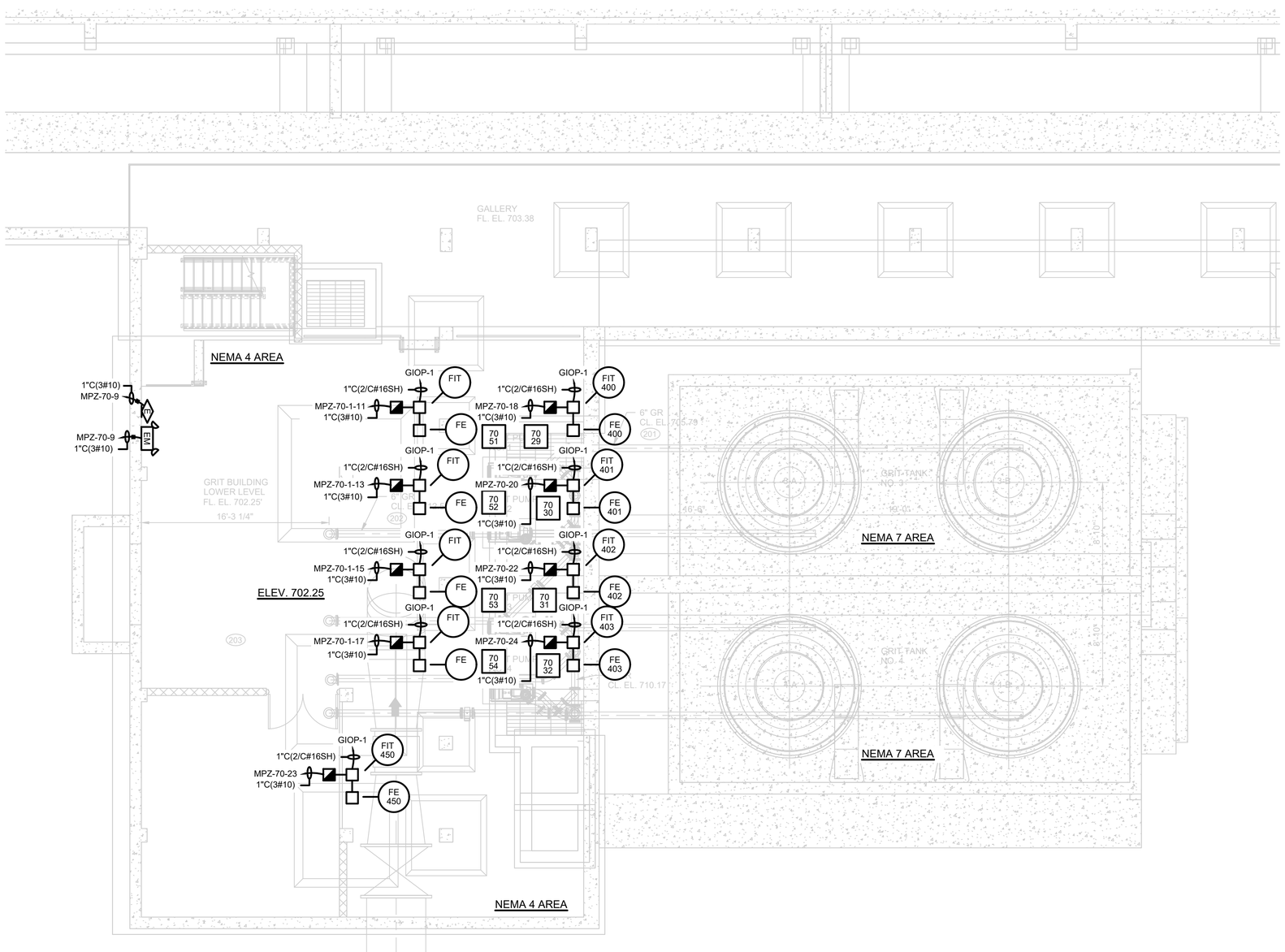

GRIT-B BUILDING LOW LEVEL PLAN (707.25)

SCALE: 3/16"=1'-0"
NEMA 4 AREA

0 2'-8" 5'-4" 10'-8"
SCALE: 3/16" = 1'-0"

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CITY OF FLINT, MICHIGAN
FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
ELECTRICAL
GRIT-B BUILDING
LOW LEVEL PLAN

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

E-309
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CONSTRUCT VERTICAL CONDUIT RACK - ENTIRE LENGTH OF WALKWAY FOR PRIMARY TANKS 1-6. RACK HEIGHT AND WIDTH AS REQUIRED. MAINTAIN SPACE IN FRONT OF EQUIPMENT AND WALKWAY AS REQUIRED.

ROUTE CONDUITS OUT EACH SIDE OF EXTERIOR WALLS, AND UNDER MCC-XP2A BELOW GRADE AS REQUIRED. CORE HOLES AS REQUIRED. PATCH BACK WITH MORTAR.

ROUTE CONDUITS FROM NEW MCC-70 AND GIOP-1 ALONG EXTERIOR WALL THEN THROUGH THIS AREA, UP - OVER TO AREA ALONG PRIMARY TANKS 7-10.

INSTALL VERTICAL CONDUIT RACK THIS AREA, ENTIRE LENGTH OF WALKWAY.

EFFLUENT CHAMBER

FLUME (TYP)

TYPICAL TANK LAYOUT SEE D-202, 3 & 4

PE CHANNELS

SCUM WELL

SCUM TROUGH CL

PIPE TUNNEL BELOW

LC-1A LC-1B LC-2A LC-2B LC-3A LC-3B LC-4A LC-4B LC-5A LC-5B LC-6A LC-6B LC-7A LC-7B LC-8A LC-8B LC-9A LC-9B LC-10A LC-10B

PRIMARY SETTLING TANK NO. 1 … PRIMARY SETTLING TANK NO. 10

PATCH ROADWAY BACK TO ORIGINAL CONDITIONS PLUS 6" BIT.

NEAMA 7 RATED PULL BOXES. SIZES AS REQUIRED. (TYP.)

VERTICAL CONDUIT RACK SUPPORTED FROM WALKWAY. HEIGHT AS REQUIRED.

CONDUIT/CONTROL (TYP.)

CONDUIT/POWER (TYP.)

ROUTE CONDUITS 8' MIN OVERHEAD TO RACK. (TYP.) SUPPORT WITH 316 STAINLESS STEEL STRUT. DO NOT BLOCK WALKWAY. (TYP.) FURNISH NEMA 7 RATED PULL BOXES AS REQUIRED.

NEMA 7 RATED PULL BOXES. SIZES AS REQUIRED. (TYP.)

VERTICAL CONDUIT RACK SUPPORTED FROM WALKWAY. HEIGHT AS REQUIRED.

SEE NOTES

CC-1 DRIVE, LC-1AB DRIVE, CC-2 DRIVE, LC-2AB DRIVE, CC-3 DRIVE, LC-3AB DRIVE, CC-4 DRIVE, LC-4AB DRIVE, CC-5 DRIVE, LC-5AB DRIVE, CC-6 DRIVE, LC-6AB DRIVE, CC-7 DRIVE, LC-7AB DRIVE, CC-8 DRIVE, LC-8AB DRIVE, CC-9 DRIVE, LC-9AB DRIVE, CC-10 DRIVE, LC-10AB DRIVE

XP2 A1 XP2 A2 XP2 A3 XP2 A4 XP2 A5 XP2 A6 XP2 A7 XP2 A8 XP2 A9 XP2 A10 XP2 A11 XP2 A12

XP2 A14 XP2 A15 XP2 A16 XP2 A17 XP2 A18 XP2 A19 XP2 A20 XP2 A21 XP2 A22 XP2 A23 XP2 A24 XP2 A25 XP2 A26 XP2 A27 XP2 A28 XP2 A29 XP2 A30 XP2 A31 XP2 A32 XP2 A33 XP2 A34 XP2 A35 XP2 A36 XP2 A37

70 2 70 3 70 4 70 5 70 6 70 7 70 8 70 9

70 13 70 14 70 15 70 16 70 17 70 18 70 19 70 20 70 21 70 22 70 23 70 24 70 25 70 26 70 27 70 28

CONDUIT/POWER (TYP.)

CONDUIT/CONTROL (TYP.)

CONDUIT/SIGNAL (TYP.)

ROUTE CONDUITS OVERHEAD 8' ABOVE WALKWAY THEN DOWN TO OTHER SIDE OF WALKWAY. SUPPORT AS REQUIRED.

6-2"C(4#8) - POWER FOR MOTORIZED ACTUATORS AND FOR MCC-XP2A
4"C(288#14) - ACTUATORS TO GPP
4"C(48-2/C#16SH) - ACTUATORS TO GPP
12-1"C(4#10) - SLUDGE COLLECTOR AND CROSS COLLECTOR POWER TO MCC-XP2A
12-1"C(18#14) - CONTROL TO MCC-XP2A STARTER BUCKETS

SEE SHEET E-003 FOR ADDITIONAL INFORMATION

4-2"C(4#8) - POWER FOR MOTORIZED ACTUATORS FOR MCC-70 EACH
4"C(192#14) - ACTUATOR CONTROL TO GIOP-1
4"C(32-2/C#16SH) - ACTUATOR SIGNAL TO GIOP-1
8-1"C(4#10) - SLUDGE COLLECTOR AND CROSS COLLECTOR POWER TO MCC-70 STARTER BUCKETS EACH
8-1"C(18#14) - CONTROL SLUDGE COLLECTORS AND CROSS COLLECTORS TO MCC-70 STARTER BUCKETS EACH

SEE NOTES: FIELD LOCATE AND ROUTE CONDUITS ON EXTERIOR WALL. SUPPORT AS REQUIRED.

EXISTING MCC-7D

EXISTING MCC-7U ABOVE

INSTALL NEW EXTERIOR RACK. ROUTE TO AVOID NEW TRANSFORMER/PAD/CONDUIT/WIRE

NEW ELECTRICAL ROOM THIS AREA

GRIT-B BUILDING

PRIMARY TANKS BATT. A OVERALL TOP PLAN

SCALE: 1/16"=1'-0"
NEMA 7 AREA

PRIMARY TANKS BATT. B OVERALL TOP PLAN

SCALE: 1/16"=1'-0"
NEMA 7 AREA

0 8' 16' 32'
SCALE: 1/16" = 1'-0"

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
ELECTRICAL
PRIMARY TANKS OVERALL TOP PLAN

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

E-310
OF 46

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Bar Measures 1 inch, otherwise drawing not to scale

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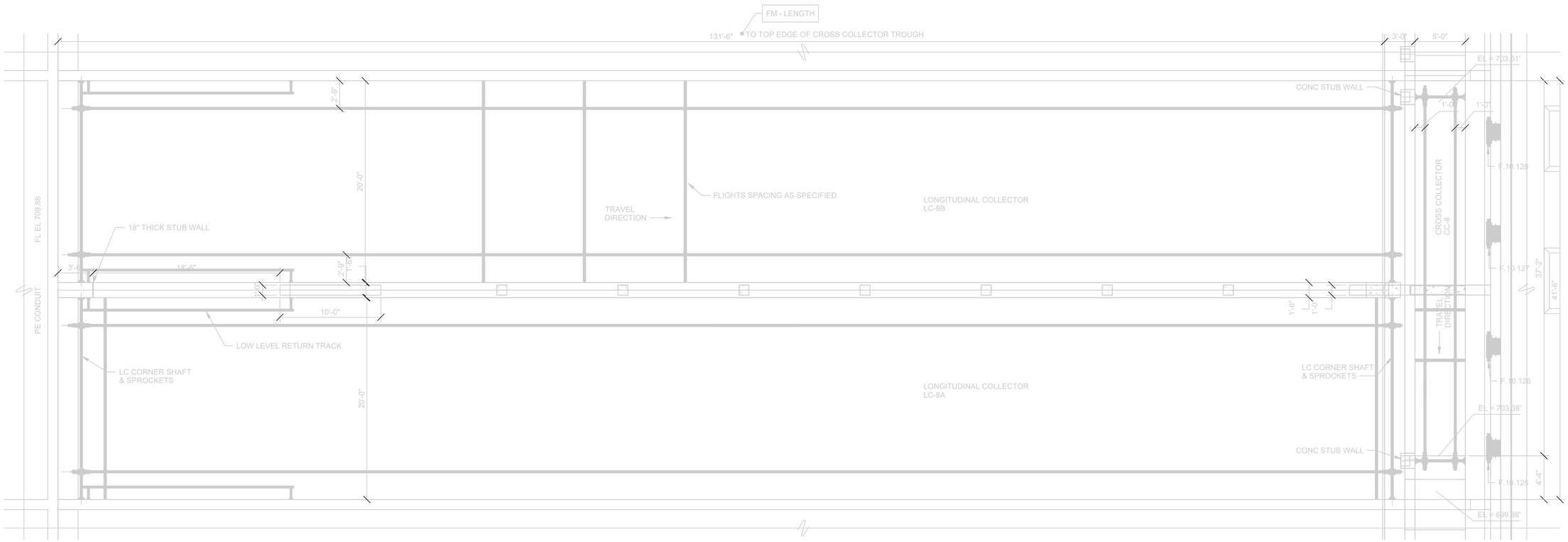
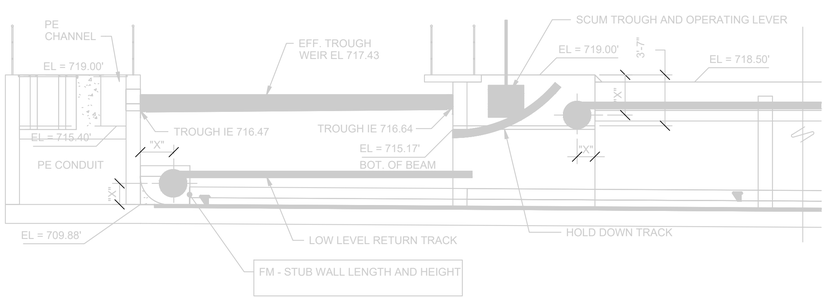


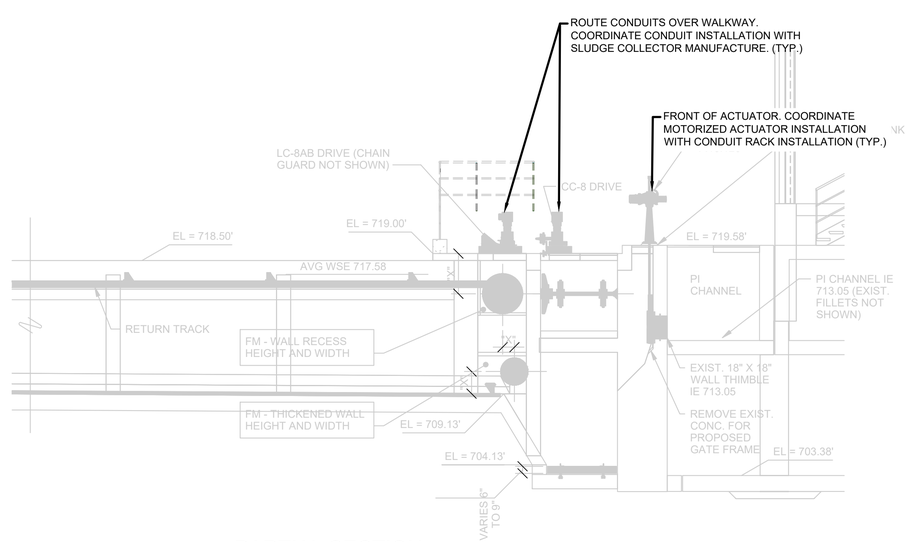
TYPICAL PST LOW LEVEL PLAN
TANK NO.8 SHOWN

SCALE: 3/16"=1'-0"



PARTIAL SECTION
EFFLUENT END

SCALE: 3/16"=1'-0"



PARTIAL SECTION
INFLUENT END

SCALE: 3/16"=1'-0"

N

0 2'-8" 5'-4" 10'-8"

SCALE: 3/16" = 1'-0"

Bar Measures 1 inch, otherwise drawing not to scale

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CITY OF FLINT, MICHIGAN

FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

PRIMARY SETTLING TANK
TYPICAL LOW LEVEL PLAN
& SECTIONS

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

E-311

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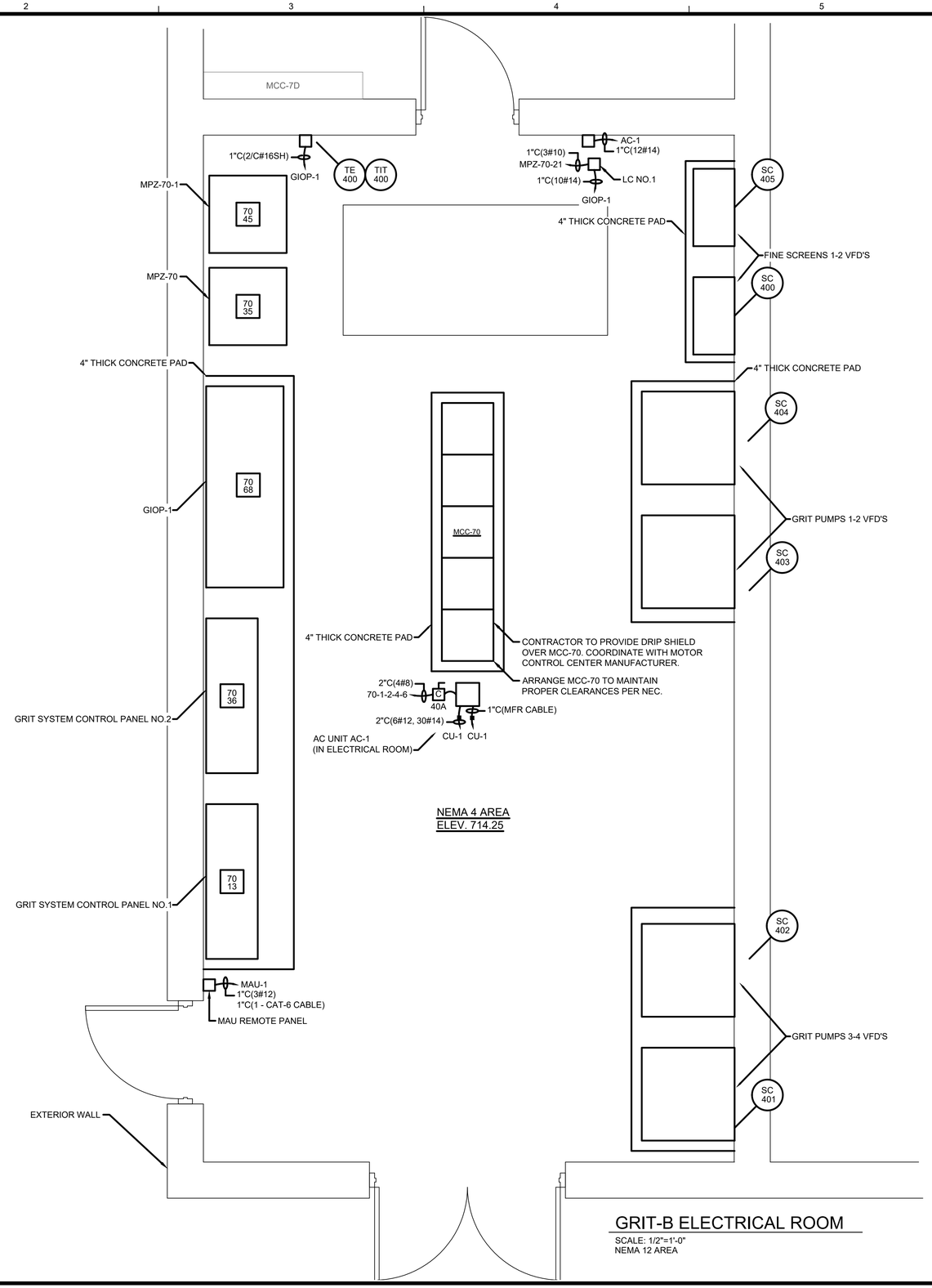

GRIT-B ELECTRICAL ROOM

SCALE: 1/2"=1'-0"
NEMA 12 AREA

NOTES:

1. FURNISH AND INSTALL EXPLOSION PROOF JUNCTION BOXES FOR CONTROL, POWER AND SIGNAL/FIBER BETWEEN THE EXISTING GRIT AND SCREEN AREAS AND THE NEW ELECTRICAL ROOM.
2. ROUTE CONDUITS OVERHEAD.
3. PROVIDE SEAL FITTINGS ON ALL RUNS ENTERING THIS ROOM.

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CITY OF FLINT, MICHIGAN
FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
GRIT-B ELECTRICAL ROOM POWER/CONTROL

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

E-312
OF 46

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

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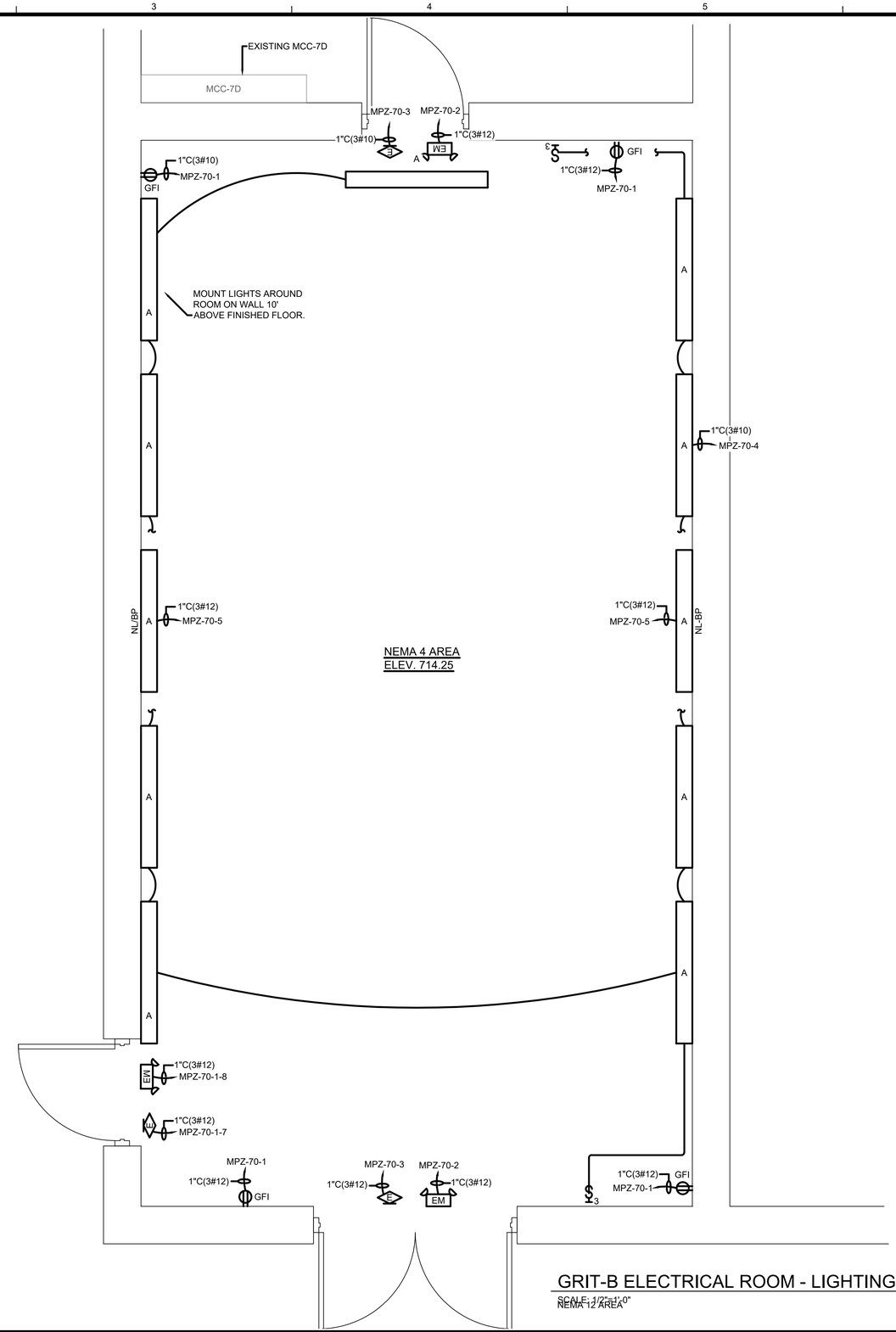

GRIT-B ELECTRICAL ROOM - LIGHTING

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

NOTES:

1. FURNISH AND INSTALL EXPLOSION PROOF JUNCTION BOXES FOR CONTROL, POWER AND SIGNAL/FIBER BETWEEN THE EXISTING GRIT AND SCREEN AREAS AND THE NEW ELECTRICAL ROOM.

0 1' 2' 4'
SCALE: 1/2" = 1'-0"

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
GRIT-B ELECTRICAL ROOM LIGHTING

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

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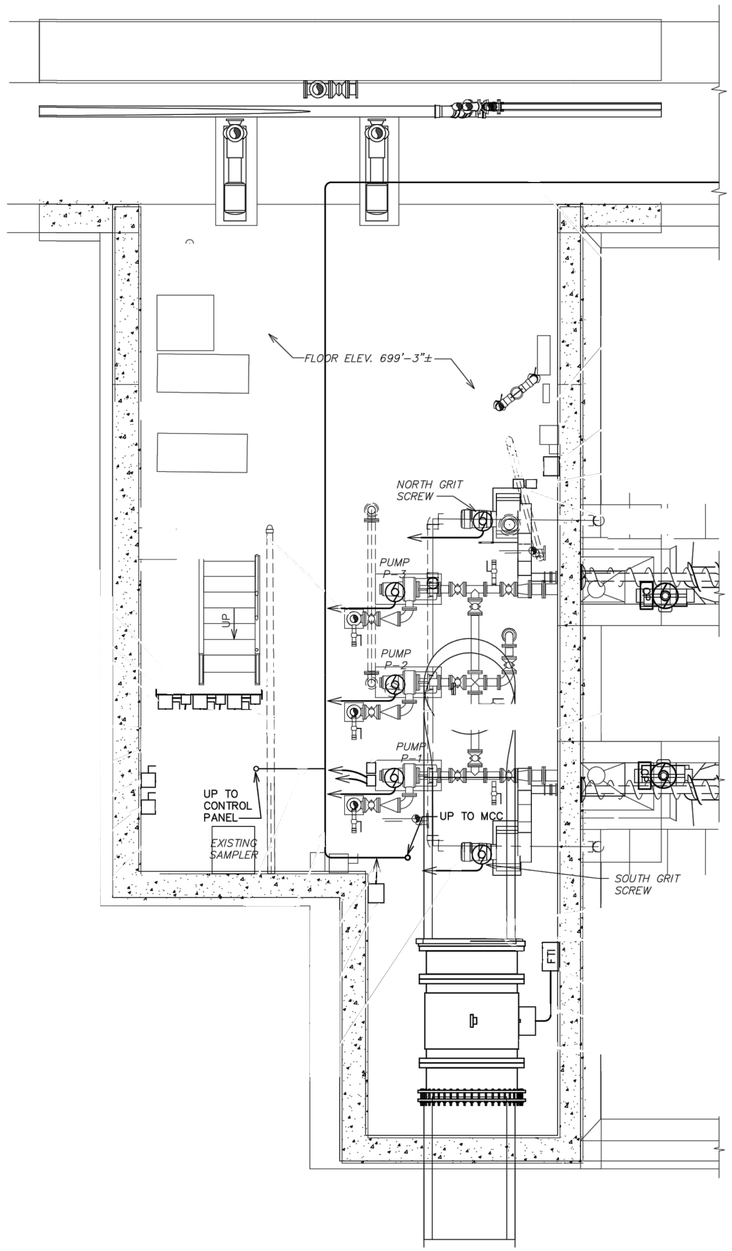
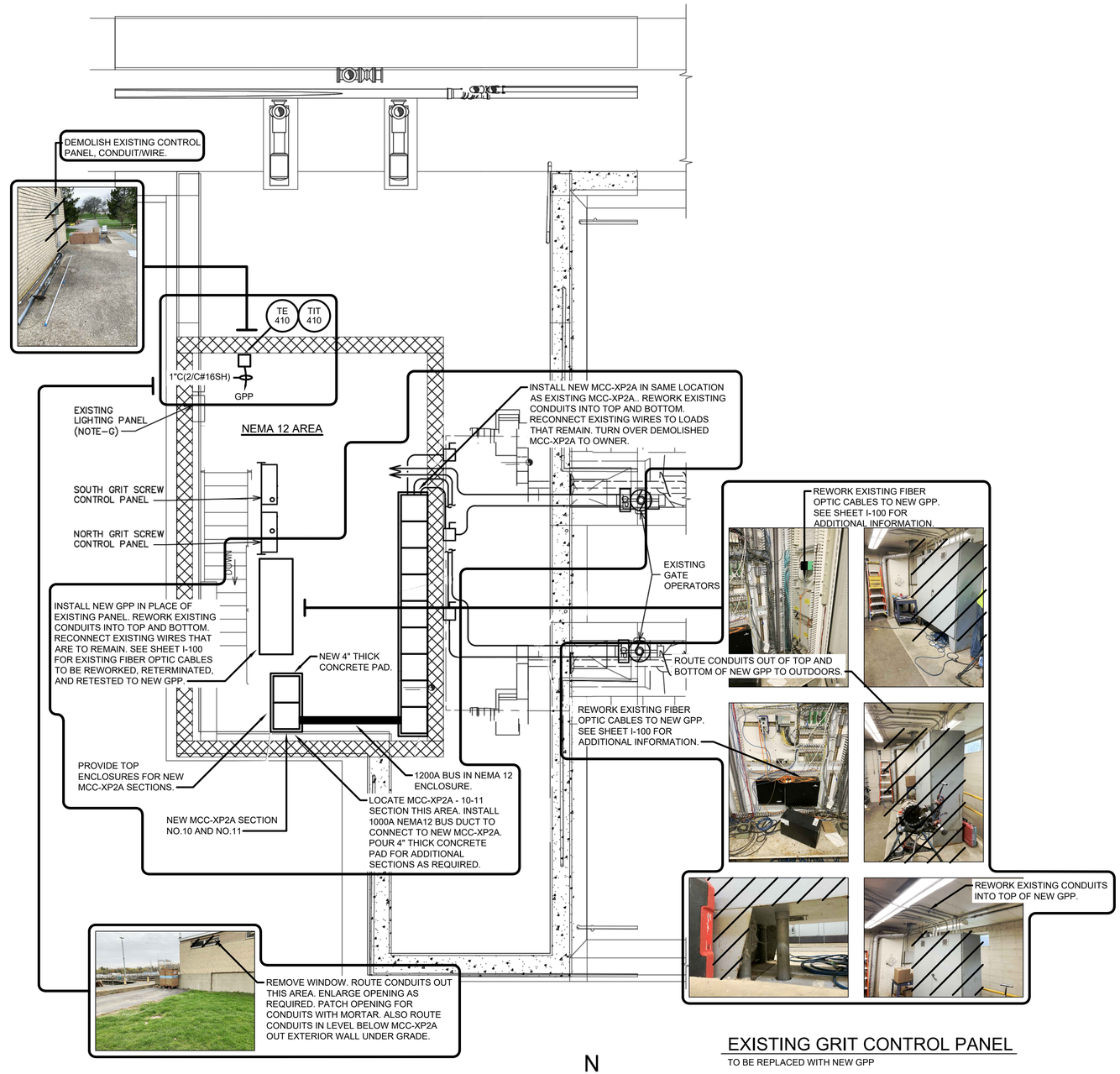


ELECTRICAL LOWER LEVEL POWER PLAN EL. 699'-3"±

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

N



GRIT-A BACKGROUND PLANS - PROPOSED WORK

NEMA 12 AREA

N

EXISTING GRIT CONTROL PANEL

TO BE REPLACED WITH NEW GPP

EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD AND CIRCLED.

