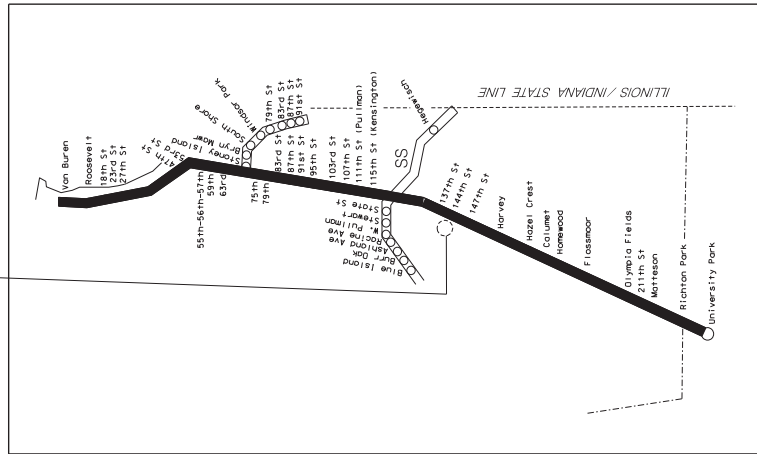
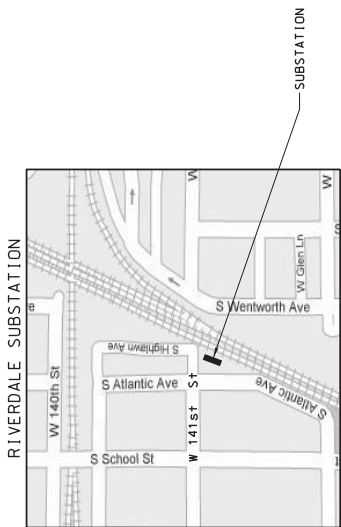




RIVERDALE SUBSTATION

DRAWING LIST

- CS-17.5-1000 COVER SHEET
- SS-17.5-1001 TOPOGRAPHICAL SURVEY
- SS-17.5-1002 OPERATIONAL NOTES
- SS-17.5-1003 SITE PLAN
- SS-17.5-1004 SITE PLAN SECTION AND NOTES
- SS-17.5-1007 LANDSCAPING PLAN, DETAILS, SCHEDULES AND NOTES
- SS-17.5-1017A FRAMING PLAN
- SS-17.5-1018 FOUNDATION AND FRAMING DETAILS
- SS-17.5-1019 STAIR, RAILING AND GATE DETAILS
- SS-17.5-1020B CHAIN LINK FENCE DETAILS
- SS-17.5-1020C SUBSTATION EQUIPMENT LAYOUT PLAN
- SS-17.5-1050 ELECTRICAL SITE PLAN
- SS-17.5-1070 ELECTRICAL GROUNDING, TRACTION AND DUCTBANK LAYOUT
- SS-17.5-1071 DUCTBANK PROFILES
- SS-17.5-1072 DUCTBANK DETAILS
- SS-17.5-1074 NOT USED
- SS-17.5-1075 SUBSTATION GROUNDING LAYOUT
- SS-17.5-1080 ELECTRICAL NOTES & SYMBOLS
- SS-17.5-1081 ELECTRICAL DETAILS
- SS-17.5-1082 ENLARGED PLANS, ELEVATIONS AND DETAILS
- SS-17.5-1085 12.5KV AC SINGLE LINE DIAGRAM
- SS-17.5-4001 TRACTION POWER ONE LINE DIAGRAM
- SS-17.5-4002 NOT USED
- SS-17.5-4003 NOT USED
- SS-17.5-4004 TRANSF 'S, RECTIFIERS & DC SWGR SINGLE LINE DIAGRAM
- SS-17.5-4006 12.5KV AC THREE LINE DIAGRAM, SHEET 1 OF 3
- SS-17.5-4101 12.5KV AC THREE LINE DIAGRAM, SHEET 2 OF 3
- SS-17.5-4102 12.5KV AC THREE LINE DIAGRAM, SHEET 3 OF 3
- SS-17.5-4103 NOT USED
- SS-17.5-4104 12.5KV AC SCHEMATIC DIAGRAM INC. LINE BKRS, 152-1 & 152-2
- SS-17.5-4105 12.5KV AC SCHEMATIC DIAGRAM BUS TIE BKRS, 152-1 & 152-2
- SS-17.5-4107 12.5KV AC SCHEMATIC DIAGRAM RECT. TRANSF. BKR, 52-T1 & 52-T2
- SS-17.5-4108 NOT USED
- SS-17.5-4109 NOT USED
- SS-17.5-4110 12.5KV AC SCHEMATIC DIAGRAM BUS-1 DIFFERENTIAL LOCKOUT
- SS-17.5-4111 12.5KV AC SCHEMATIC DIAGRAM BUS-2 DIFFERENTIAL LOCKOUT
- SS-17.5-4201 1500V DC SCHEMATIC DIAGRAM RECTIFIER-1 POWER & AUXILIARIES
- SS-17.5-4202 1500V DC SCHEMATIC DIAGRAM RECTIFIER-1 CONTROLS & ANNUNCIATOR
- SS-17.5-4203 NOT USED
- SS-17.5-4204 1500V DC SCHEMATIC DIAGRAM RECTIFIER-2 POWER & AUXILIARIES
- SS-17.5-4205 1500V DC SCHEMATIC DIAGRAM RECTIFIER-2 CONTROLS & ANNUNCIATOR
- SS-17.5-4206 RECTIFIER PLC LOGIC DIAGRAM SHEET 1
- SS-17.5-4207 RECTIFIER PLC LOGIC DIAGRAM SHEET 2
- SS-17.5-4208 RECTIFIER PLC LOGIC DIAGRAM SHEET 3
- SS-17.5-4209 RECTIFIER PLC LOGIC DIAGRAM SHEET 4
- SS-17.5-4210 1500V DC SCHEMATIC DIAGRAM RECTIFIER-1 BREAKER 72-1
- SS-17.5-4211 1500V DC SCHEMATIC DIAGRAM RECTIFIER-2 BREAKER 72-2
- SS-17.5-4226 1500V DC SCHEMATIC DIAGRAM DC SWITCHGEAR GROUND RELAY
- SS-17.5-4304A DC FEEDER BREAKER SECTION NO. 174 SCHEMATIC DIAGRAM
- SS-17.5-4304B DC FEEDER BREAKER SECTION NO. 175 SCHEMATIC DIAGRAM
- SS-17.5-4307A DC FEEDER BREAKER SECTION NO. 179 SCHEMATIC DIAGRAM
- SS-17.5-4307B DC FEEDER BREAKER SECTION NO. 180 SCHEMATIC DIAGRAM
- SS-17.5-4308A DC FEEDER BREAKER SECTION NO. T-BKR SCHEMATIC DIAGRAM
- SS-17.5-4308B DC FEEDER BREAKER SECTION NO. T-BKR SCHEMATIC DIAGRAM
- SS-17.5-5000 STATION CONTROL ARCHITECTURE NEW BUILDING INTERFACES
- SS-17.5-5001 STATION CONTROL ARCHITECTURE EXISTING BUILDING INTERFACES



SYSTEM MAP
ELECTRIC DISTRICT

REV	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION
0	02/28/2017	HS	HS					

LTK Engineering Services
LTK Engineering Services
200 N. Western Dr. Ste. 1000 Chicago IL 60606

KMI
Kallsumm Mahdi, Inc.
200 N. Western Dr. Ste. 1000 Chicago IL 60606

IDP A Company of **Gannett Fleming**
IDP
200 N. Western Dr. Ste. 1000 Chicago IL 60606

Metra
Metra
571 W. Jackson Boulevard
Chicago, Illinois 60601

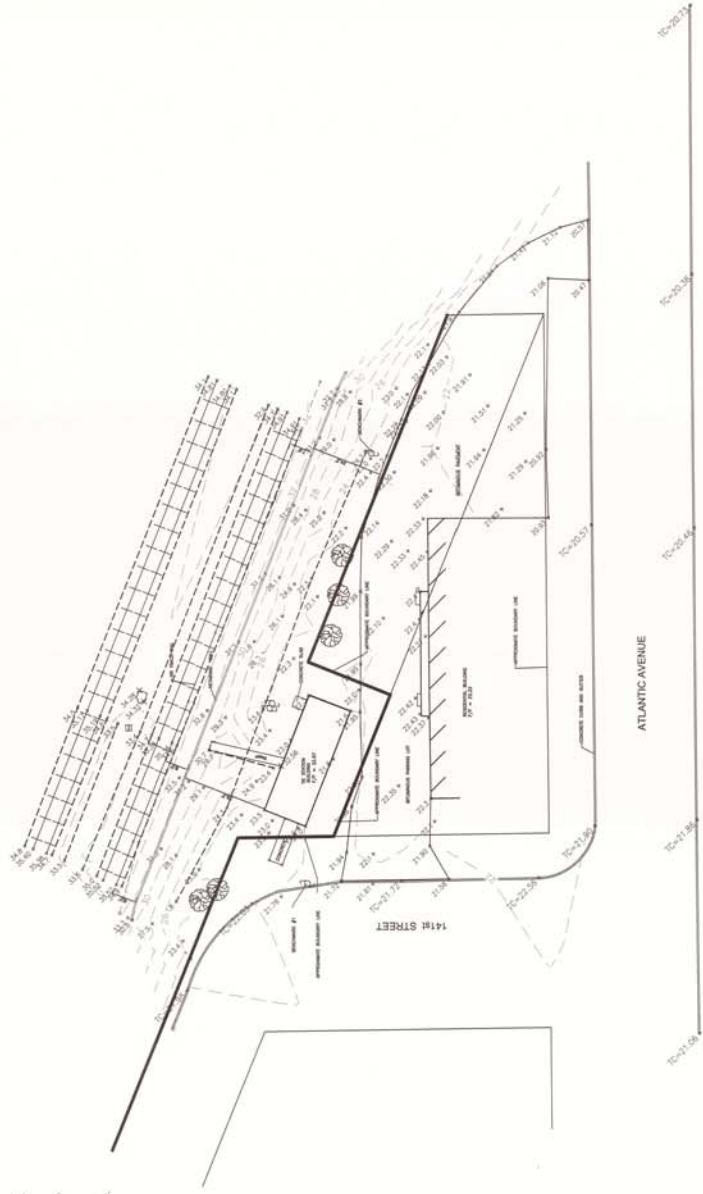
LOCATION NAME: RIVERDALE SUBSTATION
TITLE: COVER SHEET

CD FILE NUMBER: CS-17.5-1000.DGN
SCALE: 1/8" = 1'-0"
PROJECT NO.: GANZSR-PT0202
SHEET NO.: CS-17.5-1000
MILE POST NO.: 7/5



BENCHMARK #1
 BENCH. TO THE NAIL
 BRADLEY POOL
 ELEV.=23.94
 BENCHMARK #2
 BENCH. TO THE NAIL
 BRADLEY POOL
 ELEV.=24.97

SYMBOL	DESCRIPTION
▲	BENCHMARK LOCATION
⊕	WATER VALVE
⊖	ELECTRIC MANHOLE
⊙	GYI WIRE ANCHOR
⊕	POWER POLE
⊖	GAS VALVE
⊕	GAS METER
⊕	CATCH BASIN ROUND
○	DRAIN
○	ROLLAND
⊕	STREET LIGHT STANDARD
⊕	STREET LIGHT WAKAST ARM
⊕	SKIN
⊕	STEEL POST
⊕	SHEIB
⊕	DECIDUOUS TREE WIDE
X 100.00	SPOT GRADE
(R)	RECORD BEARING OR DISTANCE
(M)	MEASURED BEARING OR DISTANCE
TC	TOP OF CURB
FL	FLOWLINE
TW	TOP OF WALL
FF	FINISHED FLOOR
	BUILDING FOOT PRINT
	COMBINATION SEWER LINE
	OVERHEAD WIRES
	CHAINLINK FENCE LINE
	WOODIRON FENCE LINE
	STEEL DIAGONAL



- SURVEYOR'S NOTES:**
- ALL DIMENSIONS ARE GIVEN IN FEET AND DECIMAL PARTS THEREOF.
 - BEARINGS BASED ON ILLINOIS STATE PLANE COORDINATES, EAST ZONE, NAD83(2011), GPS DERIVED.
 - VERTICAL DATUM IS ASSUMED.
 - ONLY THOSE BUILDING LINE SETBACKS AND EASEMENTS WHICH ARE SHOWN ON THE SURVEY AND WHICH ARE REFERRED TO BY THE TITLE INSURANCE POLICY AND LOCAL ORDINANCES FOR OTHER RESTRICTIONS WHICH MAY OR MAY NOT EXIST.
 - COMPARE DEED DESCRIPTION AND SITE CONDITIONS WITH THE DATA GIVEN ON THIS PLAN AND REPORT ANY DISCREPANCIES TO THE SURVEYOR AT ONCE.
 - NO DIMENSIONS SHALL BE DERIVED FROM SCALE MEASUREMENT.
 - DISTANCES ALONG CURVES ARE ARC DISTANCES UNLESS OTHERWISE NOTED.
 - THIS SURVEY WAS PERFORMED ON THE GROUND AND COMPLETED 05/24/2017.
 - ONLY THE IMPROVEMENTS SHOWN ARE DERIVED FROM AERIAL PHOTOGRAPHY AND ARE SHOWN ON THE FACE OF THIS PLAN. LAWN SPRINKLER SYSTEMS, IF ANY, ARE NOT SHOWN ON THIS SURVEY.
 - SURFACE INDICATIONS OF UTILITIES ON THE SURVEYED PARCEL HAVE BEEN SHOWN. THE EXTENT OF UTILITIES SERVING OR EXISTING ON THE PROPERTY, PUBLIC AND/OR PRIVATE RECORDS HAVE NOT BEEN SEARCHED TO PROVIDE ADDITIONAL INFORMATION. THE LOCATION AND DEPTH OF UTILITIES HAS NOT BEEN DETERMINED AND BEEN SHOWN, HOWEVER THEIR FUNCTION AND DIMENSIONS HAVE NOT BEEN NOTED.
 - OTHER THAN VISIBLE OBSERVATIONS NOTED HEREIN, THIS SURVEY MAKES NO STATEMENT REGARDING THE ACTUAL PRESENCE OR ABSENCE OF ANY SERVICE OR UTILITY LOCATIONS. IT IS RECOMMENDED TO DETERMINE THE FULL EXTENT OF ALL UTILITIES AND UTILITY LINES. CONTACT JULLIE, AT 1-800-802-0123.

STATE OF ILLINOIS
 COUNTY OF COOK
 JUS
 THIS IS TO CERTIFY THAT THE TOPOGRAPHIC IMPROVEMENTS DEPICTED HEREON WERE SURVEYED AND THAT THIS PLAN REPRESENTS THE CONDITIONS FOUND AT THE TIME OF SAID SURVEY.
 GIVEN UNDER MY HAND AND SEAL THIS 17TH OF JANUARY, 2018 IN CHICAGO, ILLINOIS.
 ENVIRONMENTAL DESIGN INTERNATIONAL, INC.
 PROFESSIONAL DESIGN FIRM NO. 154-00124
 WILLIAM J. COOK
 LICENSE EXPIRES 11/02/2018
 THIS PROFESSIONAL SERVICE CONFORMS TO THE CURRENT ILLINOIS MINIMUM STANDARDS FOR TOPOGRAPHIC SURVEYS.
 THIS PLAN IS VALID ONLY WITH AN ORIGINAL SIGNATURE AND EMBOSSED SEAL.

REV	DATE	BY	APP	DATE	BY	APP	DESCRIPTION
0	01-17-2018	AW	WT				ISSUED FOR BID

LOCATION NAME: RIVERDALE SUBSTATION
 TITLE: TOPOGRAPHIC SURVEY
 LOG FILE NUMBER: 15-17-5-1001.DGN
 SCALE: AS SHOWN
 PROJECT NO.: 15-17-5-1001
 DRAWING NO.: SS-17-5-1001
 DATE: JANUARY 17, 2018

EDI
 Environmental Design International, Inc.
 1500 North Dearborn Street
 Chicago, IL 60610
 www.ediinc.com

Metra
 ENGINEERING DEPARTMENT
 1500 North Dearborn Street
 Chicago, IL 60610

RECORDED: []
 DRAWN: []
 CHECKED: []
 METRA P.L.L.C. CHECKED: []
 DATE: JANUARY 17, 2018

PROFESSIONAL LAND SURVEYOR
 WILLIAM J. COOK
 15-3276
 STATE OF ILLINOIS

DEMOLITION/REMOVAL NOTES:

- REMOVE EXISTING VEGETATION, TREES, STAMPS AND TOPSOIL WITHIN THE AREA SHOWN ON PLAN. REGRADE AFTER GROUND INSULATION INSTALLATION WITH VEGETATION BARBER FENCE AND 5" FC 50# ASPHALT PATCH PER DET. OF 17/01.
- EXACT EXTENT OF REMOVAL MAY NOT BE FULLY INDICATED BY THE DRAWINGS. CONSULTING ENGINEER SHALL CONFER WITH CONTRACTOR TO DETERMINE EXACT EXTENT OF REMOVAL. REMOVAL THAT WILL BE REQUIRED BY COMPARING THE DRAWINGS WITH THE EXISTING FIELD CONDITIONS. IT IS EXPRESSLY UNDERSTOOD THAT THIS CONTRACT INCLUDES ALL NECESSARY FIELD SURVEYING AND VERIFICATION WORK NECESSARY FOR A FULL AND COMPLETE EXECUTION OF THE WORK, WHETHER PARTICULARLY REFERRED TO HEREIN OR NOT.

CHAIN LINK FENCE.

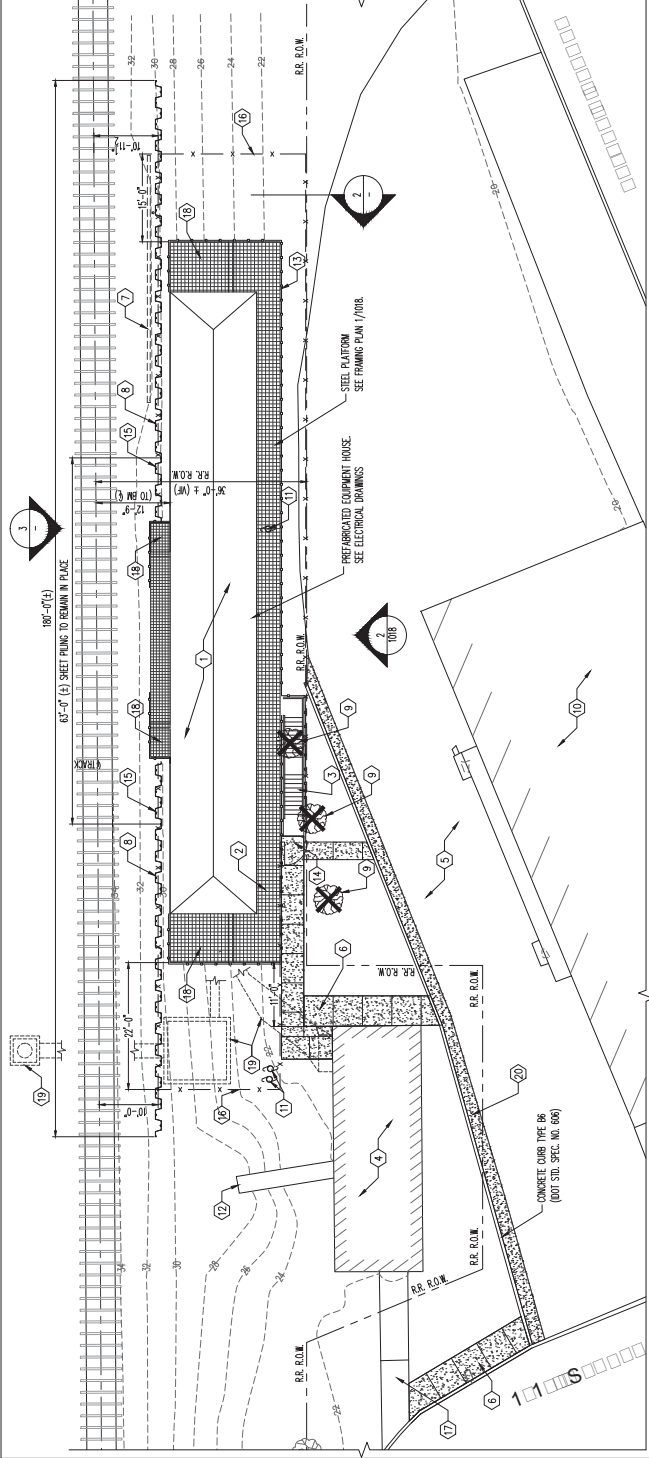
CHAIN LINK FENCE AND GATES SHALL BE DESIGNED AND INSTALLED AS SPECIFIED IN SPECIFICATION SECTION 02414. REFER TO SHEET SS-17.5-1008B AND SS-17.5-1000 FOR TYPICAL FENCE AND GATE DETAILS.

KEY NOTES:

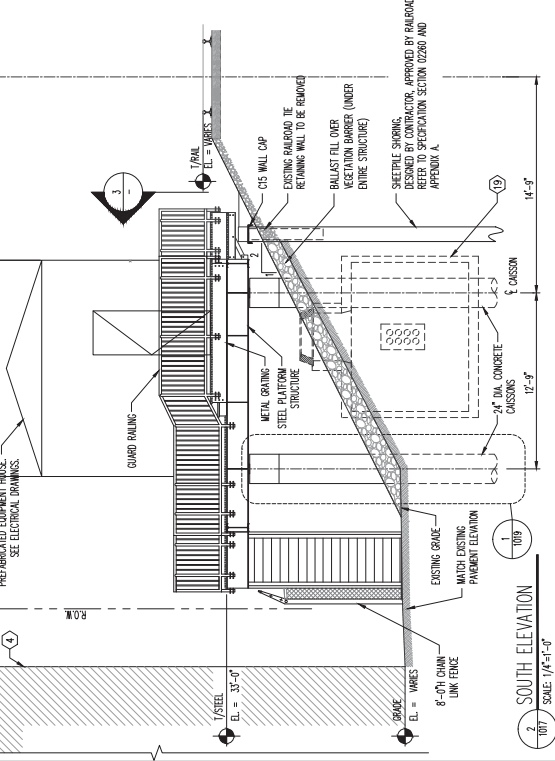
- REMOVE TREES, SHRUBS AND TOPSOIL WITHIN THE REMOVAL AREA
- PLATFORM GRADING
- STAR AND LANDING
- EXISTING STATION BUILDING TO REMAIN
- EXISTING ACCESS DRIVE TO REMAIN
- 5" FC 50# ASPHALT PATCH PER DET. OF 17/01
- EXISTING RAILROAD TIE REMAINING WALL TO BE REMOVED
- TEMPORARY SHEET PILING TO BE REMOVED AFTER CONSTRUCTION
- REMOVE EXISTING TREE AND STUMP
- EXISTING APARTMENT BUILDING N.C.
- REMOVE EXISTING UTILITY POLES AND OVERHEAD WIRES
- EXISTING CONCRETE ENCASED CONDUIT TO REMAIN
- GUARD RAILING-3 SIZES
- 4'-0"X6'-0" CHAIN LINK GATE W/ PADLOCK
- SHEET PILING TO REMAIN AFTER CONSTRUCTION
- 8'-0" CHAIN LINK FENCE
- EXISTING CONCRETE RAILWAY TO REMAIN
- DOOR LANDING
- ELECTRICAL MANHOLE AND DUCT/BANK. SEE SHEETS 1001, 1001A
- SAW CUT REMOVE PORTION OF EXISTING PAVEMENT. INSTALL PAVEMENT PATCH PER DET. STD. SPEC. SECT. 440 AND 442.