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

EXISTING GRIT-A BACKGROUND PLAN PROPOSED WORK

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

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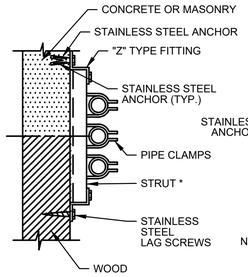
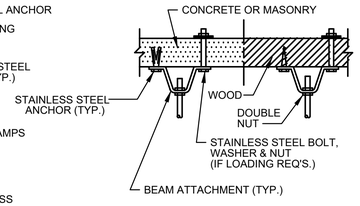
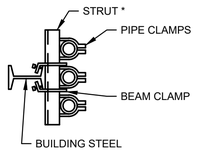
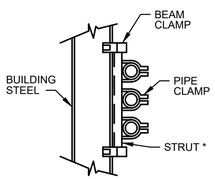




NOTE: * = STRUT SHALL BE STAINLESS STEEL HAVE A MIN. THICKNESS OF .105 INCH OR 12 GA.



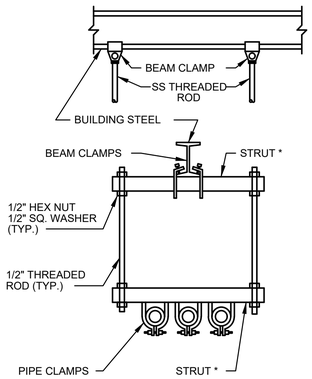


VERTICALLY RACKED SUSPENDED RUN

NO SCALE

NOTES:

1. MOUNTING HARDWARE AND SUPPORTS TO BE 316 STAINLESS STEEL.

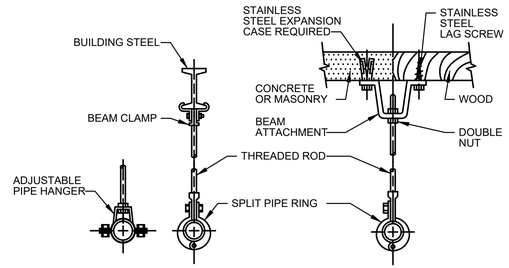


HORIZ. RACKED SUSPENDED RUN

NO SCALE

NOTES:

1. MOUNTING HARDWARE AND SUPPORTS TO BE 316 STAINLESS STEEL.

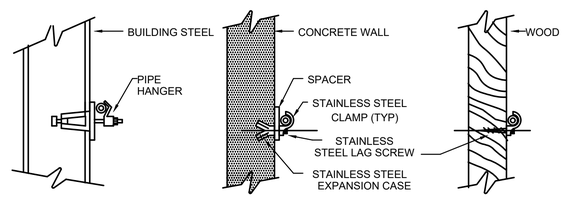


SINGLE CONDUIT HANGERS

NO SCALE

NOTES:

1. ALL MOUNTING HARDWARE AND SUPPORTS TO BE 316 STAINLESS STEEL.

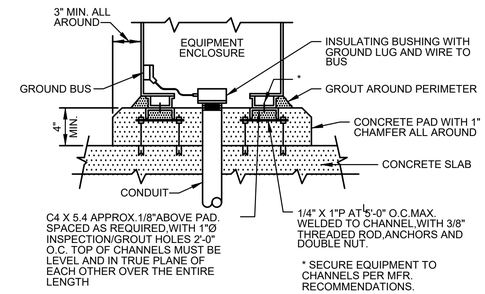


VERTICAL AND HORIZONTAL CONDUIT RACKS AND HANGERS

NO SCALE

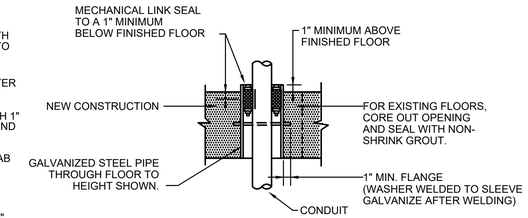
NOTES:

1. MOUNTING HARDWARE AND SUPPORTS TO BE 316 STAINLESS STEEL.



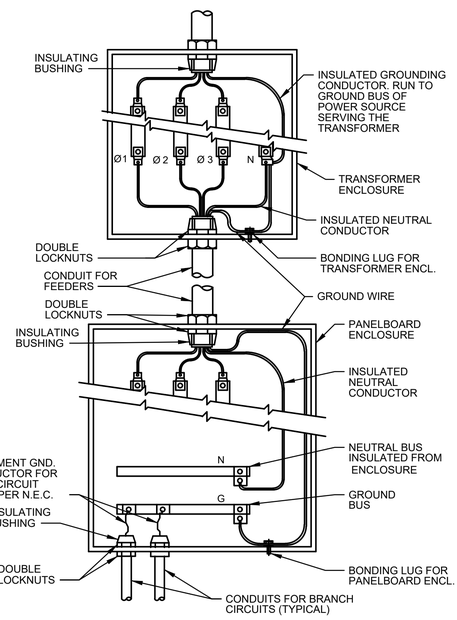
PAD MOUNTED EQUIPMENT DETAIL

NO SCALE



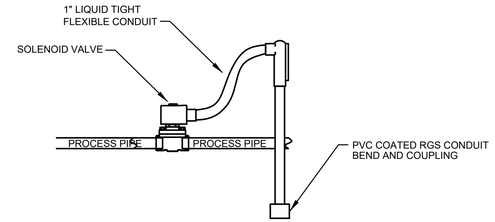
INTERIOR FLOOR CONDUIT SLEEVE DETAIL

NO SCALE



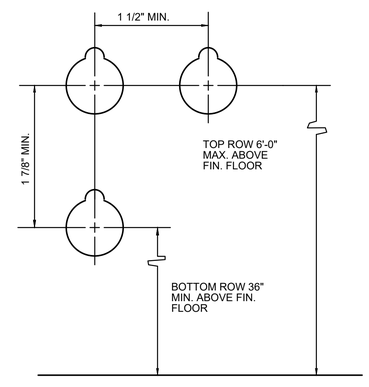
CONDUIT GROUNDING DETAILS FOR TRANSFORMERS, DISTRIBUTION PANELS AND WALL MOUNTED ENCLOSURES

NO SCALE



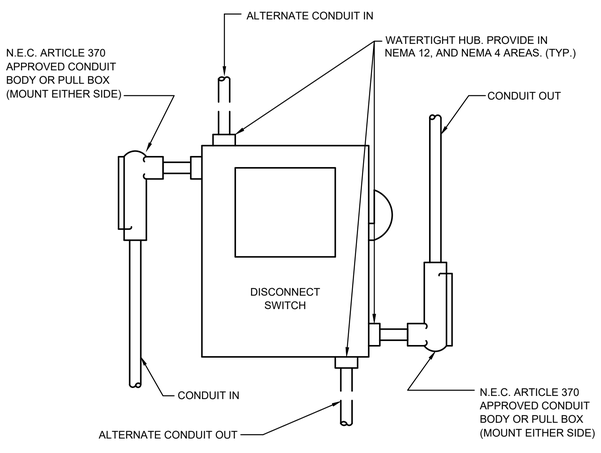
SOLENOID STUB-UP DETAIL

NO SCALE



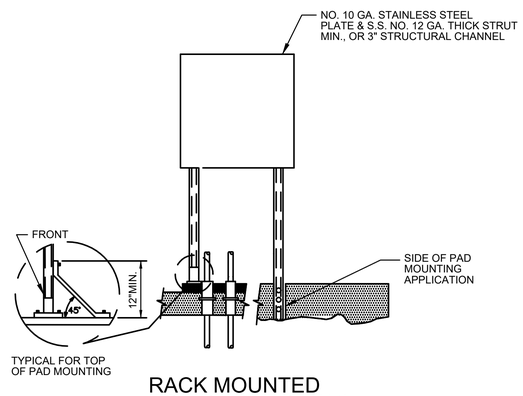
TYPICAL PUSHBUTTON, PILOTLIGHT SELECTOR SWITCH PANEL SPACING

NO SCALE



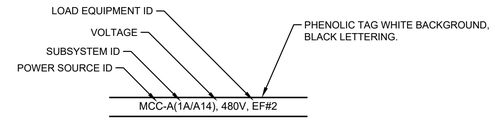
DISCONNECT SWITCHES

NO SCALE



RACK MOUNTED EQUIPMENT DETAIL

NO SCALE



FEEDER & BRANCH CIRCUIT RACEWAY LABELS

NOTE:

1. IN ACCESSIBLE CEILING SPACES AND EXPOSED IN UNFINISHED AREAS, LABEL CONDUIT WITH PANEL AND CIRCUIT NUMBERS OF CONDUCTORS ROUTED THROUGH THE CONDUIT. LABEL CONDUIT AT WALL PENETRATIONS AND CONNECTIONS TO ALL PANELS, JUNCTION BOXES, AND EQUIPMENT SERVED.

ALL HARDWARE SHALL BE 316 STAINLESS STEEL INCLUDING NUTS, BOLTS, WASHERS, ANCHORS, STRUTS, ETC. THIS REQUIREMENT HAS PRECEDENCE OVER STANDARD DETAILS, AND PROJECT MANUAL/SPECIFICATIONS.

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MARK	DATE	DESCRIPTION	BY
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CITY OF FLINT, MICHIGAN

FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

ELECTRICAL DETAILS

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

E-400

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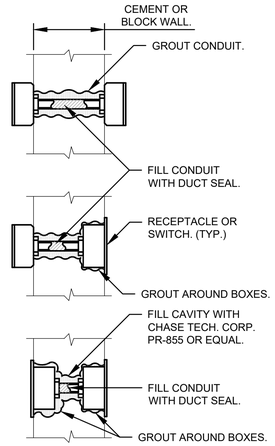
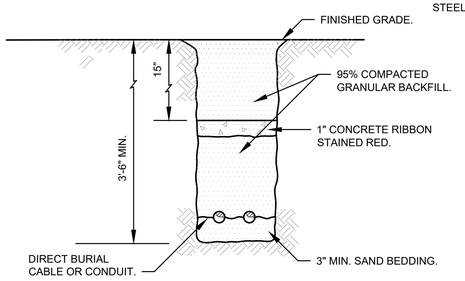


WALL BOXES BACK-TO-BACK

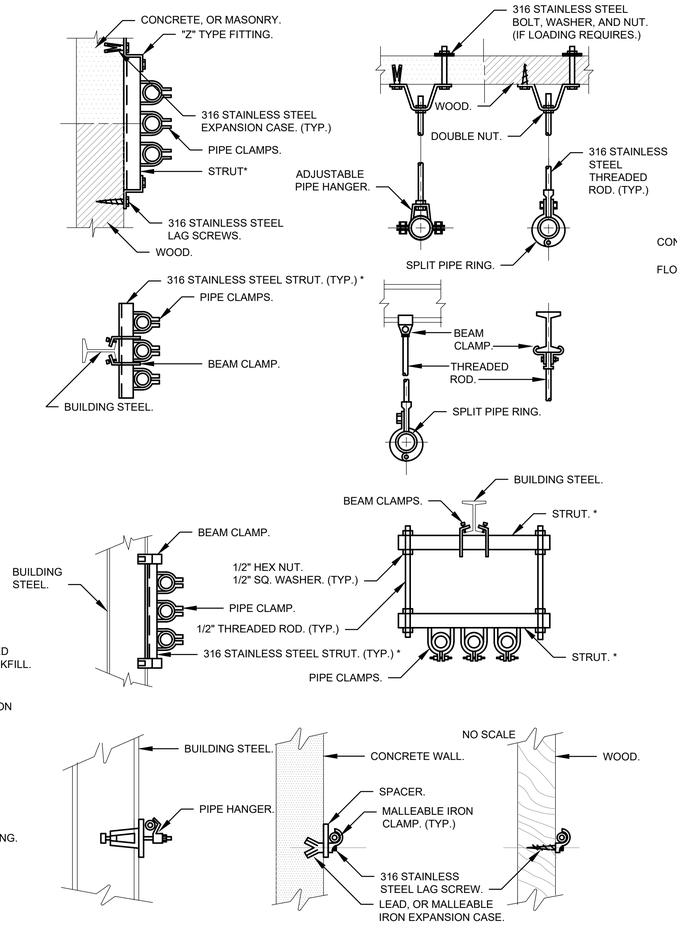
NO SCALE

- FOR SOUND PROOFING



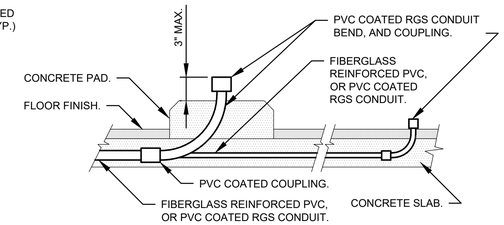
TRENCHING DETAIL

NO SCALE



VERTICAL AND HORIZONTAL CONDUIT RACKS AND HANGERS

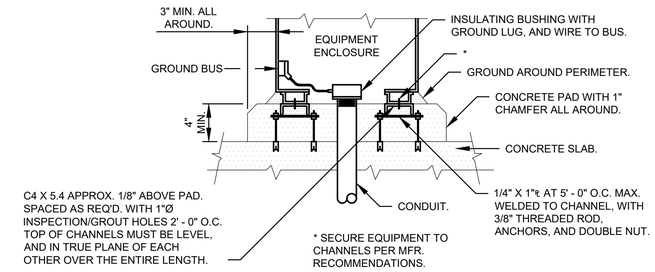
NO SCALE



NOTE:
PVC COATED CONDUIT BENDS, AND FITTINGS SHALL BE USED WHERE CONCEALED CONDUIT RUNS ARE STUBBED UP FROM THE SLAB. RISERS ON POLES SHALL BE PVC COATED RGS INCLUDING WEATHERHEADS.

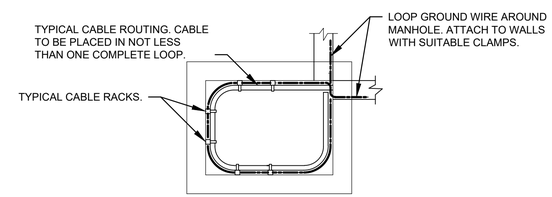
CONDUIT STUB-UP DETAIL

NO SCALE



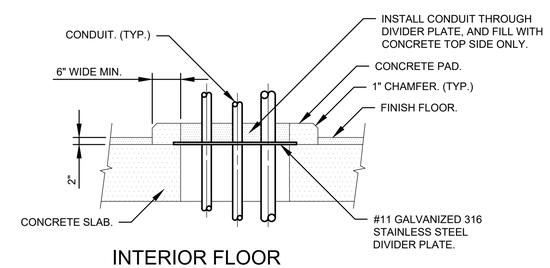
OUTDOOR PAD MOUNTED EQUIPMENT DETAIL

NO SCALE



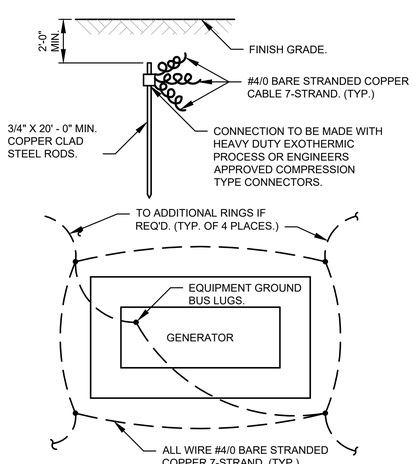
CABLE ROUTING DETAIL

NO SCALE



INTERIOR FLOOR CONDUIT FLOOR OPENING DETAIL

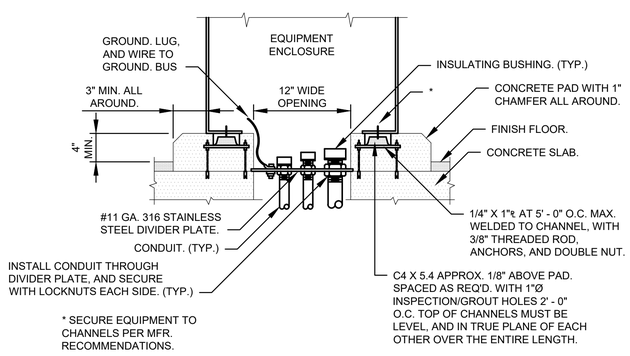
NO SCALE



NOTES:
ADDITIONAL CONCENTRIC RINGS SHALL BE ADDED AS REQ'D. TO MEET THE (5) OHM SPECIFIED RESISTANCE. EACH RING TO HAVE 4 GROUND RODS, AND SPACE 10 FEET FROM THE INNER RING.

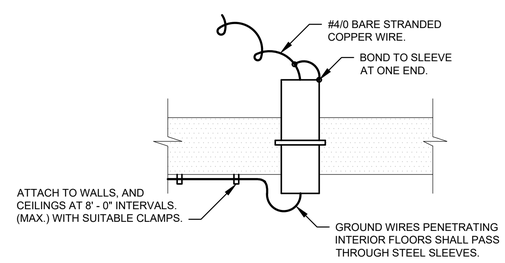
GROUND MAT DETAIL

NO SCALE



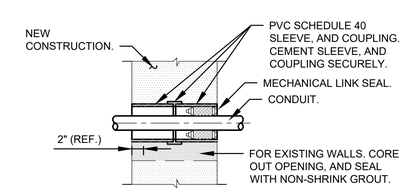
INTERIOR PAD MOUNTED EQUIPMENT DETAIL

NO SCALE



INTERIOR GROUND FLOOR SLEEVE

NO SCALE



EXTERIOR WALL CONDUIT SLEEVE DETAIL

NO SCALE
DO NOT USE BELOW GRADE.

ALL HARDWARE SHALL BE 316 STAINLESS STEEL INCLUDING NUTS, BOLTS, WASHERS, ANCHORS, STRUTS, ETC. THIS REQUIREMENT HAS PRECEDENCE OVER STANDARD DETAILS, AND PROJECT MANUAL/SPECIFICATIONS.

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CITY OF FLINT, MICHIGAN
FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
ELECTRICAL DETAILS

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

E-401
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Bar Measures 1 inch, otherwise drawing not to scale

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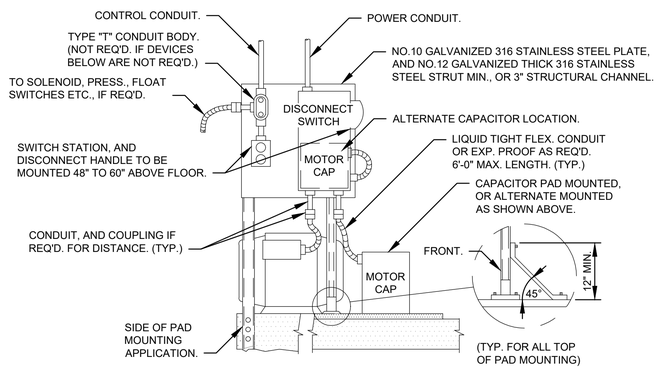
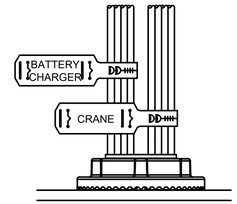


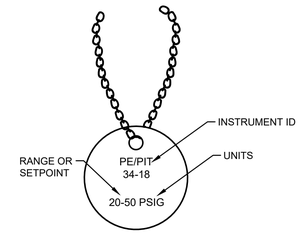
MOTOR CONDUIT DETAIL

NO SCALE
CONDUIT FROM ABOVE POWER AND CONTROL IN SEPARATE CONDUIT.



WIRE/CABLE BUNDLE TAG

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND (POWER)
2. BLACK LETTERING ON YELLOW BACKGROUND (SIGNAL)
3. BUNDLE AND LABEL WIRES/CABLES GOING TO A COMMON PANEL/EQUIPMENT/DEVICE
4. LABEL IN PANELS, MCC, MANHOLES, HAND HOLES, AND BOXES OVER 8 CUBIC FEET.



INSTRUMENT TAG

NOTE:
1. STAINLESS STEEL TAG
2. STAINLESS STEEL CHAIN
3. BLACK LETTERING
4. INSTALL TAG ON ELEMENTS AND INSTRUMENTS.

WHITE BACKGROUND BLACK LETTERS

CONTROL PANEL
*
SUPPLY XXX VOLTS: **
Disconnect Current Rating: _____
xxxxxxxxxxxxxxxx
Drawing No. ***
Built By: ****
Equipment Modle No. ****
Equipment Serial No. ****
Contract ****
Date of Manfacture Machine ****

PANEL TAG

NOTE:
1. * = PANEL NAME
2. ** = MCC & BUCKET OR LIGHTING PANEL & CIRCUIT NUMBER
3. *** = DRAWING NUMBER
4. **** = MANUFACTURER, MODEL #, SERIAL #, CONTACT INFO. & DATE.

YELLOW BACKGROUND BLACK LETTERS

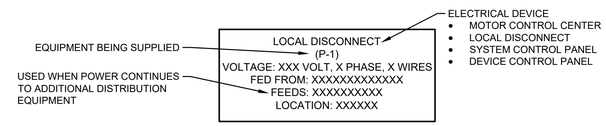
DANGER

YELLOW WIRING IS NOT DE-ENERGIAED BY DISCONNECT

AUTHORIZED PERSONNEL ONLY ALLOWED TO ENTER

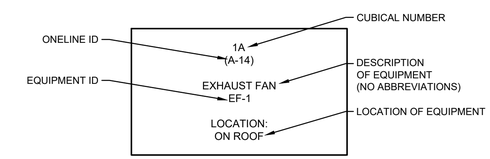
YELLOW WIRING PANEL TAG

NOTE:
1. TO BE USED WHEN PANEL HAS FOREIGN POWER (CIRCUITS THAT DO NOT DE-ENERGIZE WHEN DISCONNECT OF MAIN CIRCUIT BREAKER IS TURNED OFF). EXAMPLE IS WHEN THE MCC POWERS THE START CONTACT TO A PLC PANEL.



EQUIPMENT NAMEPLATE

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND



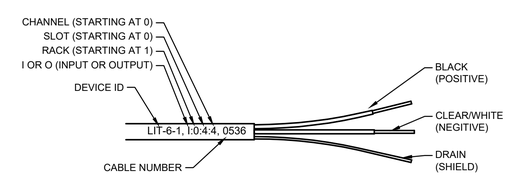
MOTOR CONTROL CENTER CUBICAL NAMEPLATE

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND

WHITE LETTING ON BLACK BACKGROUND
BLACK LETTING ON WHITE BACKGROUND

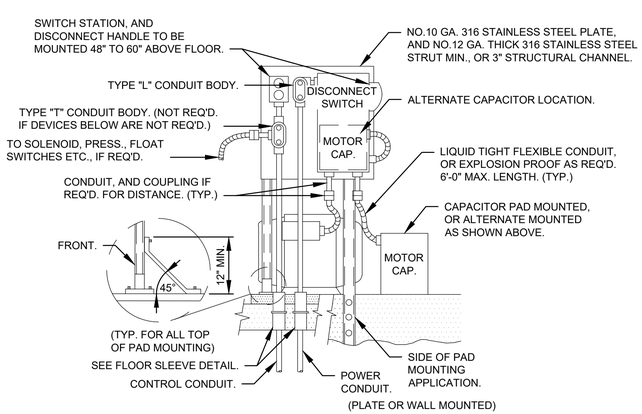
CALIBRATION
ORGANIZATION:_____
ID#:_____
DATE:_____BY:_____
DUE DATE:_____
RANGE:_____UNIT:_____

INSTRUMENT CALIBRATION



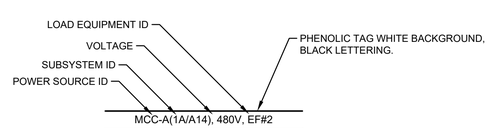
TWO CONDUCTOR CABLE

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND



MOTOR CONDUIT DETAIL

NO SCALE
CONDUIT FROM BELOW POWER AND CONTROL IN SEPARATE CONDUIT.



FEEDER & BRANCH CIRCUIT RACEWAY LABELS

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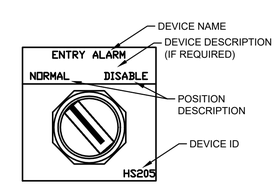

PANEL TAG PUSH BUTTON/SWITCH

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND

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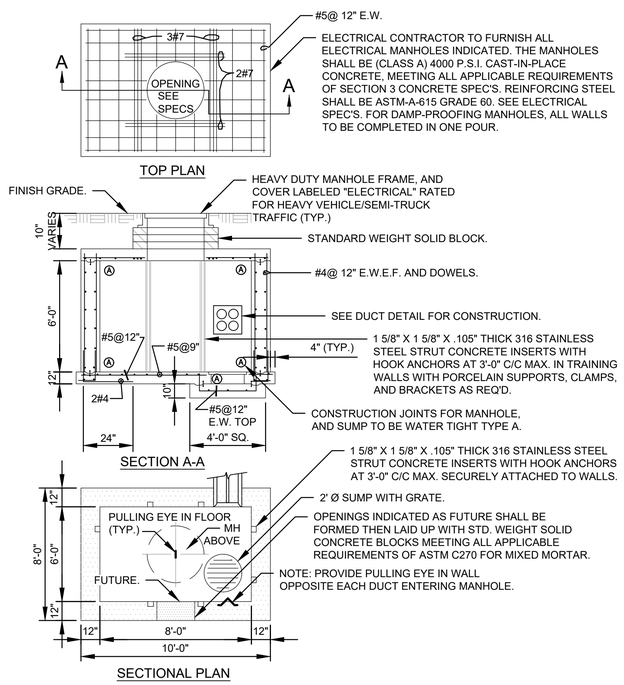
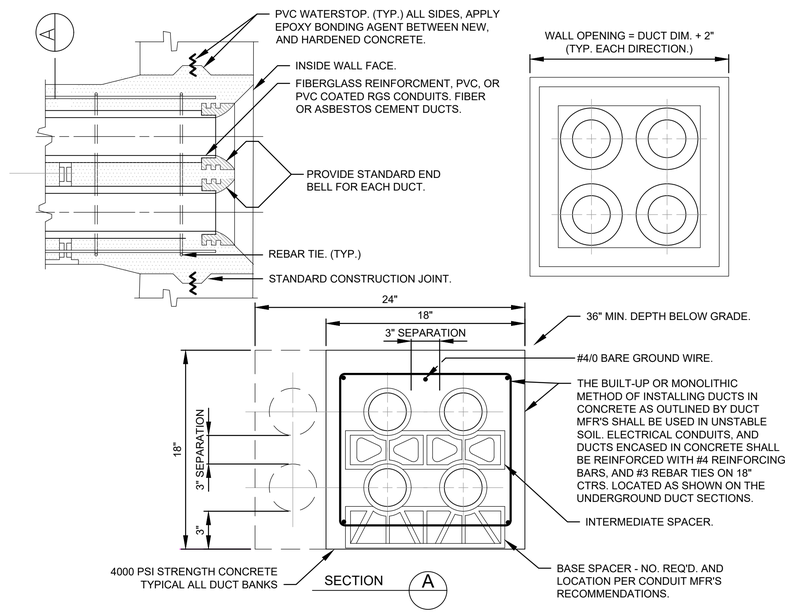
NOTE:
ELECTRICAL CONTRACTOR TO FURNISH ALL ELECTRICAL MANHOLES INDICATED. THE MANHOLES SHALL BE (CLASS A) 4000 P.S.I. CAST-IN-PLACE CONCRETE, MEETING ALL APPLICABLE REQUIREMENTS OF SECT. 3 CONC. SPEC'S. REINFORCING STEEL SHALL BE ASTM-A-615 GRADE 60. SEE ELEC. SPEC'S FOR DAMP-PROOFING MANHOLES. ALL WALLS TO BE COMPLETED IN ONE POUR.



TYPICAL SINGLE MANHOLE DETAIL

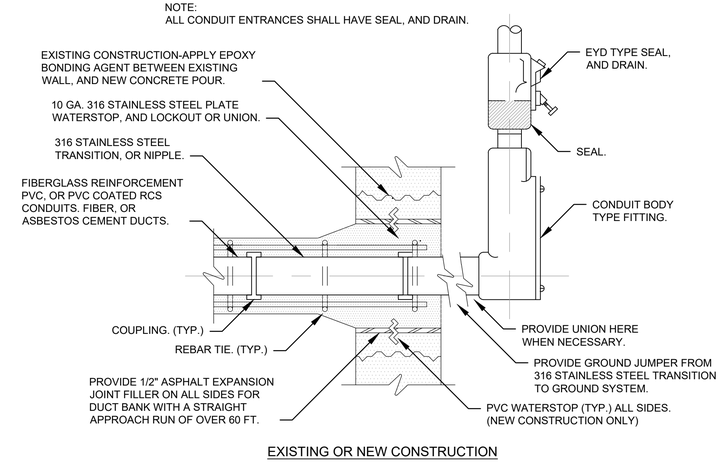
NO SCALE
HIGH WATER TABLE APPLICATION



DUCT DETAILS

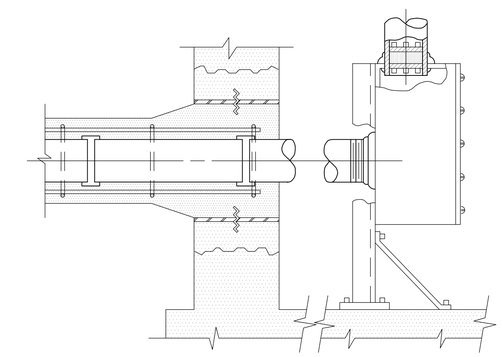
NO SCALE

NOTE:
ALL CONDUIT ENTRANCES SHALL HAVE SEAL, AND DRAIN.



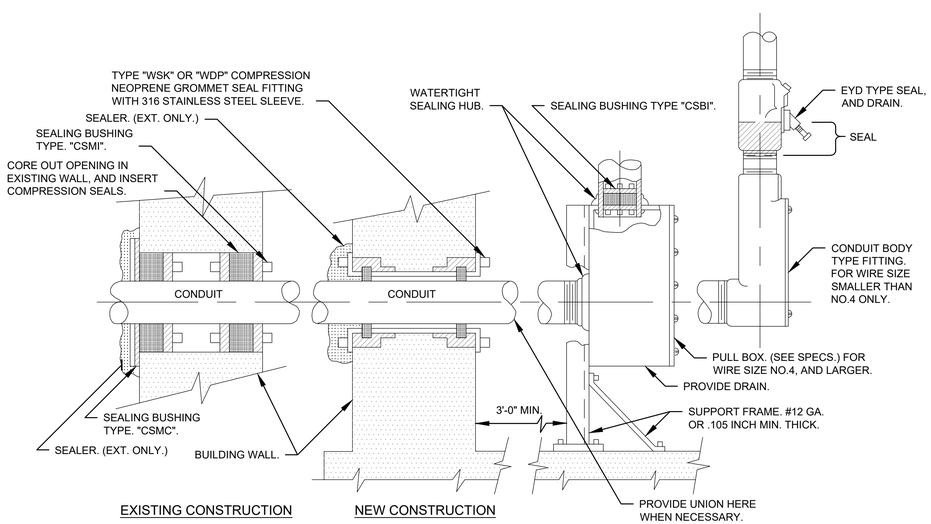
BELOW GRADE DUCT ENTRANCE DETAIL

NO SCALE
FOR WIRE SIZE SMALLER THAN NO.4 ONLY



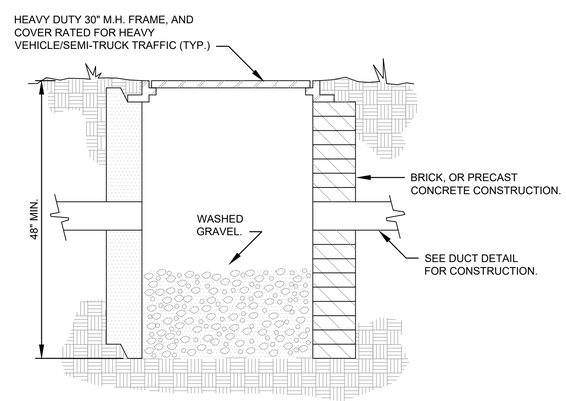
BELOW GRADE DUCT ENTRANCE DETAIL

NO SCALE
FOR WIRE SIZE NO.4 OR LARGER ONLY



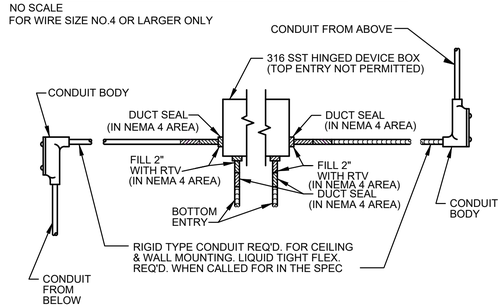
BELOW GRADE CONDUIT ENTRANCE DETAIL

NO SCALE
NOTE: ALL CONDUIT ENTRANCES SHALL HAVE SEAL, AND DRAIN.



HANDHOLE DETAIL

NO SCALE
MIN. DIMENSIONS 48"H X 48"W X 48"D



DEVICE BOX CONDUIT DETAIL

NO SCALE

NOTES:

1. TAG ALL CABLES PASSING THROUGH BOX.
2. USE WATER-TIGHT HUBS.

ALL HARDWARE SHALL BE 316 STAINLESS STEEL INCLUDING NUTS, BOLTS, WASHERS, ANCHORS, STRUTS, ETC. THIS REQUIREMENT HAS PRECEDENCE OVER STANDARD DETAILS, AND PROJECT MANUAL/SPECIFICATIONS.

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1	6/22/21	ISSUED FOR BIDS	

CITY OF FLINT, MICHIGAN
FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
ELECTRICAL DETAILS

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

E-403
OF 46

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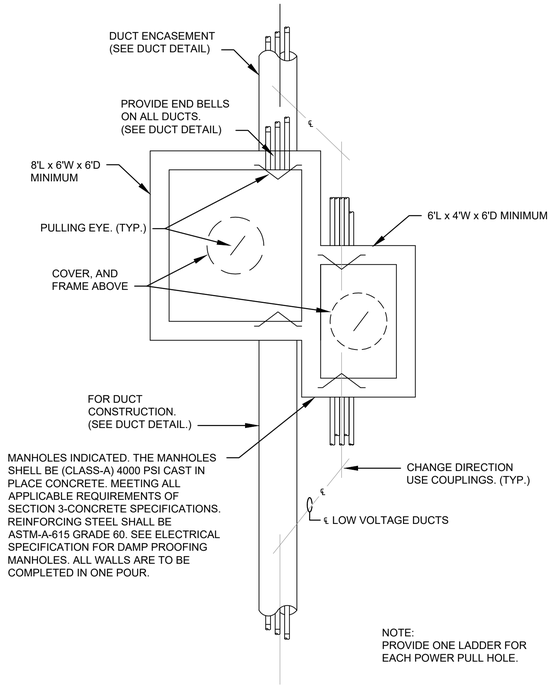
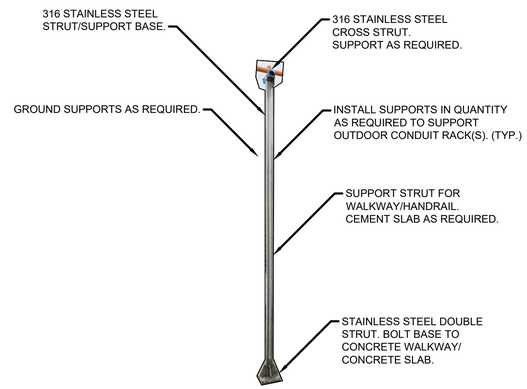


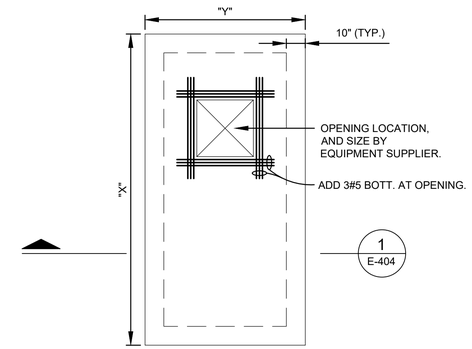
DUAL ELECTRICAL MANHOLE

NO SCALE

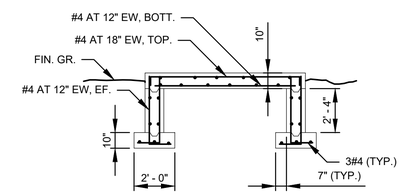


OVERHEAD CONDUIT OUTDOOR SUPPORT DETAIL

NO SCALE



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



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

1 / E-404 TRANSFORMER/SWITCH PAD (TYP.)

NO SCALE

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GRAPHIC SYMBOLS FOR INSTRUMENTATION ITEMS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	DEVICE MOUNTED ON PANEL		FLOW ACTUATED SWITCH - NC
	BOARD OR PANEL MOUNTED DEVICE - DEVICE MOUNTED INSIDE PANEL		TEMPERATURE SWITCH - NO
	FIELD OR LOCALLY MOUNTED DEVICE		TEMPERATURE SWITCH - NC
	PROGRAMMED FUNCTION NOT NORMALLY ACCESSIBLE TO OPERATOR		LIMIT SWITCH (PROXIMITY TYPE) - NORMALLY OPEN
	PROGRAMMED FUNCTION ACCESSIBLE THROUGH OPERATOR'S INTERFACE DEVICE		LIMIT SWITCH (PROXIMITY TYPE) - NORMALLY CLOSED
	PLC INPUT OR OUTPUT POINT		LIMIT SWITCH (PROXIMITY TYPE) - NORMALLY CLOSED - HELD OPEN
	INTERLOCKING		LIMIT SWITCH (PROXIMITY TYPE) - NORMALLY OPEN - HELD CLOSED
XOR	EXCLUSIVE OR		CONTROL RELAY CONTACT - NORMALLY OPEN
A	ALTERNATOR		CONTROL RELAY CONTACT - NORMALLY CLOSED
OR	OR		LIGHTING ARRESTOR
AND	AND	ETI	ELAPSED TIME INDICATOR
S	MOTOR STARTER	T	TIMING RELAY COIL
P	PURGE	T 1	TIMING RELAY COIL (OFF DELAY)
L	COMPLEX LOGIC	G	INDICATING LIGHT
	COMPUTER LOGIC SYSTEM		PUSH-TO-TEST INDICATING LIGHT
	TERMINAL OR TRANSITION POINT		BATTERY
	FLOAT SWITCH	X1 X2	SECONDARY TRANSFORMER
	PARTIAL FLUME		VARIABLE RESISTOR
	MIXER		RESISTOR
	SEAL		MOLDED CASE CIRCUIT BREAKER
	OFF PAGE CONNECTOR		SPEED SWITCH
	PROCESS MACHINERY MOTOR		MOMENTARY PUSHBUTTON OPERATOR - NORMALLY CLOSED
	VENTURI OR INSERT FLOW TUBE		MOMENTARY PUSHBUTTON OPERATOR - NORMALLY OPEN
	IN-FLOW ELEMENT (PROPELLER TYPE)		SELECTOR SWITCH - NORMALLY OPEN
	IN-LINE FLOW ELEMENT (MAGNETIC TYPE)		PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
	IN-LINE FLOW ELEMENT (ULTRASONIC)		SOLENOID OR CLUTCH
	FLOW ORIFICE		THERMAL OVERLOAD
	TURBIDITY METER	(F)	FIELD LOCATED
	ROTOMETER		TERMINAL POINT
	PUMP		TERMINAL
	BLOWER		LOW VOLTAGE FUSE
	GENERAL USE DISCONNECTING SWITCH		FUSIBLE TERMINAL BLOCK
	TIME CLOSED CONTACT ON ENERGIZATION		CIRCUIT BREAKER WITH STAB CONNECTION
	TIME OPENED CONTACT ON ENERGIZATION		CONTROL POWER TRANSFORMER
	TIME CLOSED CONTACT ON DE-ENERGIZATION	CR L / CR U	TWO COIL LATCHING RELAY
	TIME OPENED CONTACT ON DE-ENERGIZATION		RECEPTACLE
	FLOAT ACTUATED SWITCH - NO	OFF HAND AUTO	SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN
	FLOAT ACTUATED SWITCH - NC		
	PRESSURE ACTUATED SWITCH - NO		
	PRESSURE ACTUATED SWITCH - NC		
	FLOW ACTUATED SWITCH - NO		

GRAPHIC SYMBOLS FOR INSTRUMENTATION ITEMS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
FOC-DI(X) FOC-DO(X)	DISCRETE INPUT TO FIBER CONVERTER (PROVIDE WITH 120V AC P/S FIBER CONVERTER TO DISCRETE OUTPUT) (PROVIDE WITH 120V AC P/S (WEED EOTEC - 2S07/2H07 WITH 120V AC P/S)) QUANTITY (X) AS NOTED ON DRAWINGS	FOC-AI(X) FOC-AO(X)	ANALOG INPUT TO FIBER CONVERTER. FIBER CONVERTER TO ANALOG INPUT (WEED EOTEC 2T14/2R14 WITH P/S AS REQUIRED) QUANTITY (X) AS NOTED ON DRAWINGS
FOC	FIBER OPTIC CONVERTER - TYPE, AND STYLE AS NOTED		FLANGED DIAPHRAGM SEAL
FOPP	FIBER OPTIC PATCH PANEL - CONNECTORS, AND QUANTITY AS REQUIRED		

GRAPHIC SYMBOLS FOR VALVES

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	STROKE OR POSITION ACTUATOR CYLINDER (OPEN-SHUT)		CHECK VALVE
	STROKE OR POSITION ACTUATOR CYLINDER (THROTTLING)		PLUG VALVE
	PNEUMATIC DIAPHRAGM OR POSITIONER (OPEN-SHUT)		BUTTERFLY VALVE, DAMPER OR LOUVER
	PNEUMATIC DIAPHRAGM OR POSITIONER (THROTTLING)	S	TWO - WAY SOLENOID VALVE OPERATOR
M	MOTOR OPERATED (THROTTLING)	M	ELECTRONICALLY CONTROLLED CHECK VALVE
M	MOTOR OPERATED (OPEN - SHUT)	S D	TWO - WAY SOLENOID VALVE OPERATOR - DETENTED
	SLIDE - STOP GATE	S	THREE - WAY SOLENOID VALVE OPERATOR
	SLUICE GATE	S	FOUR - WAY SOLENOID VALVE OPERATOR
	AIR SET ASSEMBLY	S S MD	MANIFOLD STYLE BLOCK I/O SOLENOID VALVE - DUAL COILS
	BALL VALVE		
	GLOBE VALVE		
	GATE VALVE OR KNIFE GATE		

NOTE: THE PLC I/O ADDRESS SHALL BE USED AS THE WIRING TAG SCHEME FOR ALL PANEL AND FIELD CONTROL WIRING. COORDINATE WITH ELECTRICAL CONTRACTOR.

INSTRUMENTATION LINE SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	ELECTRICAL SIGNAL	E-NET	ETHERNET COMMUNICATION SIGNAL-UNSHIELDED TWISTED PAIR (UTP)-SPEED AS INDICATED
//	AIR LINE/PNEUMATIC SIGNAL		
L	HYDRAULIC SIGNAL	E-FO	ETHERNET FIBER OPTIC COMMUNICATIONS SIGNAL
	ELECTROMAGNETIC OR SONIC SIGNAL	FO	PLC REMOTE I/O FIBER OPTIC COMMUNICATION SIGNAL
O	SOFTWARE SIGNAL	V-FO	ETHERNET VIDEO FIBER OPTIC
	CONNECTION TO PROCESS, OR MECHANICAL LINK		

I.S.A. STANDARD LETTER FUNCTIONS

SYMBOL	FIRST LETTER	SUCCEEDING LETTERS
A	ANALYSIS, ANALOG	ALARM
B	BURNER, FLAME	BATCH
C	CONDUCTIVITY, COMMAND	CONTROL (FEEDBACK TYPE)
D	DENSITY, SPECIFIC GRAVITY	
E	VOLTAGE	PRIMARY ELEMENT
F	FLOW RATE	RATIO
G	GAGING	GLASS
H	HAND, MANUAL	HIGH
I	CURRENT	INDICATE
J	POWER	SCAN
K	TIME, TIME SCHEDULE	CONTROL (NO FEEDBACK)
L	LEVEL, LIGHT	LOW
M	MOISTURE, HUMIDITY	MIDDLE, MODULATE
N		
O	OVERLOAD	ORIFICE
P	PRESSURE, VACUUM	POINT
Q	QUANTITY	TOTALIZE, INTEGRATE
R	RADIOACTIVITY	RECORD, PRINT, RECEIVE
S	SPEED, FREQUENCY, SOLENOID	SWITCH
T	TEMPERATURE, TURBIDITY	TRANSMIT, TRANSFORM
U	MULTIVARIABLE	MULTIFUNCTION
V	VIBRATION, VISCOSITY	VALVE, DAMPER, LOUVER
W	WEIGHT, FORCE	
X		
Y		RELAY, COMPUTE
Z	POSITION	DRIVE, ACTUATE

ABBREVIATIONS

SYMBOL	DESCRIPTION
R	RESET
T	TRIP
AS	AIR SUPPLY
DO	DISSOLVED OXYGEN
GS	GAS SUPPLY
HS	HYDRAULIC SUPPLY
NS	NITROGEN SUPPLY
ORP	OXYGEN REDUCTION POTENTIAL
SS	STEAM SUPPLY
SP	SET POINT
WS	WATER SUPPLY
PV	PROCESS VARIABLE
F.O.	FAIL OPEN
F.C.	FAIL CLOSE
SBPP	SCREEN BUILDING PROCESSOR PANEL
TFBMPP	TERTIARY FILTER BUILDING MAIN PROCESSOR PANEL
HVACP	HEATING VENTILATION AIR CONDITIONING CONTROL PANEL - I/O
MD	MAIN DISCONNECT
%	GAIN OR PROPORTIONAL CONTROL
∫	INTEGRAL OR RESET CONTROL
D	DERIVATIVE OR RATE CONTROL
V	VELOCITY ALGORITHM
1-0	ON - OFF CONTROL
√	SQUARE ROOT EXTRACTOR
Σ	ADD OR TOTALIZE
Δ	SUBTRACT OR DIFFERENCE
>	HIGHEST MEASURED VARIABLE
<	LOWEST MEASURED VARIABLE
E/I , I/P	CONVERT ONE TO ANOTHER
* , /	MULTIPLY, DIVIDE
±	BIAS OR REVERSING
f(x)	CHARACTERIZE - (EQUATION / /D/%/ETC.)

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NOTES:

1. FIELD VERIFY CONDUIT ROUTING AT THE PLANT WITH OWNER. CORE HOLES AS REQUIRED TO SUIT INSTALLATION OF THE CONDUITS SHOWN. PATCH WITH NON-SHRINK GROUT.
2. TURN OVER TO OWNER AT PROJECT COMPLETION OPERATION AND MAINTENANCE MANUALS (QUANTITY AS SPECIFIED) TO OWNER.
3. IN ADDITION TO PATCH CABLES SUPPLIED FOR THE PROJECT, FURNISH 30-10FT LONG 50 MICRON MULTIMODE DUPLEX FIBER OPTIC PATCH CABLES (10-ST-SC, 10-ST-ST, 10-LC-ST) CONNECTORS, AND 30-10FT CAT-5E PATCH CABLES FOR OWNERS USE. TURN OVER CABLES TO OWNER.
4. MULTIMODE FIBER OPTIC PATCH CABLES, AND ETHERNET PATCH CABLES SUPPLIED IN THE PROJECT SHALL BE COLORED PURPLE.
5. FIBER OPTIC PATCH PANELS SHALL BE THE PRODUCT OF CORNING CABLE SYSTEMS. (RACK OR SURFACE MOUNTED AS SHOWN", ST STYLE CONNECTORS, WITH QUANTITY OF BULKHEADS AS SHOWN.

GENERAL CONSTRUCTION NOTES:

1. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW THIS CONTRACT.
2. ITEMS SHOWN OR NOTED TO BE DEMOLISHED ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED FROM SITE BY CONTRACTOR UNLESS NOTED TO BE TURNED OVER TO OWNER.
3. FOR ITEMS INDICATED AS "FIELD LOCATE", THE CONTRACTOR SHALL FIELD VERIFY FOR INTERFERENCE AND FOR LOCATIONS OF MOUNTING FLANGES, CONNECTION POINTS, ETC.
4. CONDUIT ROUTINGS SHOWN ON BACKGROUND PLANS ARE INTENDED ROUTINGS ONLY. EXACT CONDUIT ROUTINGS FOR CONDUITS, AND LENGTH SHALL BE FIELD LOCATED AND VERIFIED BY THE CONTRACTOR. COORDINATE CONDUIT ROUTING IN FINISHED AREAS WITH OWNER. CONDUIT TO BE CONCEALED IN THESE AREAS.
5. REFER TO THE CABLE MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM BEND RADIUS FOR FIBER OPTIC CABLES. INSTALL NEW PULL BOXES (PB) AS REQUIRED FOR CONDUITS. SIZE PULL BOXES AS REQUIRED PER FIBER OPTIC CABLE MANUFACTURERS RECOMMENDATIONS.
6. CONDUITS/RACEWAYS, PULL BOXES AND JUNCTION BOXES TO BE INSTALLED WITH 316 STAINLESS STEEL CHANNEL STRUT. MINIMUM STRUT LENGTH TO BE 12 INCHES, WHERE POSSIBLE.
7. PANELS SHALL BE MOUNTED OFF WALLS WITH STRUT, CONDUITS SHALL BE MOUNTED ON STRUT INCLUDING SINGLE RUNS.
8. REPAIR SIDEWALKS AND ROADWAYS DUE TO SITE WORK ADDITIONS, THE EXTENT OF THE REPAIR REQUIRED SHALL BE FIELD VERIFIED PRIOR TO BIDS IN CONJUNCTION WITH THE WORK SHOWN IN THE CONTRACT DOCUMENTS. PRIOR TO TRENCHING, FIELD LOCATE EXISTING GAS LINES, TELEPHONE LINES, SPRINKLER LINES, ETC. COORDINATE WITH OWNER
9. PULL CORDS SHALL BE INSTALLED IN CONDUITS CONTAINING NETWORK CABLES, AND FIBER OPTIC CABLES.
10. CORE HOLES AS REQUIRED TO SUIT INSTALLATION OF CONDUIT AND WIRING/CABLING AS SHOWN. FIELD VERIFY EXACT EXTENT OF WORK REQUIRED.
11. FURNISH PULL BOXES FOR FIBER OPTIC CABLE. COORDINATE EXACT BENDING RADIUS WITH MANUFACTURER.
12. NEW CONDUITS INSTALLED THIS CONTRACT WITH FIBER OPTIC CABLES ARE TO BE LABELED WITH PHENOLIC TAGS (AT BEGINNING TO END) TO INDICATE THE NUMBER OF STRANDS, ORIGINATION AND DESTINATION. TAGS TO BE COLOR CODED ORANGE FOR MULTIMODE.
13. WHERE NEW CONDUITS SHOWN TO BE INSTALLED PASS UNDER ROADWAYS, CONDUITS SHALL BE CONCRETE ENCASED.
14. PRIOR TO EXCAVATION, FIELD LOCATE EXISTING UTILITIES. COORDINATE WITH OWNER.
15. AREAS WHERE CAMERAS ARE SHOWN TO BE INSTALLED SHALL BE CLASSIFIED AS NEMA 4, UNLESS CALLED OUT OTHERWISE.
16. THE ASSOCIATED INSTRUMENTATION DRAWINGS SHOW EXISTING WIRES AND TERMINAL NUMBERS REQUIRED TO PROPERLY INTERFACE WITH NEW EQUIPMENT. THIS INFORMATION WAS COLLECTED FROM AS-BUILT DRAWINGS AND EXTENSIVE FIELD VERIFICATION. THE INFORMATION SHALL BE USED AS A GUIDE IN RE-TERMINATION. IT SHALL REMAIN THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE THE WIRING AND TO REVISE TO SUIT AS REQUIRED. CHANGES IN THE CONTRACT OR COST WILL NOT BE GRANTED FOR THIS COORDINATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE PROPOSED WORK SHOWN.
17. CONDUIT ROUTINGS SHOWN ON BACKGROUND PLANS ARE PROPOSED ROUTINGS ONLY. EXACT CONDUIT ROUTINGS AND LENGTH SHALL BE FIELD LOCATED AND VERIFIED BY THE CONTRACTOR. COORDINATE CONDUIT ROUTING IN FINISHED AREAS WITH OWNER. CONDUIT TO BE CONCEALED IN THESE AREAS.
18. RACEWAYS, PULL BOXES AND JUNCTION BOXES TO BE INSTALLED WITH 316 STAINLESS STEEL FASTENERS SUPPORTS, AND THREADED ROD, ETC. (CHANNEL STRUT TO ALSO BE STAINLESS STEEL). MINIMUM STRUT LENGTH TO BE 12 INCHES, WHERE POSSIBLE. TYPICAL FOR NEMA 12, 4, AND 7 AREAS.
19. WIRING FOR STARTERS SHALL BE IN ACCORDANCE WITH NEMA CLASS II B STANDARDS. SUBMIT ENGINEERED SHOP DRAWINGS FOR ALL STARTERS SHOWN TO BE WIRED.
20. WIRE NUMBERS (1, 3, 5, ETC.) SHALL BE PREFIXED WITH STARTER TAG NUMBERS. THE WIRE NUMBER AFTER THE PREFIX SHALL BE THE MANUFACTURER'S WIRE NUMBERING SYSTEM. WIRE MARKERS SHALL BE USED AT EACH WIRE TERMINATION POINT.
21. IN AREAS WHERE EQUIPMENT AND CONDUIT IS REMOVED, REPAIR WALL AND FLOOR SURFACES AS REQUIRED TO MATCH SURROUNDING AREA. WHERE DEVICES ARE REMOVED FROM CONCEALED BOXES, FURNISH AND INSTALL A BLANK COVER ON THE BOX.
22. FIBER OPTIC CABLE SHALL BE AS CALLED OUT ON SYSTEM CONFIGURATION DRAWINGS, MULTIMODE, ALL DIELECTRIC, SUITABLE FOR INSTALLATION UNDERGROUND IN WET CONDUIT.

GENERAL NOTES:

1. PRIOR TO SUBMITTING A BID FOR THE WORK DETAILED UNDER THIS CONTRACT, BIDDER SHALL VISIT THE FLINT WASTEWATER TREATMENT PLANT. THE BIDDER SHALL FULLY ACQUAINT ONESELF WITH EXISTING FIELD CONDITIONS AT EACH SITE. NO BULLETINS WILL BE WRITTEN FOR WORK DUE TO LACK OF VERIFICATION OF EXISTING SITE CONDITIONS AND WIRING.
2. NO WIRES SHALL BE TERMINATED TO TERMINAL STRIPS, OR OTHER EQUIPMENT WITHOUT FIRST VERIFYING SIGNAL TYPE. DAMAGES RESULTING IN LACK OF VERIFICATION SHALL BE BORNE BY THE CONTRACTOR. CONTRACTOR SHALL COORDINATE SIGNAL TYPE AND VOLTAGE WITH I/O CARDS SHOWN.
3. WITHIN CONTROL PANELS, NAMEPLATES SHALL BE PROVIDED TO INDICATE DIFFERENT VOLTAGE LEVELS WITHIN PANELS. ALSO, A NAME TAG (YELLOW BACKGROUND, RED LETTERING) SHALL BE LOCATED ON THE FRONT OF EVERY PANEL INDICATING THAT WHEN MAIN PANEL DISCONNECTED 120V IS STILL PRESENT FROM FIELD DEVICES (YELLOW WIRING/ISOLATED INPUT CARDS.)
4. PHENOLIC TAGS ON FACE OF CONTROL PANELS TO HAVE WHITE BACKGROUND AND BLACK LETTERING (EXCEPT WARNING TAGS; YELLOW BACKGROUND RED LETTERING).
5. PROVIDE SAFETY COVERS ON ALL 480V MOLDED CASE MAIN CIRCUIT BREAKERS TO INSULATE THE INCOMING CABLES AND SIDE CONDUCTORS FROM CONTACT. (TYP. FOR CONTROL PANELS.) PROVIDE BREAKER LOCKS FOR PUMP CIRCUIT BREAKERS (MCP)AND MAIN PANEL BREAKERS.
6. REFER TO WIRING DIAGRAMS FOR ADDITIONAL INFORMATION ON ISOLATED I/O. A COMMON NEUTRAL MAY BE USED FOR SEVERAL ISOLATED INPUTS FROM THE SAME STARTER. PROVIDE NEUTRAL JUMPERS WIRES WITHIN THE PANEL AS REQUIRED.
7. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW THIS CONTRACT.
8. ITEMS SHOWN CROSSHATCHED (OR NOTED TO BE DEMOLISHED) ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED, FROM SITE BY CONTRACTOR.
9. INSTALL A SINGLE CONDUCTOR INSULATED (RHW, THHN, OR XHHW) COPPER GROUND WIRE IN EACH CONDUIT, SIZE AS SHOWN ON DRAWINGS, OR AS A MINIMUM PER THE NATIONAL ELECTRICAL CODE. THIS GROUND WIRE SHALL BE CONNECTED AT EACH END TO THE EQUIPMENT GROUND. THIS ALSO INCLUDES INSTRUMENTATION DEVICES SUCH AS LEVEL, PRESSURE, FLOW TRANSMITTERS, LIMIT SWITCHES, CONDUITS, NETWORK AND I/O CABLES.
10. THE FOLLOWING EXAMPLE COMPONENT IDENTIFICATION SHALL BE USED AS APPROPRIATE:

(F) FIELD MOUNTED, NOT AT STARTER OR OTHER CONTROL PANELS
(S) STARTER PANEL MOUNTED
(MCP)AT MAIN CONTROL PANEL
(1) AT CONTROL PANEL NO.1
(2) AT CONTROL PANEL NO.2
(TCP) AT TEMPERATURE CONTROL PANEL

11. REFER TO DETAIL SHEETS. CONTRACTOR SHALL FURNISH AND INSTALL HARDWARE AND APPURTENANCES (I.E. PIPE TAPS, WETWELL BUBBLER TUBES, VALVES, COPPER TUBING, BALL VALVES, PNEUMATIC PIPING, SPOOL PIECES, ETC.) FOR FIELD DEVICES SHOWN (FLOWMETERS, PRESSURE TRANSMITTERS, LEVEL TRANSMITTERS, ETC.). WORK SHALL BE COORDINATED WITH OTHER TRADES (MECHANICAL INSTRUMENTATION, ETC.) CONTRACTOR SHALL BE RESPONSIBLE FOR SYSTEM COORDINATION AND INSTALLATION.
12. ETHERNET AND FIBER OPTIC TERMINATIONS SHALL BE PERFORMED BY A QUALIFIED REPRESENTATIVE OF CABLE MANUFACTURER, THE CABLES SHALL BE TESTED. NO SPLICING SHALL BE PERMITTED OF FIBER OPTIC CABLES, BETWEEN PANELS. FIBERS SHALL BE TERMINATED AT PATCH PANELS, INCLUDING SPARES.
13. REFER TO THE CABLE MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM BEND RADIUS FOR FIBER OPTIC CABLES. INSTALL NEW PULL BOXES (PB) AS REQUIRED FOR CONDUITS. SIZE PULLBOXES AS REQUIRED PER FIBER OPTIC CABLE MANUFACTURERS RECOMMENDATIONS..
14. CABLES (INCLUDING FIBER, ETHERNET, CONTROL WIRE, ETC.) WHERE PASSING THROUGH A PULLBOX SHALL BE LABELED AND COMPLETELY IDENTIFIED WITH IDENTIFICATION NUMBERS AND ORIGINATION/DESTINATION. THIS ALSO INCLUDES ALL CABLE BUNDLES ENTERING CONTROL PANELS, PULLBOXES, ETC.
15. CONTROL WIRES SHALL BE TAGGED WITH THE PLC I/O ADDRESS IN THE FIELD AND AT THE PANEL.
16. THE FIELD DEVICES SHOWN ON THE P&ID'S, ELECTRICAL BACKGROUNDS, AND DETAILS SHEETS MAKEUP THE FIELD DEVICE EQUIPMENT REQUIREMENTS. NOT ALL FIELD DEVICES REQUIRED ARE SHOWN ON THE P&ID'S.
17. UPS SELECTED SHALL BE COMPATIBLE WITH ISOLATION TRANSFORMERS. (TYP.)
18. REFER TO I/O DRAWING LAYOUT FOR ADDITIONAL SIGNALS NOT SHOWN ON P&ID FLOW DIAGRAMS.