SYMBOLS

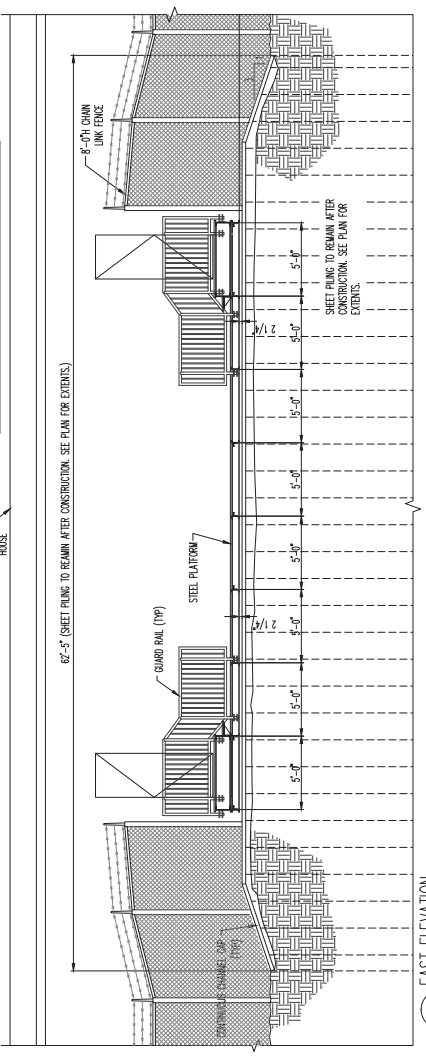
	PROPERTY LINE
	8'-0" CHAIN LINK FENCE
	CONTINUOUS RAILING
	EXISTING TREE TO REMAIN
	EXISTING TREE TO BE REMOVED
	2' WIDE ASPHALT PAVEMENT PATCH



1 SITE PLAN SCALE: 1"=10'-0"



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

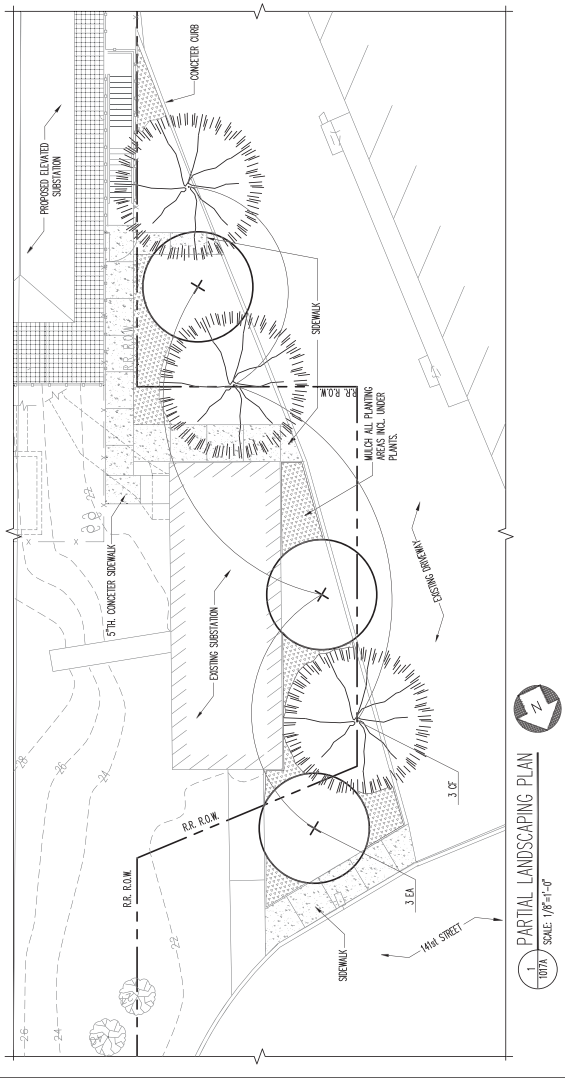
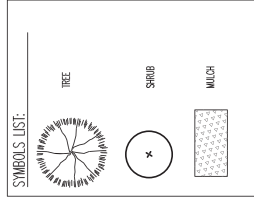


3 EAST ELEVATION SCALE: 1/4"=1'-0"

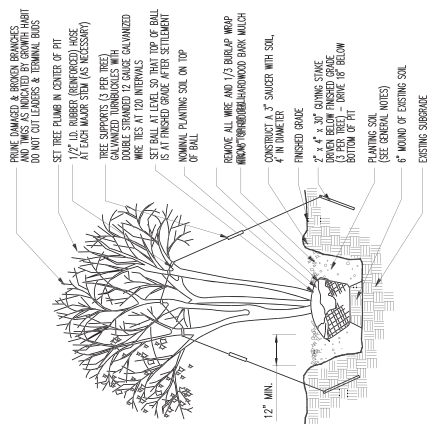
		KMI K. Mahall Mahall, Inc. ARCHITECTS & ENGINEERS 229 Washington Blvd., Suite 1100 Chicago, IL 60606 Tel.: (312) 297-9007 Fax: (312) 297-9892		PROJECT NO.: 17-024 PROJECT NAME: RIVERDALES SUBSTATION SHEET NO.: G DATE: 10/1/17 DESIGNED BY: M. J. MAHALL CHECKED BY: M. J. MAHALL DATE: 10/1/17	PROJECT NO.: 17-024 PROJECT NAME: RIVERDALES SUBSTATION SHEET NO.: G DATE: 10/1/17 DESIGNED BY: M. J. MAHALL CHECKED BY: M. J. MAHALL DATE: 10/1/17	PROJECT NO.: 17-024 PROJECT NAME: RIVERDALES SUBSTATION SHEET NO.: G DATE: 10/1/17 DESIGNED BY: M. J. MAHALL CHECKED BY: M. J. MAHALL DATE: 10/1/17	PROJECT NO.: 17-024 PROJECT NAME: RIVERDALES SUBSTATION SHEET NO.: G DATE: 10/1/17 DESIGNED BY: M. J. MAHALL CHECKED BY: M. J. MAHALL DATE: 10/1/17	PROJECT NO.: 17-024 PROJECT NAME: RIVERDALES SUBSTATION SHEET NO.: G DATE: 10/1/17 DESIGNED BY: M. J. MAHALL CHECKED BY: M. J. MAHALL DATE: 10/1/17	PROJECT NO.: 17-024 PROJECT NAME: RIVERDALES SUBSTATION SHEET NO.: G DATE: 10/1/17 DESIGNED BY: M. J. MAHALL CHECKED BY: M. J. MAHALL DATE: 10/1/17	PROJECT NO.: 17-024 PROJECT NAME: RIVERDALES SUBSTATION SHEET NO.: G DATE: 10/1/17 DESIGNED BY: M. J. MAHALL CHECKED BY: M. J. MAHALL DATE: 10/1/17	PROJECT NO.: 17-024 PROJECT NAME: RIVERDALES SUBSTATION SHEET NO.: G DATE: 10/1/17 DESIGNED BY: M. J. MAHALL CHECKED BY: M. J. MAHALL DATE: 10/1/17	PROJECT NO.: 17-024 PROJECT NAME: RIVERDALES SUBSTATION SHEET NO.: G DATE: 10/1/17 DESIGNED BY: M. J. MAHALL CHECKED BY: M. J. MAHALL DATE: 10/1/17
SITE PLAN, SECTION AND NOTES												
SCALE: 1/4"=1'-0"												
SS-17.5-1017 DATE: 10/1/17												

GENERAL NOTES

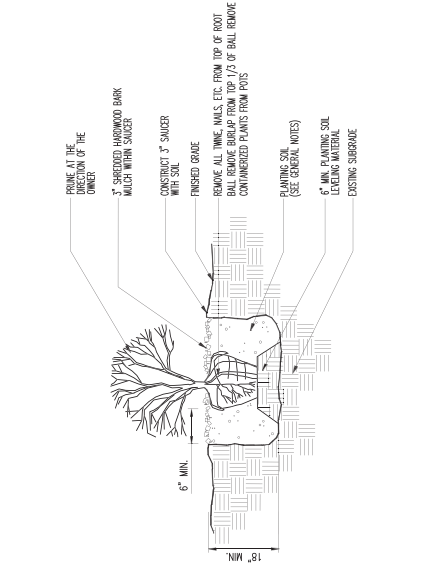
- GENERAL NOTES SHALL APPLY TO ALL NEW LANDSCAPE WORK IN THIS CONTRACT.
- PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES, CONTRACTOR SHALL NOTIFY THE LOCAL UTILITY AGENCY FOR ANY UTILITIES IN THE PROJECT AREA. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO ANY CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL UTILITY AGENCY AND/OR OTHER AGENCIES. CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY OF ANY DISCREPANCIES, OBSTACLES AND/OR PROBLEMS.
- INSTALLATION OF TREES AND SHRUBS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL NOTIFY THE OWNER OF ANY DISCREPANCIES.
- ALL SURFACE DRAINAGE SHALL BE DIRECTED AWAY FROM STRUCTURES. SURFACE DRAINAGE SHALL BE DIRECTED TO EXISTING CATCH BASINS DESIGNED FOR THE COLLECTION OF SURFACE RUN-OFF.
- CONTRACTOR SHALL REPAIR AND/OR IMPROVE ANY AREAS DAMAGED AS A RESULT OF LANDSCAPE OPERATIONS.
- ALL TREE, SHRUB PERENNIAL AND ORNAMENTAL GRASS BEDS TO RECEIVE A MINIMUM 2" OF SHREDDED HARDWOOD MULCH.
- ALL PERENNIAL, ORNAMENTAL GRASSES AND GROUND COVER BEDS TO RECEIVE A MINIMUM 2" MULCH COMPOST.
- PLANT MATERIAL SIZES SHOWN ON PLANT SCHEDULE ARE MINIMUM ACCEPTABLE SIZES.
- PLANTING SOIL SHALL BE USED FOR THE PLANTING MEDIUM FOR THE PROJECT AND SHALL COMPLY WITH SPECIFICATIONS.
- THE CONTRACTOR SHALL PREPARE PLANTING BEDS BY ADDING SOIL AMENDMENTS UNLESS NOTED OTHERWISE. PER PLANTING DETAILS ON SHEET 14, PLANTING SOIL SHALL BE 7" MIN. THICK IN ALL AREAS. PLANTING BEDS SHALL BE 12" MIN. DEEP. PLANTING BEDS SHALL RECEIVE 6" THICK PLANTING SOIL. TREES AND SHRUBS SHALL RECEIVE 6" MIN. THICK PLANTING SOIL.
- ALL PLANTS TO BE BALLED AND BURLAPPED OF CONSUMER GRADE AS SPECIFIED IN PLANT SCHEDULE. ALL PLANTS TO BE BALLED AND BURLAPPED OF CONSUMER GRADE AS SPECIFIED IN PLANT SCHEDULE. ALL PLANTS TO BE BALLED AND BURLAPPED OF CONSUMER GRADE AS SPECIFIED IN PLANT SCHEDULE. ALL PLANTS TO BE BALLED AND BURLAPPED OF CONSUMER GRADE AS SPECIFIED IN PLANT SCHEDULE.
- CONTRACTOR SHALL WATER ALL PLANTS IMMEDIATELY AFTER PLANTING. FLOOD PLANTS THREE TIMES DURING FIRST TWENTY-FOUR HOURS AFTER PLANTING.
- ALL NEW TRANSPLANTED SHRUBS TO BE SPRAYED WITH AN ANTIDESICCANT WITHIN TWENTY-FOUR HOURS AFTER PLANTING. ANTI-DESICCANT SHALL BE EQUAL TO "WATERPROOF".
- ALL AREAS THAT HAVE BEEN DISRUPTED DURING THE CONSTRUCTION PROCESS, AND HAVE NOT BEEN DESIGNATED WITH NEW LANDSCAPE PLANTINGS, SHALL BE RESTORED WITH ROOT CLASS 2 SEEDING AND EROSION CONTROL BLANKET.
- THE FOLLOWING GUIDELINES SHALL BE FOLLOWED WHEN PLACING TREES. NO TREE SHALL BE PLANTED CLOSER THAN THE FOLLOWING DISTANCES TO UTILITIES:
 - 15 FEET FROM STREET LIGHTS
 - 10 FEET FROM ANY UTILITY CONTROL DEVICE (TRAFFIC LIGHT)
 - ADJUST TREE LOCATIONS AS REQUIRED.
- TREES SELECTED FOR PLANTING SHALL BE LOCALLY GROWN WITHIN A 100 MILE RADIUS OF THE PROJECT AREA. CONTRACTOR SHALL OBTAIN TREE SPECIFICATIONS FROM THE LOCAL UTILITY AGENCY AND/OR OTHER AGENCIES. TREES SHALL BE TAGGED WITH THE CITY WITH A LETTER STATING WHERE THE TREES WERE GROWN. TREES SHALL BE HEALTHY, FREE FROM DISEASE AND DEFOLIATION. CONTRACTOR SHALL OBTAIN TREE SPECIFICATIONS FROM THE LOCAL UTILITY AGENCY AND/OR OTHER AGENCIES. CONTRACTOR SHALL OBTAIN TREE SPECIFICATIONS FROM THE LOCAL UTILITY AGENCY AND/OR OTHER AGENCIES.



LANDSCAPING SCHEDULE			
SYMBOL	BOTANICAL NAME	COMMON NAME	NOTES/SPECIAL CONDITIONS
○	CORNUS FLORIDA	FLORIBUND DOGWOOD	B&B MULTI-STEM
○	EDONIVUS ALATUS	WINKED EDONIVUS	B&B OR C.C.

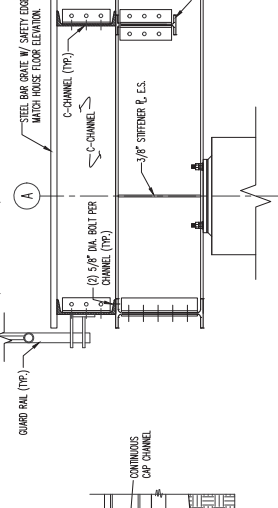
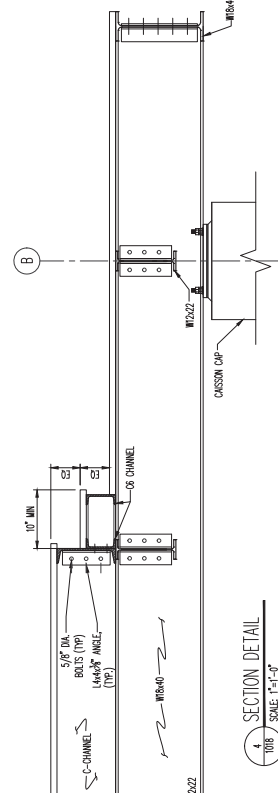
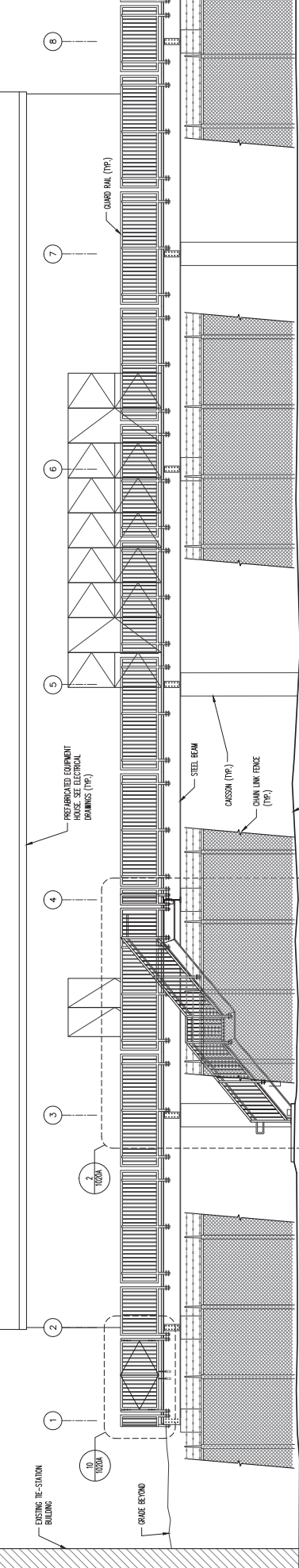
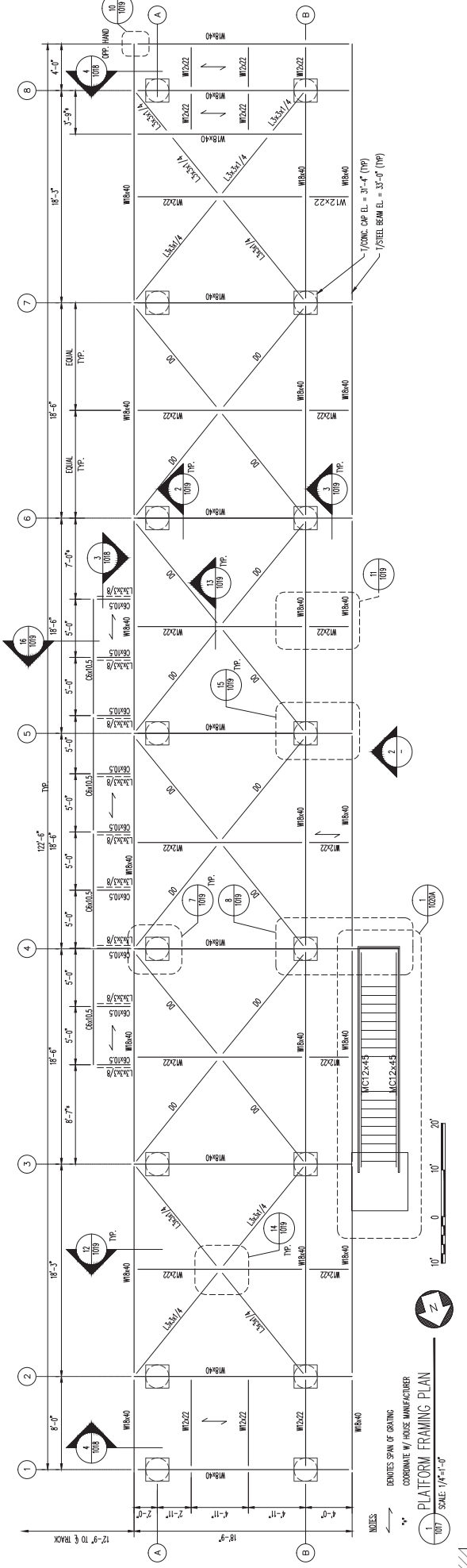


3 TREE PLANTING DETAIL
SCALE: 1/8" = 1'-0"

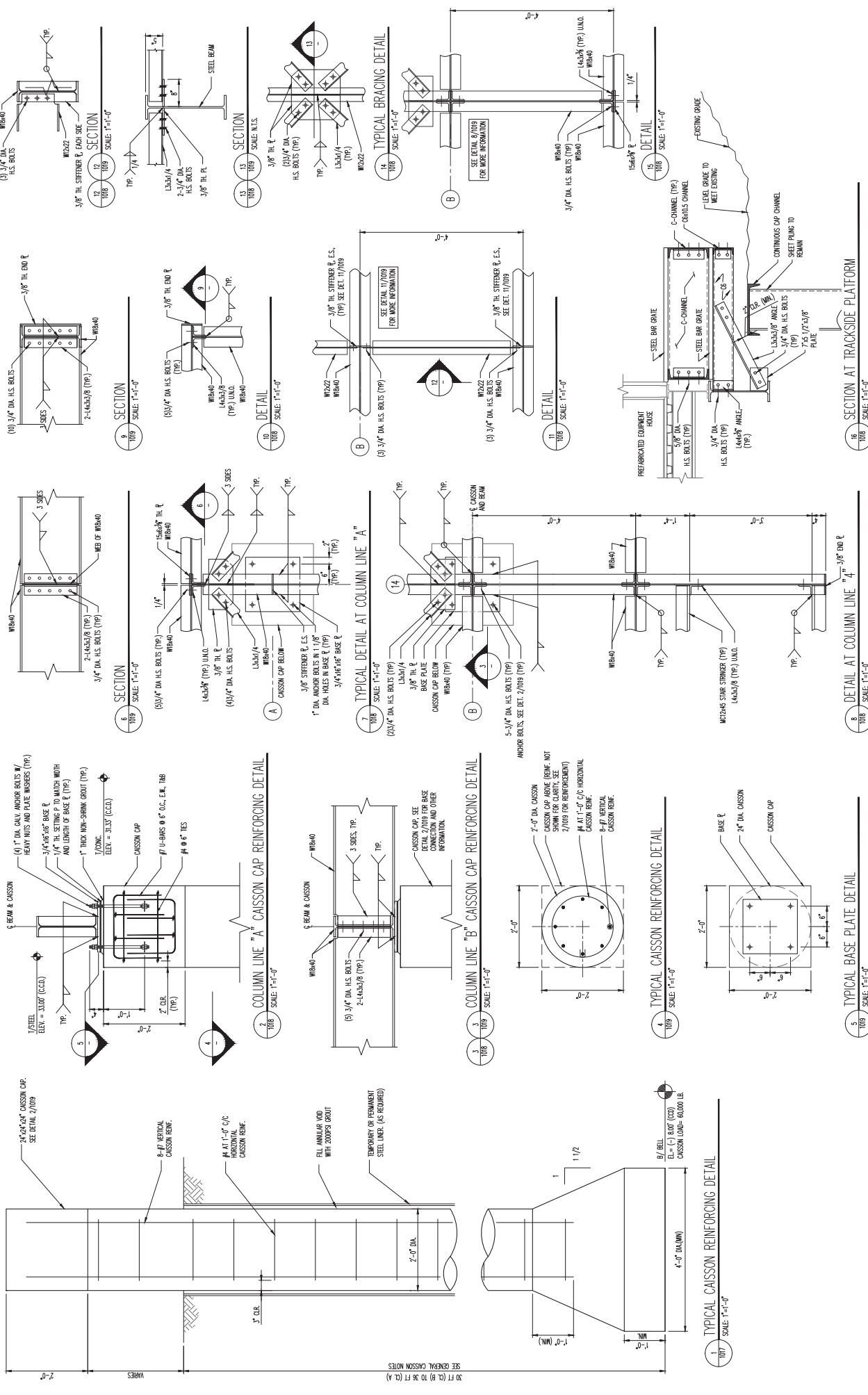


2 SHRUB PLANTING DETAIL
SCALE: 1/8" = 1'-0"

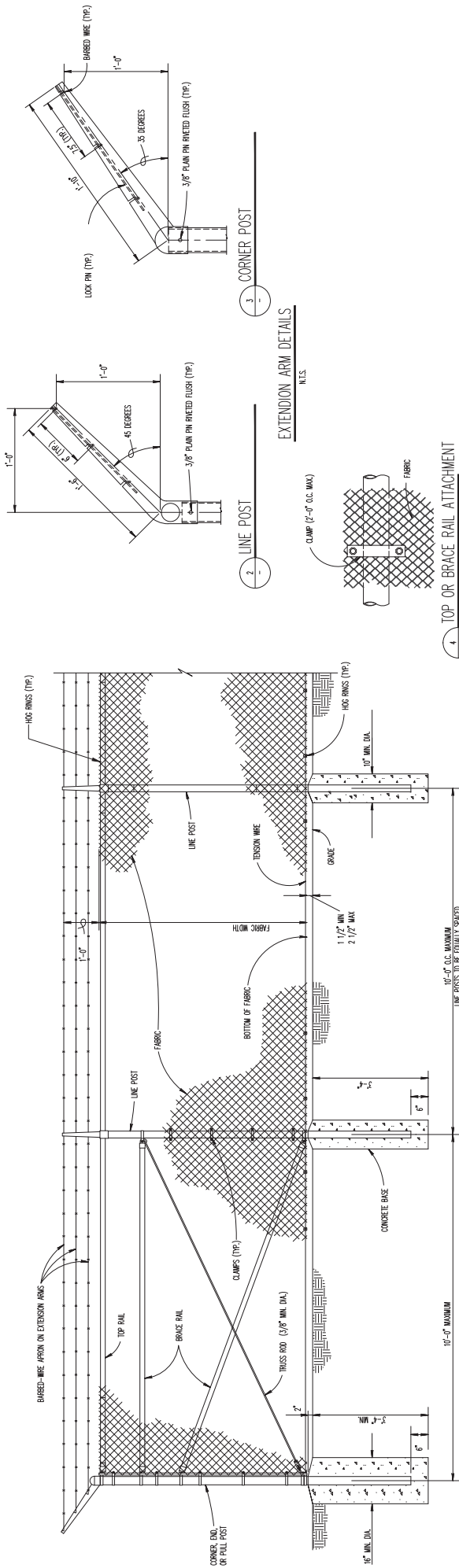
PROJECT: RIVERDALE SUBSTATION		DATE: 08/20/2013
DESIGNED BY: S.S.	CHECKED BY: M.S.	SCALE: 1/8" = 1'-0"
LANDSCAPING PLAN, DETAILS, SCHEDULES AND NOTES		PROJECT NO.: 13-011
KMI Architects & Engineers, Inc.		PROJECT NO.: 13-011
220 W. Jackson Blvd., Suite 1900 Chicago, IL 60606		PROJECT NO.: 13-011
Tel.: (312) 997-0007 Fax: (312) 997-0992		PROJECT NO.: 13-011
SS-17.5-1017		PROJECT NO.: 13-011



PROJECT NO. 1001001001 SHEET NO. SS-17.5-101 DATE 11/15/17		KMI Kathleen M. Kitch, Inc. ARCHITECTURAL ENGINEERS 220 W. Ashland Blvd., Suite 1070 Chicago, IL 60606 Tel.: (312) 967-5807 Fax.: (312) 967-9902	Metr METRA RAILROADS 677 JOLIET ST. S. CHICAGO, IL 60606 TEL: (312) 675-1000	RIVERDALE SUBSTATION FRAMING PLAN SS-17.5-101	
SCALE: 1/4"=1'-0" SCALE: 1"=1'-0"				PROJECT NO. 1001001001 SHEET NO. SS-17.5-101 DATE 11/15/17	PROJECT NO. 1001001001 SHEET NO. SS-17.5-101 DATE 11/15/17
1 1001 2 1002 3 1003 4 1004 5 1005 6 1006 7 1007 8 1008 9 1009	1 1010 2 1011 3 1012 4 1013 5 1014 6 1015 7 1016 8 1017 9 1018			1 1019 2 1020 3 1021 4 1022 5 1023 6 1024 7 1025 8 1026 9 1027 10 1028	1 1029 2 1030 3 1031 4 1032 5 1033 6 1034 7 1035 8 1036 9 1037



<p>KMI Kulshrestha Mankar, Inc. ARCHITECTS & ENGINEERS 220 W. Ashland Blvd., Suite 1010 Chicago, IL 60606 Tel.: (312) 267-9807 Fax.: (312) 267-9802</p>		<p>Metricon METRICON CONSULTANTS, INC. 1000 N. W. 10th St., Suite 1000 Fort Lauderdale, FL 33304 Tel.: (954) 576-1000 Fax.: (954) 576-1019</p>	
PROJECT NO.: 17-0101 SHEET NO.: 17-0101-01		PROJECT NO.: 17-0101 SHEET NO.: 17-0101-01	
CONTRACT NO.: 17-0101-01		CONTRACT NO.: 17-0101-01	
DATE: 11/15/17		DATE: 11/15/17	
DRAWN BY: SGG		DRAWN BY: SGG	
CHECKED BY: SGG		CHECKED BY: SGG	
APPROVED BY: SGG		APPROVED BY: SGG	
PROJECT: RIVERDALE SUBSTATION		PROJECT: RIVERDALE SUBSTATION	
FOUNDATION AND FRAMING DETAILS		FOUNDATION AND FRAMING DETAILS	
SS-17-5-1019		SS-17-5-1019	