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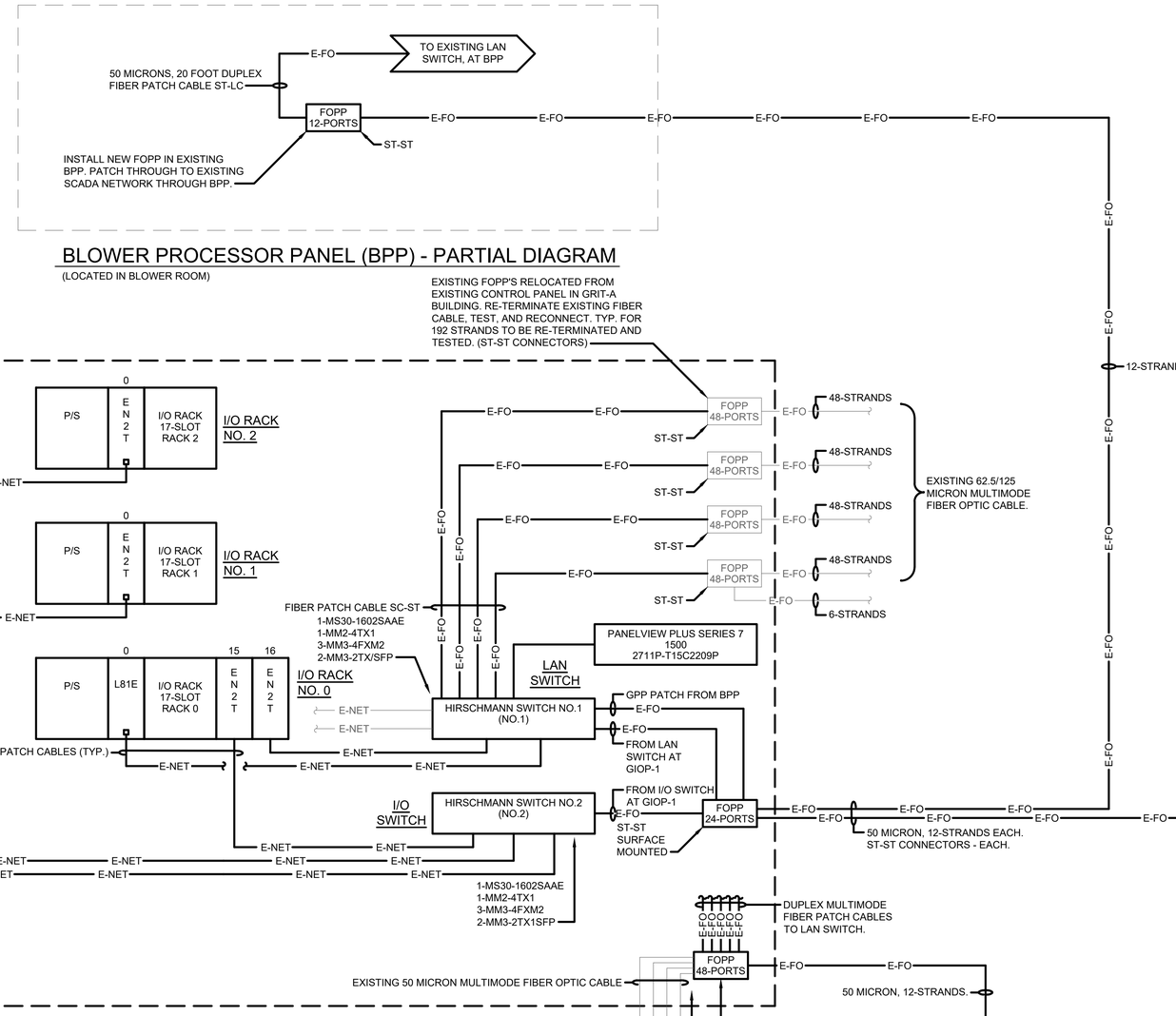
NOTES:

1. PLC HARDWARE SHOWN TO BE ROCKWELL.
2. FURNISH EXTENDED TERMINAL BLOCK HOUSINGS FOR THE CONTROL LOGIX IO CARDS SHOWN ON THE CONTRACT DRAWINGS-WIRING DIAGRAMS.
3. PROGRAMMING OF PACKAGE PLC'S AND PANELVIEWS FOR THE GRIT, AND FINE SCREENS IS BY THE MANUFACTURER. INTEGRATION OF THESE SYSTEMS TO THE EXISTING PLANT-WIDE SCADA SYSTEM BY TETRA TECH. SIGNALS NECESSARY FOR AUTOMATIC OPERATION FROM THE PLANT-WIDE SCADA SYSTEM TO THE PACKAGE SYSTEMS WILL BE MESSAGED OVER THE FIBER OPTIC NETWORK BY TETRA TECH. CONTRACTOR/MANUFACTURERS TO COORDINATE THESE REQUIREMENTS WITH OWNER/TETRA TECH DURING THE SHOP DRAWING REVIEW PROCESS.
4. PROGRAMMING OF GPP, AND GIOP-1 BY TETRA TECH.
5. COORDINATE IP ADDRESSES WITH OWNER/TETRA TECH FOR THE PACKAGED SYSTEMS.
6. PROVIDE 1 SPARE PLC PROCESSOR, ETHERNET BRIDGE CARD, AND ONE I/O CARD OF EACH TYPE USED. (IA16I, OW16I, IF8IH, OF8I)



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1	6/22/21	ISSUED FOR BIDS	

CITY OF FLINT, MICHIGAN

FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION SYSTEM CONFIGURATION

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-100

OF 39

Copyright: Tetra Tech

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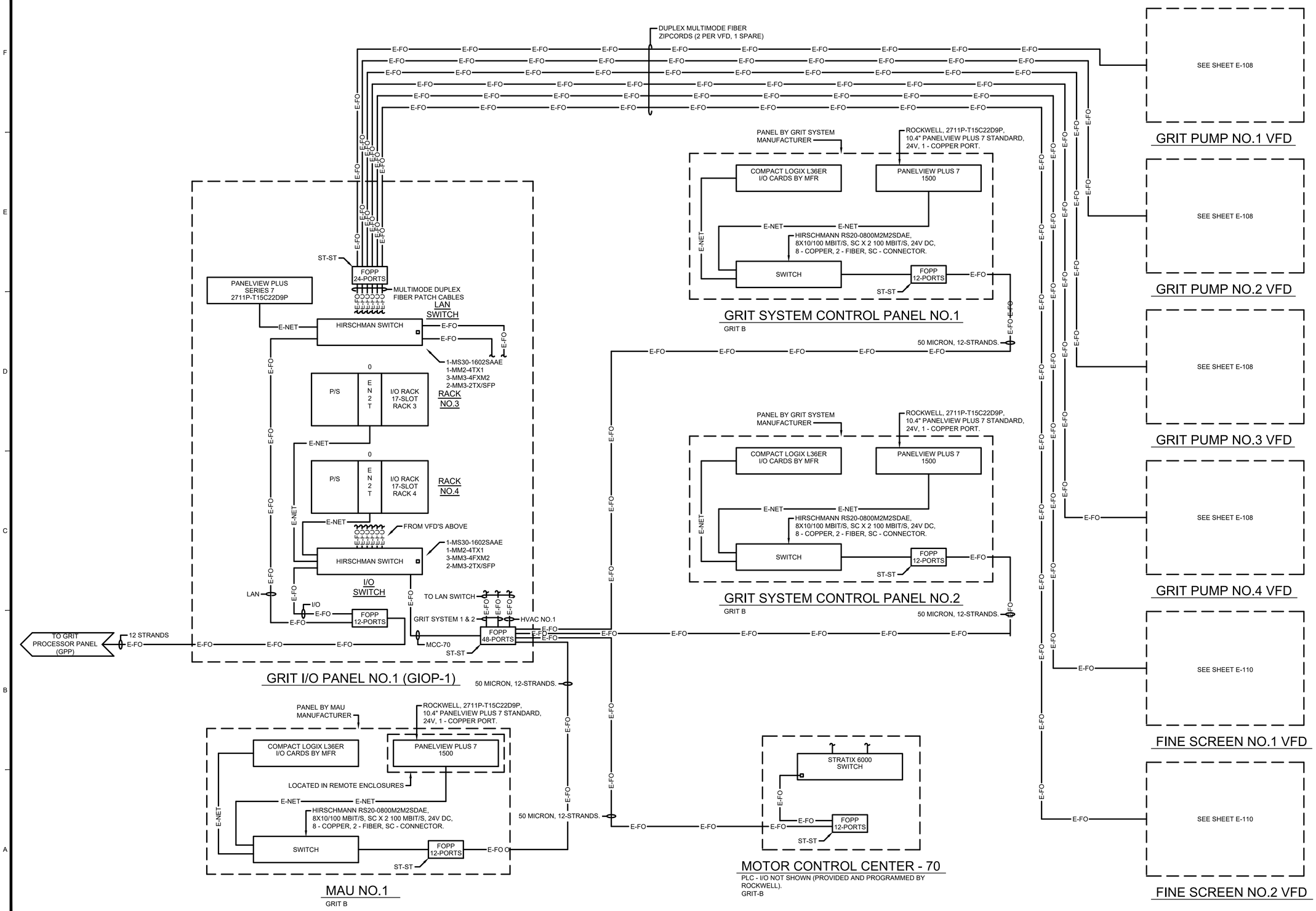
Bar Measures 1 inch, otherwise drawing not to scale



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INSTRUMENTATION SYSTEM CONFIGURATION

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-101
OF 39

Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

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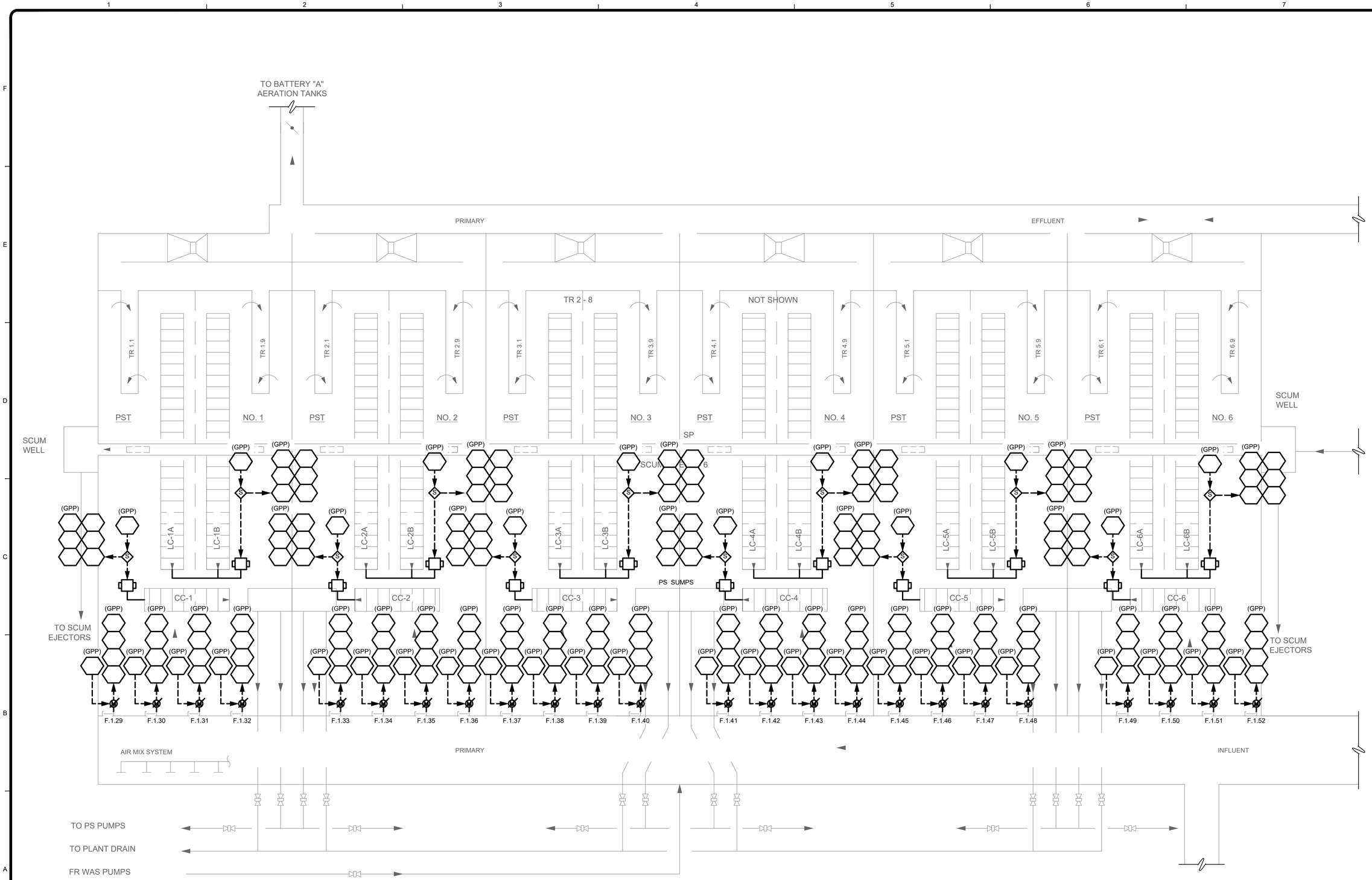

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CITY OF FLINT, MICHIGAN

FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION PRIMARY TANKS 1 - 6 P&ID

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-200

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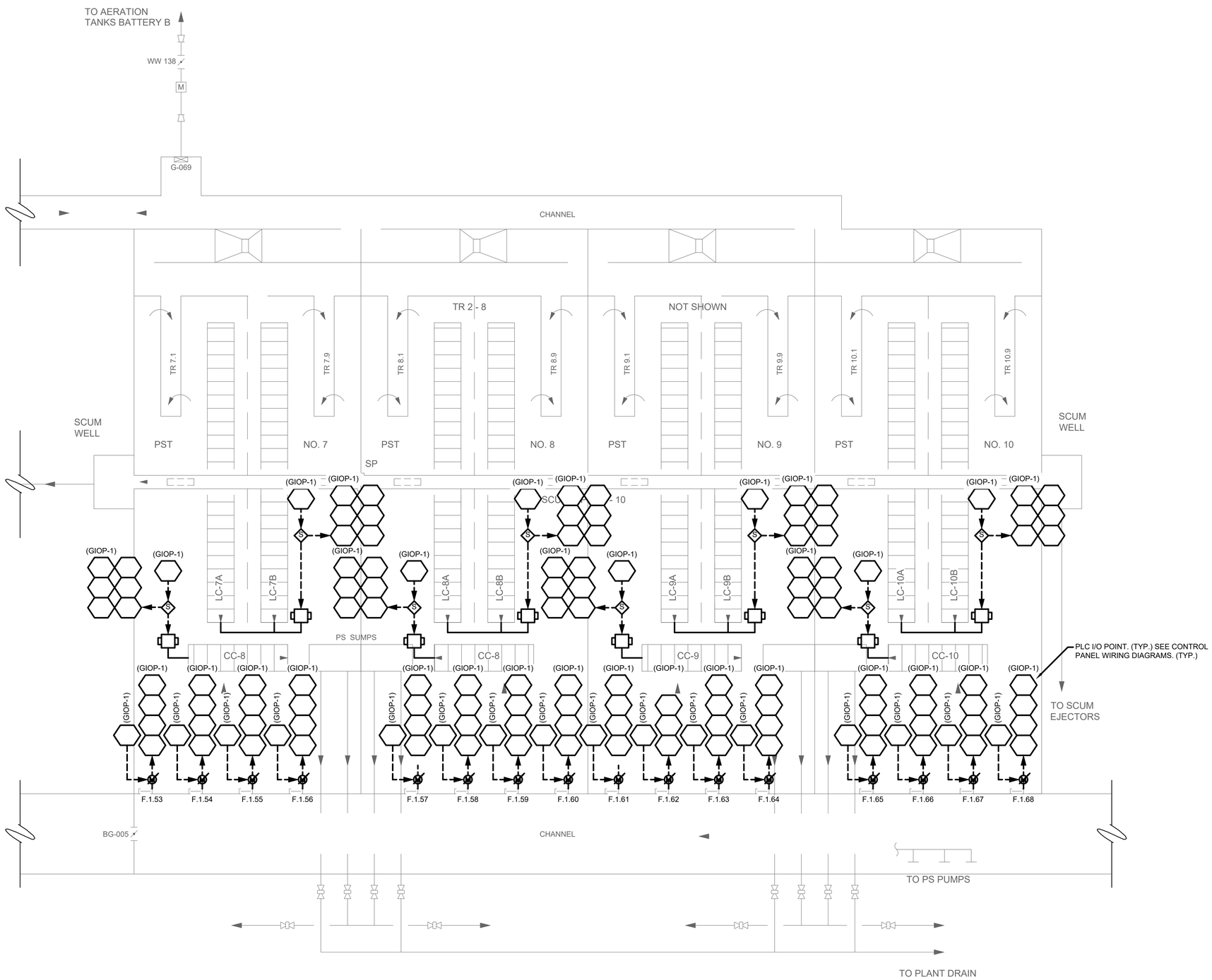

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CITY OF FLINT, MICHIGAN

FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION PRIMARY TANKS 7 - 10 P&ID

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-201

OF 39

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Bar Measures 1 inch, otherwise drawing not to scale

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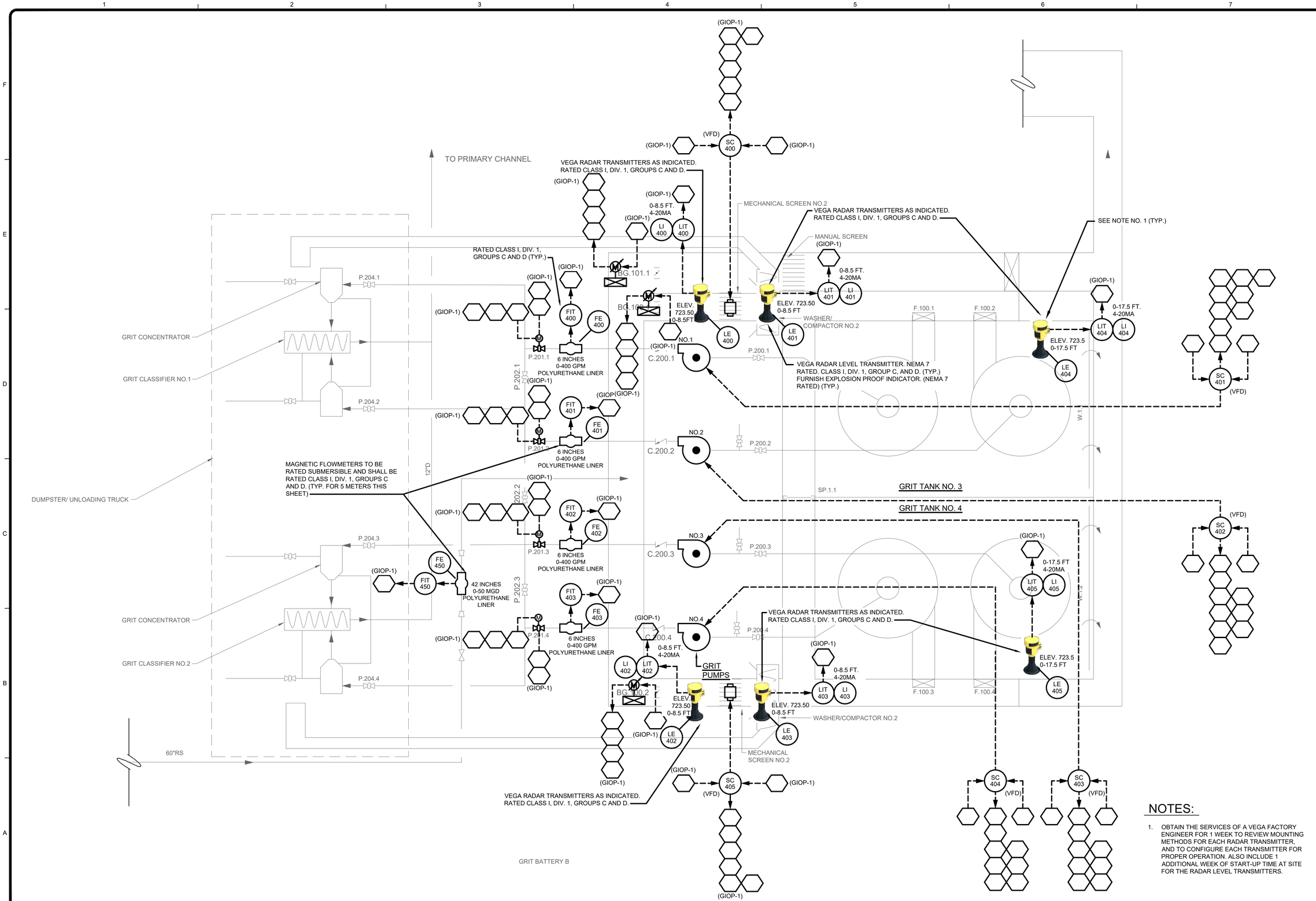

NOTES:

1. OBTAIN THE SERVICES OF A VEGA FACTORY ENGINEER FOR 1 WEEK TO REVIEW MOUNTING METHODS FOR EACH RADAR TRANSMITTER, AND TO CONFIGURE EACH TRANSMITTER FOR PROPER OPERATION. ALSO INCLUDE 1 ADDITIONAL WEEK OF START-UP TIME AT SITE FOR THE RADAR LEVEL TRANSMITTERS.

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
INSTRUMENTATION P&ID

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-202
OF 39

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Bar Measures 1 inch, otherwise drawing not to scale

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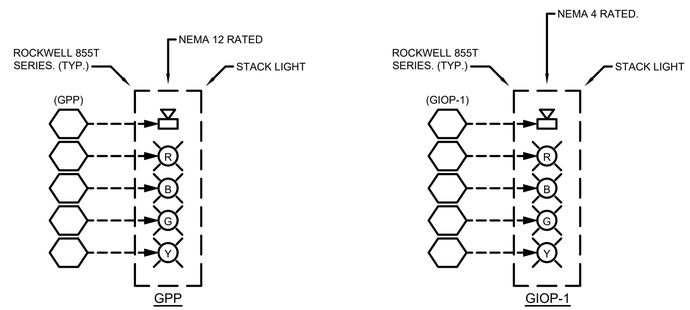
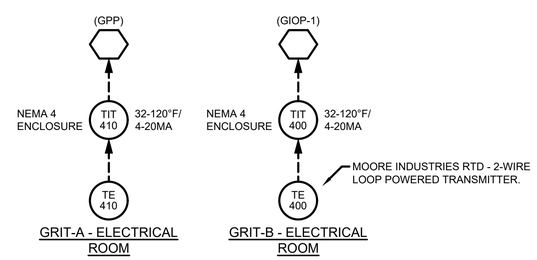


ALARM STACK LIGHTS



AREA TEMPERATURE TRANSMITTERS

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CITY OF FLINT, MICHIGAN

FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION
PRIMARY TANKS
PROCESS FLOW DIAGRAM

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-203

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Bar Measures 1 inch, otherwise drawing not to scale

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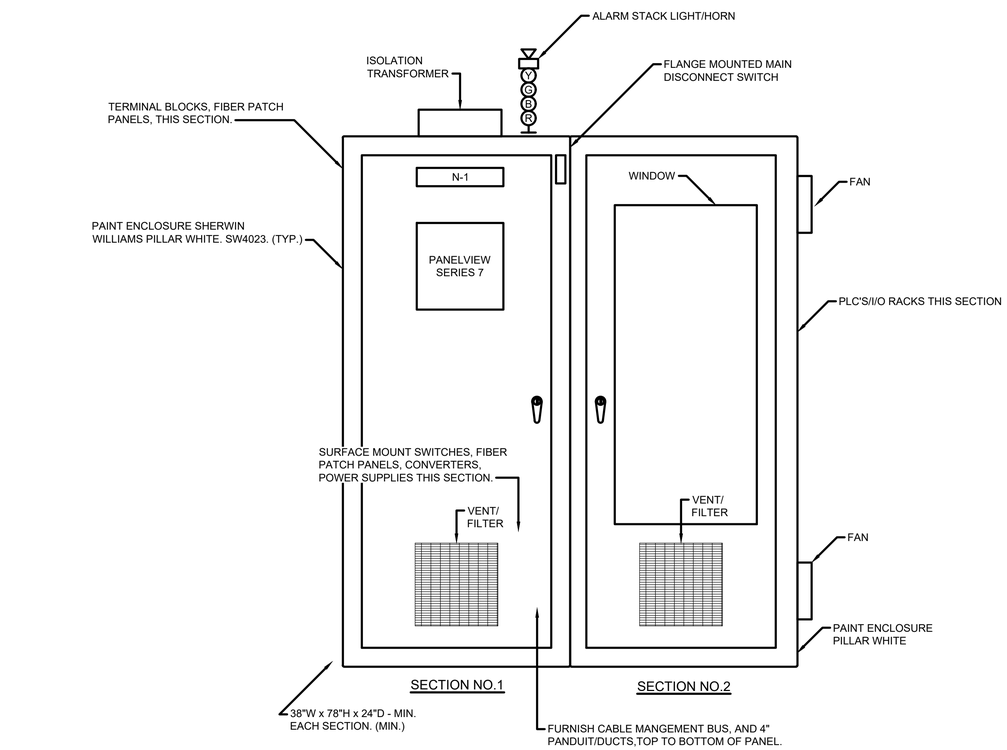
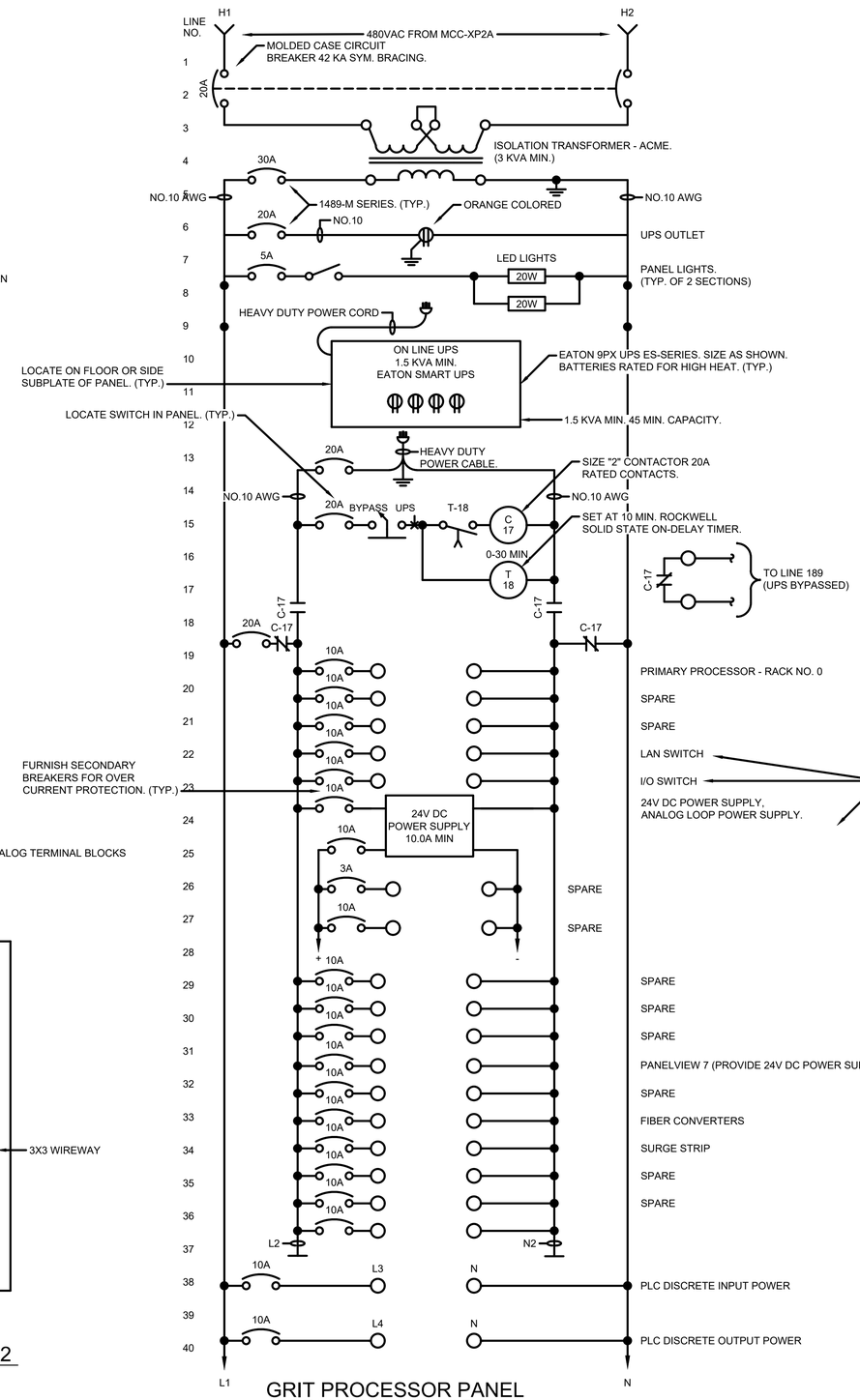


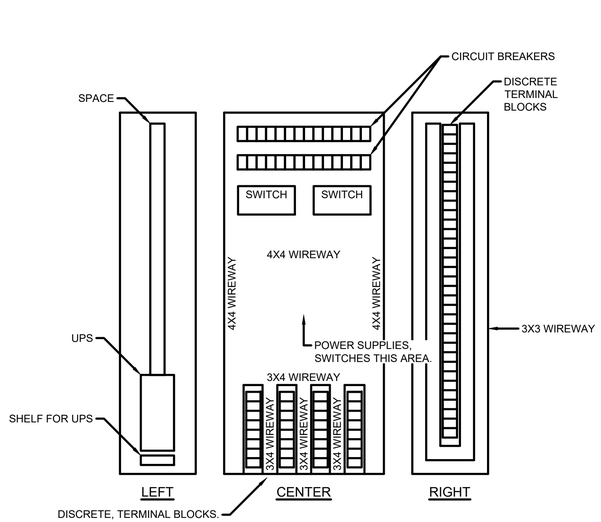
GRIT PROCESSOR PANEL (GPP) - LAYOUT

NEMA 12 ENCLOSURE



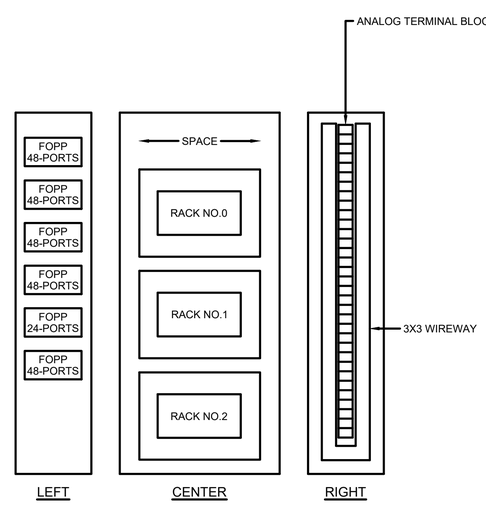
GRIT PROCESSOR PANEL (GPP) WIRING DIAGRAM

NO SCALE



SUBPLATE LAYOUT - SECTION NO.1

NO SCALE
NOTE: NOT ALL SUBPLATE DEVICES ARE SHOWN.