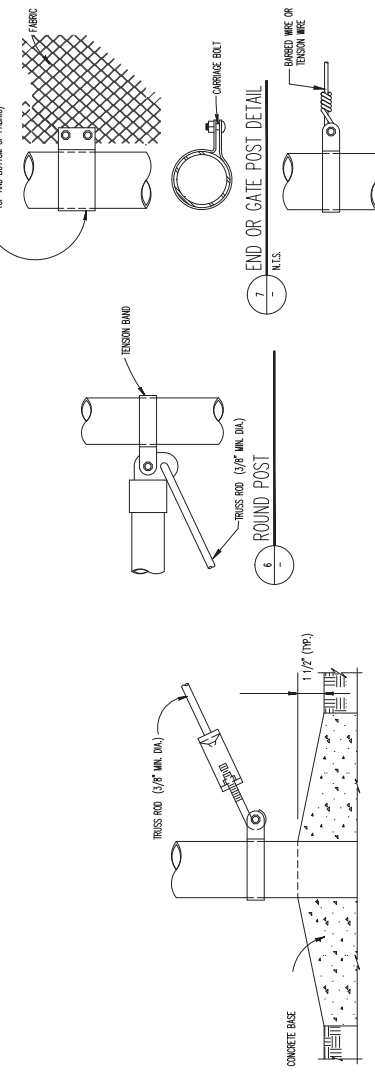


1 CHAIN LINK SECURITY FENCE DETAIL
N.T.S.

4 TOP OR BRACE RAIL ATTACHMENT
N.T.S.

2 LINE POST
EXTENSION ARM DETAILS
N.T.S.

3 CORNER POST
N.T.S.



5 TRUSS ROD AND BAND
N.T.S.

6 ROUND POST
N.T.S.

7 END OR GATE POST DETAIL
N.T.S.

8 TENSION BAND DETAIL
N.T.S.

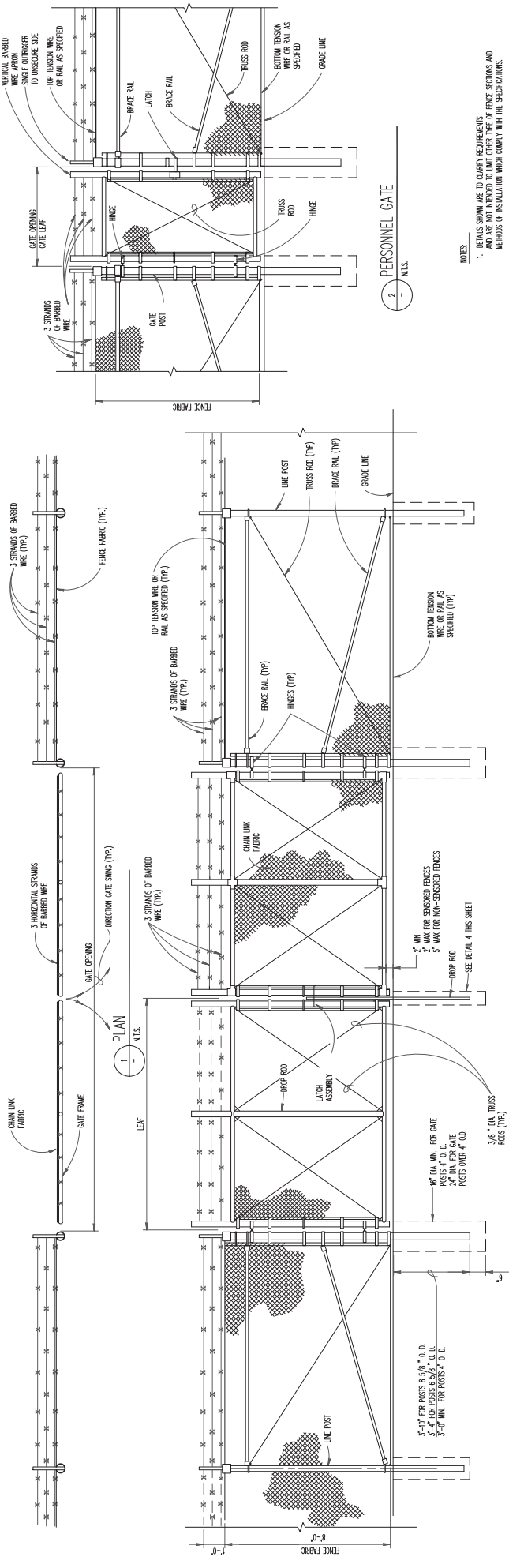
FASTENING DETAILS
N.T.S.

- NOTES:
- 1 DETAILS SHOWN ARE TO CLARIFY REQUIREMENTS AND ARE NOT INTENDED TO LIMIT OTHER TYPES OF FENCE SECTIONS AND METHODS OF INSTALLATION THAT COMPLY WITH THE SPECIFICATIONS.
 - 2 WIRE TIES, RAILS, AND BRACES SHALL BE CONSTRUCTED ON THE SCORE SIDE OF THE FENCE ALIGNED. CHAIN LINK FABRIC SHALL BE PLACED ON THE SIDE OPPOSITE THE SCORE AREA.
 - 3 UNLESS SPECIFICALLY SHOWN OR SPECIFIED, FENCE SHALL HAVE AN APRON EXTENDED OUTWARD FROM THE AREA BEING PROTECTED.

USE AND SECTION	STEEL POST SCHEDULE		
	MINIMUM OUTSIDE DIMENSIONS (NOMINAL)		
CORNER, END & FULL POSTS	FABRIC WIDTH 72" OR LESS	FABRIC WIDTH 84" TO 96"	FABRIC WIDTH 108" AND OVER
TUBULAR - ROUND	2.375" O.D.	2.975" O.D.	4.00" O.D.
TUBULAR - SQUARE	2.00" SQ.	2.50" SQ.	3.00" SQ.
LINE POSTS	1.80" O.D.	2.375" O.D.	2.875" O.D.
TOP, BOTTOM & BRACE RAILS	1.80" O.D.	2.375" O.D.	2.875" O.D.
TUBULAR - ROUND	1.80" O.D.	2.375" O.D.	2.875" O.D.
TUBULAR - SQUARE	1.80" O.D.	2.375" O.D.	2.875" O.D.

9 LINE POST ATTACHMENTS
N.T.S.

		KMI Kalshekar Mankar, Inc. ARCHITECTS & ENGINEERS 222 W. Ashland Blvd., Suite 1070 Chicago, IL 60606 Tel.: (312) 267-8807 Fax.: (312) 267-9962	
ALL SUBSTATIONS		CHAIN LINK FENCE DETAILS	
PROJECT NO.: SHEET NO.:	SCALE:	DATE:	DRAWN BY:
PROJECT:	CLIENT:	DESIGNER:	CHECKER:
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PROJECT:	CLIENT:	DESIGNER:	



1 PERSONNEL GATE
N.T.S.

2 PERSONNEL GATE
N.T.S.

3 ELEVATION DOUBLE SWING GATE
N.T.S.

4 DROP ROD FOUNDATION
N.T.S.

5 OFFSET HINGE
N.T.S.

6 GATE KEEPER
N.T.S. (TO ROD GATE OPEN)

7 STANDARD HINGE
N.T.S.

8 LATCH ASSEMBLY
N.T.S.

9 DROP ROD ASSEMBLY
SCALE: 1/2"=1'-0"

10 SWING GATE DETAILS
N.T.S.

NOTES:
1. DETAILS SHOWN ARE TO CLARIFY REQUIREMENTS AND ARE NOT INTENDED TO LIMIT OTHER TYPE OF FENCE SECTIONS AND METHODS OF INSTALLATION WHICH COMPLY WITH THE SPECIFICATIONS.
2. SWING GATES SHALL BE CONSIDERED WITH DROP RODS, PARADOLCS, LATCH ASSEMBLY AND GATE KEEPERS EXCEPT AS NOTED.
3. ALL GATE FRAMES SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM F900 FOR FENCE FRAMES. THE MINIMUM REQUIREMENTS OF ASTM F900 SHALL BE OF REINFORCING STEEL OR GALVANNEAL STEEL. HEAVY FITTINGS, AT CONTRACTOR'S OPTION A WELDED HORIZONTAL BRACE MAY BE USED IN LIEU OF TRUSS RODS TO BRACE ALL-WELDED GATE FRAMES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER ROD CONNECTION OF ALL GATES SUPPLIED.

GATE POST SCHEDULE	
GATE LEAF WIDTH (NOMINAL)	OUTSIDE DIMENSION (NOMINAL)
17' OR LESS	4.0" 00
GREATER THAN 17' TO 18'	6.625" 00
MORE THAN 18'	8.625" 00

REVISIONS:

NO.	DATE	BY	APP	DESCRIPTION
0	07-26-2017	OT	EG	ISSUED FOR BID

CONSULTANT SEAL & SIGNATURE: [Seal]

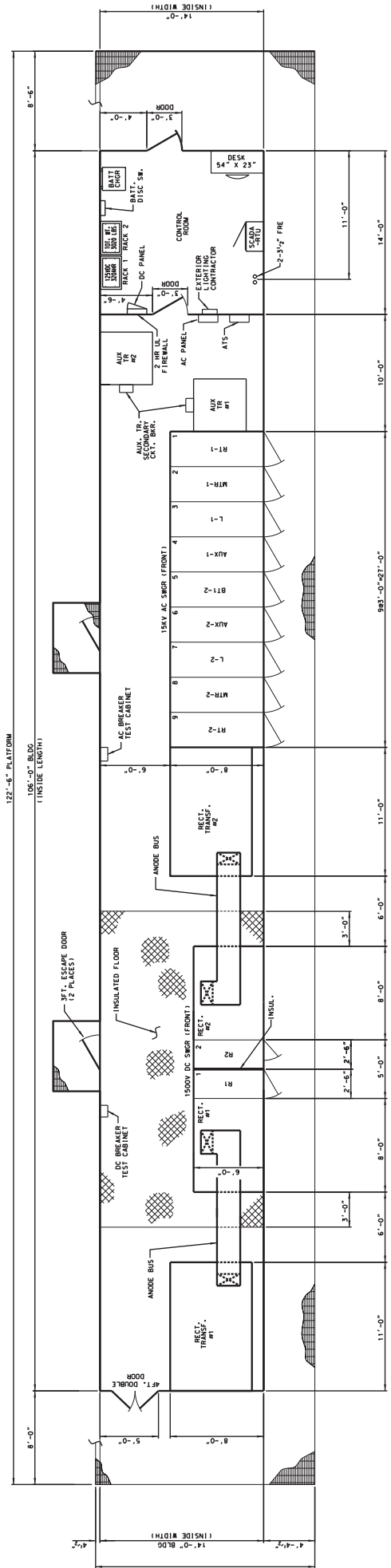
CONSULTANT: **KMI**
K. J. Kucharski, Maheshi, Inc.
ARCHITECTS & ENGINEERS
229 W. Jackson Blvd., Suite 1910 Chicago, IL 60606
TEL: (312) 597-7800 FAX: (312) 597-0832

DESIGNED BY: [Blank]
DRAWN BY: [Blank]
CHECKED BY: [Blank]
SCALE: [Blank]
DATE: JUNE 12, 2017

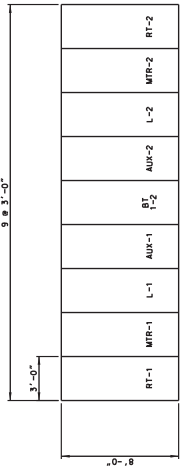
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MILE POST NO.: [Blank]

LOCATION NAME: ALL SUBSTATIONS
TITLE: CHAIN LINK SWING GATE DETAILS
CAD FILE NUMBER: SS-17-1020.DGN
DISTRICT: [Blank]
SHEET NO.: [Blank]
PROJECT NO.: GW2624-17-1020
MILE POST NO.: [Blank]

SS-17-5-1020C



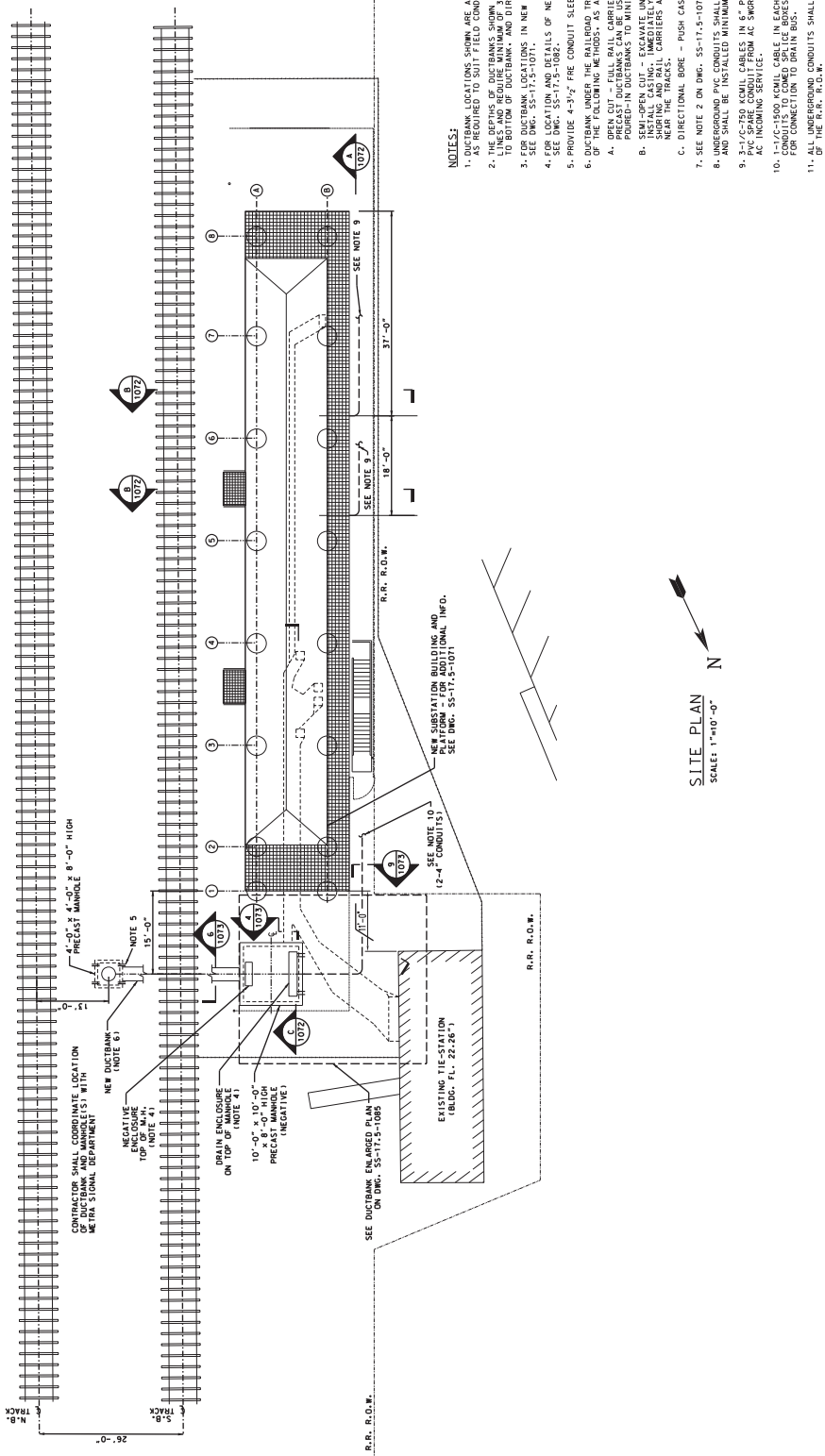
PLAN
SCALE: 1/4" = 1'-0"



AC SWITCHGEAR ELEVATION
SCALE: 1/4" = 1'-0"

- NOTES:
1. SUBSTATION BUILDING DIMENSIONS SHALL BE MINIMUM 14 FEET HIGH.
 2. FOR UNDERGROUND DUCTWORKS AND CONSULTS SEE DWG. SS-17.5-1071.
 3. THE REAR OF TRANSFORMER AND RECTIFIER SHALL BE PROVIDED WITH REMOVABLE PANELS.

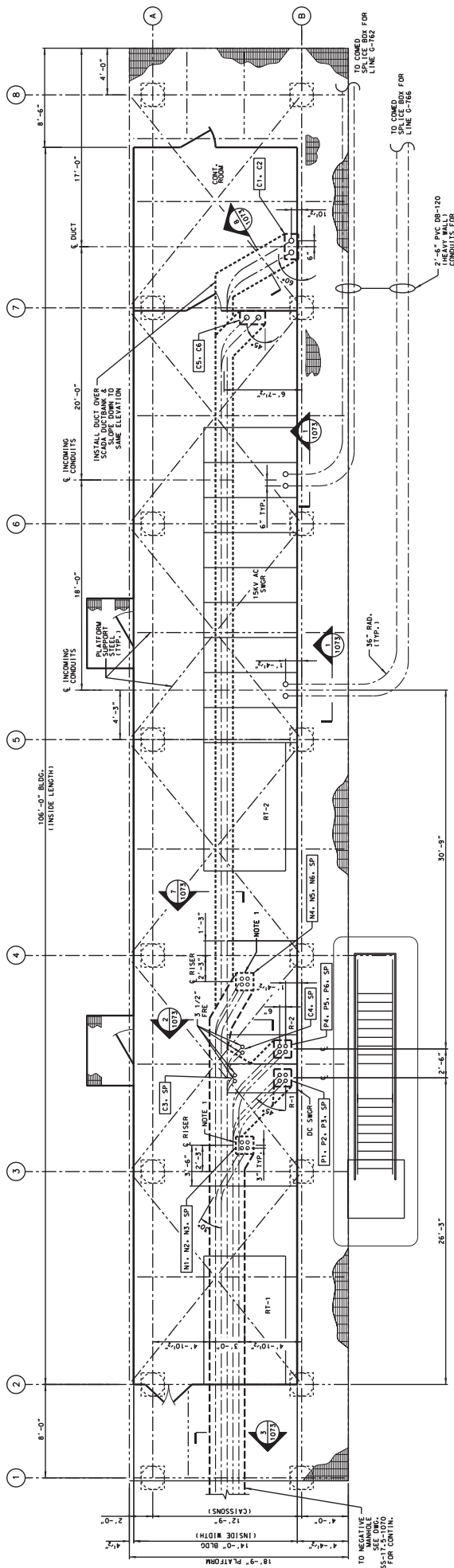
LOCATION NAME: RIVERDALE SUBSTATION		CAD FILE NUMBER: SS-17.5-1050	
TITLE: SUBSTATION EQUIPMENT LAYOUT PLAN		DISTRICT: SHEET NO.: SS-17.5-1050	
DESIGNER: JMC DRAWN: JMC CHECKED: FM METRI & ASSOCIATES 20 N. Wacker Dr. Ste. 1500 Chicago IL 60606		PROJECT NO.: GMSR-PT0020 WILE POST NO.: T/S	
CONSULTANT SEAL & SIGNATURE 		CONSULTANT: 	
DATE: 01/26/2017	ISSUED FOR BID	REV. DATE APP. BY APP. DATE	DESCRIPTION



- NOTES:**
1. DUCTBANK LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE ADJUSTED AS REQUIRED TO SUIT FIELD CONDITIONS.
 2. THE DEPTHS OF DUCTBANKS SHOWN ARE BASED ON EXISTING CONTOUR TO BOTTOM OF DUCTBANK, AND DIRECT BURIED PVC CONDUITS.
 3. FOR DUCTBANK LOCATIONS IN NEW SUBSTATION BUILDING AREA.
 4. SEE DRAWING AND DETAILS OF NEGATIVE AND DRAIN ENCLOSURES.
 5. PROVIDE 4-3/2" FIRE CONDUIT SLEEVES IN MANHOLE WALL.
 6. DUCTBANK UNDER THE RAILROAD TRACK SHALL BE INSTALLED BY ONE OF THE FOLLOWING METHODS, AS APPROVED BY METRA:
 - A. PRECAST DUCTBANKS CAN BE USED INSTEAD OF Poured-in Ductbanks to minimize construction time.
 - B. TOP OF SLEEVES - EXPOSED UNDER TRACK AND SHORING AND RAIL CARRIERS ARE ON Y REQUIRED.
 - C. DIRECTIONAL BORE - PUSH CASING.
 7. SEE NOTE 2 ON D.W.G. SS-17.5-1071.
 8. ALL UNDERGROUND CONDUITS SHALL BE INSTALLED MINIMUM 3'-0" BELOW GRADE.
 9. 3-1/2" (C-750) KCMIL CABLES IN 6" PVC UNDERGROUND CONDUIT AND ONE 6" PVC SPARE CONDUIT FROM AC SWR TO COMED SPLICE BOXES FOR AC INCOMING SERVICE.
 10. CONDUITS TO COMED SPLICE BOXES IN EACH OF THE 2" PVC UNDERGROUND CONDUITS TO COMED SPLICE BOXES (ONE CONDUIT IN EACH SPLICE BOX) FOR CONNECTION TO DRAIN BUS.
 11. ALL UNDERGROUND CONDUITS SHALL BE INSTALLED ONE FOOT EAST OF THE R.R. R.O.W.

SITE PLAN
SCALE: 1"=40'-0"

LOCATION NAME: RIVERDALE SUBSTATION		CAD FILE NUMBER: SS-17.5-107000	
TITLE: ELECTRICAL SITE PLAN		SCALE: 1"=40'-0"	DISTRICT: 17.5
PROJECT NO.: GMS24-R10000		SHEET NO.: SS-17.5-1070	MILE POST NO.: 17.5
CONSULTANT SEAL & SIGNATURE 		CONSULTANT: IDP A Company of Gannett Fleming CONSULTANT: 20 N. Wacker Dr., Ste. 1500 Chicago IL 60606	
REVISIONS:		DRAWN: JMC CHECKED: FM METRA P.O. BOX 2000 CHICAGO, ILLINOIS 60601 DATE: JUNE 12, 2017	
ISSUED FOR BID	REV. DATE BY APP	DATE BY APP	DESCRIPTION

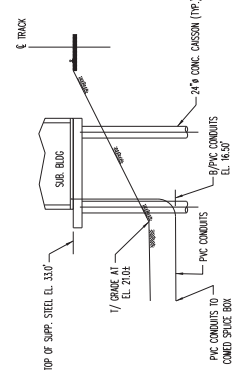


- NOTES:**
1. LOCATE 4 1/2" FPE CONDUITS IN AREA DESIGNATED FOR DUCTING NEGATIVE FEEDERS - SEE RECTIFIER MFR'S DRAWINGS.
 2. THE CONTRACTOR SHALL INCLUDE IN THE BID 150' LFT OF UNDERGROUND SERVICE SPLICE BOXES.
 3. THE CONTRACTOR SHALL SUBMIT THE DUCTBANK LAYOUT AFTER THE EQUIPMENT MANUFACTURER'S DIMS ARE APPROVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EXACT LOCATION OF CONDUIT RISER AT EACH PIECE OF EQUIPMENT.
 4. FOR UNDERGROUND CABLE TABULATION SEE DWG. SS-17.5-1073

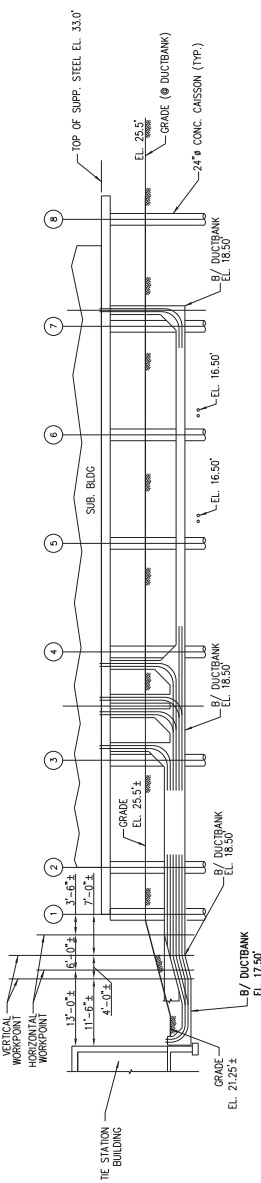
PLAN
SCALE 1/2" = 1'-0" N

REV	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION
0	0/0/2017	HS	HS					ISSUED FOR BID
								DESCRIPTION

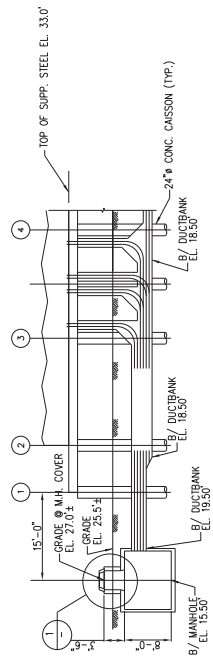
KMI Kalsoum Mehdil, Inc. 233 N. Dearborn St., Ste. 400 Chicago, IL 60608 Tel: (312) 988-0887 Fax: (312) 988-0882		LDP A Company of Gannett Fleming CONSULTANT 20 N. Wacker Dr. Ste. 1500 Chicago IL 60606		Meta ENGINEERING ARCHITECT 547 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60681		DRAWN: JMC CHECKED: FM METE P. J. S. GOSWAMI DATE: JUNE 12, 2017	
LOCATION NAME: RIVERDALE SUBSTATION		TITLE: UNDERGROUND CONDUIT AND DUCTBANK LAYOUT		CAD FILE NUMBER: SS-17.5-1073.DWG		DISTRICT: PROJECT NO.: SHEET NO.: MILE POST NO.:	



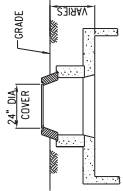
8
INCOMING COMED SERVICE
SCALE: 1"=10'-0"



A
DUCTBANK PROFILE
SCALE: 1"=10'-0"



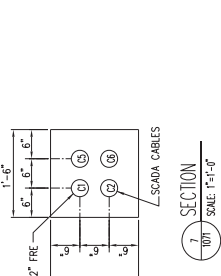
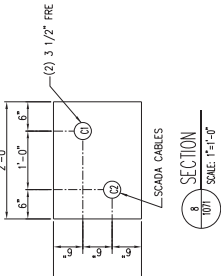
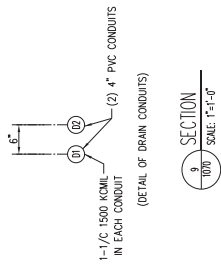
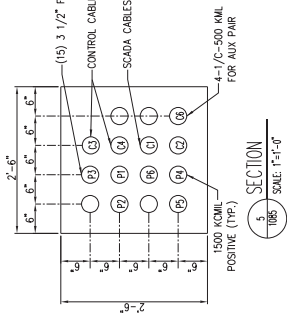
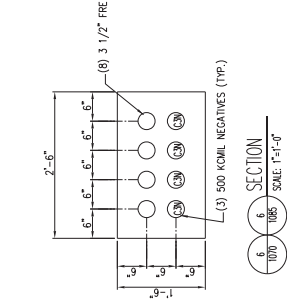
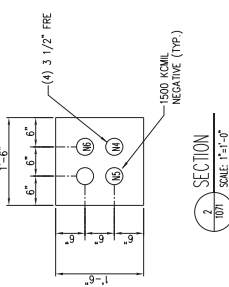
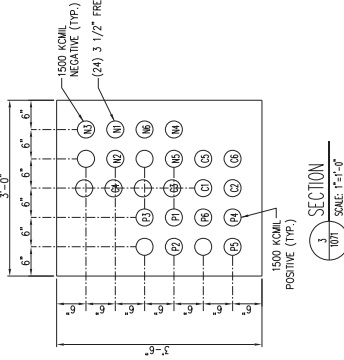
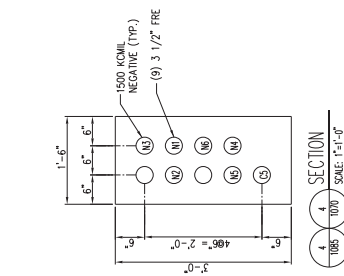
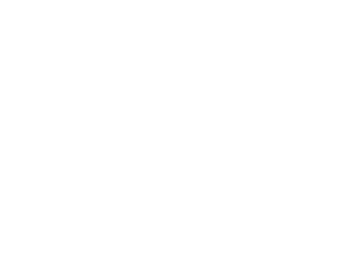
C
DUCTBANK PROFILE
SCALE: 1"=10'-0"



1
DETAIL
SCALE: N.T.S.

NOTES:
 1. DUCTBANK LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE ADJUSTED AS REQUIRED TO SUIT FIELD CONDITIONS.
 2. THE DEPTHS OF DUCTBANKS SHOWN ARE BASED ON EXISTING CONDUIT TO BE BELOW OF DUCTBANK.
 3. FOR DUCTBANK AND CONDUIT LOCATIONS IN NEW SUBSTATION BUILDING AREA SEE DWG. SS-175-1071.

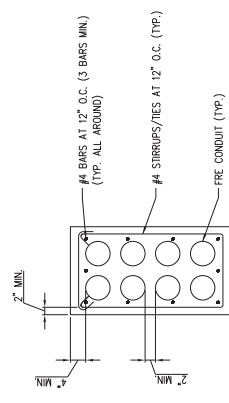
CAD FILE NUMBER: SS-17-5107200N DATE: 06/12/2017 PROJECT NO.: GAN28-FY10000 SHEET NO.: SS-17-5-1072 MILE POST NO.: 7/5		LOCATION NAME: TITLE: RIVERDALE SUBSTATION DUCTBANK PROFILES
ISSUED FOR BID DESCRIPTION REV. DATE BY APP 0 0/0/2017 HS HS		CONSULTANT: KMI Kalsium Mehdi, Inc. 2274 Jackson Blvd., Suite 1000 Chicago, IL 60606 TEL: (312) 460-0487 FAX: (312) 265-0486 CONSULTANT SEAL & SIGNATURE CONSULTANT: JDP JDP CONSULTANTS 20 N. Wacker Dr., Ste. 1500 Chicago IL 60606 DATE: JUNE 12, 2017 META CONSULTANTS 547 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60681
PRINTED ON 80175		






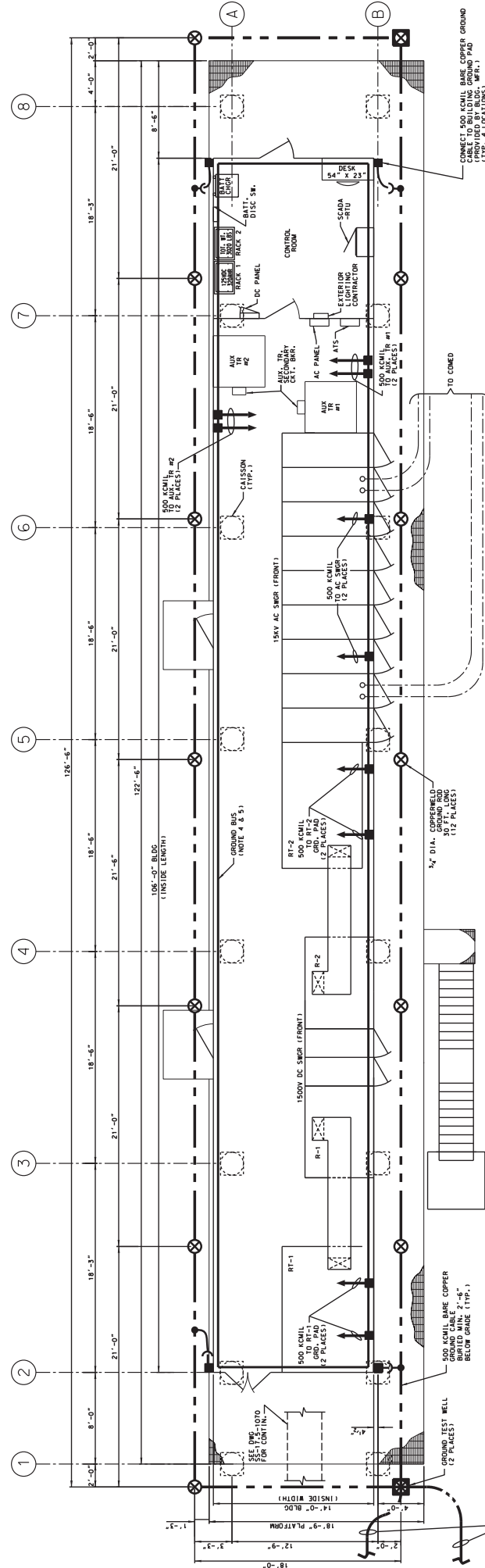
CABLE TABLE

CABLE I.D.	FROM	TO
CE	COMED INCOMING LINE	15KV AC SWITCHGEAR CUBICLE 2 OR B
M1, M2, ETC.	CATHODE BREAKERS IN DC SWITCHGEAR	DC SWITCHGEAR IN THE STATION
N1, N2, ETC.	RECTIFIER #1 OR #2	NEGATIVE ENCLOSURE ON TOP OF NEGATIVE MANHOLE
CSN	NEGATIVE ENCLOSURE ON TOP OF NEGATIVE MANHOLE	TRUCK-RUNNING RAIL
M1, M2	CONTROL ROOM	SCADA IN THE STATION
CS1, CS2	CATHODE BREAKERS IN DC SWITCHGEAR	DC SWITCHGEAR IN THE STATION
CS3, CS4	CATHODE BREAKERS IN DC SWITCHGEAR	DC SWITCHGEAR IN THE STATION
CS	AC PANEL	NEGATIVE DRAINAGE PANEL
CS	AC PANEL	CONTROL BOX AT THE BREAKER STATION
CS	AC PANEL	(AUX PWR. TO THE BBR STATION)

NOTES:
 1. ALL DUCT BANKS SHALL BE REINFORCED.



LOCATION NAME: RIVERDALE SUBSTATION		CAD FILE NUMBER: 88-7-12723-000	
TITLE: DUCTBANK DETAILS		DISTRICT: SHEET NO.: SS-17.5-1073	
DESIGNER: HSE DRAWN: JC CHECKED: FM METRA P&S, DESIGNT CHICAGO, ILLINOIS 60601		PROJECT NO.: GANETT-P10002 FILE POST NO.: T/S	
CONSULTANT SEAL & SIGNATURE 		CONSULTANT KMI Kalesam Mehta, Inc. 201 N. Wacker Dr. Ste. 1500 Chicago IL 60606 TEL: (312) 967-9600 FAX: (312) 967-9602	
CONSULTANT SEAL & SIGNATURE 		CONSULTANT Gannett Fleming A Company of IGP 201 N. Wacker Dr. Ste. 1500 Chicago IL 60606	
CONSULTANT SEAL & SIGNATURE 		CONSULTANT Metra METRA TRANSIT AUTHORITY 547 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601	
REVISIONS NO. DATE BY APP DESCRIPTION	ISSUED FOR BID 01/26/2017 HS DATE REV.	DATE REV.	DATE REV.














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


- NOTES:
1. BARE COPPER GROUND CABLE SHALL BE BURIED MINIMUM 18" BELOW GRADE.
 2. ALL GROUNDING CONNECTIONS BELOW GRADE SHALL BE MADE USING CROMELT WELDS, UNLESS OTHERWISE SPECIFIED.
 3. GROUND ROD LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR MAY RELOCATE RODS AS REQUIRED TO CLEAR FIELD OBSTRUCTIONS.
 4. ENTIRE BUILDING GROUNDING SHALL BE INSTALLED AND SHALL BE CONNECTED TO GROUND PADS OF THE BUILDING.
 5. ALL SUBSTATION EQUIPMENT REQUIRING GROUNDING SHALL BE CONNECTED TO SUBSTATION GROUND BUS PER NATIONAL ELECTRICAL CODE.
 6. ALL GROUNDING RISERS ABOVE GRADE FOR CONNECTION TO THE BUILDING GROUND PADS SHALL BE INSTALLED IN THE RIGID STEEL CONDUIT SUPPORTED ALONG THE COLUMNS.



- LEGEND:
- GROUND CABLE BURIED IN EARTH OR CONCEALED IN CONDUIT
 - GROUND CABLE IN CONDUIT
 - GROUND CABLE CHANGE OF ELEVATION
 - ⊗ GROUND ROD 1/2" DIA., 5' LONG COPPERWELD GROUND RODS, MIN. 30 FT. TOTAL LENGTH (6 SECTIONS)
 - ⊗ GROUND TEST WELL 1/2" DIA., 5' LONG COPPERWELD GROUND TEST WELLS, MIN. 30 FT. TOTAL LENGTH (6 SECTIONS)

DISTRICT: SS-17.5-1075 SHEET NO.: PROJECT NO.: CAD FILE NUMBER: SS-17.5-1075.DWG	
LOCATION NAME: RIVERDALE SUBSTATION	
TITLE: SUBSTATION GROUNDING LAYOUT	
175 N. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601	
DESIGNED BY: JMC DRAWN: JMC CHECKED: EM	METTA PARS, ESSENT DATE: JUNE 12, 2017
201 N. Western Dr. Ste. 1000 Chicago IL 60606	
CONSULTANT SEAL & SIGNATURE 	
ISSUED FOR BID 07/26/2017	DESCRIPTION
REV. DATE BY APP	REV. DATE BY APP

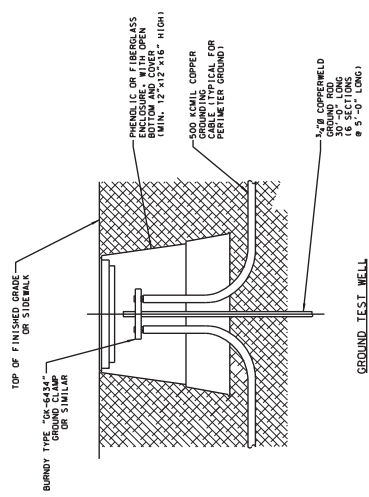
SYMBOLS	GENERAL CONT'D	GROUNDING	GROUNDING NOTES	GENERAL NOTES
<p>GENERAL</p>  POWER TRANSFORMER	<p>MAGNETIC OVERLOAD DEVICE</p> 	<p>GROUND CABLE BURIED IN EARTH OR EMBEDDED IN CONCRETE</p> 	<p>1. GROUND CABLE RUNS ARE SHOWN DIAGRAMMATICALLY. EXACT RUNS SHALL BE DETERMINED IN FIELD TO SUIT CONDITIONS.</p> <p>2. ALL OUTDOOR UNDERGROUND CABLE SHALL BE 500DC MIL BARE COPPER, UNLESS NOTED OTHERWISE.</p> <p>3. UNDERGROUND GRID TO BE RUN MINIMUM 2'-6" BELOW GRADE AND SHALL BE INSTALLED IN CONCRETE OR MASONRY TO PREVENT DAMAGE DUE TO GROUND FAULTS AND/OR EARTH SETTLEMENT.</p> <p>4. AT POINTS OF CROSSING, UNDERGROUND CABLE SHALL BE RUN ABOVE FOUNDATION FOOTINGS, EXISTING DUCTRANSES, SEWER LINES AND OTHER BURIED UTILITIES.</p> <p>5. GROUND WELLS AND RODS SHALL BE INSTALLED AT APPROXIMATE LOCATIONS SHOWN BY DRIVING (NOT DRILLING OR JETTING) USING DRIVING STUD FITTINGS TO ABSORB IMPACT.</p> <p>6. ALL SURFACES TO BE GROUNDING SHALL BE THOROUGHLY CLEANED TO BARE METAL BEFORE MAKING CONNECTIONS.</p> <p>7. ALL GROUND GRID CONNECTIONS BELOW GRADE SHALL BE CABLED TYPE & CABLED CONNECTIONS SHALL BE INSPECTED BEFORE BACKFILLING. IF RUFTY OR POROUS WELDS ARE FOUND, THEY SHALL BE CUT OUT AND THE CONNECTIONS REWELDED.</p> <p>8. ALL GROUNDING CABLE CONNECTIONS TO EQUIPMENT ABOVE GRADE AND INSIDE THE SUBSTATION BUILDING SHALL BE THE BOLTED TYPE.</p> <p>9. BAR TO BAR AND LUG TO BAR BOLTED CONNECTIONS SHALL BE MADE WITH 1/2" COLD CHAMFERED CLEAN, SILVER-PLATE ALL BAR AND LUG CONNECTIONS. MAKE ELECTRICALLY CLEAN, SILVER-PLATE ALL BAR AND LUG CONNECTIONS.</p> <p>10. ALL METAL CONDUITS, EQUIPMENT AND JUNCTION BOXES SHALL BE GROUNDED WITH MINIMUM #2 COPPER CABLE. CAT GROUND CABLE CONNECTIONS TO ALUMINUM THAT WITH IN-OXIDE COMPOUND.</p> <p>11. AFTER THE ENTIRE GROUNDING SYSTEM HAS BEEN INSTALLED, INCLUDING RODS, THE SYSTEM SHALL BE TESTED TO MEET SPECIFICATION REQUIREMENTS.</p>	<p>1. ALL DISTANCES OF EXISTING STRUCTURES SHOWN ON THE DRAWINGS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY DIMENSIONS BEFORE PROCEEDING WITH THE INSTALLATIONS.</p> <p>2. CONDUIT USED SHALL BE AS FOLLOWS:</p> <p>A. EXPOSED CONDUIT INSIDE SUBSTATION BUILDING SHALL BE IMC (INTERMEDIATE METAL CONDUIT), UNLESS NOTED OTHERWISE.</p> <p>B. OUTDOOR CONDUIT FOR GENERAL USE SHALL BE HD-DIP GALVANIZED RIGID STEEL, UNLESS NOTED OTHERWISE.</p> <p>C. CONDUIT FOR CONCRETE SHALL BE PRECAST OR CONCRETE ENCASED. CONDUIT SHALL BE FREE OF FIBERGLASS REINFORCED PRODUCTS SHOWN ON PLANS.</p> <p>D. CONCRETE ENCASED CONDUIT FOR INCOMING 12KV CORED FEEDERS SHALL BE FIBERGLASS REINFORCED CONDUIT.</p> <p>E. FIBERGLASS REINFORCED CONDUIT SERVICES ARE ENCASED IN COMMON CONCRETE DUCTBANK. THE CONDUIT TYPE IS SPECIFIED ON PLANS.</p> <p>F. DIRECT BURIED UNDERGROUND CONDUIT SHALL BE HEAVY WALL PVC, TYPE DB-120, MANUFACTURED PER NEMA-6 AND 8.</p> <p>3. EXPOSED CONDUIT SHALL BE SUPPORTED AT APPROX. 6'-0" INTERVALS (MAXIMUM INTERVAL NOT TO EXCEED TO -5').</p> <p>4. RADIUS OF CURVATURE TO THE INSIDE EDGE OF FIELD BENDS SHALL BE A MINIMUM OF EIGHT-TIMES THE TRADE SIZE OF CONDUIT, UNLESS NOTED OTHERWISE.</p> <p>5. EXPOSED CONDUIT SHALL IN GENERAL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO WALLS AND TRIANGULAR MEMBERS.</p> <p>6. CONDUITS INSTALLED PARALLEL TO HOT SURFACES SHALL BE RUN A MINIMUM OF 4 INCHES AWAY FROM SUCH SURFACES.</p> <p>7. ALL CONDUITS SHALL BE IDENTIFIED BY PERMANENTLY MARKED ACCOUNTS AND DISHINGS OR INSULATED CORNAMING BUSHING INDOORS AND CASKETED CONDUIT HUB PLATES OUTDOORS. EXCEPT WHERE ENCLOSURES ARE FURNISHED WITH INTEGRAL THREADED HUBS.</p> <p>8. CONDUIT TERMINATIONS AT MOTORS, ELECTRICAL INSTRUMENTS AND WHERE CONDUITS ARE TO BE WELDED TO OTHER CONDUITS SHALL BE MADE WITH NEMA 4R TYPE, UNLESS OTHERWISE NOTED, AND SHALL BE LOCATED CLEAR OF INTERFERENCES FOR READY ACCESS.</p> <p>9. ALL INDOOR JCT. & TERM. BOXES SHALL BE NEMA 12 TYPE. ALL OUTDOOR BOXES SHALL BE NEMA 4R TYPE, UNLESS OTHERWISE NOTED, AND SHALL BE LOCATED CLEAR OF INTERFERENCES FOR READY ACCESS.</p> <p>10. UNLESS SPECIFIED, JUNCTION BOXES SHALL BE SIZED BY THE CONTRACTOR WHEN INSTALLED IN FIELD AND SHALL BE LOCATED AS NOTED ON DRAWINGS.</p> <p>11. UNLESS THE TERMS "SHALL" OR "SHOULD" ARE USED FOR REFERENCE ON A DRAWING, THE TWO TERMS SHOULD BE CONSIDERED SYNONYMOUS.</p>
<p>THERMAL OVERLOAD DEVICE</p> 	<p>GROUND CABLEWELD CONNECTION</p> 	<p>GROUND BOLTED CONNECTION</p> 		
<p>POTENTIAL TRANSFORMER</p> 	<p>ELECTRICAL EQUIPMENT, SUCH AS CONTROL PANELS, PULLBOXES, ETC.</p> 	<p>GROUND ROD 3/4" DIA. X 1' LONG COPPERWELD GROUND RODS - MIN. 30 FT. TOTAL LENGTH (6 SECTIONS)</p> 		
<p>CURRENT TRANSFORMER</p> 	<p>JUNCTION BOX (ALSO IDENTIFIED AS J.B. OR JCT. BOX)</p> 	<p>GROUND TEST WELL 3/4" DIA. X 1' LONG COPPERWELD GROUND TEST WELLS - MIN. 30 FT. TOTAL LENGTH (6 SECTIONS)</p>		
<p>AIR CIRCUIT BREAKER</p>	<p>POWER OUTLET</p>	<p>EXPOSED COPPER GROUND BAR BUS UNLESS OTHERWISE NOTED</p>		
<p>DRAWDOUT TYPE</p>	<p>CONDUIT BURIED IN CONCRETE OR BURIED IN EARTH</p>	<p>CONDUIT CHANGE OF ELEVATION</p>		
<p>FUSE</p>	<p>CONDUIT EXPOSED</p>	<p>GROUNDING ROD 3/4" DIA. X 1' LONG COPPERWELD GROUND RODS - MIN. 30 FT. TOTAL LENGTH (6 SECTIONS)</p>		
<p>RESISTOR</p>	<p>CONDUIT TURNING UP OR TOWARD OBSERVER</p>	<p>GROUND ROD 3/4" DIA. X 1' LONG COPPERWELD GROUND RODS - MIN. 30 FT. TOTAL LENGTH (6 SECTIONS)</p>		
<p>SHUNT</p>	<p>CONDUIT TURNING DOWN OR AWAY FROM OBSERVER</p>	<p>CONDUIT EXPOSED COPPER GROUND BAR BUS UNLESS OTHERWISE NOTED</p>		
<p>STATION CLASS ARRESTER</p>	<p>FLEXIBLE ELECTRICAL CONDUIT</p>	<p>CONDUIT BURIED IN CONCRETE OR BURIED IN EARTH</p>		
<p>DISTRIBUTION CLASS ARRESTER</p>	<p>METERING/INDICATING DEVICES</p> <p>A AMMETER</p> <p>V VOLTMETER</p> <p>AS AMMETER SWITCH</p> <p>VS VOLTMETER SWITCH</p> <p>RL INDICATING LIGHT</p> <p>A11-AMBER B11-BLUE R11-RED W11-WHITE</p>	<p>CONDUIT CHANGING TO INSULATED CONDUIT</p>		
<p>CAPACITOR FIXED</p>	<p>BATTERY</p>	<p>CONDUIT CHANGING TO UNINSULATED CONDUIT</p>		
<p>BATTERY</p>	<p>INDICATING LIGHT</p>	<p>CONDUIT CHANGING TO UNINSULATED CONDUIT</p>		
<p>RECTIFIER</p>	<p>DISCONNECT SWITCH</p>	<p>CONDUIT CHANGING TO UNINSULATED CONDUIT</p>		
<p>DISCONNECT SWITCH</p>	<p>AUTOMATIC TRANSFER SWITCH</p>	<p>CONDUIT CHANGING TO UNINSULATED CONDUIT</p>		
<p>AUTOMATIC TRANSFER SWITCH</p>				

REV	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION
0	07-26-2017	HS	HS					ISSUED FOR BID
								DESCRIPTION

DESIGNED BY: JMC	DRAWN: JMC	CHECKED: FM
		
MERTEN PAUL GRENT 201 N. Webster St., Ste. 1000 Chicago IL 60606		

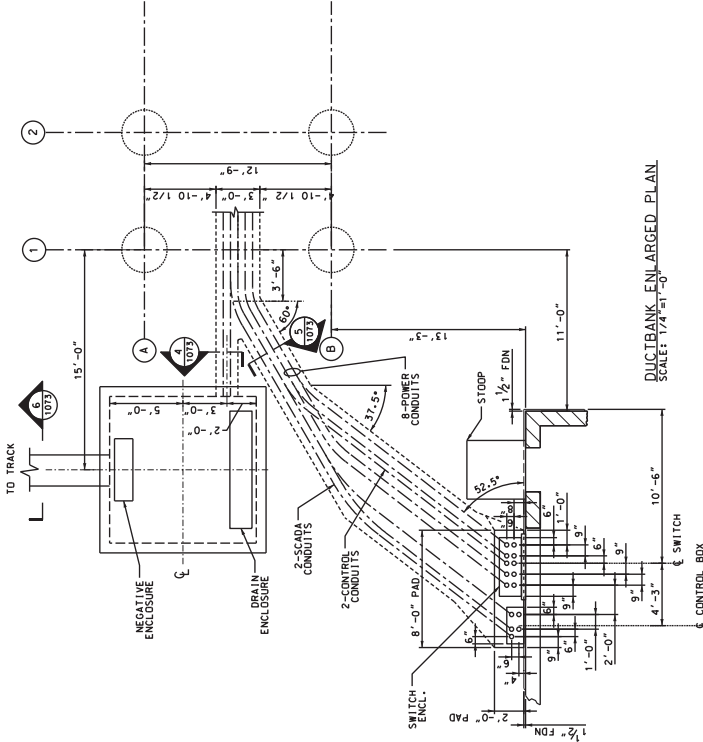
CONSULTANT SEAL & SIGNATURE	CONSULTANT	CONSULTANT NAME	LOCATION NAME	CAD FILE NUMBER
		Meta METTA CONSULTANTS 571 N. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601	RIVERDALE SUBSTATION TITLE	SS-17.5-1080

ISSUED FOR BID	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION

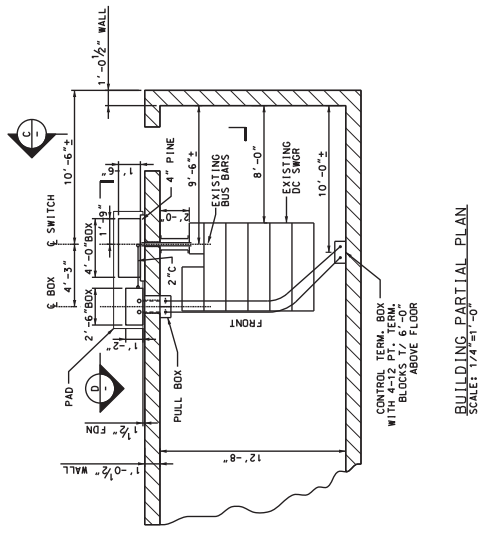


GROUND TEST WELL
DETAIL 1
SCALE NONE

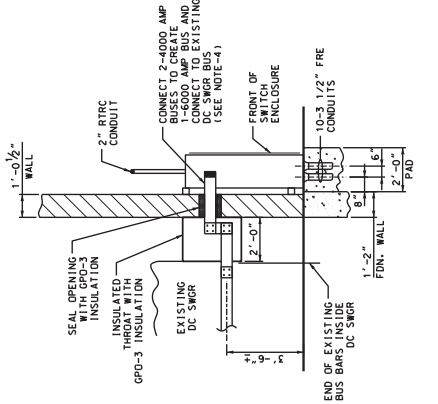
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LOCATION NAME: RIVERDALE SUBSTATION		TITLE: ELECTRICAL DETAILS	
 METRA METRA REGIONAL SERVICE CENTER 571 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60691		 IDP A Company of Gannett Fleming CONSULTANT 201 N. Webster St., Ste. 1000 Chicago IL 60606	
DESIGNED BY: JMC	DRAWN: JMC	CHECKED: FM	DATE: JUNE 12, 2017
CONSULTANT SEAL & SIGNATURE		CONSULTANT	
ISSUED FOR BID	DESCRIPTION	REV	DATE
BY	APP	DATE	APP
DATE	APP	DATE	APP



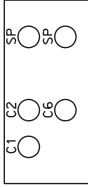
DUCTBANK ENLARGED PLAN
SCALE: 1/4"=1'-0"



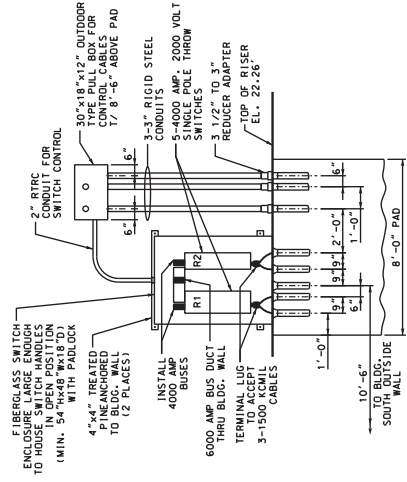
BUILDING PARTIAL PLAN
SCALE: 1/4"=1'-0"



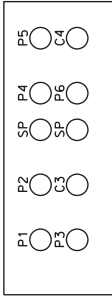
ELEVATION
SCALE: 3/8"=1'-0"



ENLARGED PLAN OF CONDUIT RISER FOR THE PULL BOX



SWITCHBOX FRONT VIEW
SCALE: 3/8"=1'-0"



ENLARGED PLAN OF CONDUIT OPENINGS FOR THE SWITCH ENCLOSURE

- NOTES:
- CONTRACTOR SHALL FIELD VERIFY ALL EXISTING INSTALLATIONS AND MAKE NECESSARY ADJUSTMENTS.
 - AS EXISTING.
 - FOR CABLE TABULATION SEE Dwg. 55-17.5-1073.
 - THE GPD AMP BUS BETWEEN THE SWITCH ENCLOSURE AND WEATHERDOLLY WATER TIGHT FIBERGLASS DUCT.