SUBPLATE LAYOUT - SECTION NO.2

NO SCALE
NOTE: NOT ALL SUBPLATE DEVICES ARE SHOWN.

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS
INSTRUMENTATION
GRIT PROCESSOR PANEL (GPP) PANEL LAYOUT, WIRING DIAGRAM

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

I-300
OF 39

Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

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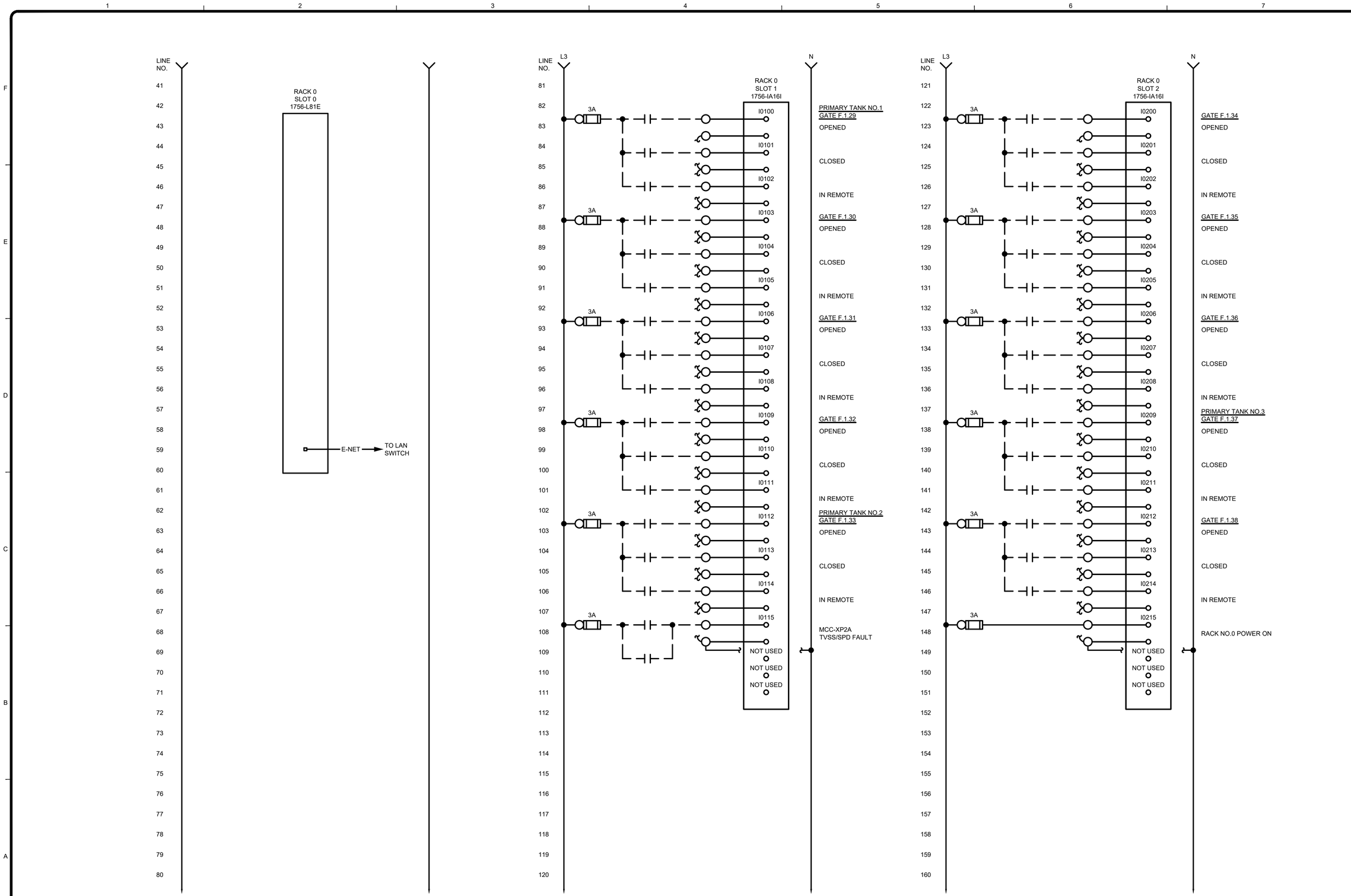

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION

GRIT PROCESSOR PANEL (GPP)

PANEL LAYOUT, WIRING DIAGRAM, RACK 0

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

I-301

OF 39

Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

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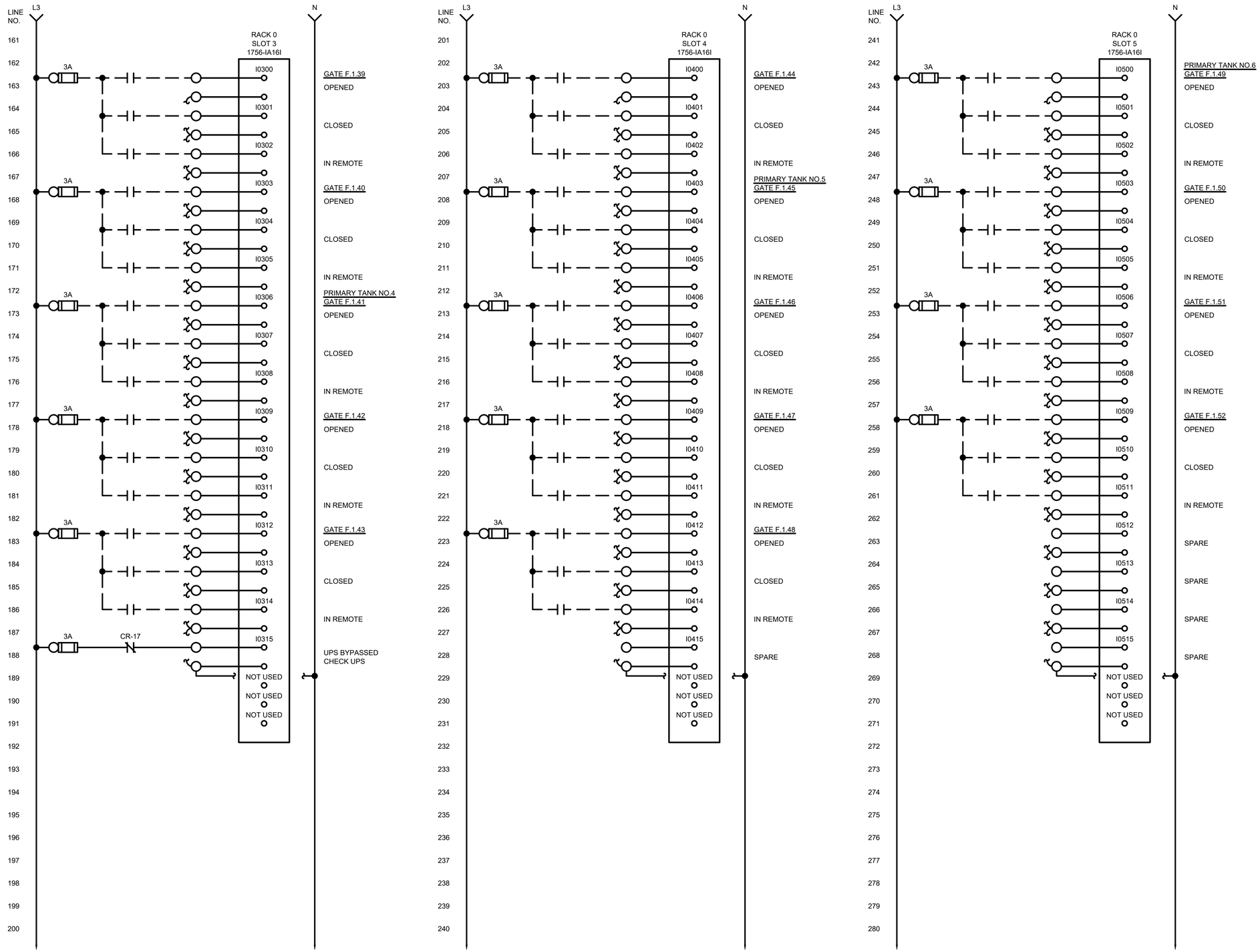

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION

GRIT PROCESSOR PANEL (GPP)

PANEL LAYOUT, WIRING DIAGRAM, RACK 0

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-302

OF 39

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Bar Measures 1 inch, otherwise drawing not to scale

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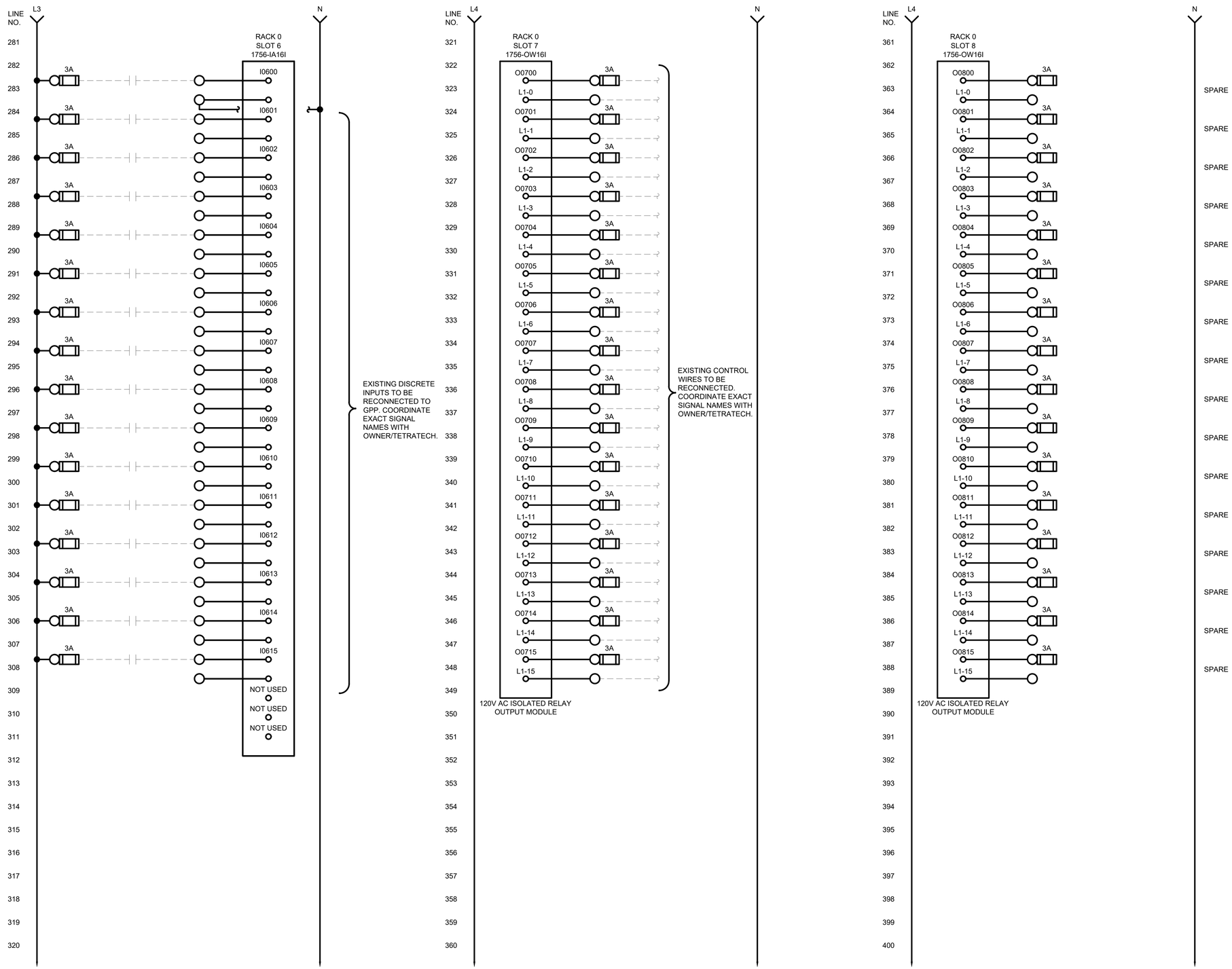

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INSTRUMENTATION

GRIT PROCESSOR PANEL (GPP) PANEL LAYOUT, WIRING DIAGRAM, RACK 0

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

I-303

OF 39

Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

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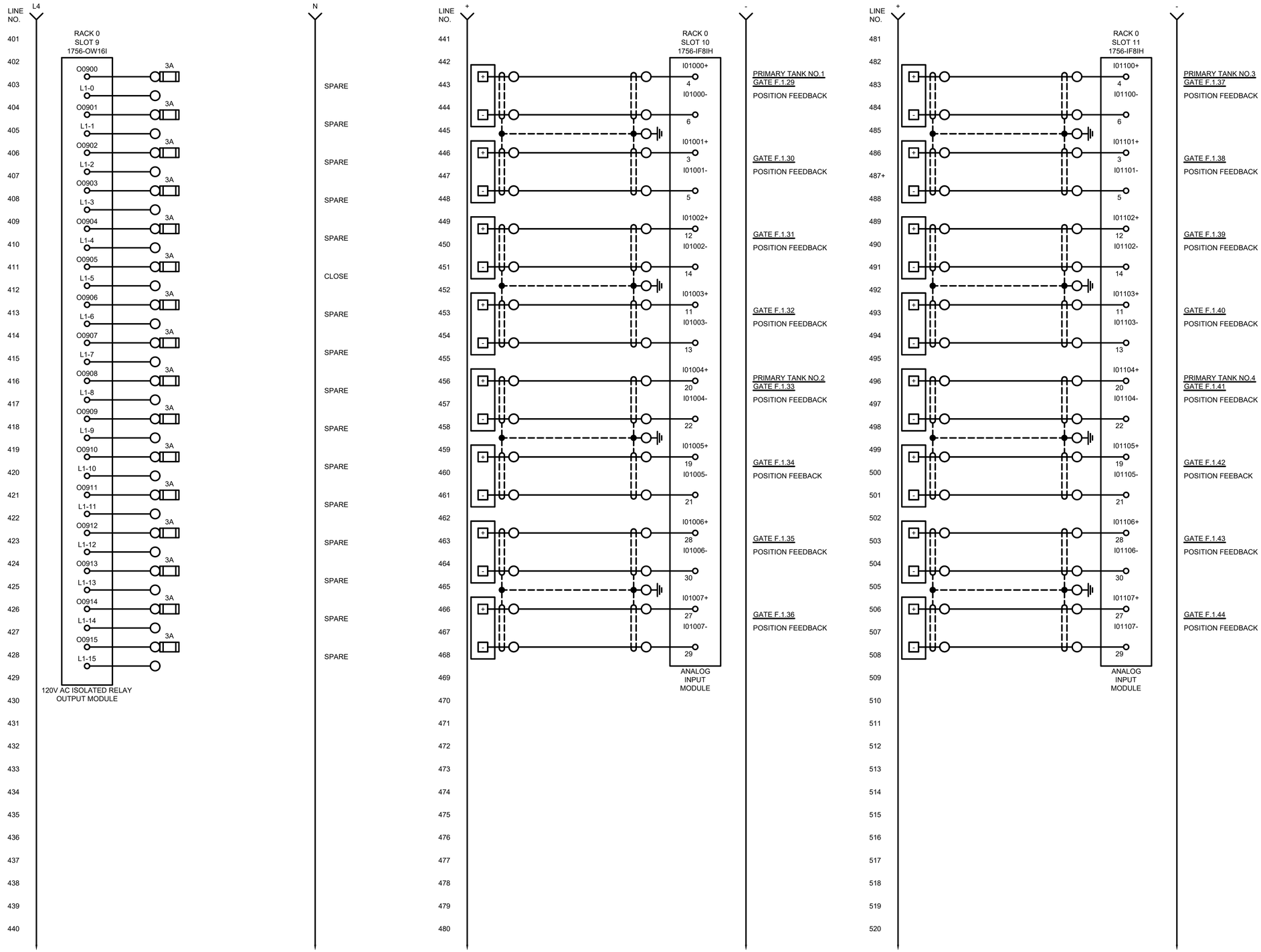

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENATION

GRIT PROCESSOR PANEL (GPP) PANEL LAYOUT, WIRING DIAGRAM, RACK 0

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

I-304

OF 39

Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

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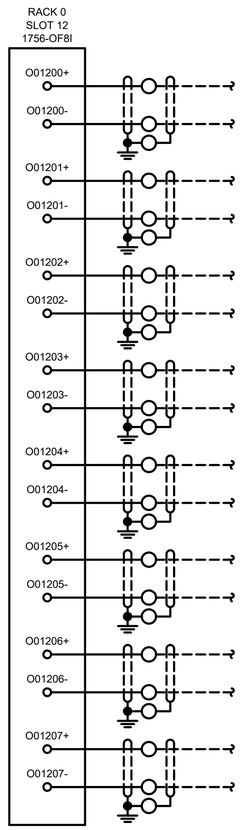

LINE NO.	+	-
521		
522		
523		PRIMARY TANK NO.1 GATE F.1.29
524		POSITION CONTROL
525		
526		GATE F.1.30
527		POSITION CONTROL
528		
529		GATE F.1.31
530		POSITION CONTROL
531		
532		GATE F.1.32
533		POSITION CONTROL
534		PRIMARY TANK NO.2 GATE F.1.33
535		POSITION CONTROL
536		
537		GATE F.1.34
538		POSITION CONTROL
539		
540		GATE F.1.35
541		POSITION CONTROL
542		
543		GATE F.1.36
544		POSITION CONTROL
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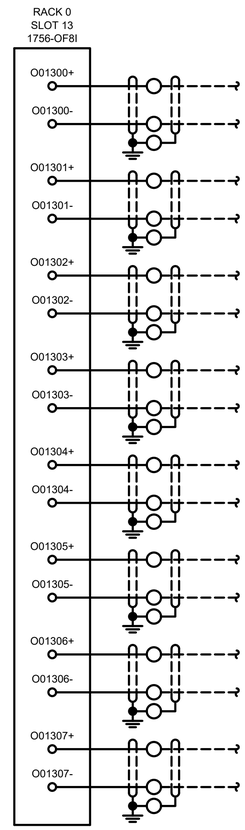

LINE NO.	+	-
561		
562		
563		PRIMARY TANK NO.3 GATE F.1.37
564		POSITION CONTROL
565		
566		GATE F.1.38
567		POSITION CONTROL
568		
569		GATE F.1.39
570		POSITION CONTROL
571		
572		GATE F.1.40
573		POSITION CONTROL
574		PRIMARY TANK NO.4 GATE F.1.41
575		POSITION CONTROL
576		
577		GATE F.1.42
578		POSITION CONTROL
579		
580		GATE F.1.43
581		POSITION CONTROL
582		
583		GATE F.1.44
584		POSITION CONTROL
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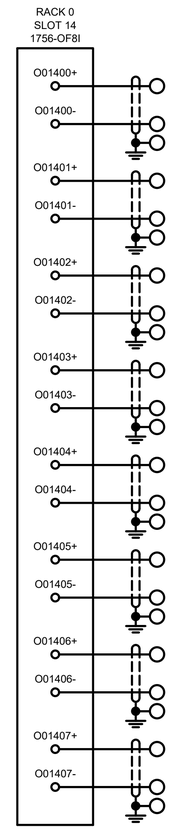

LINE NO.	+	-
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602		
603		SPARE
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606		SPARE
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609		SPARE
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613		
614		SPARE
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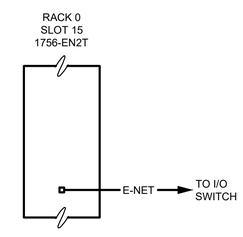

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CITY OF FLINT, MICHIGAN

FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION

GRIT PROCESSOR PANEL (GPP) PANEL LAYOUT, WIRING DIAGRAM, RACK 0

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-305

OF 39

Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

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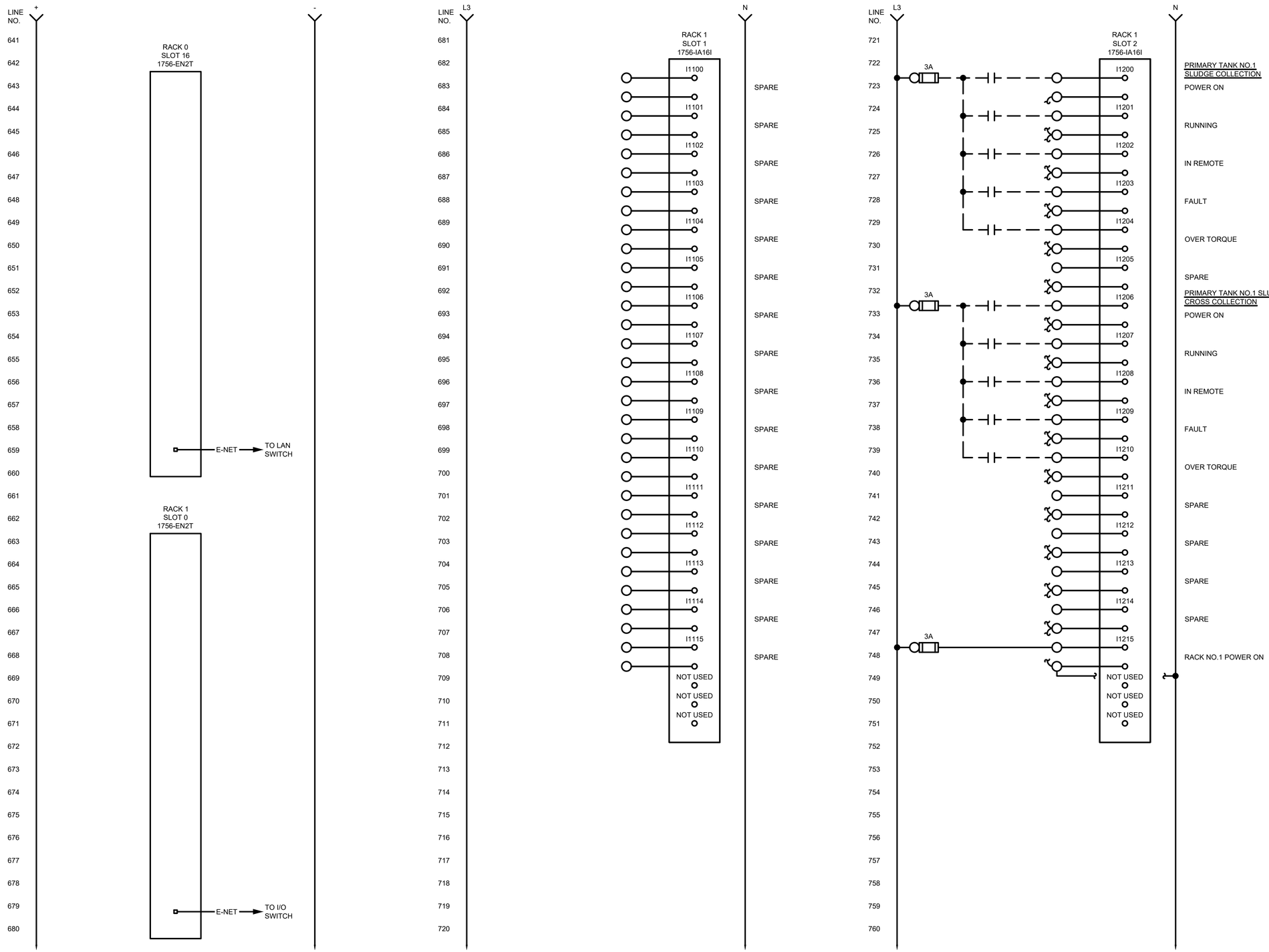

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CITY OF FLINT, MICHIGAN

FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENATION

GRIT PROCESSOR PANEL (GPP) PANEL LAYOUT WIRING DIAGRAM, RACK 0, RACK 1

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-306

Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

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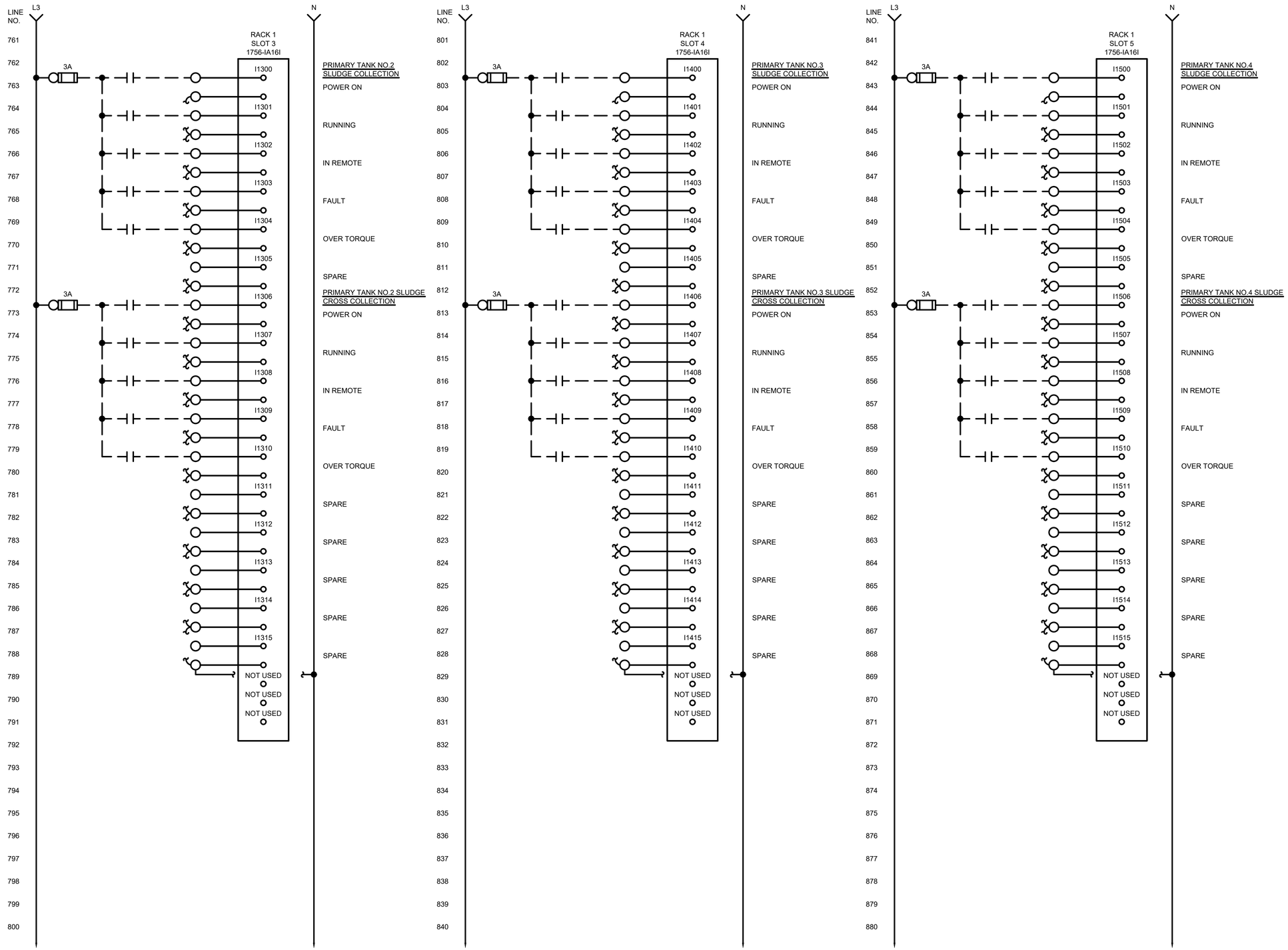

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION

GRIT PROCESSOR PANEL (GPP)

PANEL LAYOUT WIRING DIAGRAM, RACK 1

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-307

OF 39

Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

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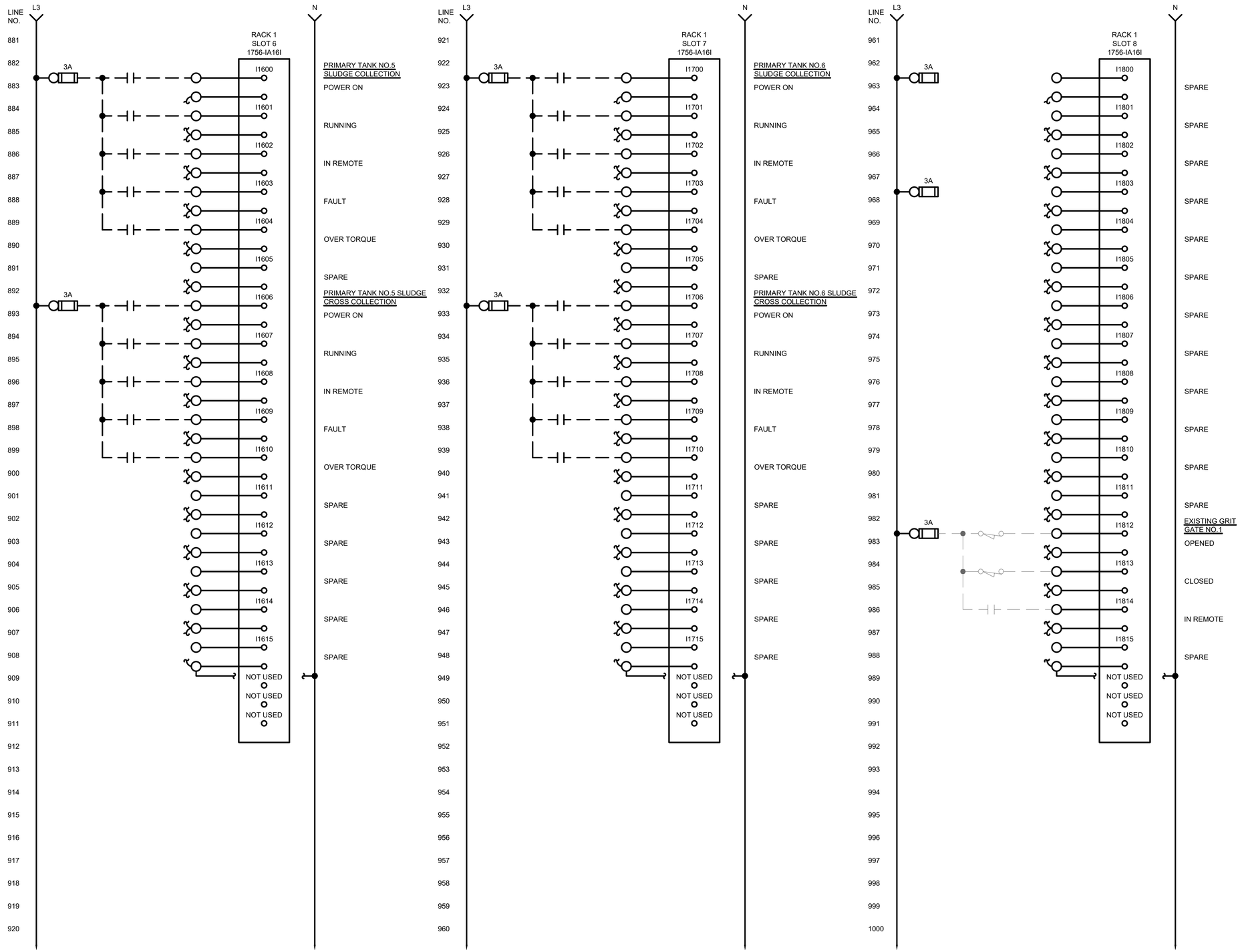

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENATION

GRIT PROCESSOR PANEL (GPP)

PANEL LAYOUT WIRING DIAGRAM, RACK 1

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-308

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Copyright: Tetra Tech

Bar Measures 1 inch, otherwise drawing not to scale

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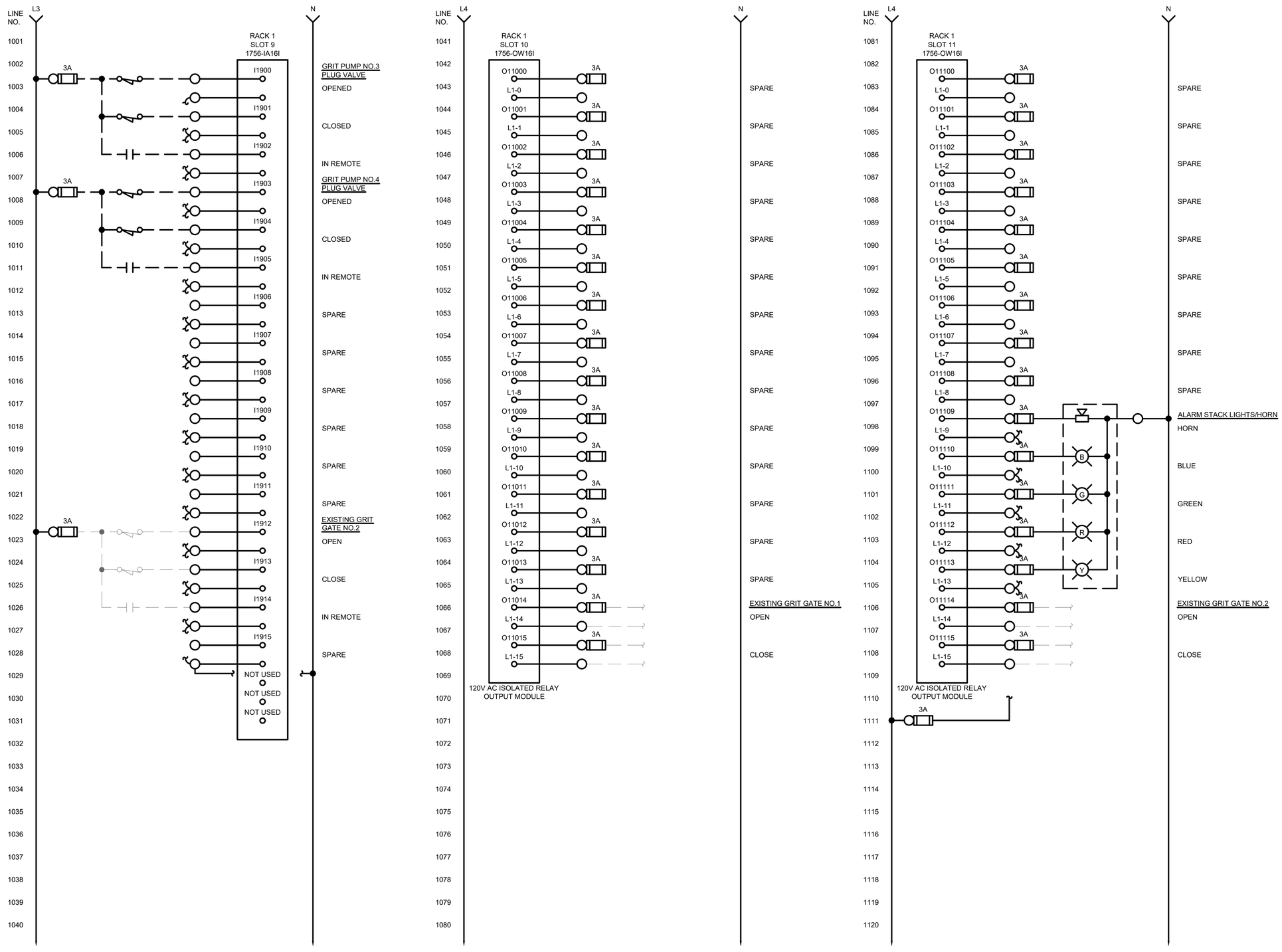

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INSTRUMENATION
GRIT PROCESSOR PANEL (GPP)
PANEL LAYOUT, WIRING DIAGRAM, RACK 1

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-309
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Bar Measures 1 inch, otherwise drawing not to scale

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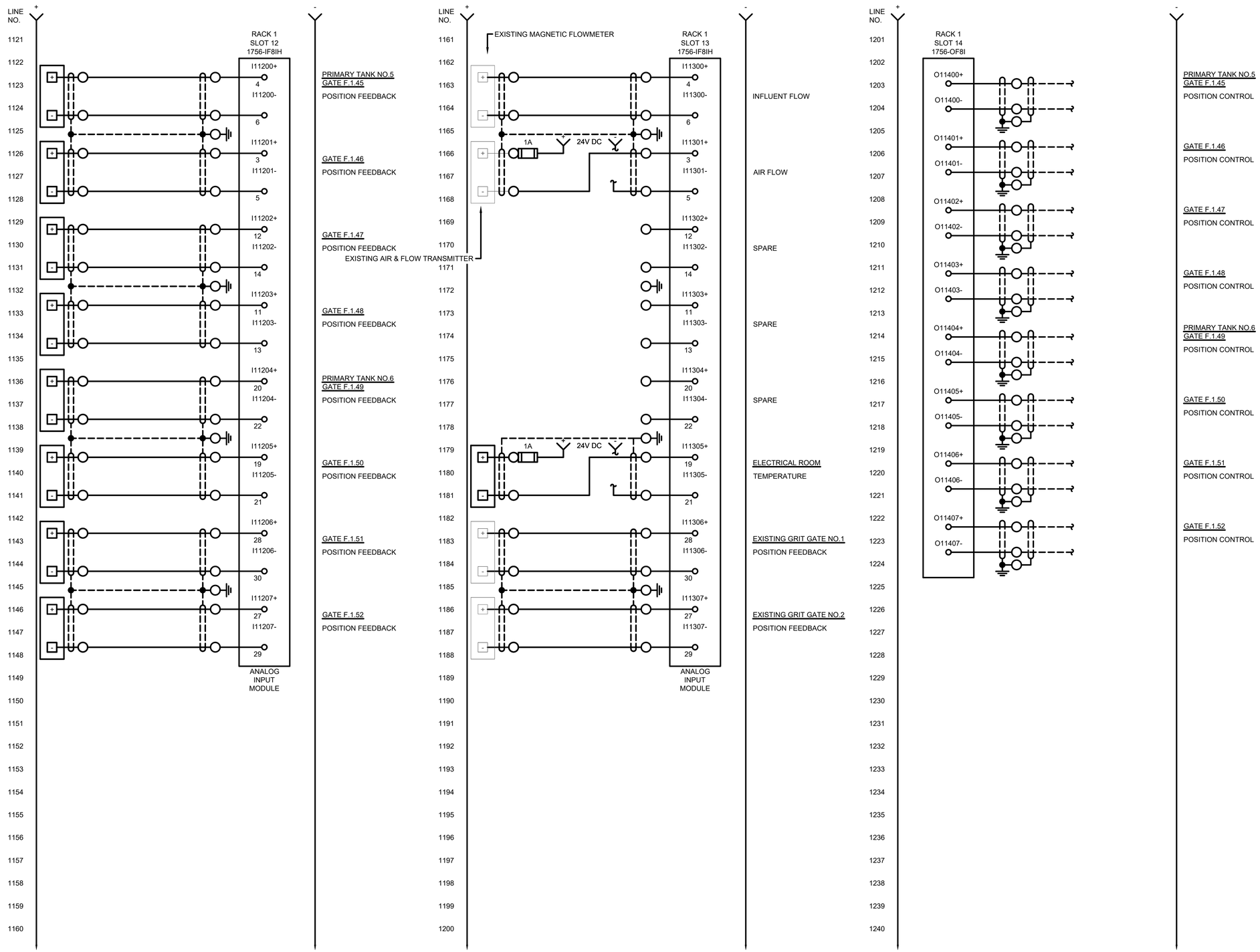

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INSTRUMENTATION
GRIT PROCESSOR PANEL (GPP)
PANEL LAYOUT, WIRING DIAGRAM, RACK 1

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

I-310
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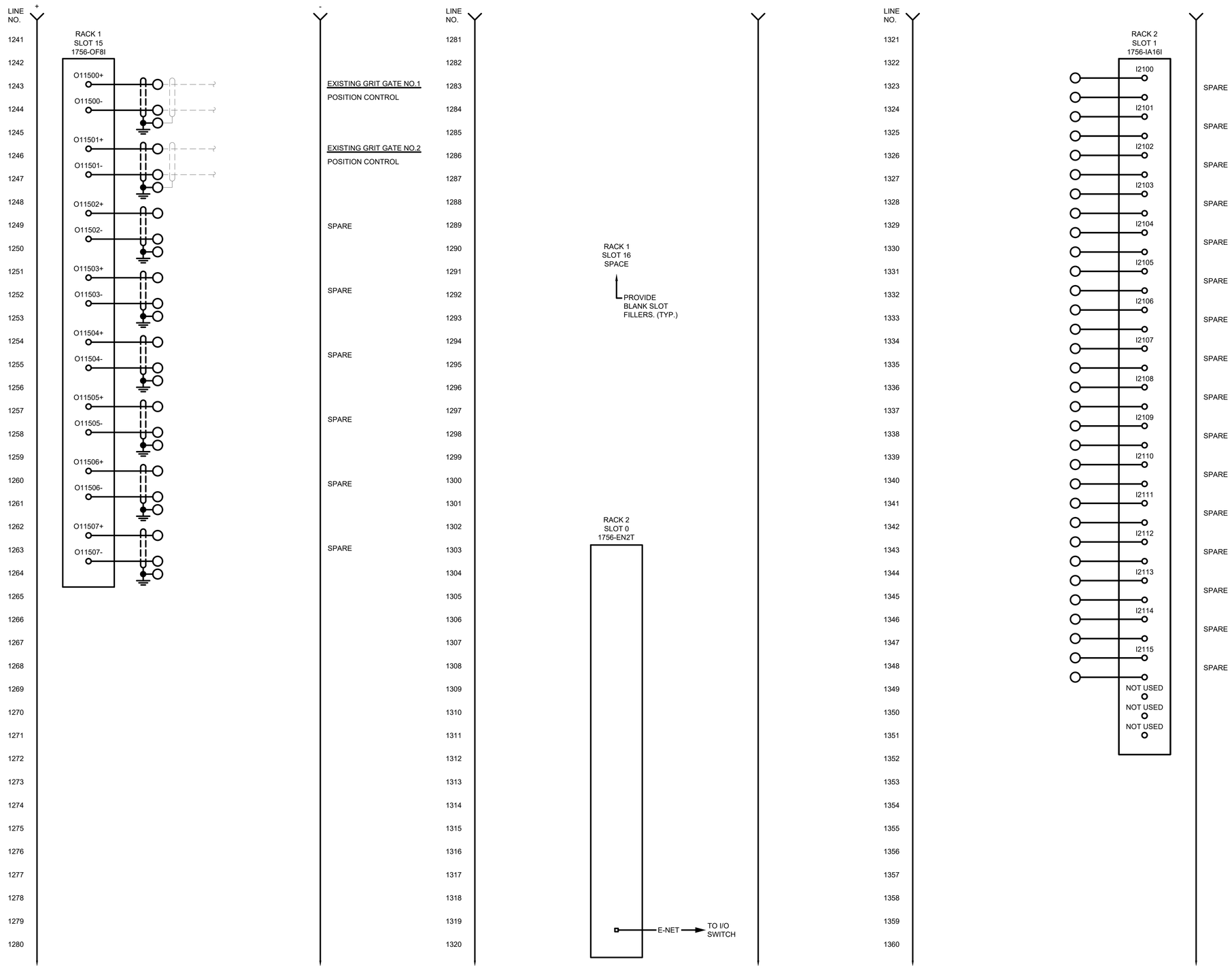

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INSTRUMENATION

GRIT PROCESSOR PANEL (GPP) PANEL LAYOUT WIRING DIAGRAM, RACK 1, RACK 2

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

I-311

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Bar Measures 1 inch, otherwise drawing not to scale

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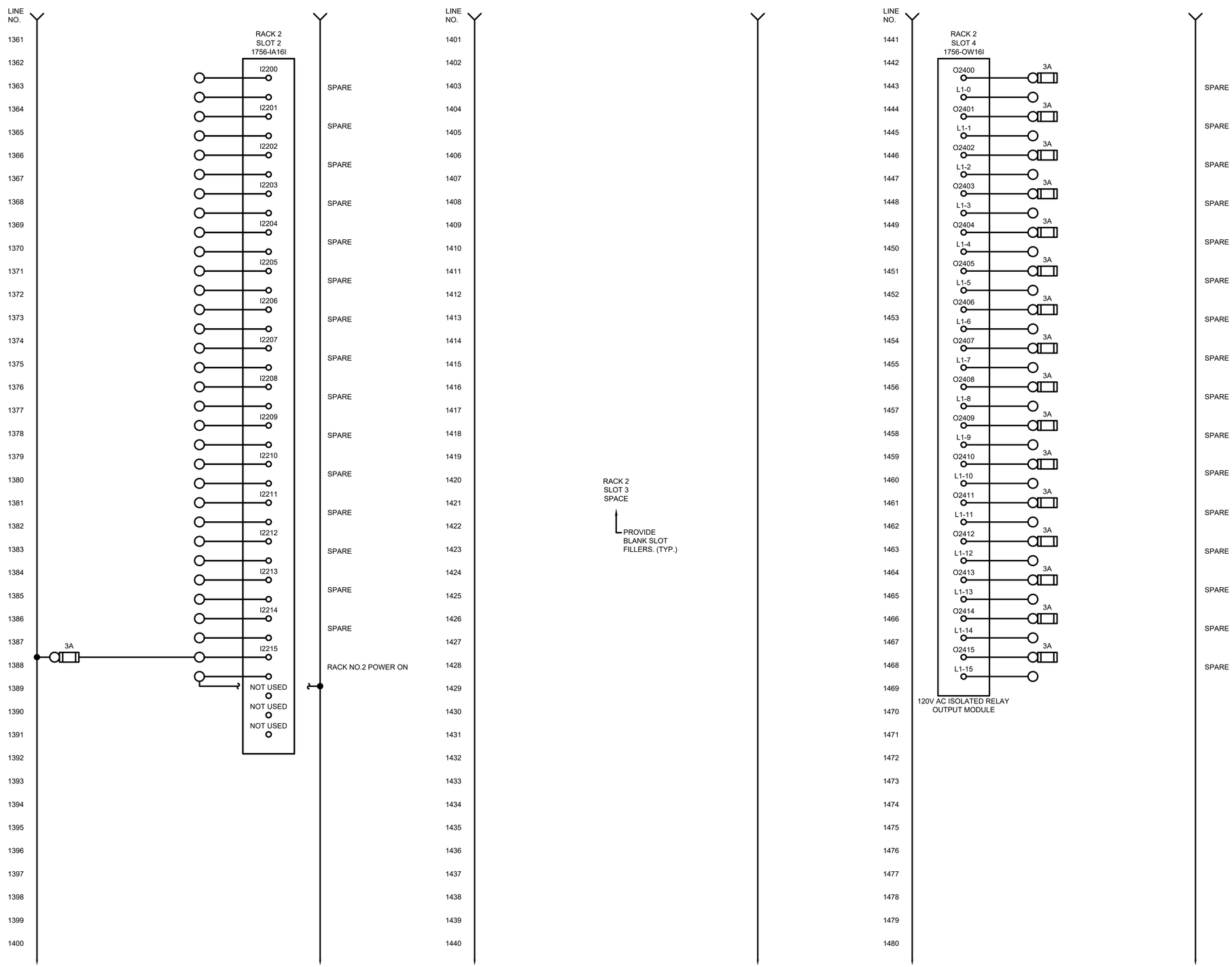

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INSTRUMENTATION
GRIT PROCESSOR PANEL (GPP)
PANEL LAYOUT, WIRING DIAGRAM, RACK 2

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

I-312

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LINE NO.

1481 1482 1483 1484 1485 1486 1487 1488 1489 1490 1491 1492 1493 1494 1495 1496 1497 1498 1499 1500 1501 1502 1503 1504 1505 1506 1507 1508 1509 1510 1511 1512 1513 1514 1515 1516 1517 1518 1519 1520

RACK 2
SLOT 5
SPACE

PROVIDE
BLANK SLOT
FILLERS. (TYP.)

LINE NO.

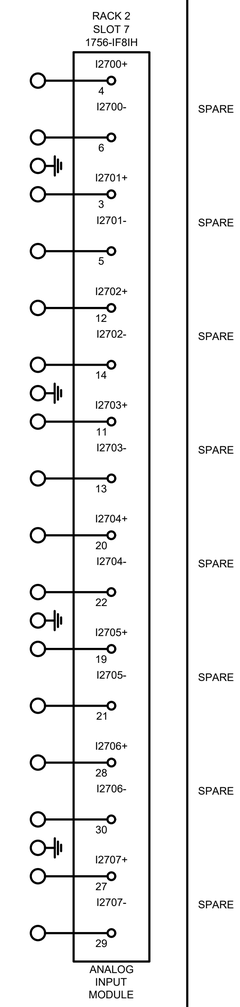
1521 1522 1523 1524 1525 1526 1527 1528 1529 1530 1531 1532 1533 1534 1535 1536 1537 1538 1539 1540 1541 1542 1543 1544 1545 1546 1547 1548 1549 1550 1551 1552 1553 1554 1555 1556 1557 1558 1559 1560

RACK 2
SLOT 6
SPACE

PROVIDE
BLANK SLOT
FILLERS. (TYP.)

LINE NO.

1561 1562 1563 1564 1565 1566 1567 1568 1569 1570 1571 1572 1573 1574 1575 1576 1577 1578 1579 1580 1581 1582 1583 1584 1585 1586 1587 1588 1589 1590 1591 1592 1593 1594 1595 1596 1597 1598 1599 1600



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INSTRUMENATION

GRIT PROCESSOR PANEL (GPP)
PANEL LAYOUT, WIRING DIAGRAM, RACK 2

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DRWN:	JLS
CHKD:	GCJ

I-313

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INSTRUMENATION
GRIT PROCESSOR PANEL (GPP)
PANEL LAYOUT, WIRING DIAGRAM, RACK 2

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DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-314
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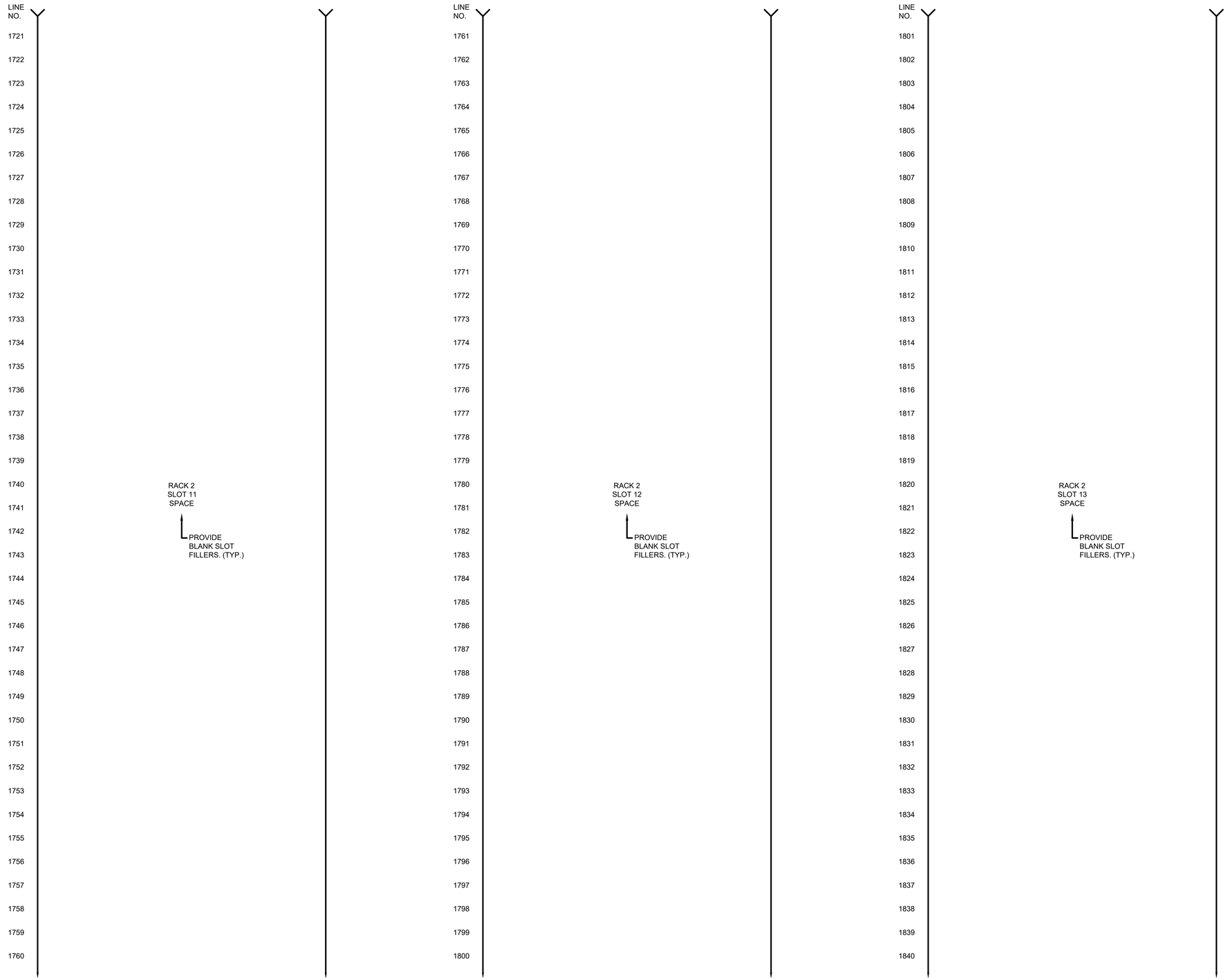

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INSTRUMENATION

GRIT PROCESSOR PANEL (GPP)

PANEL LAYOUT, WIRING DIAGRAM, RACK 2

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DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-315

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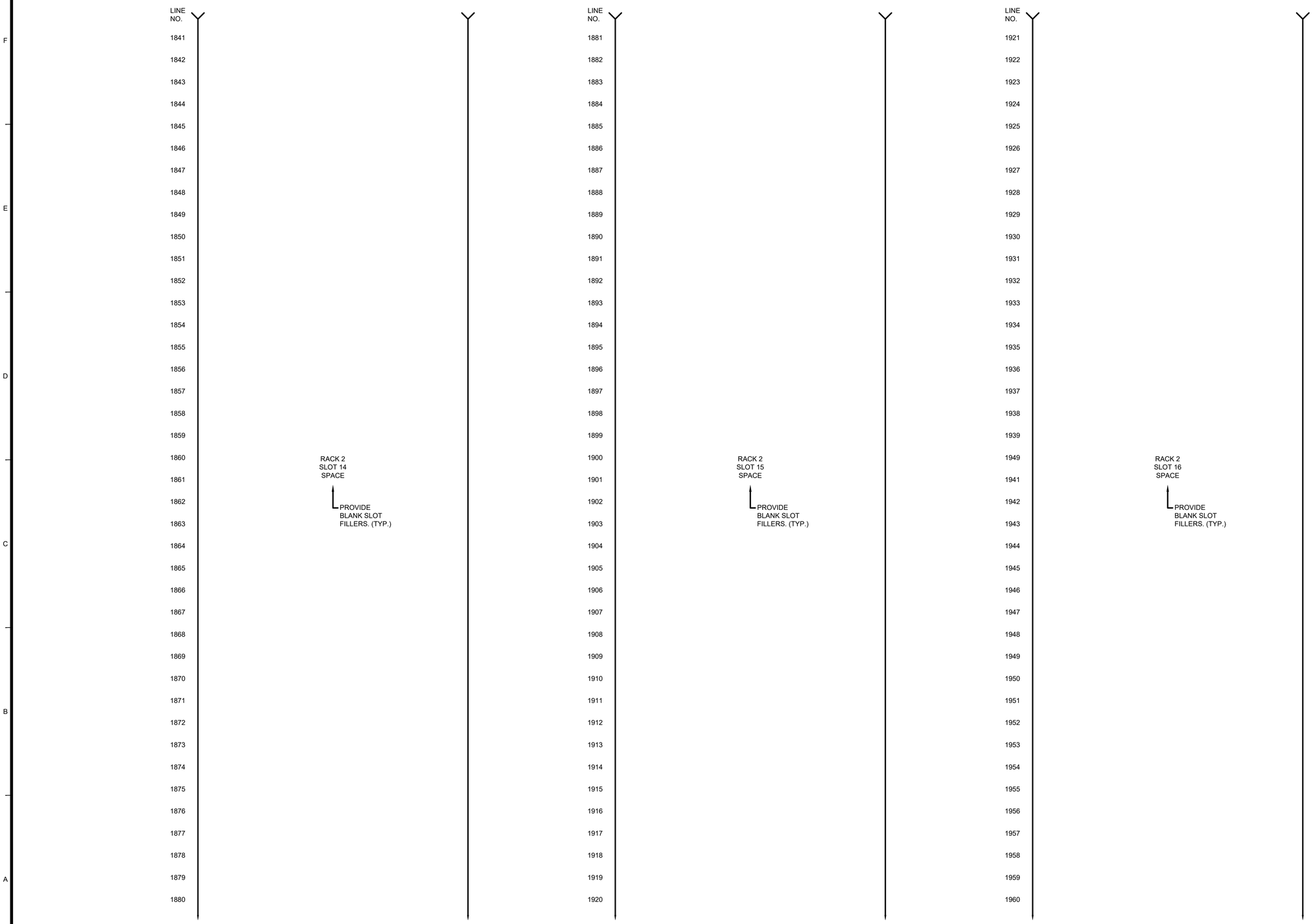

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INSTRUMENATION

GRIT PROCESSOR PANEL (GPP) PANEL LAYOUT, WIRING DIAGRAM, RACK 2

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DRWN: JLS
CHKD: GCJ

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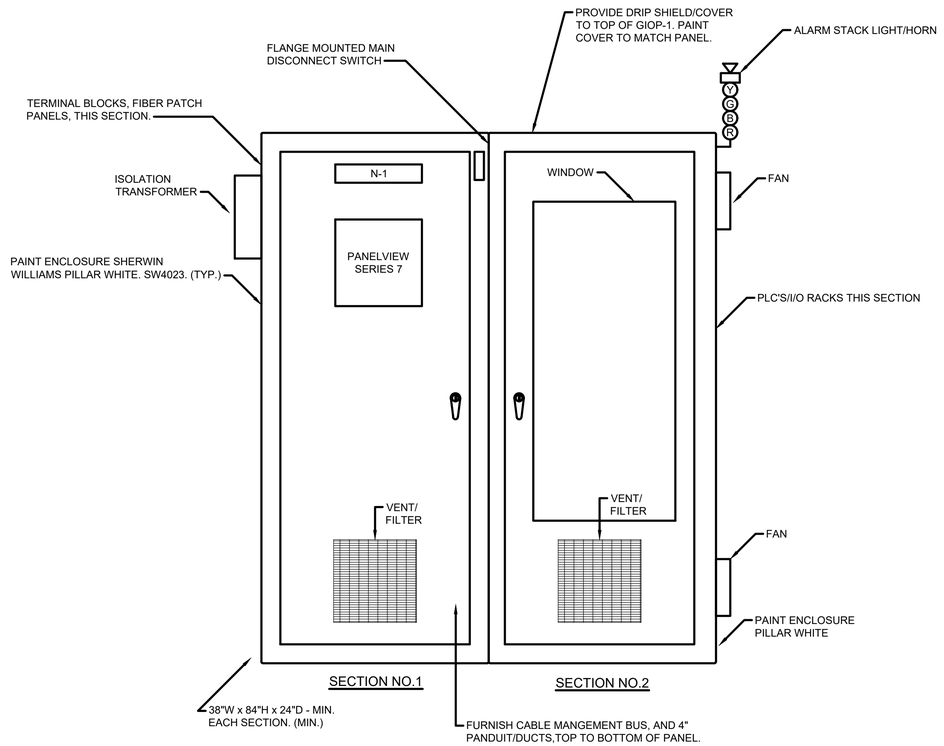
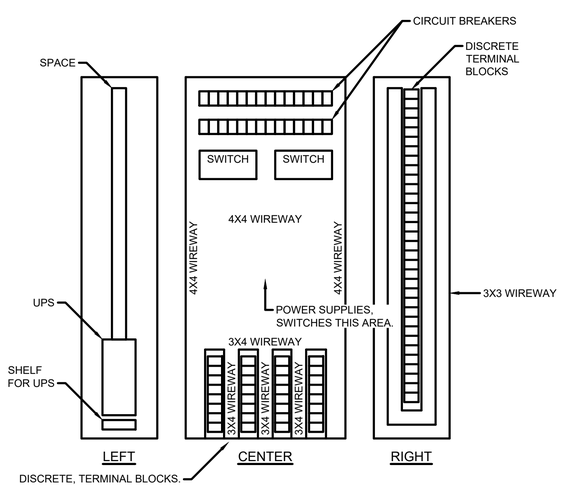