REV.	DATE	BY	APP	DESCRIPTION
0	07/26/2017	HS	HS	ISSUED FOR BID

ISSUED FOR BID	DATE	BY	APP	DESCRIPTION

CONSULTANT SEAL & SIGNATURE

LDP CONSULTANT

Gannett Fleming
A Company of
METRA PARK, GRANIT
201 N. Webster St., Ste. 1000 Chicago IL 60606

DATE: JUNE 12, 2017

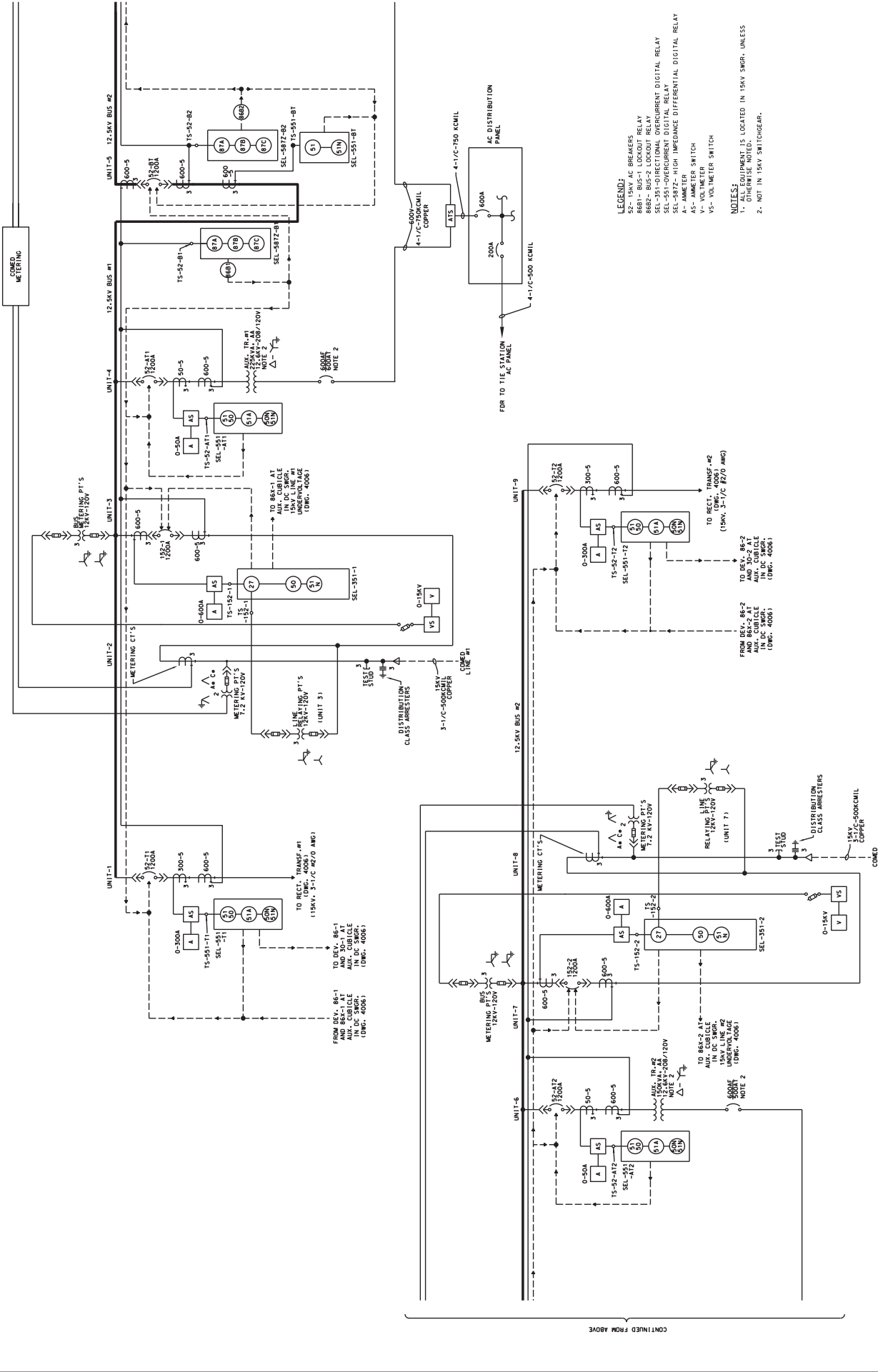
DRAWN: JMC
CHECKED: FM
METRA PARK, GRANIT

LOCATION NAME: RIVERDALE SUBSTATION
TITLE: ENLARGED PLANS ELEVATIONS AND DETAILS

CAD FILE NUMBER: 55-17.5-1080-D

SCALE: AS SHOWN
PROJECT NO.: 55-17.5-1080-D
SHEET NO.: 1/5
MILE POST NO.: 1/5

DISTRICT: SS-17.5-1085



CONTINUED FROM ABOVE

- LEGEND:**
- AC BREAKER
 - 8881- BUS-1 LOCKOUT RELAY
 - 8882- BUS-2 LOCKOUT RELAY
 - SEL-551-DIRECTIONAL OVERCURRENT DIGITAL RELAY
 - SEL-551-OVERCURRENT DIGITAL RELAY
 - SEL-551-IMPEDANCE DIFFERENTIAL DIGITAL RELAY
 - A- AMMETER
 - AS- AMMETER SWITCH
 - V- VOLT METER
 - VS- VOLT METER SWITCH
- NOTES:**
- ALL EQUIPMENT IS LOCATED IN 15KV SWGR, UNLESS OTHERWISE NOTED.
 - NOT IN 15KV SWITCHGEAR.

REV	DATE	BY	APP	DESCRIPTION
0	0/0/2017	HS	HS	ISSUED FOR BID

ISSUED FOR BID	HS	HS
DATE	BY	APP
DESCRIPTION	REV	DATE

CONSULTANT SEAL & SIGNATURE	CONSULTANT	ISSUERS: HS	DRAWN: JMC	CHECKED: FM
	IDP	Gannett Fleming	20 N. Wacker Dr. Ste. 1500 Chicago IL 60606	547 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601

PROJECT NO.	PROJECT NO.	PROJECT NO.
SS-17.5-4011	SS-17.5-4011	SS-17.5-4011
SHEET NO.	SHEET NO.	SHEET NO.
1/5	1/5	1/5

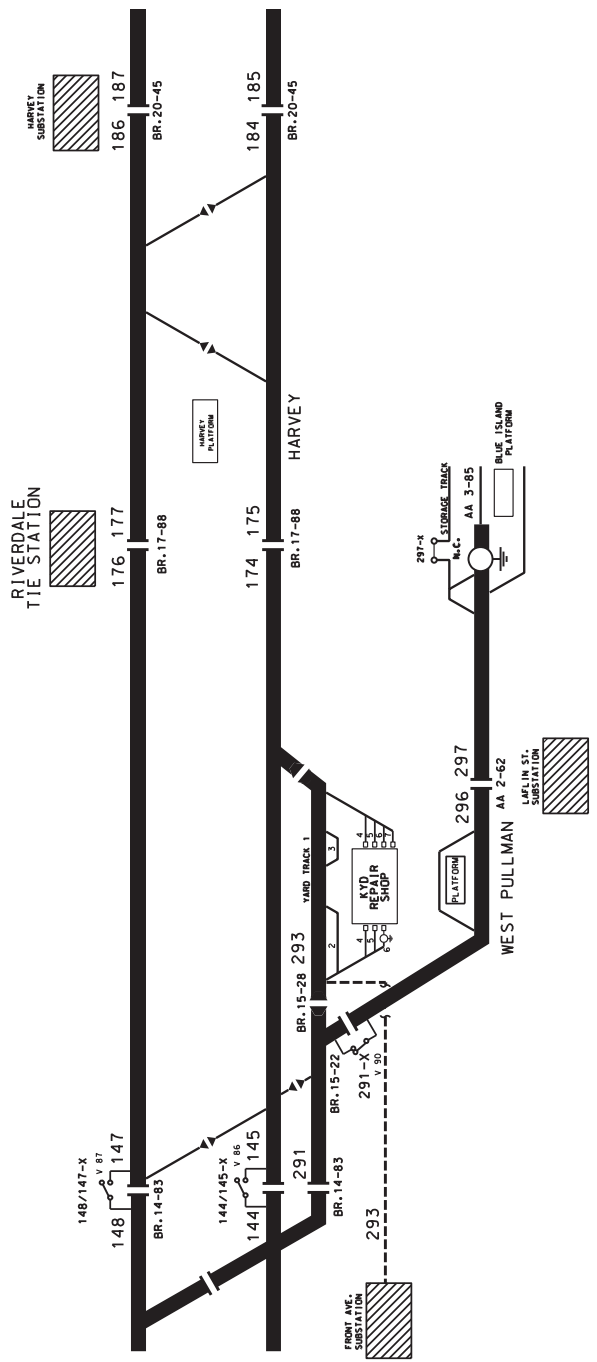
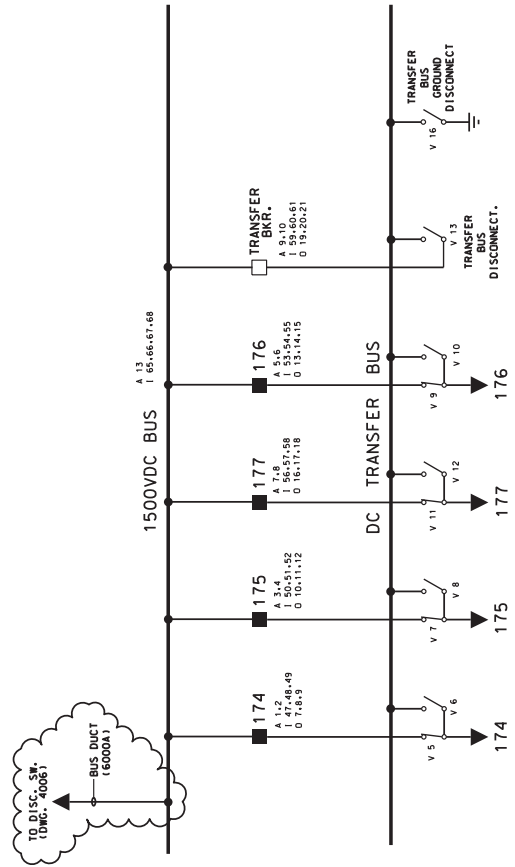
LOCATION NAME	LOCATION NAME	LOCATION NAME
RIVERDALE SUBSTATION	RIVERDALE SUBSTATION	RIVERDALE SUBSTATION
TITLE	TITLE	TITLE
12.5KV AC SINGLE LINE DIAGRAM	12.5KV AC SINGLE LINE DIAGRAM	12.5KV AC SINGLE LINE DIAGRAM

CAD FILE NUMBER	CAD FILE NUMBER	CAD FILE NUMBER
18-11-4001-D00	18-11-4001-D00	18-11-4001-D00

RIVERDALE TIE STATION

FEEDER STRUCTURE 17-88

CIRCUIT WITHIN THE CLOUD INDICATES NEW WORK UNDER THIS CONTRACT



BY LDP

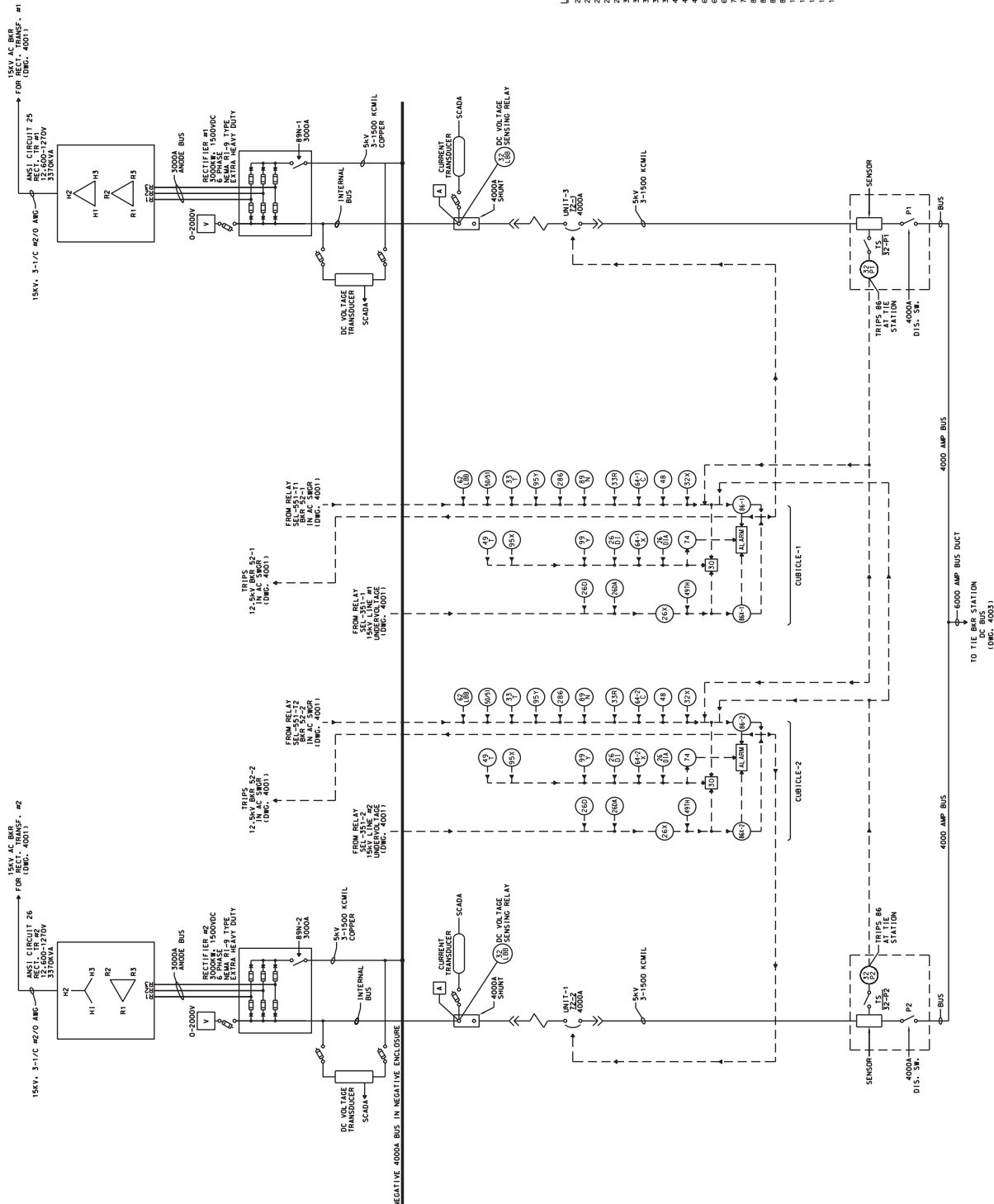
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-	11/11	REVISED FOR DATA SHEET ELONGATION	WPS
-	3/04	REVISED DMC - 40065	WPS
-	5/2/89	REVISED FOR GRAPHIC DISPLAY DMC - 40065	WPS
-	5/2/89	GRAPHIC DISPLAY DMC - 40065	WPS

Metra ENGINEERING DEPARTMENT
CHICAGO, ILLINOIS

TRACTION POWER
ONE LINE DIAGRAM

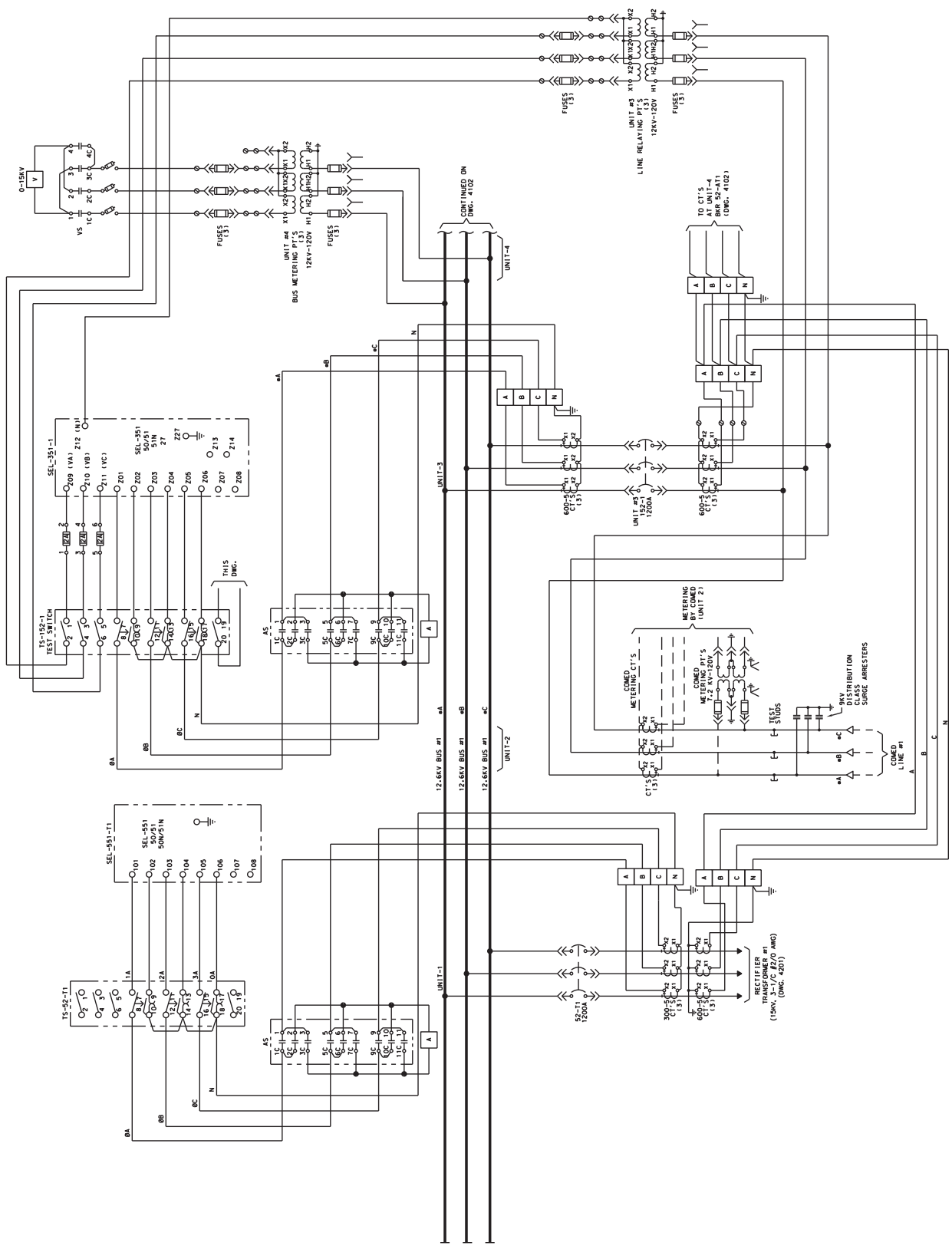
RIVERDALE TIE STATION

SCALE: 1/8"=1'-0"	DATE: 10/2/95
FILE: ELEC/EM/RIVERDALE/4003.dwg	PROJECT: RAS
DESIGNER: WDS	CHECKER: WPS
DRAWN: WDS	DATE: 10/2/95
METRA ELECT. SS-17.5-4003	



- LEGEND:**
- 260- RECT. OVERTEMP-SECOND STEP
 - 260A- RECT. NEG. OVERTEMP - SECOND STEP
 - 261- RECT. NEG. OVERTEMP-FIRST STEP
 - 261A- RECT. NEG. OVERTEMP- FIRST STEP
 - 26A- AUXILIARY TO 260 AND 260A
 - 30- RECTIFIER ANNUNCIATOR
 - 30A- RECTIFIER ANNUNCIATOR
 - 32A- CURRENT SENSING RELAY FOR DEV-32 CKT
 - 33- RECT. TR. DOOR POSITION SWITCH
 - 33A- RECT. TR. DOOR POSITION SWITCH
 - 491- TRANS. WINDING OVERTEMP-FIRST STEP
 - 491A- TRANS. WINDING OVERTEMP-FIRST STEP
 - 62BB- BREAKER BACK-UP TIMING RELAY
 - 62B- BREAKER BACK-UP TIMING RELAY
 - 64A- RECT. GRD. REL-HOT STRUCTURE
 - 72- CATHODE BREAKER
 - 74- DOUBLE ALARM RELAY-HOT STRUCTURE HOT
 - 86A- CONDITIONAL LOCKOUT RELAY
 - 86- HAND RESET LOCKOUT RELAY
 - 89N- RECT. AFTER NEG. DISC. 3PH
 - 89- RECT. AFTER NEG. DISC. 3PH
 - 150RR- RATE OF RISE DIGITAL RELAY
 - 164M- DC SWGR GRD RELAY-GROUNDED STRUCTURE
 - 164- DC SWGR GRD RELAY-GROUNDED STRUCTURE
 - 164A- DC SWGR RELAY TO DEVICE 164

<p>Meta 547 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601</p>		<p>CONSULTANT</p>
<p>GD&P A Company of Gannett Fleming 20 N. Wacker Dr. Ste. 1500 Chicago IL 60606</p>		<p>CONSULTANT SEAL & SIGNATURE</p>
<p>ISSUES FOR BID</p>		<p>ISSUES FOR BID</p>
REV. DATE	BY	APP
0 0/20/2017	HS	HS
DESCRIPTION		DESCRIPTION
ISSUED FOR BID		DESCRIPTION
PROJECT NO. G0265-RF02002		SHEET NO.
FILE NO. 17-5-4006		FILE NO.
PROJECT NAME: RIVERDALE SUBSTATION		DEST. DISTRICT:
TITLE: TRANSFERS, RECTIFIERS & DC SWGR SINGLE LINE DIAGRAM		
LOCATION NAME: RIVERDALE SUBSTATION		
DRAWN: JMC		DATE: JUNE 12, 2017
CHECKED: FM		
DESIGNED: MERRILL P. GOSWAMI		
DATE: JUNE 12, 2017		



GE TYPE: 166B1CF11

CONTACTS	POSITIONS
1	X
2	X
3	X
4	X
5	X
6	X
7	X
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54	X
55	X
56	X
57	X
58	X
59	X
60	X
61	X
62	X
63	X
64	X
65	X
66	X
67	X
68	X
69	X
70	X
71	X
72	X
73	X
74	X
75	X
76	X
77	X
78	X
79	X
80	X
81	X
82	X
83	X
84	X
85	X
86	X
87	X
88	X
89	X
90	X
91	X
92	X
93	X
94	X
95	X
96	X
97	X
98	X
99	X
100	X

GE TYPE: 166B1CF15

CONTACTS	POSITIONS
1	X
2	X
3	X
4	X
5	X
6	X
7	X
8	X
9	X
10	X
11	X
12	X
13	X
14	X
15	X
16	X
17	X
18	X
19	X
20	X
21	X
22	X
23	X
24	X
25	X
26	X
27	X
28	X
29	X
30	X
31	X
32	X
33	X
34	X
35	X
36	X
37	X
38	X
39	X
40	X
41	X
42	X
43	X
44	X
45	X
46	X
47	X
48	X
49	X
50	X
51	X
52	X
53	X
54	X
55	X
56	X
57	X
58	X
59	X
60	X
61	X
62	X
63	X
64	X
65	X
66	X
67	X
68	X
69	X
70	X
71	X
72	X
73	X
74	X
75	X
76	X
77	X
78	X
79	X
80	X
81	X
82	X
83	X
84	X
85	X
86	X
87	X
88	X
89	X
90	X
91	X
92	X
93	X
94	X
95	X
96	X
97	X
98	X
99	X
100	X

LEGEND:
 S2 OR 152V OVERCURRENT DIGITAL RELAY
 SEL-351-1 OVERCURRENT DIGITAL RELAY
 AS-AMMETER SWITCH
 VS-VOLTMETER SWITCH
 V-VOLTMETER

NOTES:
 1. ALL EQUIPMENT IS LOCATED IN 15KV SWGR. UNLESS OTHERWISE NOTED.
 2. TERMINAL BLOCK PRIOR TO A SURTING A DEVICE.
 3. TERMINAL BLOCK PRIOR TO CONNECTING TO A DEVICE.