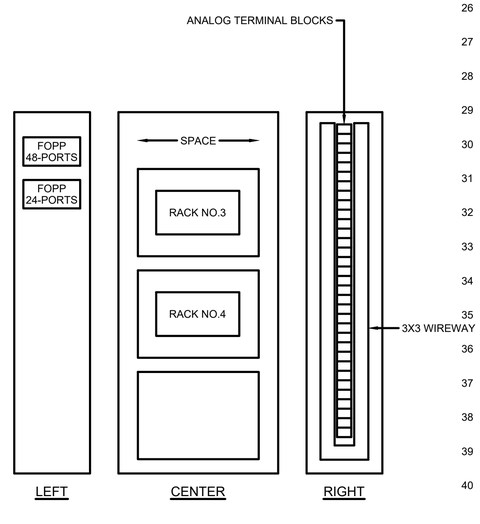
GRIT I/O PANEL (GIOP-1) - LAYOUT

NEMA 12 ENCLOSURE



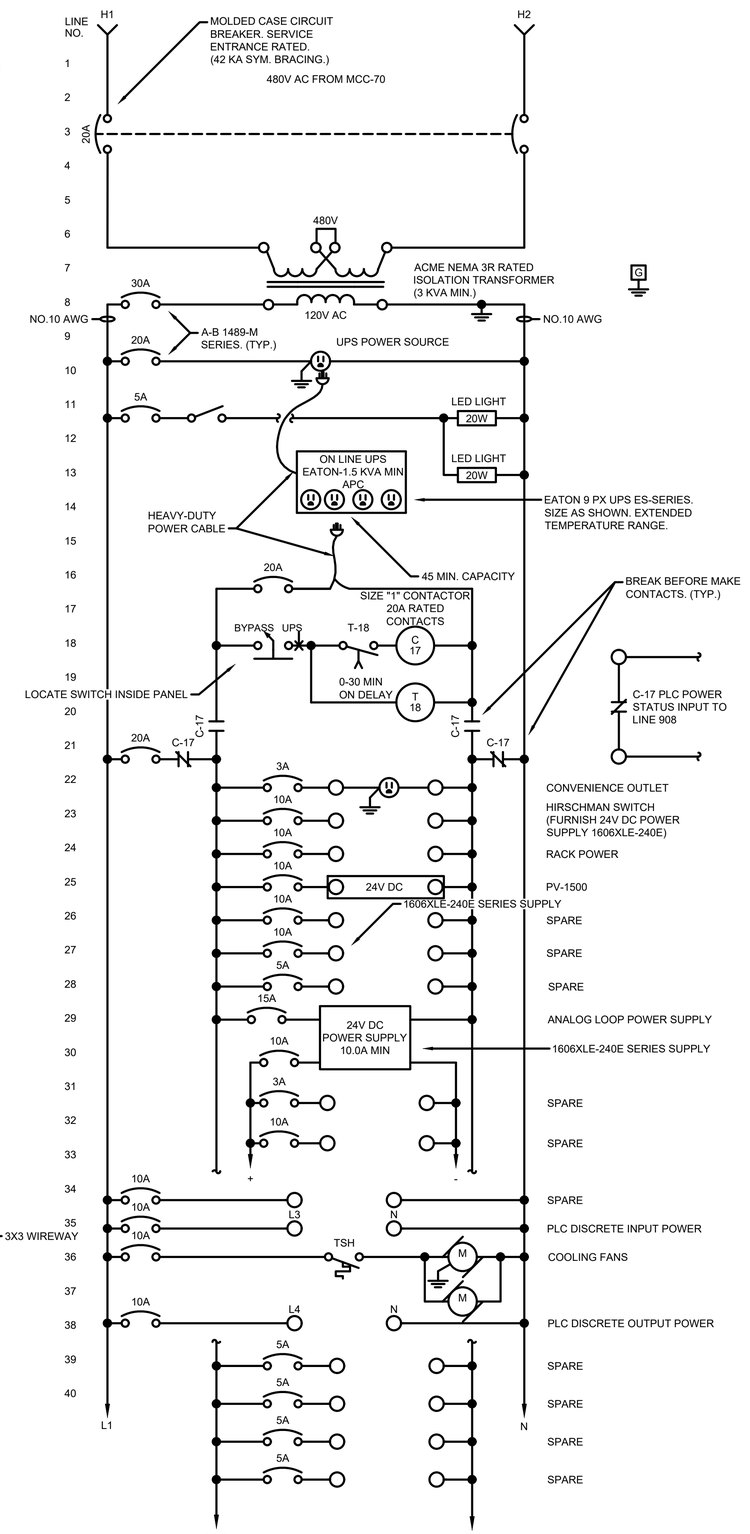
SUBPLATE LAYOUT - SECTION NO.1

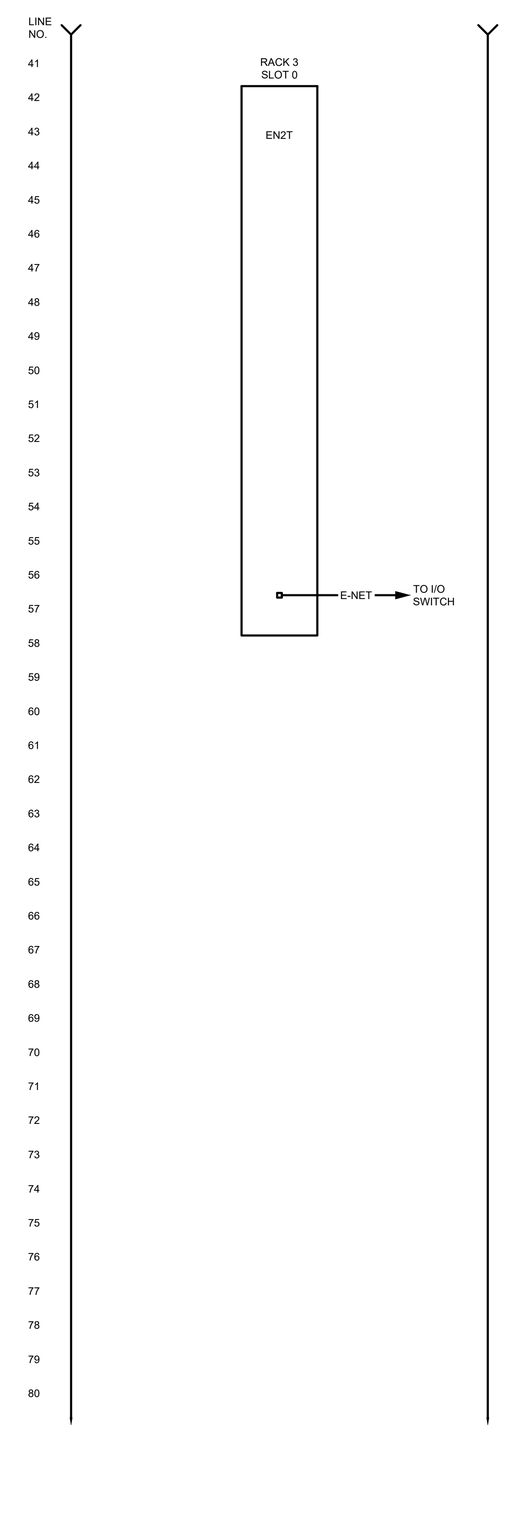
NO SCALE
NOTE: NOT ALL SUBPLATE DEVICES ARE SHOWN.



SUBPLATE LAYOUT - SECTION NO.2

NO SCALE
NOTE: NOT ALL SUBPLATE DEVICES ARE SHOWN.





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GRIT I/O PANEL NO.1
RACK 3 WIRING DIAGRAM

PROJ:	200-156238-21001
DESN:	GCJ
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CHKD:	GCJ

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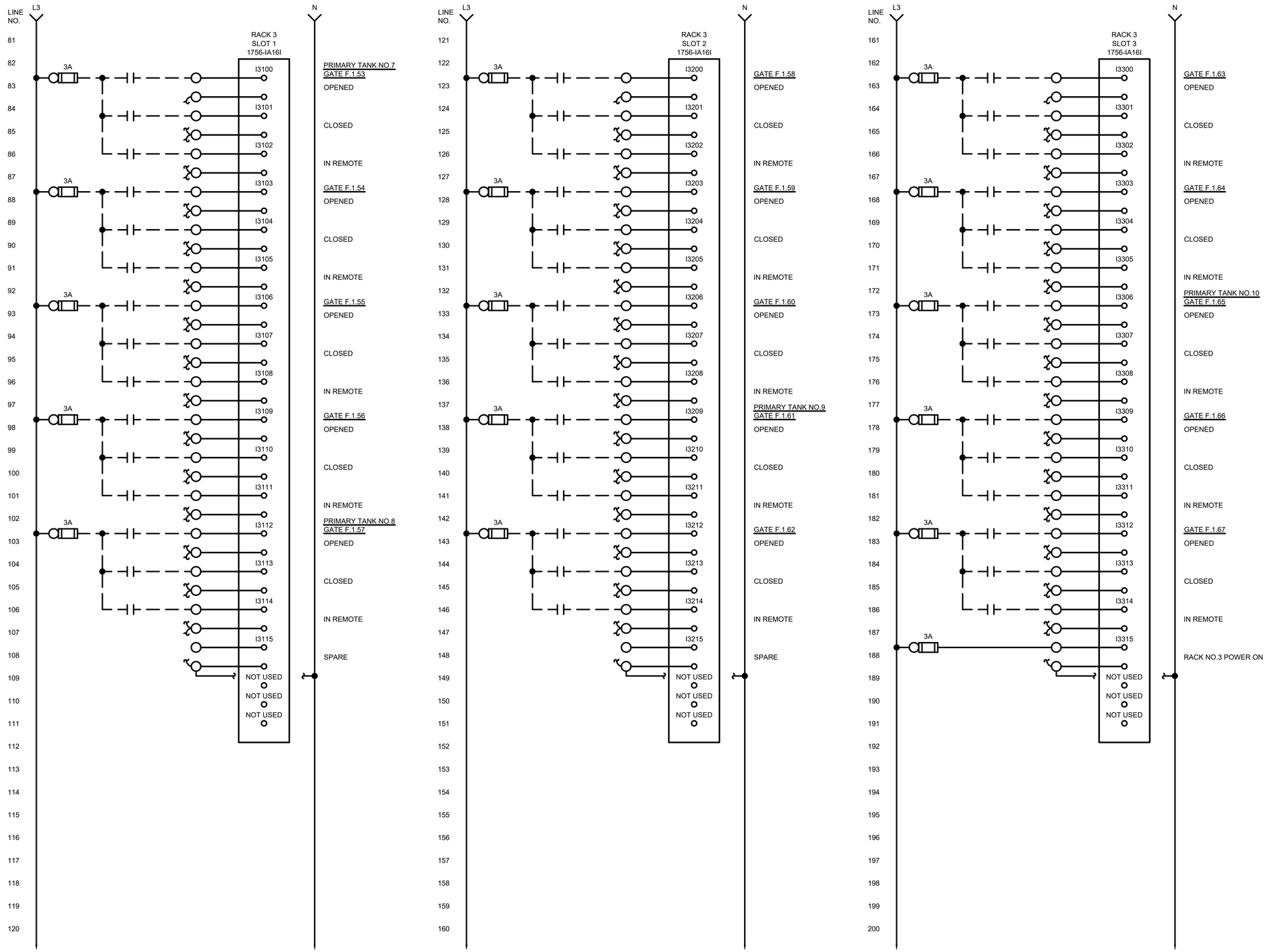

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INSTRUMENTATION
GRIT I/O PANEL NO.1
RACK 3 WIRING DIAGRAM

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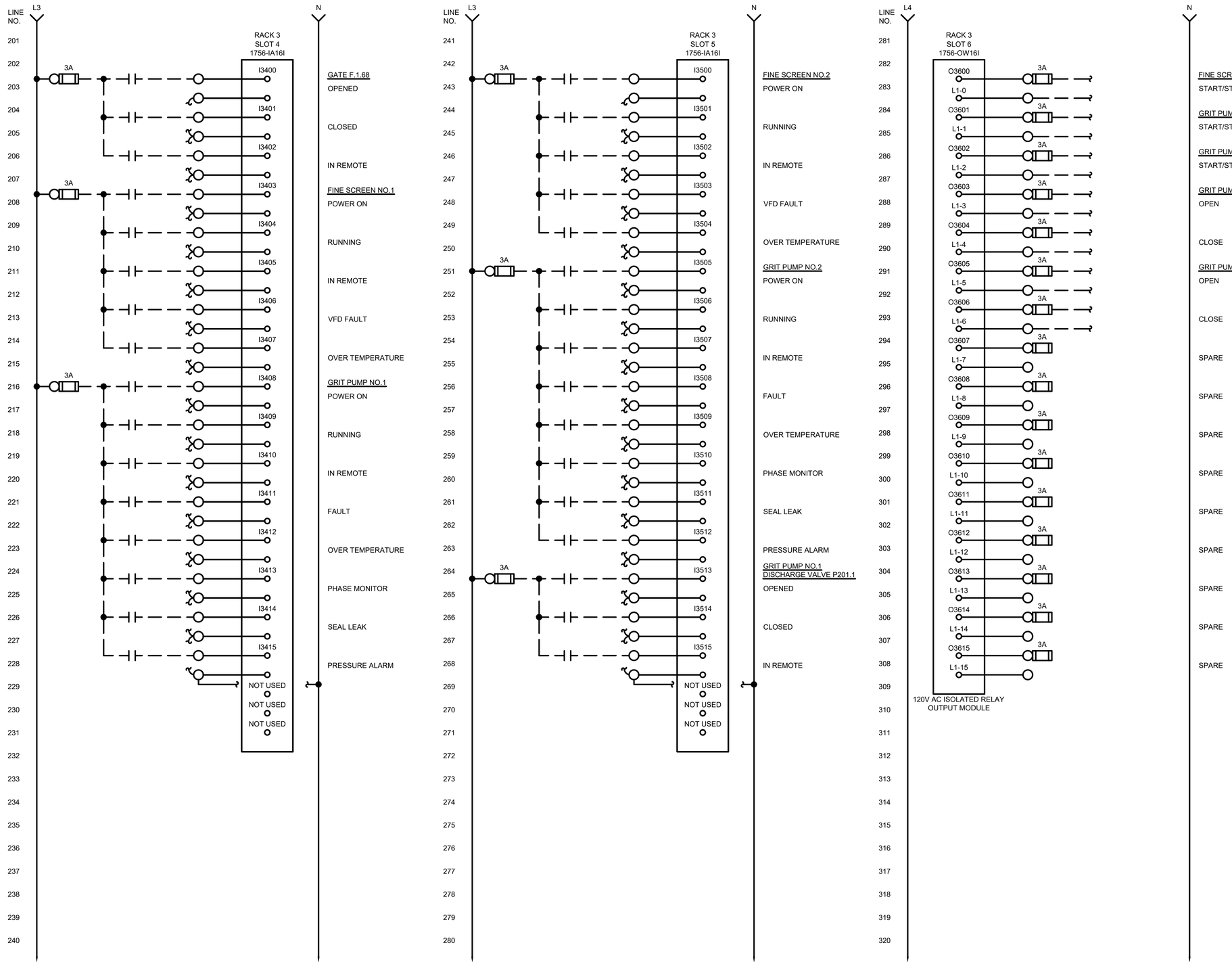

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INSTRUMENTATION
GRIT I/O PANEL NO.1
RACK 3 WIRING DIAGRAM

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-319

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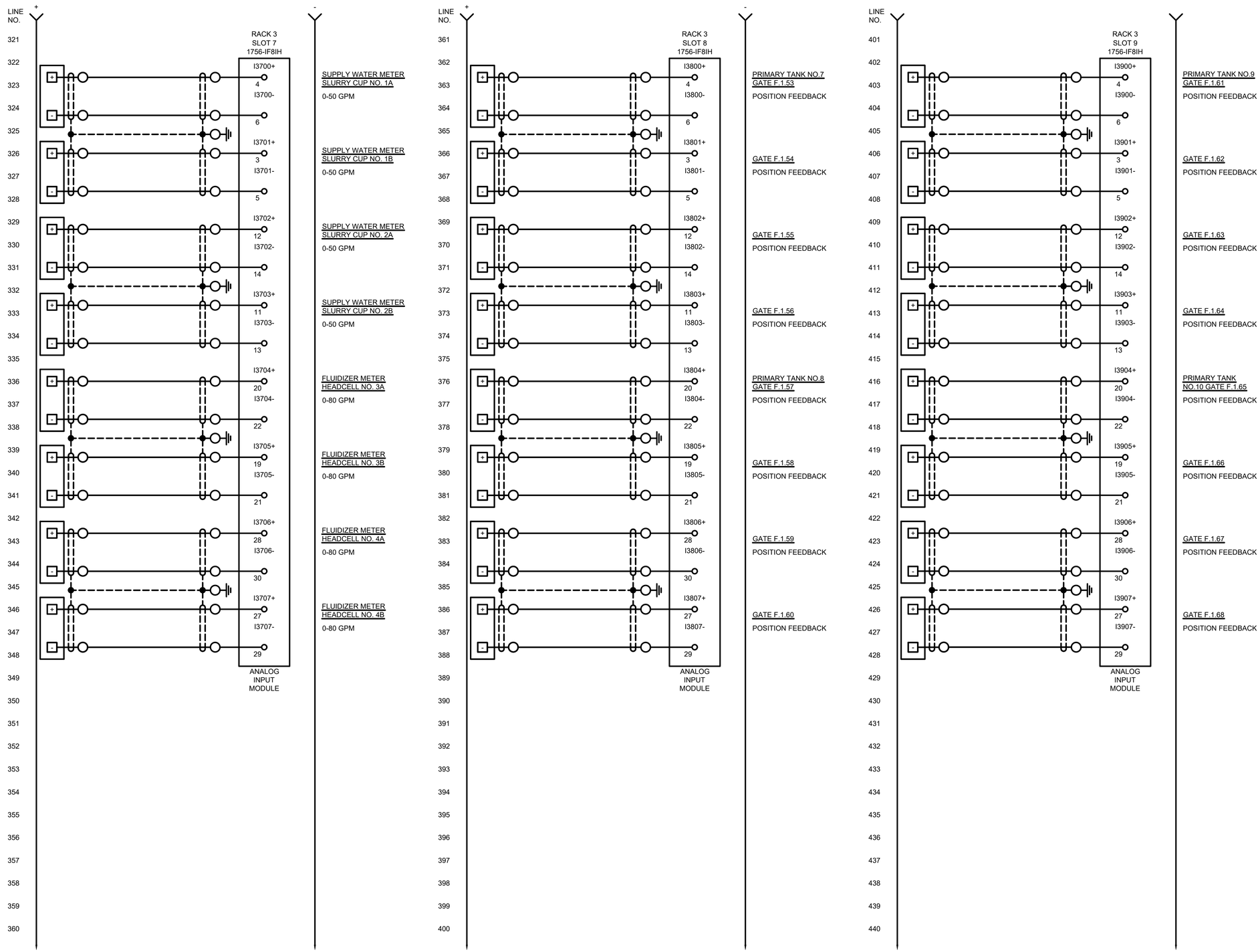

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INSTRUMENTATION
GRIT I/O PANEL NO.1
RACK 3 WIRING DIAGRAM

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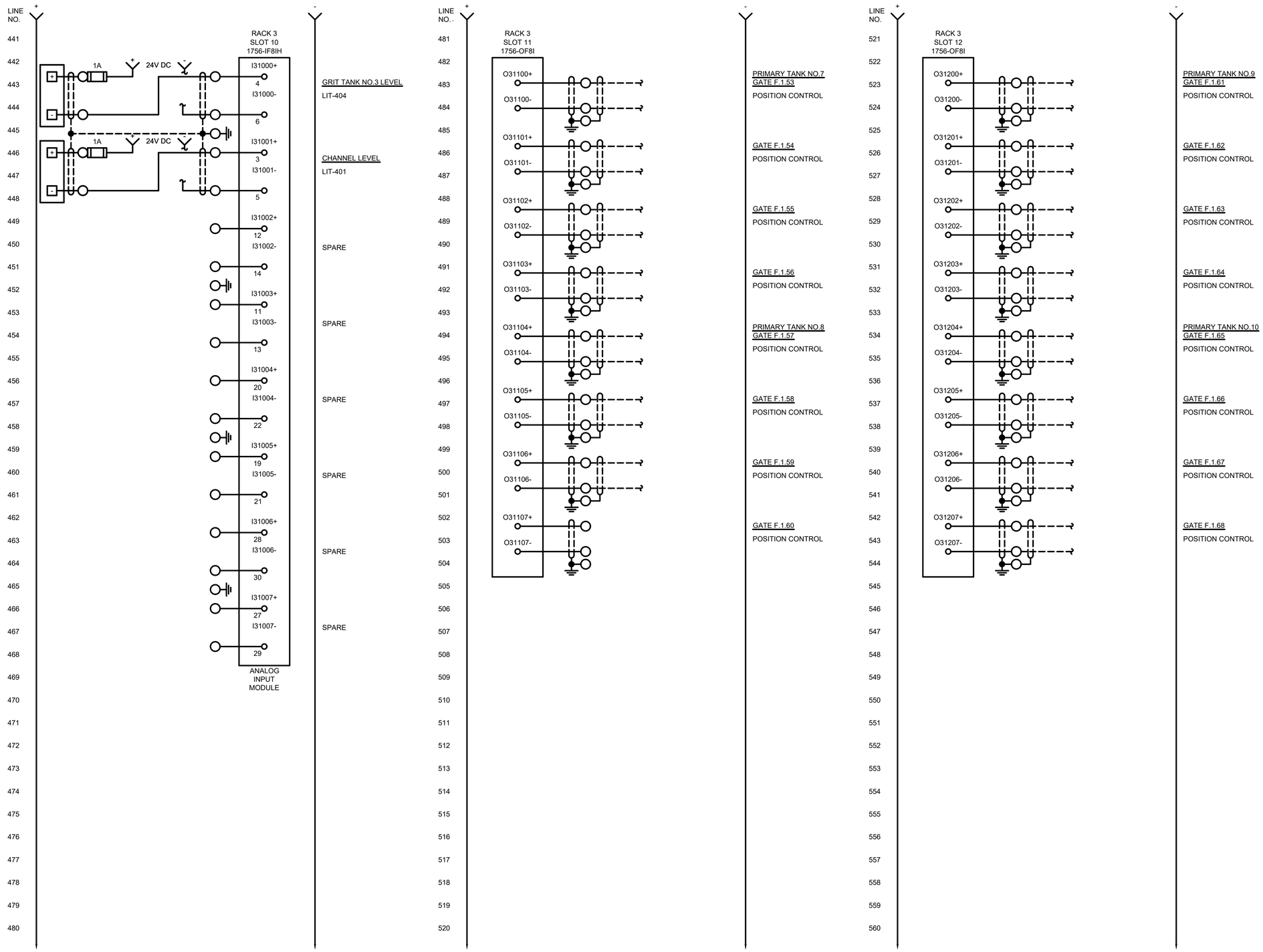

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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION
GRIT I/O PANEL NO.1
RACK 3 WIRING DIAGRAM

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

I-321

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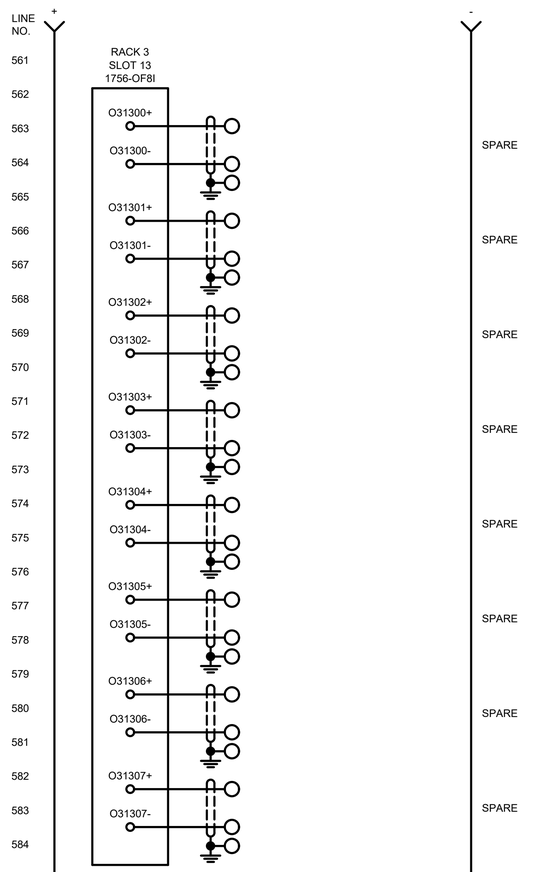

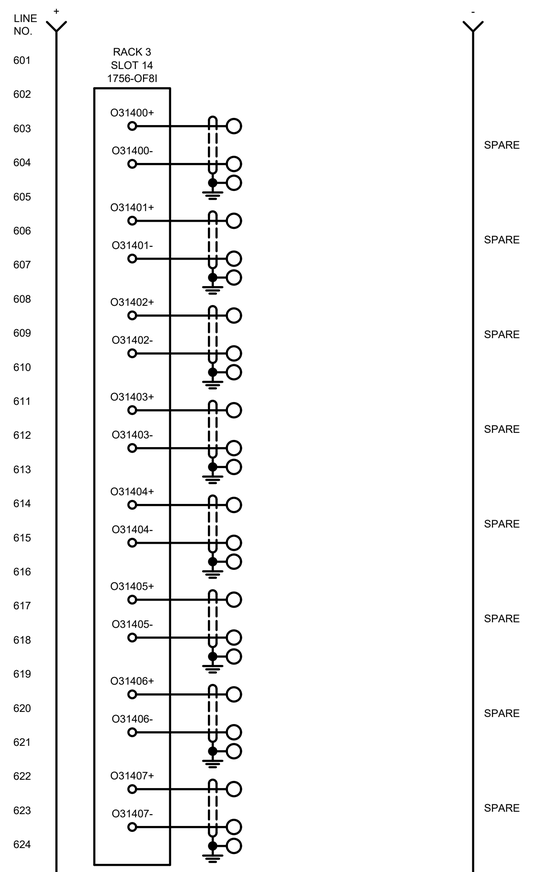

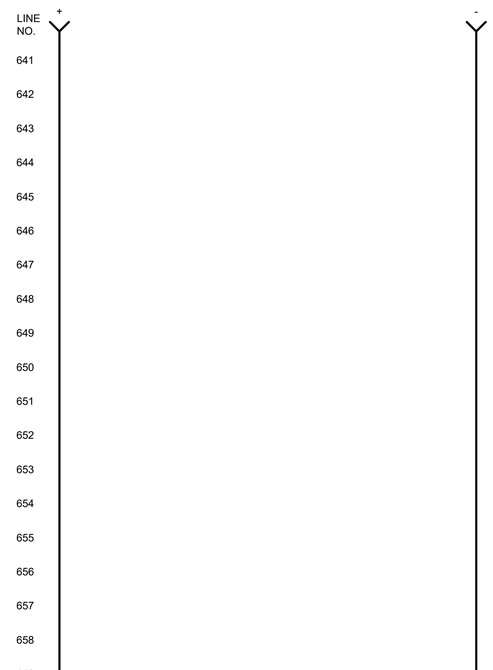

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INSTRUMENTATION
GRIT I/O PANEL NO.1
RACK 3 WIRING DIAGRAM

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CHKD:	GCJ

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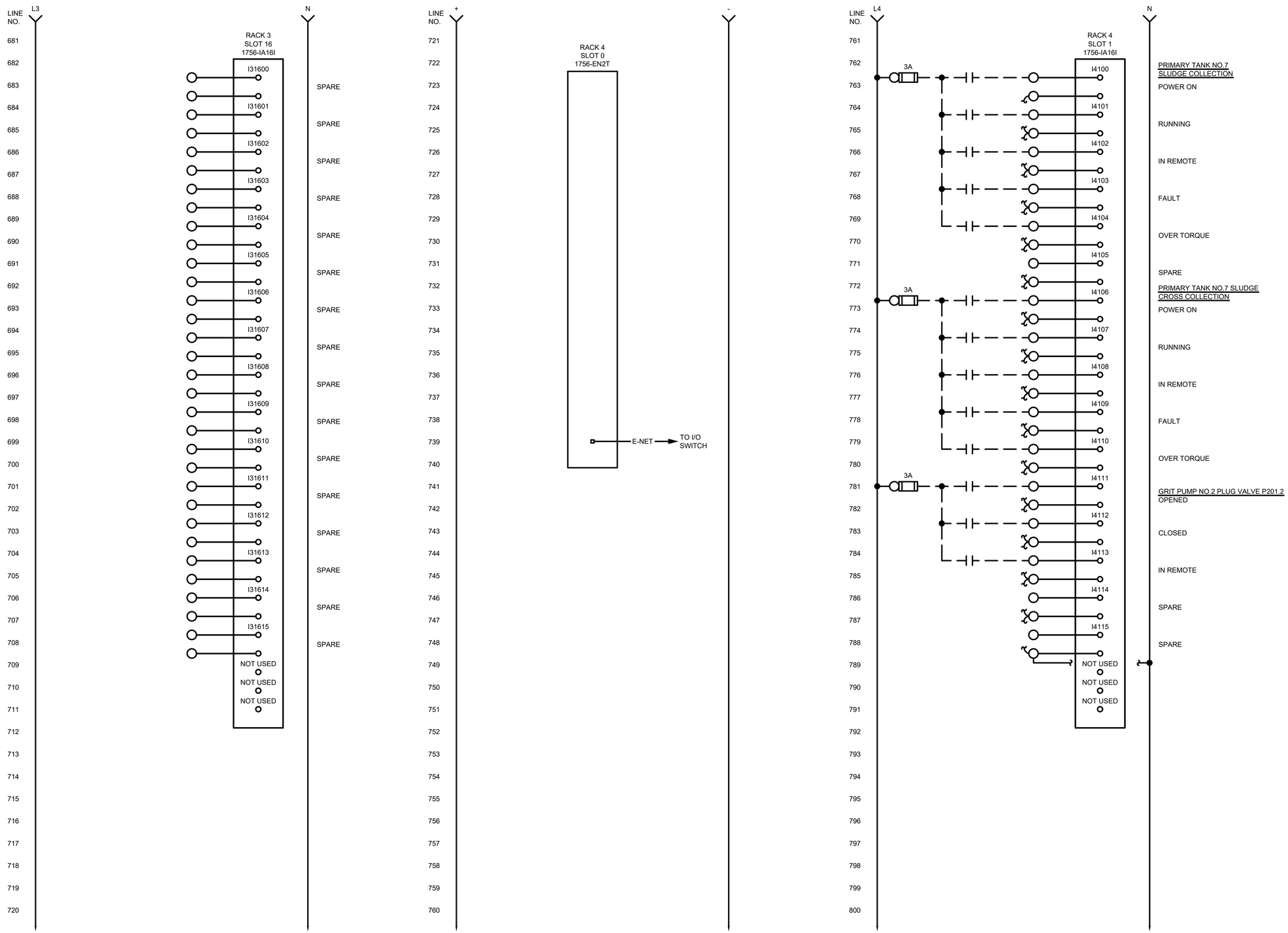

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1	6/22/21	ISSUED FOR BIDS	

CITY OF FLINT, MICHIGAN

FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION
GRIT I/O PANEL NO.1
RACK 3, RACK 4 WIRING DIAGRAM

PROJ: 200-156238-21001
DESN: GCJ
DRWN: JLS
CHKD: GCJ

I-323
OF 39

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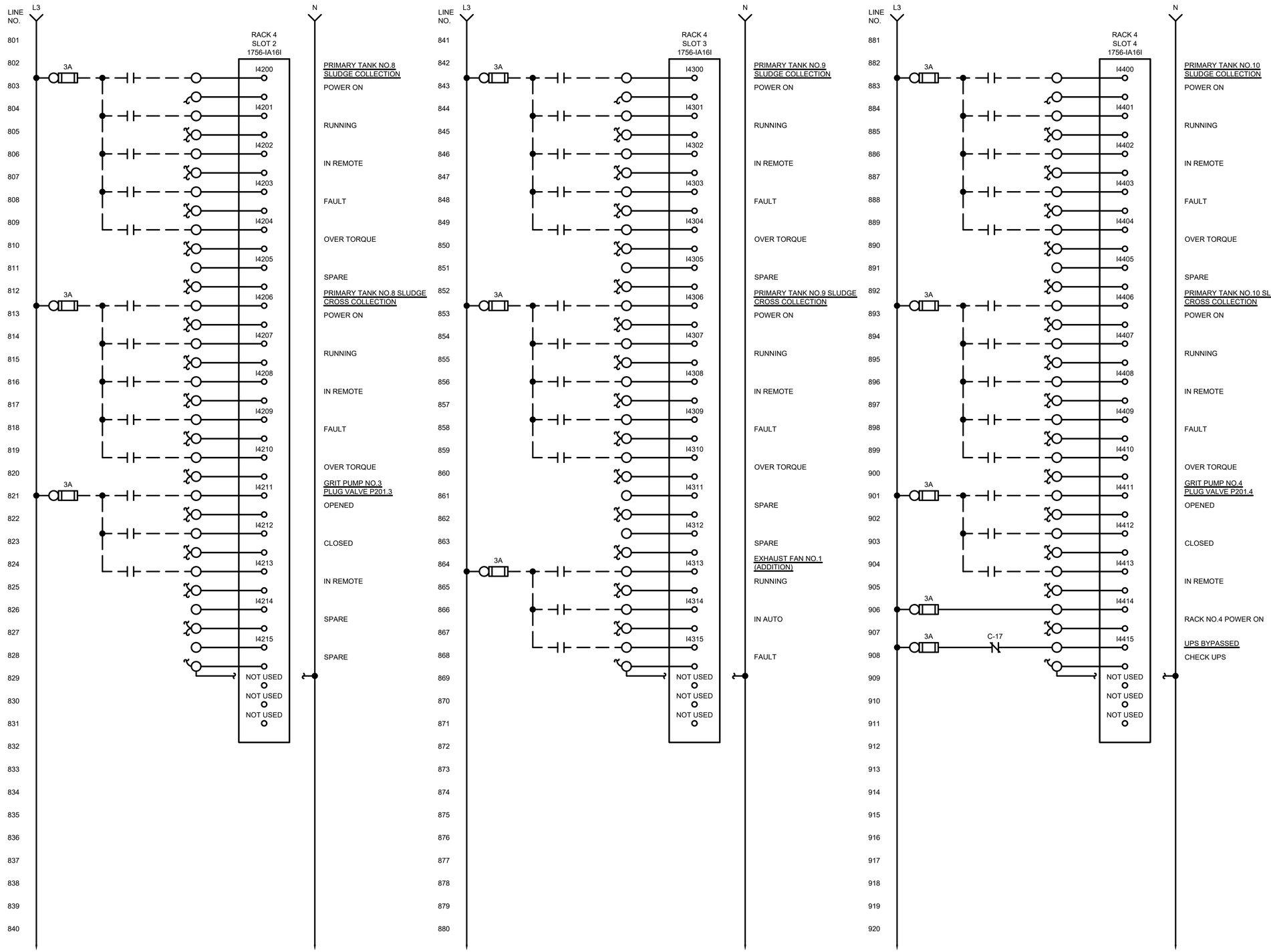
Bar Measures 1 inch, otherwise drawing not to scale

6/21/2021 3:51:37 PM - \\TT.LOCAL\IER\PROJECTS\LANSING\IER\156238\200-156238-21001\CAD\SHEETFILES\EI-323_GRIT 1 RACK 3-RACK 4 WIR DIA_V1.DWG - SHANK, JASON



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INSTRUMENTATION
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RACK 4 WIRING DIAGRAM

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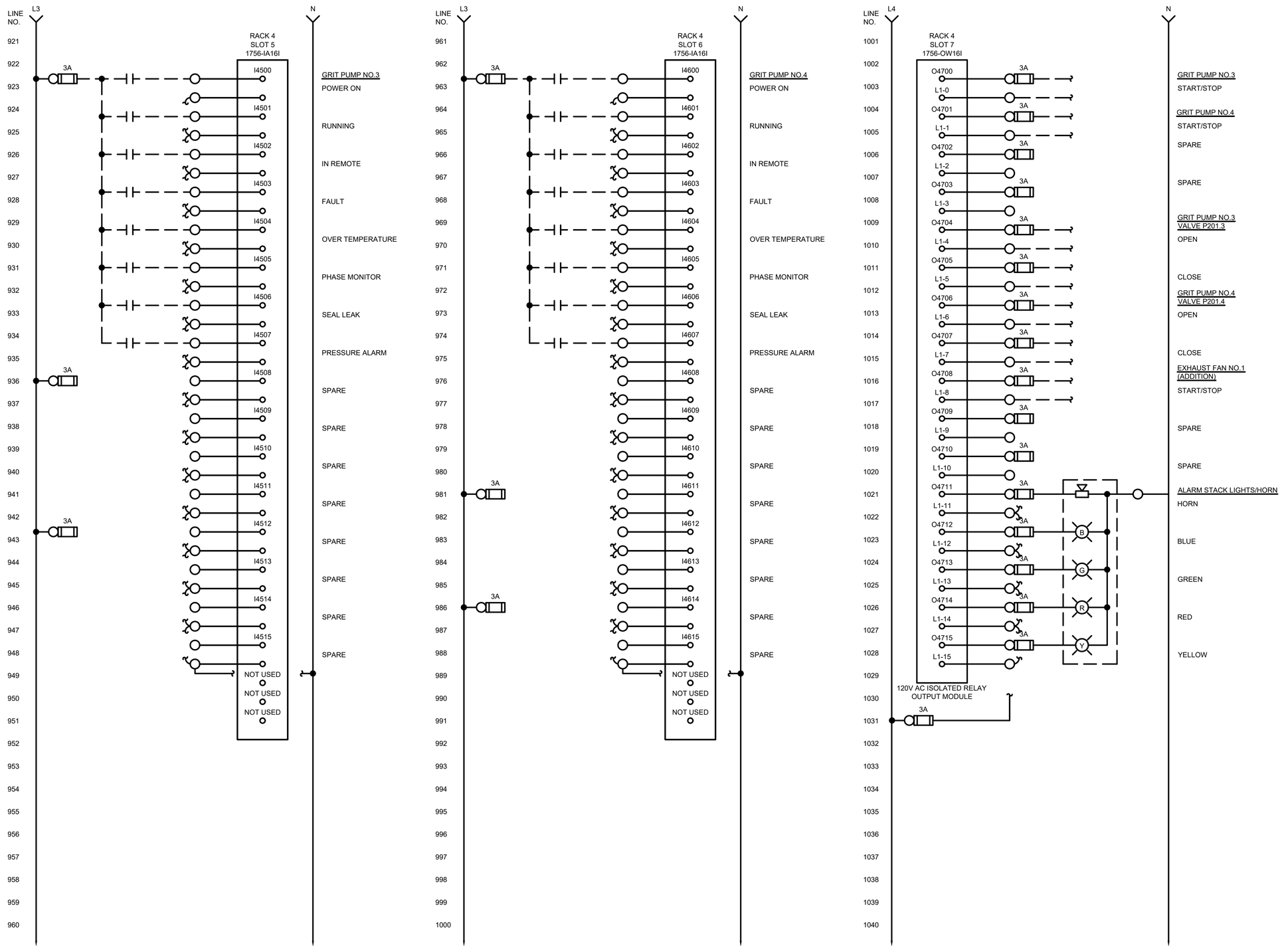

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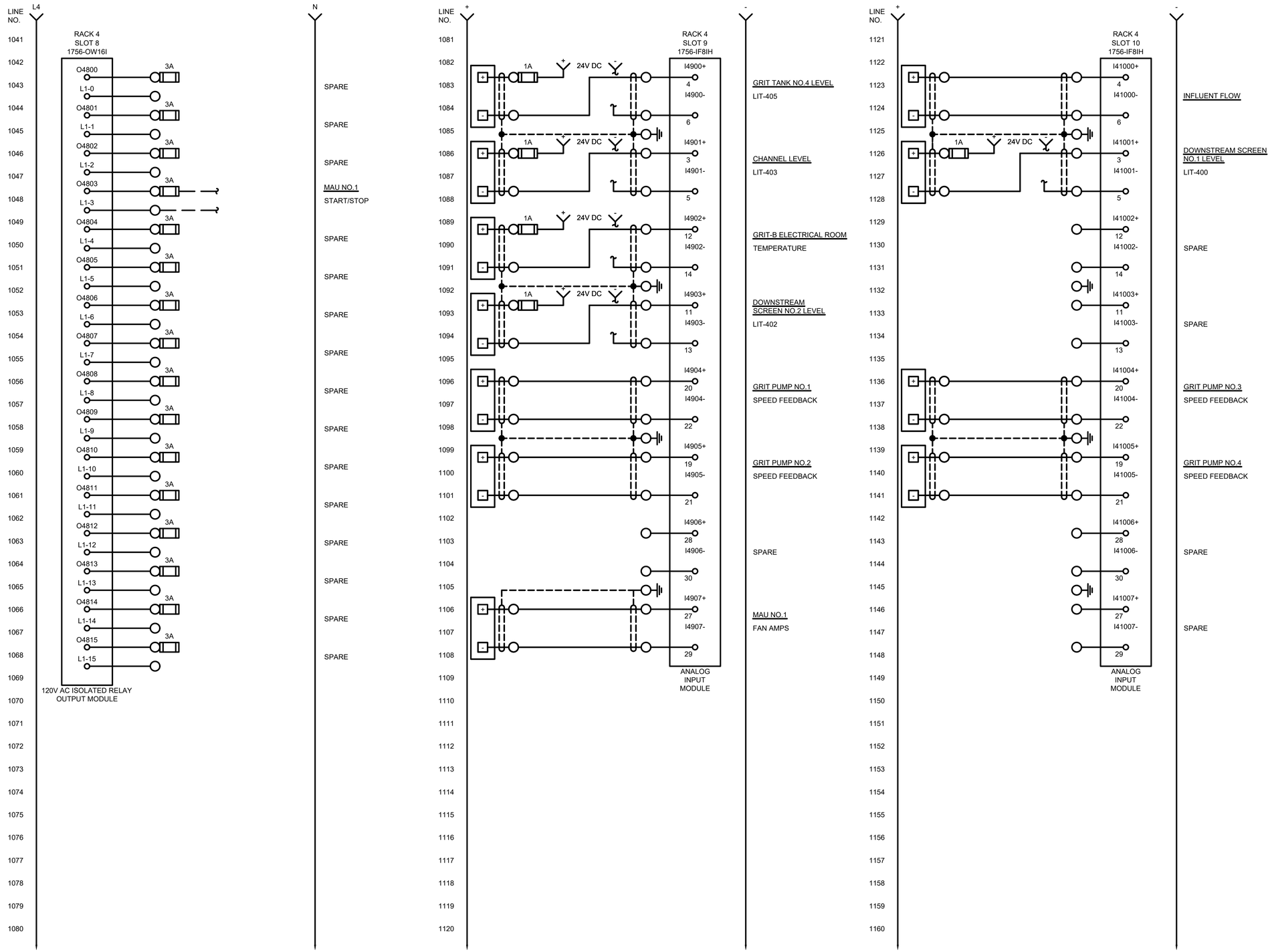

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GRIT I/O PANEL NO.1
RACK 4 WIRING DIAGRAM

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DESN: GCJ
DRWN: JLS
CHKD: GCJ

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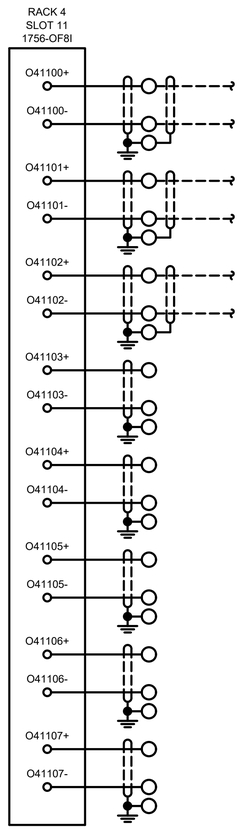
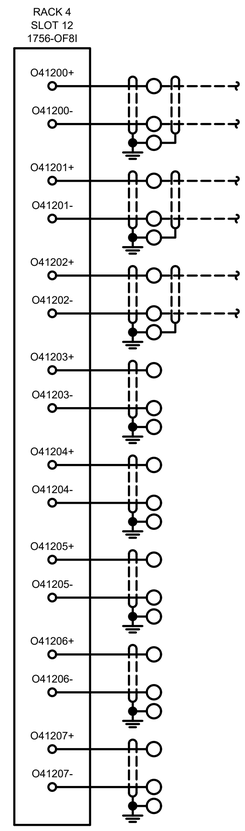


LINE NO.		
1161		
1162		
1163	GRIT PUMP NO.1	
1164	SPEED CONTROL	
1165		
1166	GRIT PUMP NO.2	
1167	SPEED CONTROL	
1168		
1169	FINE SCREEN NO.1	
1170	SPEED CONTROL	
1171		
1172	SPARE	
1173		
1174		
1175	SPARE	
1176		
1177		
1178	SPARE	
1179		
1180		
1181	SPARE	
1182		
1183		
1184	SPARE	
1185		
1186		
1187		
1188		
1189		
1190		
1191		
1192		
1193		
1194		
1195		
1196		
1197		
1198		
1199		
1200		



LINE NO.		
1201		
1202		
1203	GRIT PUMP NO.3	
1204	SPEED CONTROL	
1205		
1206	GRIT PUMP NO.4	
1207	SPEED CONTROL	
1208		
1209	FINE SCREEN NO.2	
1210	SPEED CONTROL	
1211		
1212	SPARE	
1213		
1214		
1215	SPARE	
1216		
1217		
1218	SPARE	
1219		
1220		
1221	SPARE	
1222		
1223		
1224	SPARE	
1225		
1226		
1227		
1228		
1229		
1230		
1231		
1232		
1233		
1234		
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1240		

LINE NO.	
1241	
1242	
1243	
1244	
1245	
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1247	
1248	
1249	
1250	
1251	
1252	
1253	
1254	
1255	
1256	
1257	
1258	
1259	
1260	RACK 4 SLOT 13 SPACE
1261	
1262	PROVIDE BLANK SLOT FILLERS. (TYP.)
1263	
1264	
1265	
1266	
1267	
1268	
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FLINT WPC GRIT BAT "B" SYSTEM & PRIMARY TANKS IMPROVEMENTS

INSTRUMENTATION
GRIT I/O PANEL NO.1
RACK 4 WIRING DIAGRAM

PROJ:	200-156238-21001
DESN:	GCJ
DRWN:	JLS
CHKD:	GCJ

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OF 39

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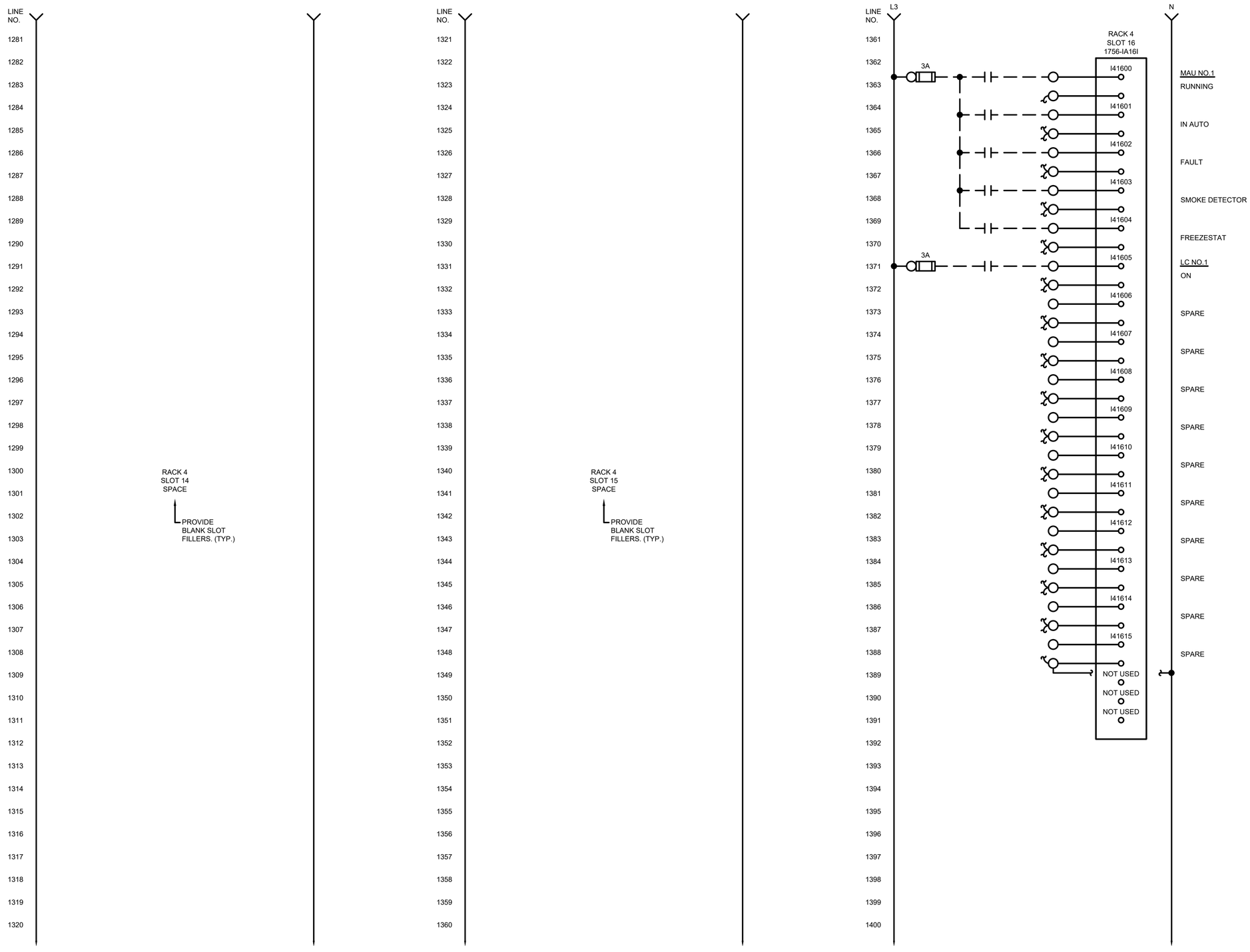

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GRIT I/O PANEL NO.1
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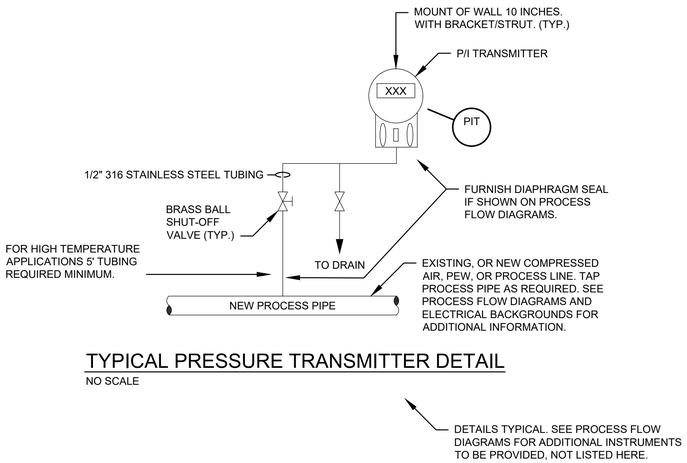
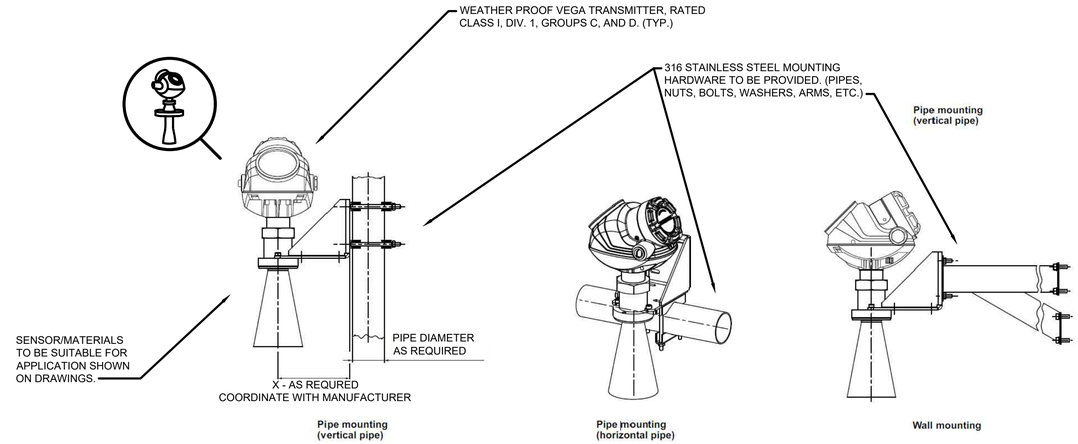


TYPICAL PRESSURE TRANSMITTER DETAIL

NO SCALE

DETAILS TYPICAL. SEE PROCESS FLOW DIAGRAMS FOR ADDITIONAL INSTRUMENTS TO BE PROVIDED, NOT LISTED HERE.



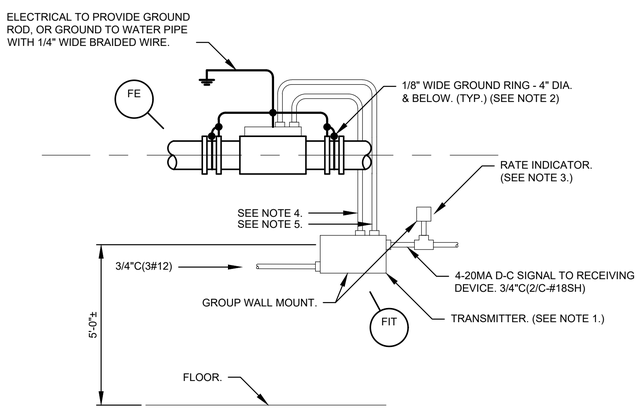
LEVEL TRANSMITTER (RADAR) DETAILS (VEGA)

NO SCALE

LI 400, LI 401, LI 402, LI 403, LI 404, LI 405

LIT 400, LIT 401, LIT 402, LIT 403, LIT 404, LIT 405

LE 400, LE 401, LE 402, LE 403, LE 404, LE 405



NOTES:

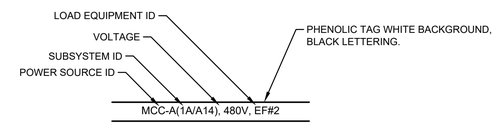
1. LOCATION FOR TRANSMITTERS NOT INTEGRALLY MOUNTED ON THE FLOW METER.
2. GROUND MAGMETER AS INSTRUCTED BY THE VENDOR.
3. INSTALL SEPARATELY MOUNTED INDICATOR. NOT REQUIRED ON INDICATING WALL MOUNTED TRANSMITTERS.
4. POWER WIRING. 1"C POWER AS SUPPLIED BY MANUFACTURER.
5. SIGNAL WIRING. 1"C SIGNAL AS SUPPLIED BY MANUFACTURER.

MAGNETIC FLOW METER DETAIL

NO SCALE.

FIT 400, FIT 401, FIT 402, FIT 403, FIT 450

FE 400, FE 401, FE 402, FE 403, FE 450



FEEDER & BRANCH CIRCUIT RACEWAY LABELS

NOTE:

1. IN ACCESSIBLE CEILING SPACES AND EXPOSED IN UNFINISHED AREAS, LABEL CONDUIT WITH PANEL AND CIRCUIT NUMBERS OF CONDUCTORS ROUTED THROUGH THE CONDUIT. LABEL CONDUIT AT WALL PENETRATIONS AND CONNECTIONS TO ALL PANELS, JUNCTION BOXES, AND EQUIPMENT SERVED.

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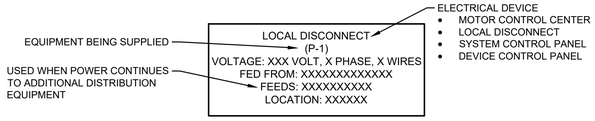
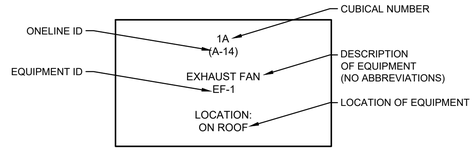


EQUIPMENT NAMEPLATE

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND



MOTOR CONTROL CENTER CUBICAL NAMEPLATE

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND

WHITE BACKGROUND BLACK LETTERS

CONTROL PANEL
*
SUPPLY XXX VOLTS: **
Disconnect Current Rating: _____
xxxxxxxxxxxxxxxx
Drawing No. _____ ***
Built By: ****
Equipment Modle No. ****
Equipment Serial No. ****
Contract ****
Date of Manfacture Machine ****

PANEL TAG

NOTE:
1. * = PANEL NAME
2. ** = MCC & BUCKET OR LIGHTING PANEL & CIRCUIT NUMBER
3. *** = DRAWING NUMBER
4. **** = MANUFACTURER, MODEL #, SERIAL #, CONTACT INFO. & DATE.

YELLOW BACKGROUND
BLACK LETTERS

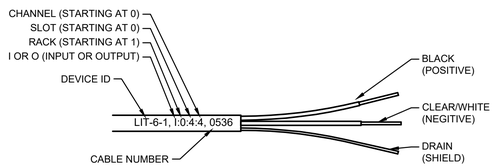
DANGER

YELLOW WIRING
IS NOT
DE-ENERGIAED
BY DISCONNECT

AUTHORIZED
PERSONNEL ONLY
ALLOWED TO ENTER

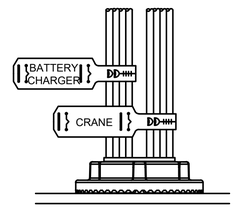
YELLOW WIRING PANEL TAG

NOTE:
1. TO BE USED WHEN PANEL HAS FOREIGN POWER (CIRCUITS THAT DO NOT DE-ENERGIZE WHEN DISCONNECT OF MAIN CIRCUIT BREAKER IS TURNED OFF). EXAMPLE IS WHEN THE MCC POWERS THE START CONTACT TO A PLC PANEL.



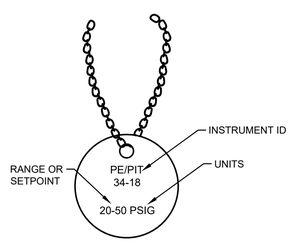
TWO CONDUCTOR CABLE

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND



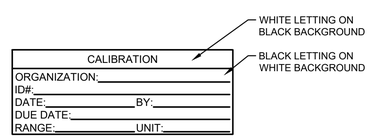
WIRE/CABLE BUNDLE TAG

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND (POWER)
2. BLACK LETTERING ON YELLOW BACKGROUND (SIGNAL)
3. BUNDLE AND LABEL WIRES/CABLES GOING TO A COMMON PANEL/EQUIPMENT/DEVICE
4. LABEL IN PANELS, MCC, MANHOLES, HAND HOLES, AND BOXES OVER 8 CUBIC FEET.

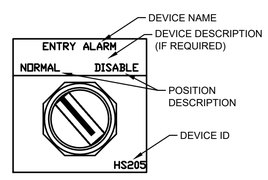


INSTRUMENT TAG

NOTE:
1. STAINLESS STEEL TAG
2. STAINLESS STEEL CHAIN
3. BLACK LETTERING
4. INSTALL TAG ON ELEMENTS AND INSTRUMENTS.

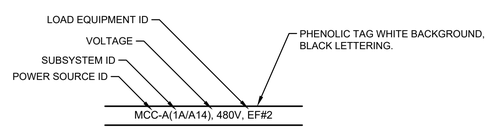


INSTRUMENT CALIBRATION



PANEL TAG
PUSH BUTTON/SWITCH

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND



FEEDER & BRANCH CIRCUIT
RACEWAY LABELS

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