LOCATION NAME: RIVERDALE SUBSTATION
 TITLE: 12.5KV AC FUSE LINE DIAGRAM SHEET 1 OF 3
 SHEET NO.: SS-17.5-4101
 PROJECT NO.: GMSR-F10202
 DATE: 11/15/05

DESIGNED BY: JMC
 DRAWN BY: JMC
 CHECKED BY: FM
 METEER PALS, ESSENT
 DATE: JUNE 12, 2017

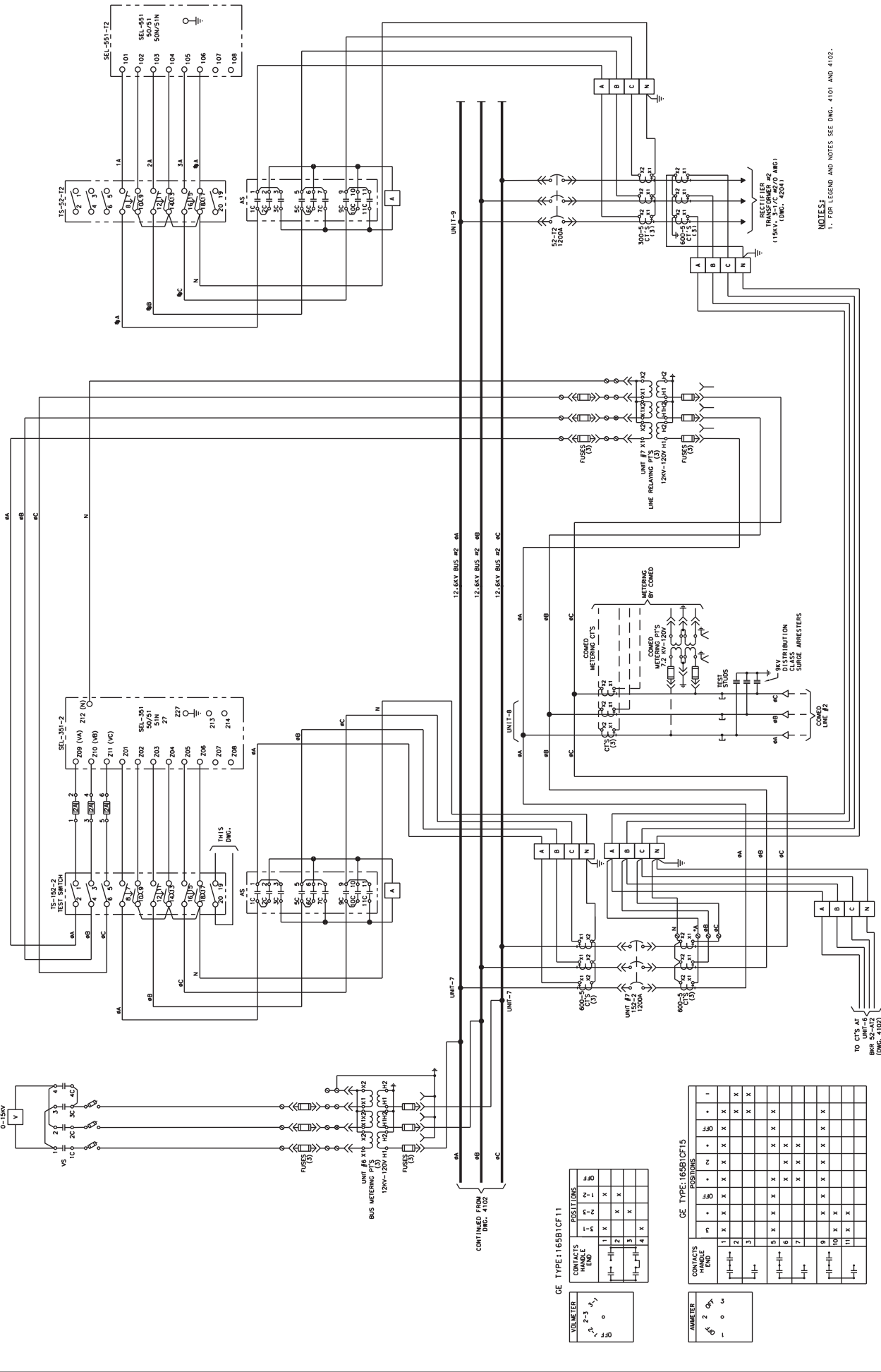
CONSULTANT: Gannett Fleming
 20 N. Wacker Dr., Ste. 1500 Chicago IL 60606

ISSUED FOR BID: []
 DATE: []
 BY: []
 APP: []

DESCRIPTION: []

REV: [] DATE: [] BY: [] APP: []

PRINTED ON SOL175



NOTES:
 1. FOR LEGEND AND NOTES SEE DWG. 4101 AND 4102.

TO CT'S AT BUS BARS (DWG. 4102)

LEGEND:

SYMBOL	DESCRIPTION
	VOLUME
	AMMETER

GE TYPE: 165B1CF11 CONTACTS POSITIONING

CONTACTS	POSITIONS	1	2	3	4	5	6	7	8	9	10	11	12
1	X	X	X	X	X	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X	X	X	X	X	X
3	X	X	X	X	X	X	X	X	X	X	X	X	X
4	X	X	X	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X	X	X	X
7	X	X	X	X	X	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X	X	X	X
9	X	X	X	X	X	X	X	X	X	X	X	X	X
10	X	X	X	X	X	X	X	X	X	X	X	X	X
11	X	X	X	X	X	X	X	X	X	X	X	X	X
12	X	X	X	X	X	X	X	X	X	X	X	X	X

GE TYPE: 165B1CF15 CONTACTS POSITIONING

CONTACTS	POSITIONS	1	2	3	4	5	6	7	8	9	10	11	12
1	X	X	X	X	X	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X	X	X	X	X	X
3	X	X	X	X	X	X	X	X	X	X	X	X	X
4	X	X	X	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X	X	X	X
7	X	X	X	X	X	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X	X	X	X
9	X	X	X	X	X	X	X	X	X	X	X	X	X
10	X	X	X	X	X	X	X	X	X	X	X	X	X
11	X	X	X	X	X	X	X	X	X	X	X	X	X
12	X	X	X	X	X	X	X	X	X	X	X	X	X

ISSUED FOR BID

REV	DATE	BY	APP	DESCRIPTION
0	0/0/2017	HS	HS	

CONSULTANT SEAL & SIGNATURE

CONSULTANT: IEP CONSULTANTS, INC. (Seal and Signature)

REVISIONS:

NO.	DATE	DESCRIPTION

PROJECT INFORMATION:

PROJECT NO.: GMSR-PT0002
PROJECT NAME: 12.6KV AC THREE LINE DIAGRAM
SHEET NO.: SS-17.5-4103
SHEET TOTAL: 3 OF 3

LOCATION NAME: INTERPRELLEBATION
TITLE: 12.6KV AC THREE LINE DIAGRAM
SHEET 3 OF 3

DESIGNED BY: JMC
DRAWN BY: JMC
CHECKED BY: FM
DATE: 06/12/2017

CONSULTANT: IEP CONSULTANTS, INC.
ADDRESS: 201 N. Wacker Dr., Ste. 1500 Chicago IL 60606
PHONE: (312) 467-1000
FAX: (312) 467-1001
WEBSITE: www.iepconsultants.com

COMPANY LOGO: IEP CONSULTANTS, INC. (Seal)

CLIENT LOGO: Meta (Seal)

CLIENT ADDRESS: 547 W. JACKSON BOULEVARD, CHICAGO, ILLINOIS 60601

DATE: JUNE 12, 2017

PRINTED ON: 80175

CONTROL SWITCH
DEVICE-CCS

CONTACTS	POSITION		CLOSE
	TRIP	TRIP	
1-2	T	X	X
3-4	C		

SPRING RETURN TO "TRIP"

SELECTOR SWITCH
DEVICE-CS

CONTACTS	POSITION		REMOTE LOCAL
	R	X	
1-2	R	X	X
3-4	L		
5-6	R	X	X
7-8	L		
9-10	R	X	X
11-12	L		

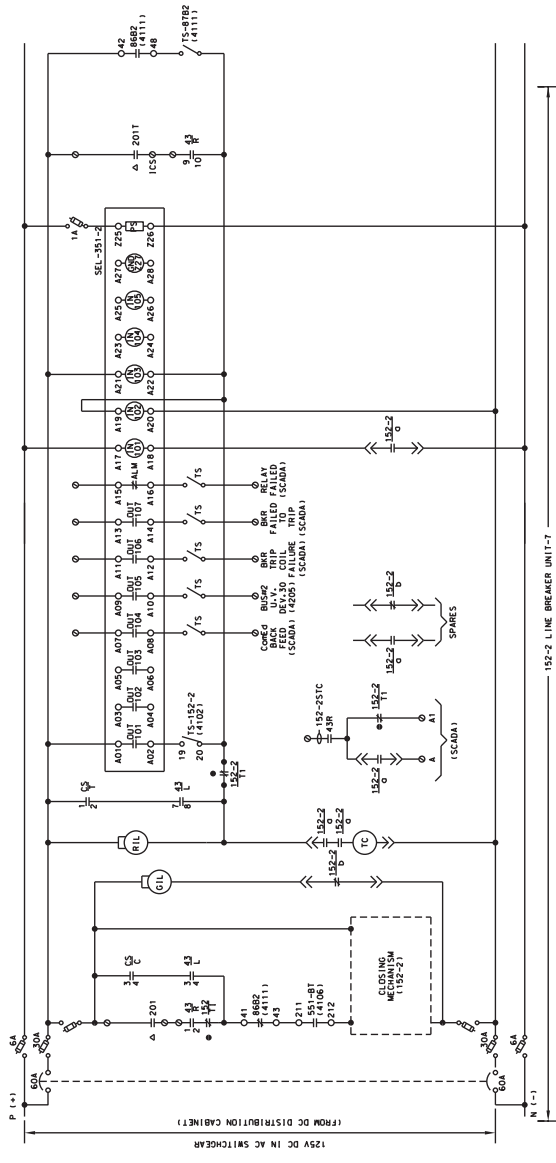
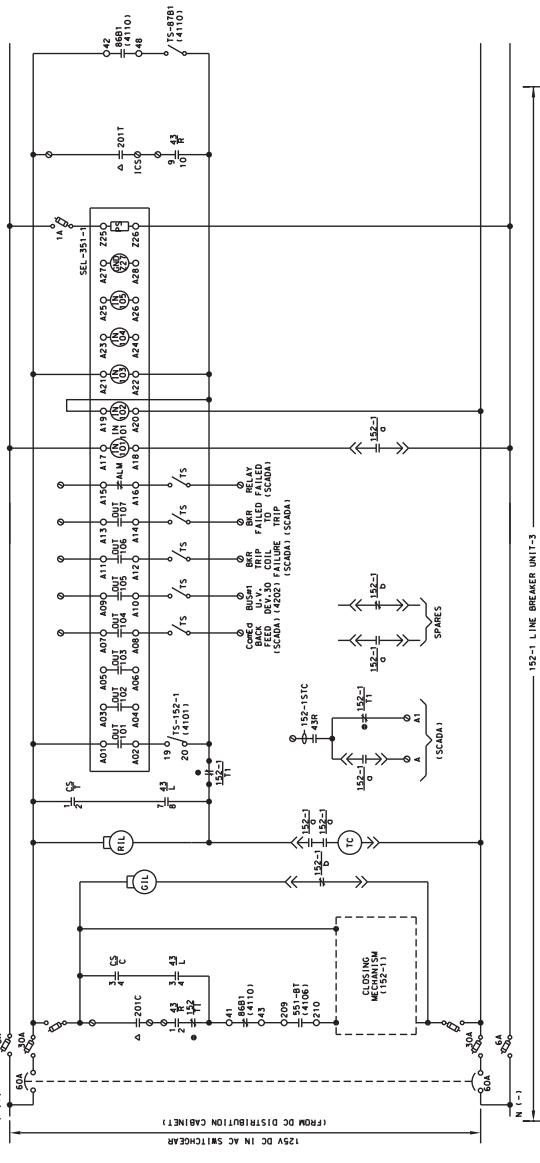
NON-SPRING RETURN.
 REMOTE POSITION AT 12 O' CLOCK.
 LOCAL POSITION COUNTERCLOCKWISE WHEN FACING FRONT OF SWITCH.

LEGEND:

- IN SCADA RTU CABINET
- CLOSED ONLY WITH BREAKER IN CONNECTED POSITION
- TERMINAL WITH BREAKER IN CONNECTED POSITION
- TERMINAL BLOCK

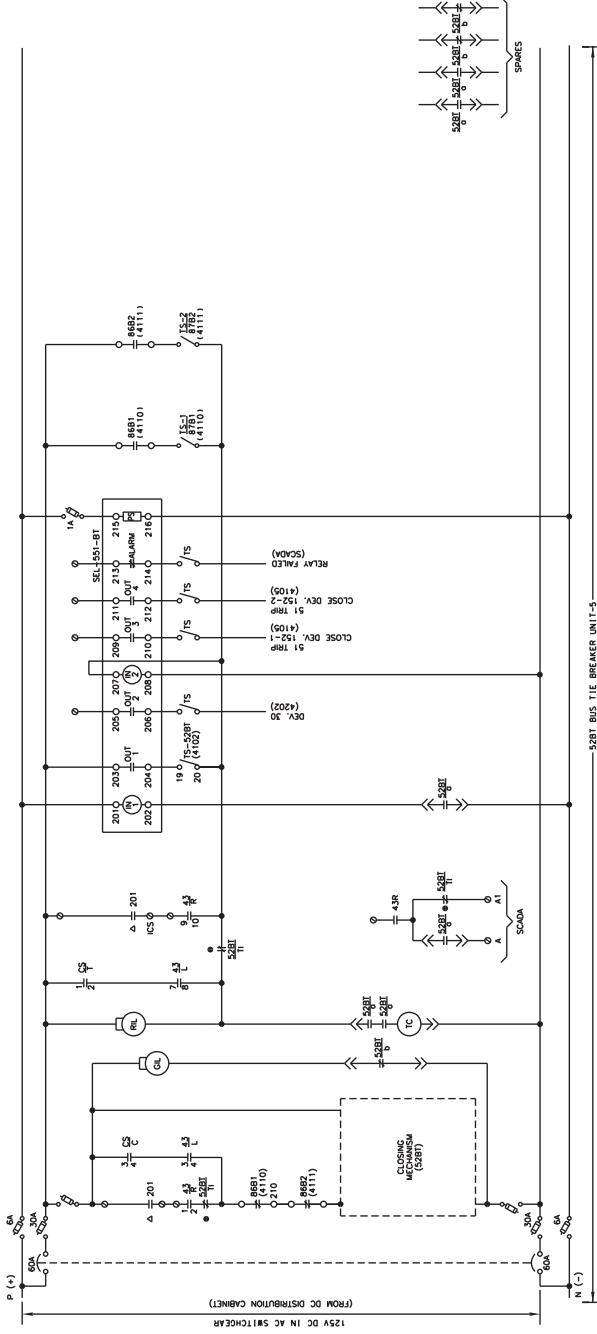
NOTES:

- UNLESS OTHERWISE NOTED, ALL EQUIPMENT IS LOCATED IN 15KV SWGR.
- NUMBER IN PARENTHESIS REFERS TO A DRAWING NUMBER.



ISSUED FOR BID						DATE						
REV	DATE	BY	APP	REV	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION
0	0/28/2017	HS	HS									
 Metra ELECTRIC DIVISION 347 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601												
ISSUERS: JRS DRAWN: JMC CHECKED: FM DESIGNER: MERRIN P. JACOBSON DATE: JUNE 12, 2017												
CONSULTANT SEAL & SIGNATURE								CONSULTANT Gannett Fleming 201 N. Wacker Dr., Ste. 1500 Chicago IL 60606				
LOCATION NAME: RIVERDALE SUBSTATION TITLE: 15 KV AC GOVERNATIC BREAKER INC. LINE BKGS: 152-1 & 152-2												
CAD FILE NUMBER: 85-7124-R0200 DISTRICT: PROJECT NO.: GWZRS-PT0202 SHEET NO.: SS-17.5-4105 WILE POST NO.: T/S												

PRINTED ON 50175



CONVERTER SWITCH DEVICE-43

CONTACTS	POSITION	TRIP	OFF	AFTER	CLOSE
1-2	T	X			
3-4	C				X

SPRING RETURN TO "OFF"

SELECTOR SWITCH POSITION

CONTACTS	POSITION	REMOTE	LOCAL
1-2	R	X	
3-4	L		X
5-6	R	X	
7-8	L		X
9-10	R	X	
11-12	L		X

NON-SPRING RETURN. 12 0° CLOCK.
LOCAL POSITION, CLOCKWISE WHEN FACING FRONT OF SWITCH

LEGEND:

- A - LOCATED IN SCADA RTU CABINET
- 1 - BREAKER
- 2 - BREAKER WITH BREAKER IN CONNECTED POSITION
- 3 - BREAKER ONLY WITH BREAKER IN CONNECTED POSITION
- 4 - TERMINAL BLOCK

NOTES:

1. ALL EQUIPMENT IS LOCATED IN 15KV SWGR.
2. UNLESS OTHERWISE NOTED.
3. NUMBER IN PARENTHESES REFERS TO A DRAWING NUMBER.



CONSULTANT
DDP CONSULTANTS, INC.
 A Company of
Gannett Fleming
 201 N. Wacker Dr., Ste. 1500 Chicago IL 60606
 DATE: JUNE 12, 2017



LOCATION NAME: RIVERDALE SUBSTATION
 TITLE: 12.5KV DC GOVERNATIC DIAGRAM BUS TIE BRK. SZBT

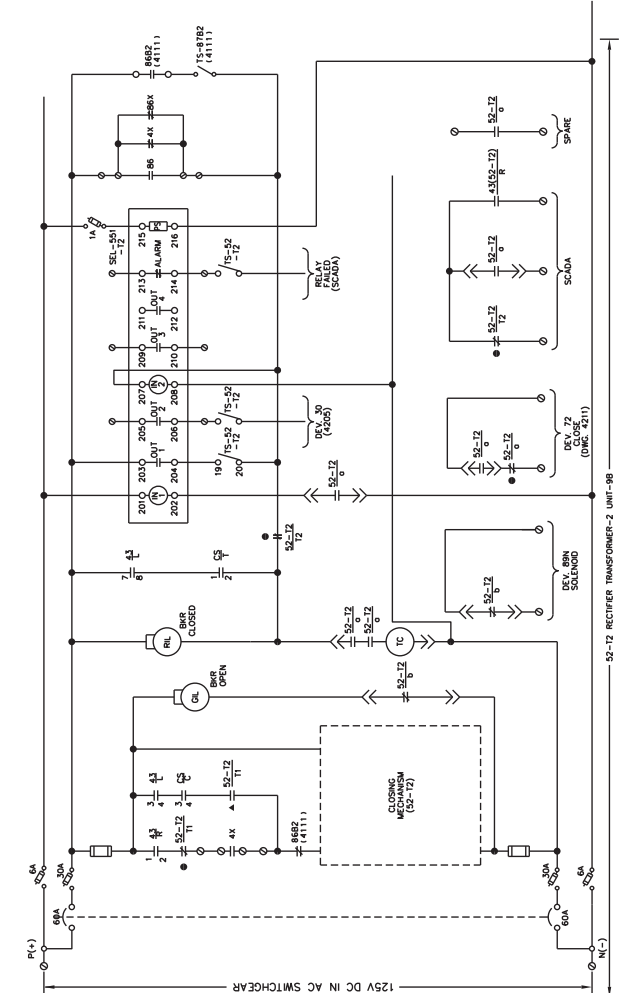
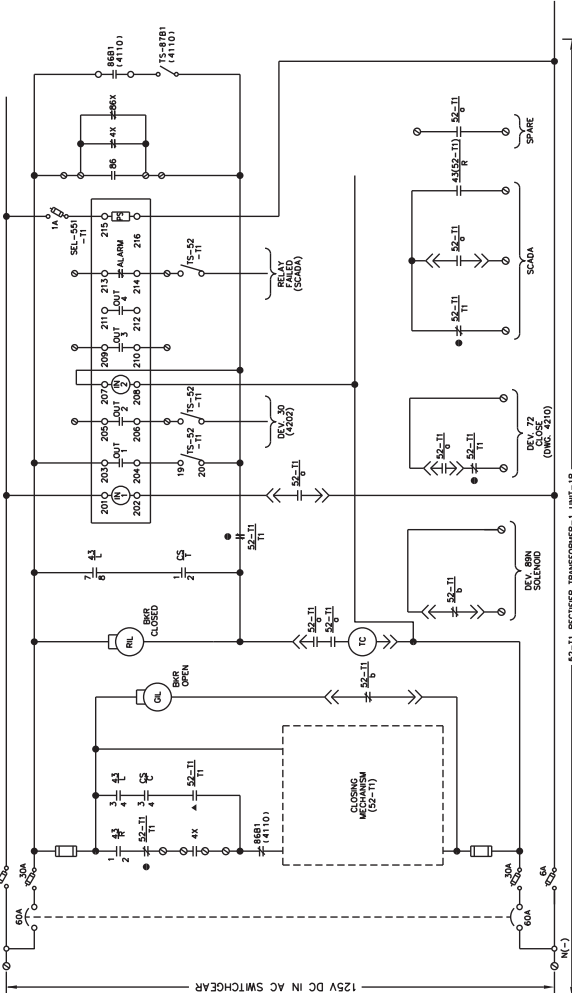
ISSUED FOR BID

REV#	DATE	BY	APP	DESCRIPTION
0	0/0/2017	HS	HS	

REVISIONS:	DATE:	BY:	APP:
DRAWN: JMC	CHECKED: FM	METRA PLS. DESANT	DATE: JUNE 12, 2017

CAD FILE NUMBER: 85-712-100000

DESTRICT:	PROJECT NO.:	SHEET NO.:
	GMZSR-F70002	SS-17.5-4106
	FILE POST NO.:	



CONTROL-SWITCH DEVICE-5S

CONTACTS		POSITION	
		TRIP	TRIP/CLOSE
1-2	T	X	
3-4	C		X

SPRING RETURN TO "OFF".

SELECTOR SWITCH DEVICE-4S

CONTACTS		POSITION	
		REMOTE	LOCAL
1-2	R	X	
3-4	L		X
5-6	R	X	
7-8	L		X
9-10	R	X	
11-12	L		X

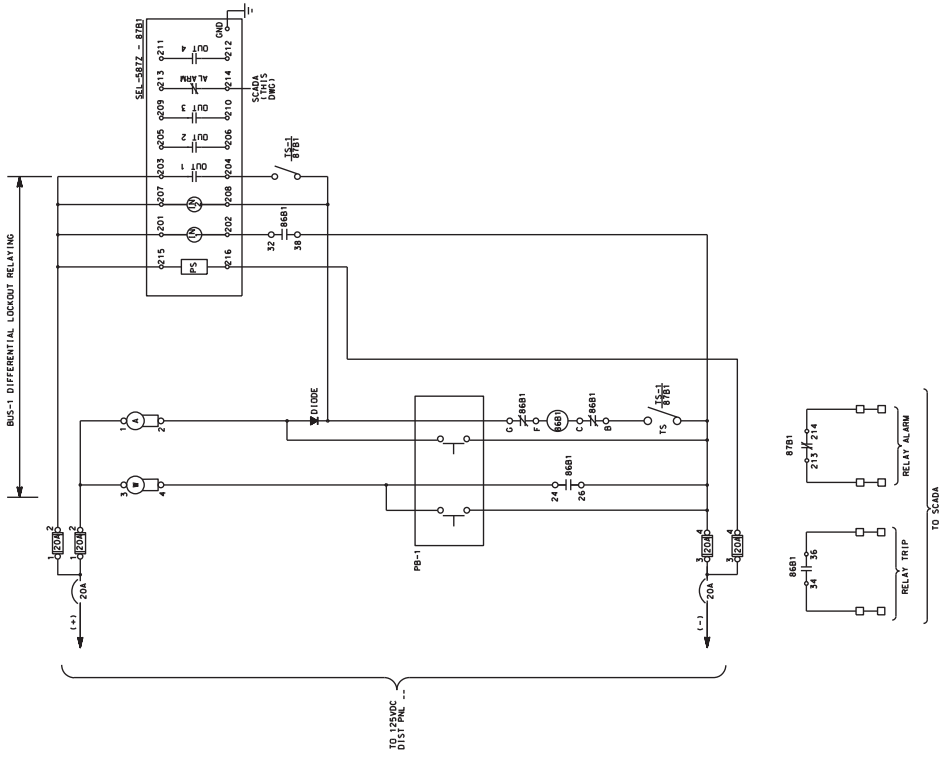
LEGEND:

- CLOSING IN 450MS DELAY CONTACT
- OPEN ONLY WITH BREAKER IN CONNECTED POSITION
- TERMINAL BLOCK

NOTES:

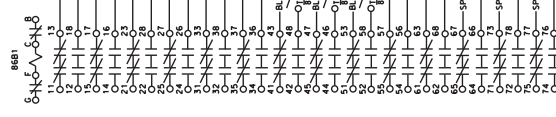
- ALL EQUIPMENT IS LOCATED IN 18KV SWGR. UNLESS OTHERWISE NOTED.
- NUMBER IN PARENTHESES REFERS TO A DRAWING NUMBER.

LOCATION NAME: RIVERDALE SUBSTATION		COD FILE NUMBER: 85-17-5-4107.00N																
TITLE: 18.0KV AC GOVERNATIC CONTROL RECT. TRANSF. BRK. 52-11 & 52-12		DISTRICT: PROJECT NO. GM258-PT0200 SHEET NO. SS-17-5-4107																
 META ENGINEERING & CONSTRUCTION 547 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60681																		
DESIGNED BY: JMC DRAWN BY: JMC CHECKED BY: FM METRI PLUS, CHICAGO DATE: JUNE 12, 2017		CONSULTANT: IEP CONSULTANT SEAL & SIGNATURE																
<table border="1" style="width:100%; text-align: center;"> <tr> <th>REV#</th> <th>DATE</th> <th>BY</th> <th>APP</th> <th>DESCRIPTION</th> </tr> <tr> <td>0</td> <td>0/29/2017</td> <td>HS</td> <td></td> <td>ISSUED FOR BID</td> </tr> </table>		REV#	DATE	BY	APP	DESCRIPTION	0	0/29/2017	HS		ISSUED FOR BID	<table border="1" style="width:100%; text-align: center;"> <tr> <th>REV#</th> <th>DATE</th> <th>BY</th> <th>APP</th> <th>DESCRIPTION</th> </tr> </table>		REV#	DATE	BY	APP	DESCRIPTION
REV#	DATE	BY	APP	DESCRIPTION														
0	0/29/2017	HS		ISSUED FOR BID														
REV#	DATE	BY	APP	DESCRIPTION														



LOCKOUT RELAY (8B81)
X - DENOTES CLOSED IN POSITION

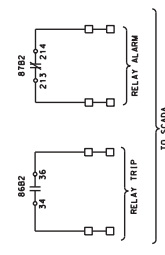
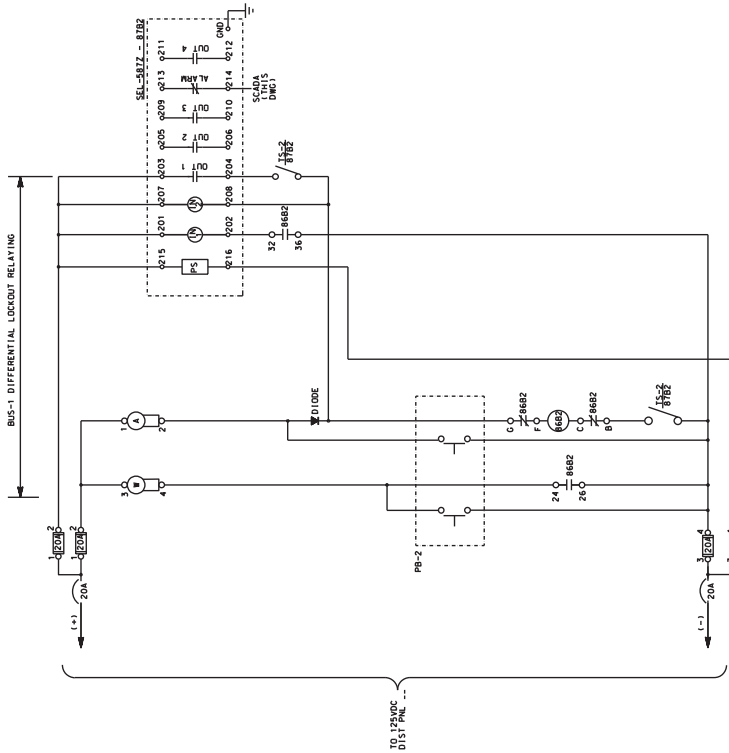
RECH	CONTACTS	POSITION
1	110-HH-013	X
1	120-HH-018	X
1	150-HH-017	X
1	140-HH-016	X
2	210-HH-023	X
2	220-HH-028	X
2	250-HH-027	X
2	240-HH-024	X
3	320-HH-038	X
3	350-HH-037	X
3	340-HH-036	X
4	410-HH-043	X
4	420-HH-048	X
4	450-HH-047	X
4	440-HH-046	X
5	510-HH-053	X
5	520-HH-058	X
5	550-HH-057	X
5	540-HH-054	X
6	620-HH-068	X
6	650-HH-067	X
6	640-HH-066	X
7	710-HH-073	X
7	720-HH-078	X
7	750-HH-077	X
7	740-HH-076	X



LEGEND:
 8T81 BUS-1 DIFFERENTIAL RELAY
 8B81 BUS-1 LOCKOUT RELAY
 TS-1 TEST SWITCH FOR BUS DIFFERENTIAL AND LOCKOUT RELAY FOR BUS-1
 PB MOMENTARY TEST PUSHBUTTON

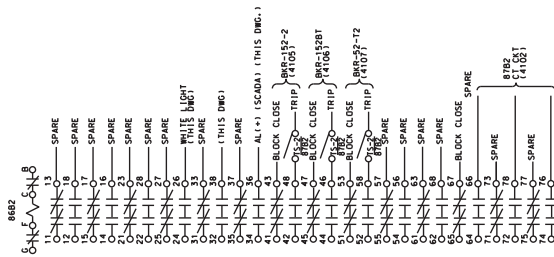
NOTES:
 1. NUMBER IN PARENTHESES REFERS TO A DRAWING NUMBER

ISSUED FOR BID		DATE	BY	APP	DESCRIPTION
0	0/0/2017	HS	HS		
REV	DATE	BY	APP		
CONSULTANT SEAL & SIGNATURE 					
CONSULTANT 					
ISSUERS: JRS DRAWN: JMC CHECKED: FM METRA P&S, DESANT DATE: JUNE 12, 2017					
LOCATION NAME: RIVERDALE SUBSTATION TITLE: 13,60V AC GOVERNATIC DISARM BUS-1 DIFFERENTIAL LOCKOUT					
CAD FILE NUMBER: 88-17-2410000 SHEET NO.: SS-17.5-4110		PROJECT NO.: 04262-RP10002 FILE FOLDER NO.: DISTRICT:			



LOCKOUT RELAY: 8682
 X - DENOTES CLOSED IN POSITION

RELA	CONTACTS	POSITION
1	15-N-11-033	X
	12-N-11-038	X
	15-N-11-037	X
	14-N-11-016	X
2	21-N-11-023	X
	22-N-11-028	X
	25-N-11-027	X
	31-N-11-033	X
	32-N-11-038	X
	35-N-11-037	X
	34-N-11-036	X
	42-N-11-048	X
	45-N-11-047	X
	44-N-11-046	X
3	51-N-11-053	X
	52-N-11-058	X
	55-N-11-057	X
	54-N-11-056	X
	61-N-11-063	X
	62-N-11-068	X
	65-N-11-067	X
	64-N-11-066	X
	72-N-11-078	X
	75-N-11-077	X
	74-N-11-076	X



LEGEND:
 8182 BUS-2 DIFFERENTIAL RELAY
 8682 BUS-2 LOCKOUT RELAY
 15-2 LOCKOUT RELAY FROM BUS-2
 PB MOMENTARY TEST PUSHBUTTON

NOTES:
 1. 8182 IN PARENTHESIS REFERS TO
 A DRAWING NUMBER

REV	DATE	BY	APP	DESCRIPTION
0	9/28/2017	HS	HS	ISSUED FOR BID



CONSULTANT SEAL & SIGNATURE

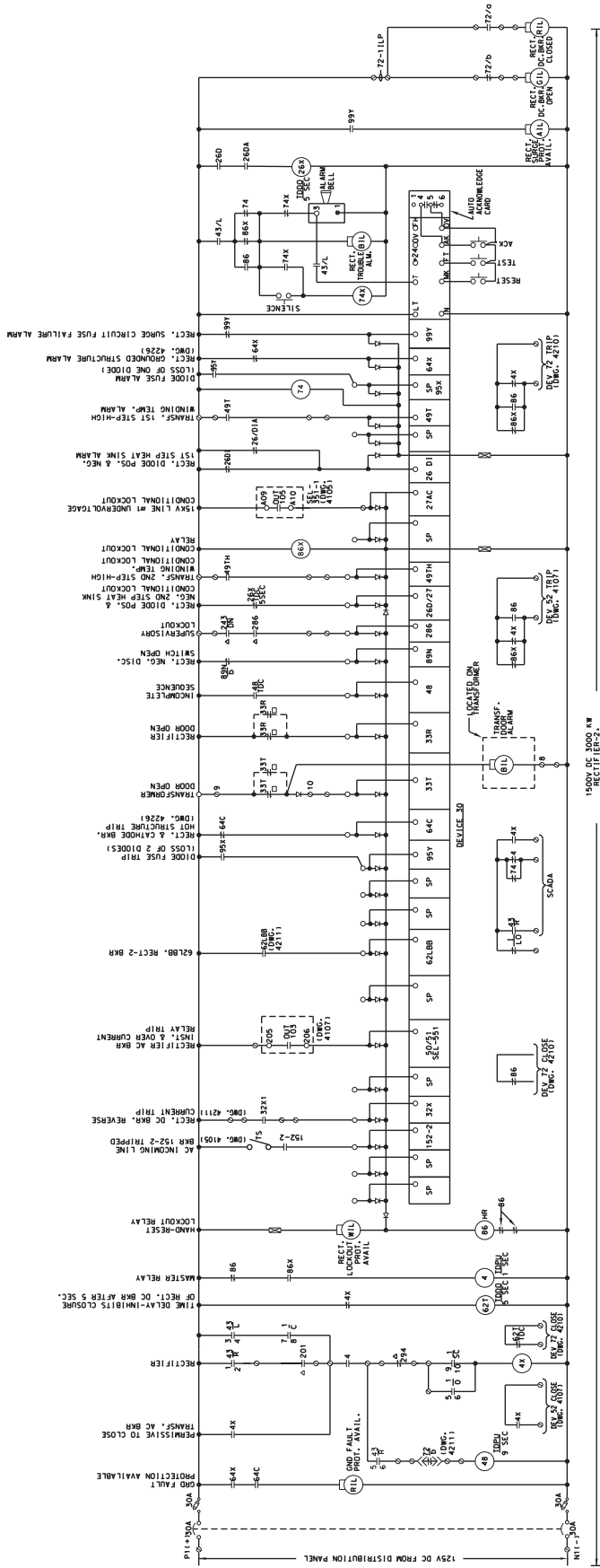
CONSULTANT
 IGP
 A Company of
 Gannett Fleming
 201 N. Wacker Dr. Ste. 1600 Chicago IL 60606
 Consultant:
 Robert J. Johnson
 201 N. Wacker Dr. Ste. 1600 Chicago IL 60606
 DATE: JUNE 12, 2017

REVISIONS:
 DRAWN: JMC
 CHECKED: FM
 METRA PALS, ESSENT
 DATE: JUNE 12, 2017



LOCATION NAME:
 RIVERDALE SUBSTATION
 TITLE:
 15.6KV A/C GOVERNATIC DIAGRAM
 BUS-2 DIFFERENTIAL LOCKOUT

PROJECT NO.:
 GAN26-1710202
 SHEET NO.:
 SS-17.5-4111
 CAD FILE NUMBER: SS-17.5-4112.DWG
 DISTRICT:
 W/5
 FILE POST NO.:



1500V DC 2000 KW
RECTIFIER-2
CONTROLS AND ANNUNCIATOR

- SYMBOLS:**
- ▲ LOCATED IN SCADA RTU CABINET
 - CLOSED ONLY WITH BREAKER IN CONNECTED POS.
 - ▲ OPEN ONLY WITH BREAKER IN CONNECTED POS.
 - TERMINAL BLOCK
 - RTU-INDICATES SCADA REMOTE TERMINAL UNIT.

SELECTOR SWITCH
DEVICE-4S

CONTACTS	POSITION
1-2	REMOTE LOCAL
3-4	R
5-6	X
7-8	X
9-10	R
11-12	X

MASTER CONTROL SWITCH
DEVICE-1

CONTACTS	POSITION
1-2	OFF
3-4	ON
5-6	OFF
7-8	ON
9-10	OFF
11-12	ON

NONSPRING RETURN
LOCAL POSITION CLOSURE IS WHEN FACING FRONT OF SWITCH.

PROJECT NO. GMS28-F70002
SHEET NO. SS-17.5-4205
DATE 07/20/2017

ISSUED FOR BID
DESCRIPTION

REV. DATE BY APP

CONSULTANT SEAL & SIGNATURE

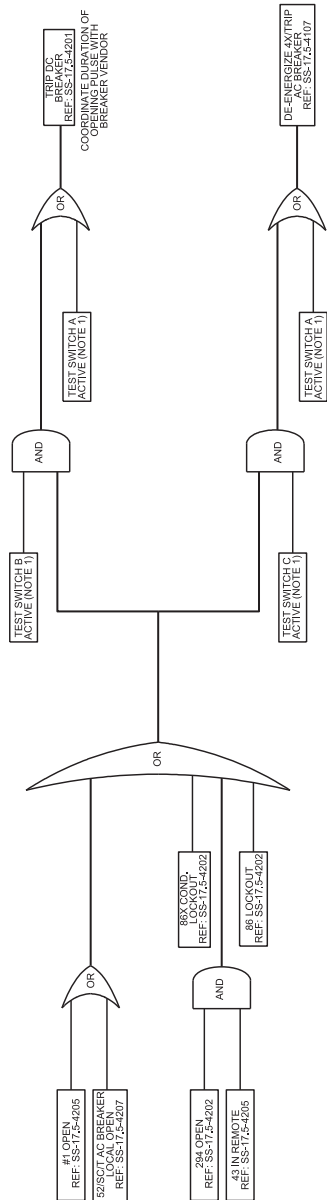
CONSULTANT: **Meta**
A COMPANY OF **Gannett Fleming**
547 W. JACKSON BOULEVARD
CHICAGO, ILLINOIS 60661

REVISIONS: JMC
CHECKED: FM
METEER PALS, ESSENT
DATE: JUNE 12, 2017

LOCATION NAME: RIVERDALE SUBSTATION
TITLE: RECTIFIER-2 CONTROLS & ANNUNCIATOR

CAD FILE NUMBER: SS-17.5-4205-000

AC BREAKER/CATHODE TRIP

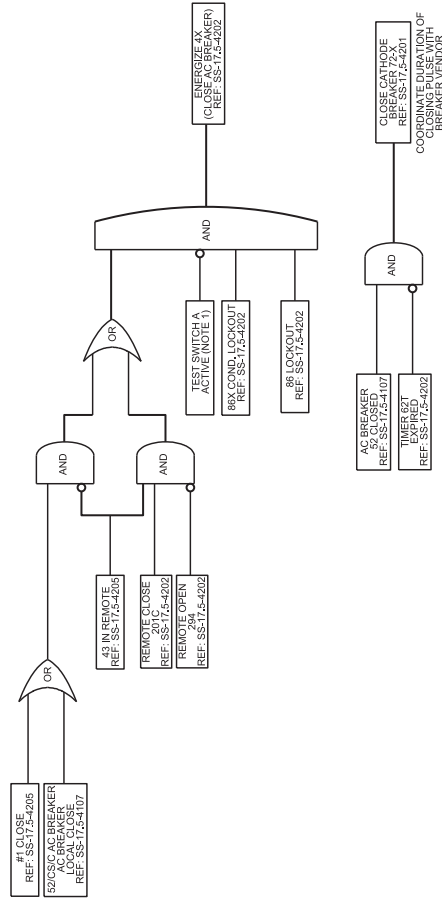


NOTES:

- TEST SWITCHES SHOWN IN THE LOGIC DIAGRAM ARE USED FOR THE ANNUNCIATOR. THE FOLLOWING KEYS SHALL BE AVAILABLE:
 A TRIP AND LOCK 52ZR AND 17ZR
 B ENABLE TRIP TO 52R
 C ENABLE TRIP TO 17R
 D ENABLE 4X INCOMPLETE SEQUENCE
 E ENABLE 88 LOCKOUT
- ALL LOGIC DIAGRAMS ARE FOR INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY ALL LOGIC DIAGRAMS AGAINST ALL CONTRACTUAL REQUIREMENTS BASED ON THE EQUIPMENT PROVIDED.

SUB CONSULTANT		PRIMARY CONSULTANT		PRIMARY CONSULTANT		PRIMARY CONSULTANT		LOCATION NAME		CAD FILE NUMBER	
SEAL/SIGNATURE		SEAL/SIGNATURE		SEAL/SIGNATURE		SEAL/SIGNATURE		RIVERDALE SUBSTATION		SPELLES	
DESCRIPTION		DESCRIPTION		DESCRIPTION		DESCRIPTION		TITLE		PROJECT NO.	
ISSUED FOR BID		ISSUED FOR BID		ISSUED FOR BID		ISSUED FOR BID		RECTIFIER PLC LOGIC DIAGRAM		GWS24-2710000	
REV. DATE		REV. DATE		REV. DATE		REV. DATE		AC BREAKER/CATHODE TRIP		MILE POST NO.	
BY		BY		BY		BY		SHEET NO.		T/S	
APP		APP		APP		APP		SS-17.5-4206		DISTRICT:	
APP		APP		APP		APP		SHEET NO.		SHEET NO.	
APP		APP		APP		APP		SS-17.5-4206		SHEET NO.	

AC BREAKER/CATHODE CLOSE



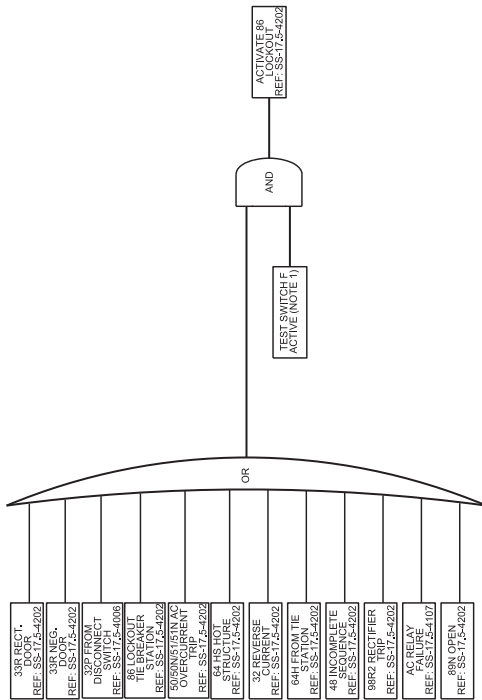
NOTES:

- TEST SWITCHES SHOWN IN THE LOGIC DIAGRAM SHALL BE ASSIGNED AND PROGRAMMED ON THE PANEL SHEET FOR THE ASSIGNMENT. THE FOLLOWING ARE THE SWITCHES TO BE AVAILABLE:
 - A TRIP AND BLOCK 52R AND 172R
 - B TRIP AND BLOCK 52R AND 172R
 - C ENABLE TRIP TO 52R
 - D RESET #4 INCOMPLETE SEQUENCE
 - E ENABLE TRIP TO 52R
 - F ENABLE 88 LOCKOUT
- ALL LOGIC DIAGRAMS ARE FOR INFORMATION ONLY. THE SUPPLIER SHALL ENSURE THAT THE PLC CODE ON THE EQUIPMENT PROVIDED, MEETS THE REQUIREMENTS BASED ON THE EQUIPMENT PROVIDED.

REV	DATE	BY	APP	DESCRIPTION
0	1/28/2017	AA	ER	ISSUED FOR BID

SUB CONSULTANT SEAL/SIGNATURE	PRIMARY CONSULTANT SEAL/SIGNATURE		DESIGNED BY: DRAWN N. EMZ CHECKED BY: MEREDITH A. R. CERANT DATE: JUNE 12, 2017	LOCATION NAME: RIVERDALE SUBSTATION TITLE: RECTIFIER PLC LOGIC DIAGRAMS AC BREAKER/CATHODE CLOSE SHEET Z OF 4	CAD FILE NUMBER: SFRLES	DISTRICT: PROJECT NO.: GW4284-010002 SHEET NO.: SS-17.5-4207 MILE POST NO.:
--------------------------------------	--	--	---	--	----------------------------	--

LOCKOUT LOGIC



NOTES:

- TEST SWITCHES SHOWN IN THE LOGIC DIAGRAM SHALL BE SOFT KEYS PROGRAMMED ON THE HMI SHALL BE AVAILABLE. THE FOLLOWING KEYS SHALL BE AVAILABLE:
 A TRIP AND BLOCK 52R AND 172R
 B ENABLE TRIP TO 172R
 C RESET 48 INCOMPLETE SEQUENCE
 D 5890 RECTIFIER
 E ENABLE 86 LOCKOUT
 F ENABLE 86 LOCKOUT
- ALL LOGIC DIAGRAMS ARE FOR INFORMATION ONLY. THE SUPPLIER SHALL ENSURE THAT THE PLC CODE MATCHES ALL SUPPLIER'S ORIGINAL REQUIREMENTS BASED ON THE EQUIPMENT PROVIDED.

REV	DATE	BY	APP	DESCRIPTION
0	12/20/17	AA	ER	ISSUED FOR BID

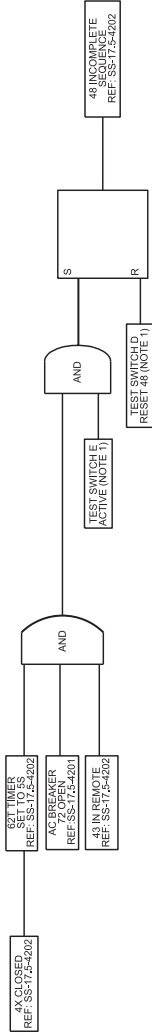
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DRAWN BY: E. RINE	DRAWN BY: E. RINE	DRAWN BY: E. RINE	DRAWN BY: E. RINE
CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT
META P.A. S. CONSULT	META P.A. S. CONSULT	META P.A. S. CONSULT	META P.A. S. CONSULT
DATE: JUNE 12, 2017	DATE: JUNE 12, 2017	DATE: JUNE 12, 2017	DATE: JUNE 12, 2017

DESIGNER'S SIGNATURE	DESIGNER'S SIGNATURE	DESIGNER'S SIGNATURE	DESIGNER'S SIGNATURE
CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT
META P.A. S. CONSULT	META P.A. S. CONSULT	META P.A. S. CONSULT	META P.A. S. CONSULT
DATE: JUNE 12, 2017	DATE: JUNE 12, 2017	DATE: JUNE 12, 2017	DATE: JUNE 12, 2017

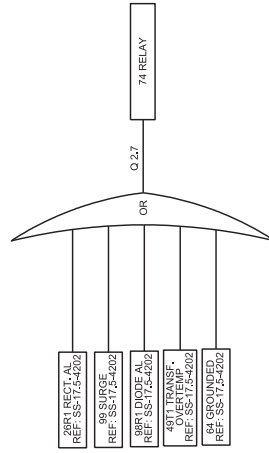
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DRAWN BY: E. RINE	DRAWN BY: E. RINE	DRAWN BY: E. RINE	DRAWN BY: E. RINE
CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT
META P.A. S. CONSULT	META P.A. S. CONSULT	META P.A. S. CONSULT	META P.A. S. CONSULT
DATE: JUNE 12, 2017	DATE: JUNE 12, 2017	DATE: JUNE 12, 2017	DATE: JUNE 12, 2017

DESIGNED BY: J. SCHMIDT	DESIGNED BY: J. SCHMIDT	DESIGNED BY: J. SCHMIDT	DESIGNED BY: J. SCHMIDT
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CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT	CHECKED BY: J. SCHMIDT
META P.A. S. CONSULT	META P.A. S. CONSULT	META P.A. S. CONSULT	META P.A. S. CONSULT
DATE: JUNE 12, 2017	DATE: JUNE 12, 2017	DATE: JUNE 12, 2017	DATE: JUNE 12, 2017

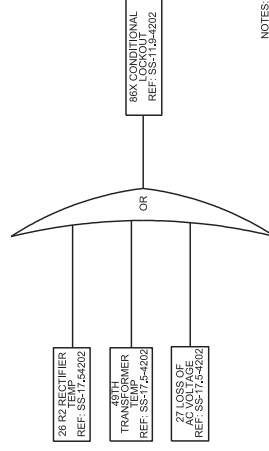
INCOMPLETE SEQUENCE



74 RELAY TROUBLE

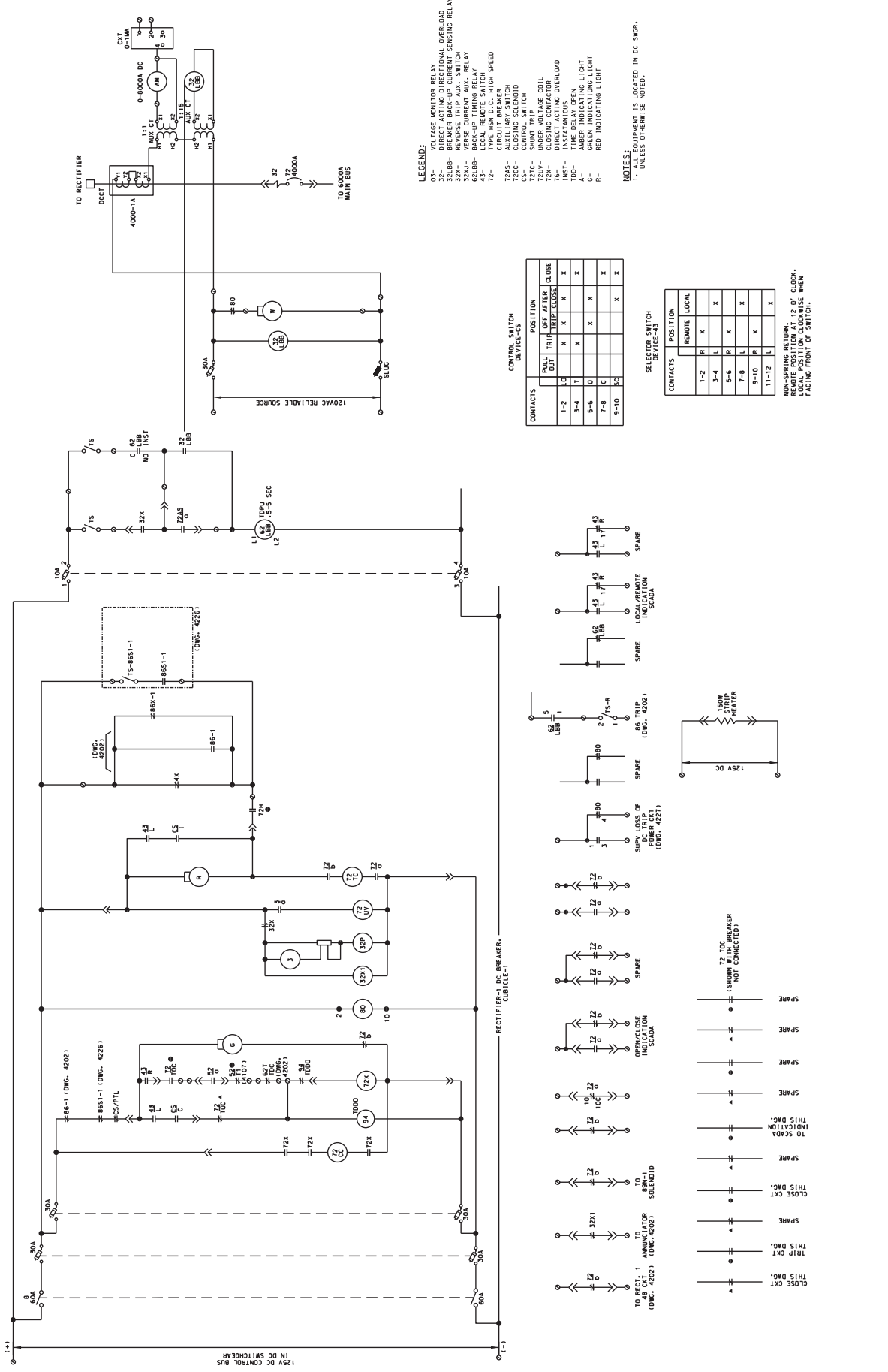


CONDITIONAL LOCKOUT



- NOTES:
- TEST SWITCHES SHOWN IN THE LOGIC DIAGRAM SHALL BE SOFT KEYS PROGRAMMED ON THE HMI. THE SUPPLIER SHALL ENSURE THAT THE FOLLOWING KEYS SHALL BE AVAILABLE:
 - A TRIP AND BLOCK 52R AND 172R
 - B ENABLE TRIP TO 172R
 - C RESET 48 INCOMPLETE SEQUENCE
 - D ENABLE 88 LOCKOUT
 - E ENABLE 88 LOCKOUT
 - F ENABLE 88 LOCKOUT
 - ALL LOGIC DIAGRAMS ARE FOR INFORMATION ONLY. THE SUPPLIER SHALL ENSURE THAT THE PLC CODE AND THE EQUIPMENT REQUIREMENTS BASED ON THE EQUIPMENT PROVIDED.

CAD FILE NUMBER: SPPRESS		LOCATION NAME: RIVERDALE SUBSTATION		DISTRICT: SPPRESS	
PROJECT NO.: GW4254-710002		TITLE: RECTIFIER PLC LOGIC DIAGRAM LOCKOUT AND ALARM LOGIC SHEET 4 OF 4		SHEET NO.: SS-17.5-4209	
MILE POST NO.: 11.5		METRO ENGINEERING SERVICES 571 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601		DATE: JUNE 12, 2017	
DESIGNED BY: DREW N. EMZ		CHECKED BY: METRO P.M. S. GONZALEZ		DATE: JUNE 12, 2017	
PRIMARY CONSULTANT: LTK Engineering Services		SUB CONSULTANT:		DESCRIPTION:	
REV	DATE	BY	APP	DESCRIPTION	
0	12/20/2017	AA	ER	ISSUED FOR BID	



LEGEND:

DS- VOLTAGE MONITOR RELAY
 32- DIRECT ACTING DIRECTIONAL OVERLOAD
 32A- REVERSE TRIP- JUMP
 32B- REVERSE TRIP- JUMP
 32C- REVERSE TRIP- JUMP
 32X- REVERSE CURRENT AUX. RELAY
 62LBB- BACK-UP TIMING RELAY
 72- TYPE HSN D.C. HIGH SPEED
 72AS- CIRCUIT BREAKER
 72ZC- CLOSING SOLENOID
 CS- CONTROL SWITCH
 72V- UNDER VOLTAGE COIL
 72X- CLOSING CONTACTOR
 INST- INSTANTANEOUS
 TOD- TIME DELAY OPEN
 C- GREEN INDICATING LIGHT
 R- RED INDICATING LIGHT

NOTES:
 1. ALL EQUIPMENT IS LOCATED IN DC SWGR.
 1. UNLESS OTHERWISE NOTED.

CONTROL SWITCH
 DEVICE-43

CONTACTS	POSITION	CLOSE
1-2	TRIP	X
3-4	TRIP	X
5-6	TRIP	X
7-8	TRIP	X
9-10	TRIP	X
11-12	TRIP	X

SELECTOR SWITCH
 DEVICE-43

CONTACTS	POSITION	CLOSE
1-2	REMOTE	X
3-4	REMOTE	X
5-6	REMOTE	X
7-8	REMOTE	X
9-10	REMOTE	X
11-12	REMOTE	X

125V DC SUPPLY
 REMOTE POSITION AT 12 O' CLOCK
 LOCAL POSITION CLOCKWISE WHEN
 FACING FRONT OF SWITCH.

ISSUED FOR BID	DESCRIPTION	REV	DATE	BY	APP
DATE					
BY					
APP					
DESCRIPTION					

ISSUED FOR BID

PROJECT NO. GMS28-F10002

SHEET NO. SS-17.5-4210

FILE POST NO. / US

LOCATION NAME: RIVERDALE SUBSTATION

TITLE: 150W DC CONVERTER BREAKER 72A RECTIFIER BREAKER

REVISIONS:

NO.	DESCRIPTION	DATE
1		

DESIGNED BY: JMC
 DRAWN BY: FM
 CHECKED BY: MERRILL S. COLETT
 DATE: JUNE 12, 2017

CONSULTANT: Gannett Fleming
 201 N. Wacker Dr., Ste. 4500 Chicago IL 60606

CONTRACTOR: ICP
 201 N. Wacker Dr., Ste. 4500 Chicago IL 60606

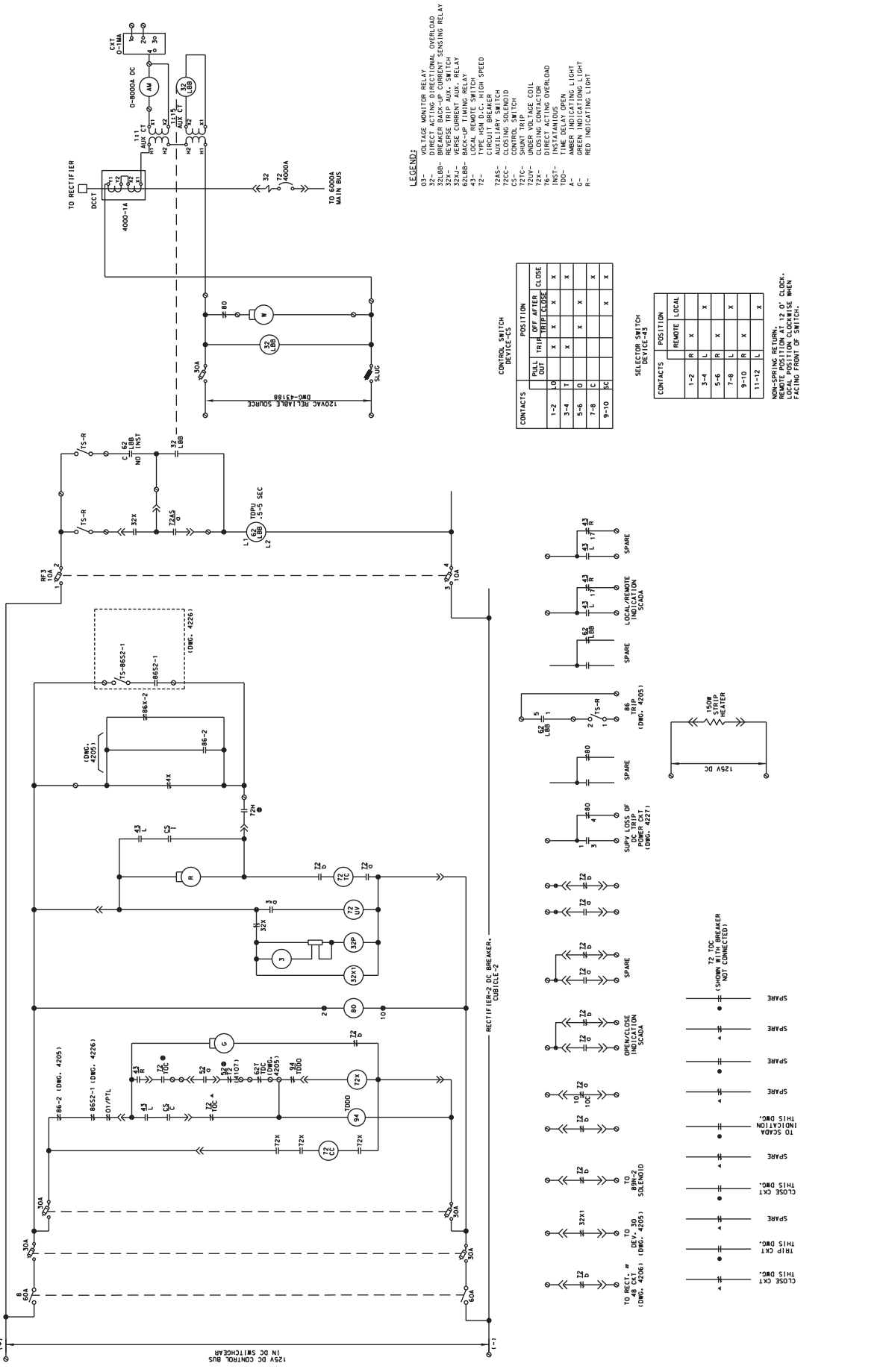
CONSULTANT SEAL & SIGNATURE

PROJECT NO. GMS28-F10002

SHEET NO. SS-17.5-4210

FILE POST NO. / US

150W DC SUPPLY
 REMOTE POSITION AT 12 O' CLOCK
 LOCAL POSITION CLOCKWISE WHEN
 FACING FRONT OF SWITCH.



- LEGEND:**
- 93- VOLTAGE MONITOR RELAY
 - 91- REVERSE TRIP RELAY
 - 92- BREAKER BACK-UP CURRENT SENSING RELAY
 - 32X- REVERSE TRIP AUX. SWITCH
 - 80- LOCAL STOP RELAY
 - 62LBB- BACK-UP TIMING RELAY
 - 43- LOCAL REMOTE SWITCH
 - 72- CIRCUIT BREAKER
 - 72AS- AUXILIARY SWITCH
 - 72S- CIRCUIT BREAKER
 - 72C- CONTROL SWITCH
 - 72D- SHUNT TRIP
 - 72E- SHUNT TRIP
 - 72F- SHUNT TRIP
 - 72G- SHUNT TRIP
 - 72H- SHUNT TRIP
 - 72I- SHUNT TRIP
 - 72J- SHUNT TRIP
 - 72K- SHUNT TRIP
 - 72L- SHUNT TRIP
 - 72M- SHUNT TRIP
 - 72N- SHUNT TRIP
 - 72O- SHUNT TRIP
 - 72P- SHUNT TRIP
 - 72Q- SHUNT TRIP
 - 72R- SHUNT TRIP
 - 72S- SHUNT TRIP
 - 72T- SHUNT TRIP
 - 72U- SHUNT TRIP
 - 72V- SHUNT TRIP
 - 72W- SHUNT TRIP
 - 72X- SHUNT TRIP
 - 72Y- SHUNT TRIP
 - 72Z- SHUNT TRIP
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CONTROL SWITCH DEVICES

CONTACTS	PULL OUT	TRIP	OFF	AFTER	CLOSE
1-2	X	X	X	X	X
3-4	X	X	X	X	X
5-6	X	X	X	X	X
7-8	X	X	X	X	X
9-10	X	X	X	X	X

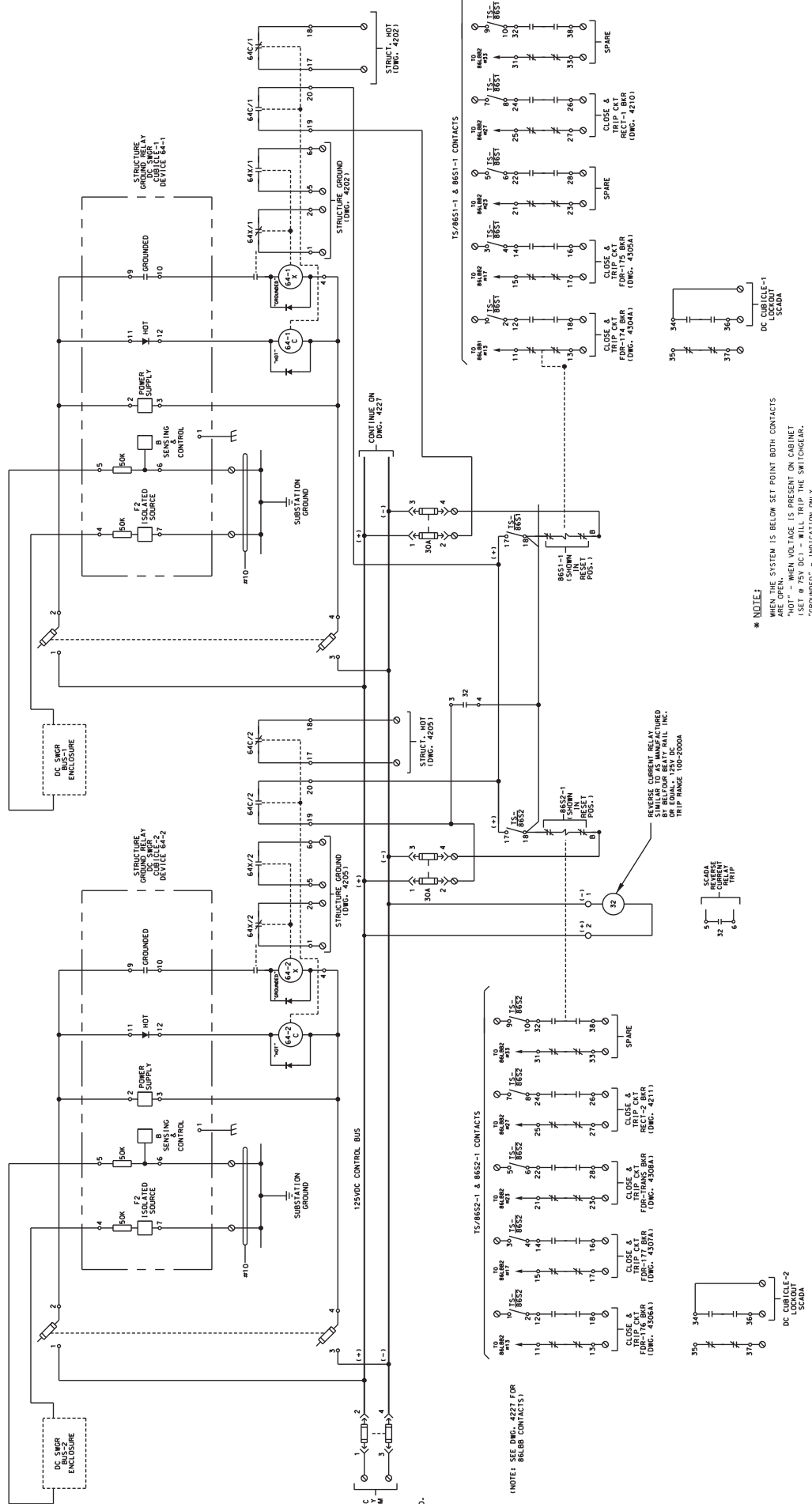
SELECTOR SWITCH DEVICES

CONTACTS	REMOTE	LOCAL
1-2	R	X
3-4	L	X
5-6	R	X
7-8	L	X
9-10	R	X
11-12	L	X

NON-SPRING RETURN, LOCAL POSITION CLOSING IS WITH FACING FRONT OF SWITCH.

PRINTED ON 80115

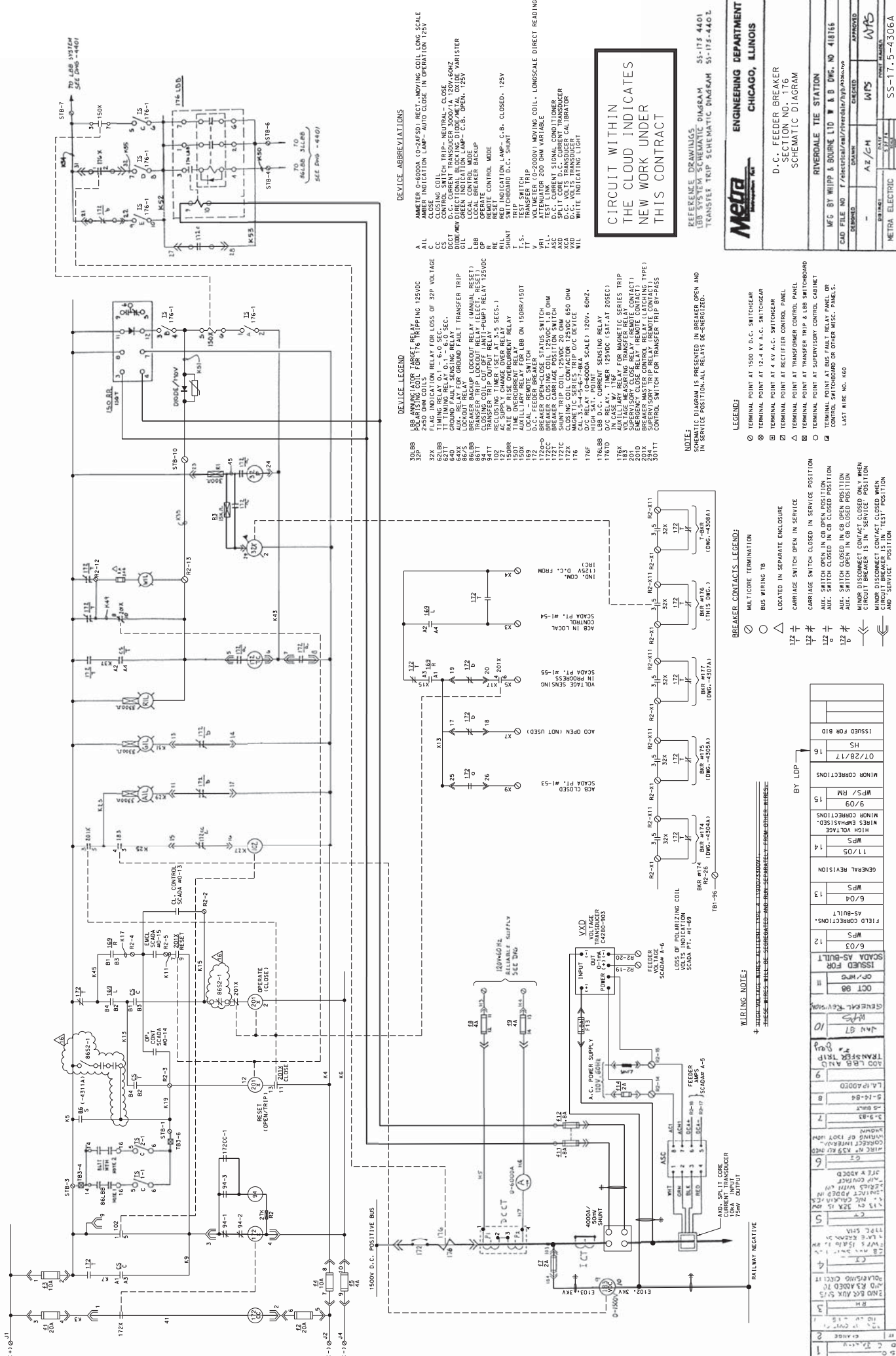
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REV	DATE	BY	APP	DESCRIPTION										
<p>CONSULTANT SEAL & SIGNATURE</p>														
<p>CONSULTANT</p>														
<p>ISSUES: HIS</p> <p>DRAWN: JMC</p> <p>CHECKED: FM</p> <p>REVISED: SCENT</p> <p>DATE: JUNE 12, 2017</p>														
<p>Meta</p> <p>547 W. JACKSON BOULEVARD</p> <p>CHICAGO, ILLINOIS 60681</p>														
<p>LOCATION NAME: RIVERDALE SUBSTATION</p> <p>TITLE: 1500V DC SCHEMATIC DIAGRAM RECTIFIER BREAKER 723</p>														
<p>CAD FILE NUMBER: 85174217.DWG</p>														



*** NOTICE:**
 WHEN THE SYSTEM IS BELOW SET POINT BOTH CONTACTS
 WILL TRIP. WHEN VOLTAGE IS PRESENT ON CABINET
 (SET @ 75V DC) - WILL TRIP THE SWITCHGEAR.
 "GROUNDED" - INDICATION ONLY

DC SWGR-STRUCTURE GRD RELAY, CUBICLE-2

ISSUED FOR BID				DESCRIPTION			
REV	DATE	BY	APP	REV	DATE	BY	APP
0	0/0/2017	HS					
PROJECT NO.: GANZB-F70202 SHEET NO.: SS-17.5-4226 FILE FOLDER: I/S							
LOCATION NAME: RIVERDALE SUBSTATION TITLE: 1500V DC SCHEMATIC DIAGRAM DC SWITCHGEAR GROUND RELAY							
DRAWN: JMC CHECKED: FM DESIGNED: MRETA PALLAS, ESSENT DATE: JUNE 12, 2017				CONSULTANT: Gannett Fleming CONSULTANT SEAL & SIGNATURE: [Signature]			
DESIGNER: JMC CHECKER: FM DATE: JUNE 12, 2017				PROJECT NO.: GANZB-F70202 SHEET NO.: SS-17.5-4226 FILE FOLDER: I/S			



CIRCUIT WITHIN THE CLOUD INDICATES NEW WORK UNDER THIS CONTRACT

TRIP LAMP - 115V
SEE PWD - 4401

DEVICE ABBREVIATIONS

- ALL AMERICAN ELECTRIC (O-200) MOVING COIL LONG SCALE
- CLS CLOSE
- CLS CONTROL SWITCH TRIP - NEUTRAL - CLOSE
- DCCT D.C. CURRENT TRANSFORMER 3000/1A 20V 60HZ
- GLN GREEN INDICATION LAMP - C.B. OPEN, 125V
- LBB LOCAL BREAKER BACKUP
- OP OPERATE
- RE RESET
- RE RESISTOR
- SLUNT SLIDING CONTACT
- T TRIP
- TRIP TRIP
- V VOLTMETER (0-2000V) MOVING COIL, LONGSCALE DIRECT READING
- V TEST LINE
- WGL WIRE GUARD LOCKING SWITCH
- WLT WHITE INDICATING LIGHT

REFERENCE DRAWINGS 55-117-4401
SCHEMATIC DIAGRAM
TRANSFER TRIP SCHEMATIC DIAGRAM 55-117-4402



ENGINEERING DEPARTMENT
CHICAGO, ILLINOIS

D.C. FEEDER BREAKER
SECTION NO. 176
SCHEMATIC DIAGRAM

RIVERDALE TIE STATION

MFG BY WHIPP & BOONE LTD W B BPG. NO 41816

APPROVED WFS

DESIGNED WFS

CHECKED WFS

DATE

DRAWN

FILE NO

BY WHIPP & BOONE LTD W B BPG. NO 41816

APPROVED WFS

DESIGNED WFS

CHECKED WFS

DATE

DRAWN

FILE NO

BY WHIPP & BOONE LTD W B BPG. NO 41816

APPROVED WFS

DESIGNED WFS

CHECKED WFS

DATE

DRAWN

FILE NO

NOTE:
SCHEMATIC DIAGRAM IS PRESENTED IN BREAKER OPEN AND IN SERVICE POSITION-ALL RELAYS DE-ENERGIZED.

LEGEND:

- TERMINAL POINT AT 1600 V D.C. SWITCHGEAR
- ⊗ TERMINAL POINT AT 12.4 KV A.C. SWITCHGEAR
- ⊠ TERMINAL POINT AT 4 KV A.C. SWITCHGEAR
- ⊡ TERMINAL POINT AT RECTIFIER CONTROL PANEL
- △ TERMINAL POINT AT TRANSFORMER CONTROL PANEL
- ▽ TERMINAL POINT AT SUPERVISORY CONTROL CABINET
- ◻ TERMINAL POINT ON FEEDER BUS
- ◼ TERMINAL POINT ON OTHER FEEDER BUS.

- ⊢ CARRIAGE SWITCH OPEN IN SERVICE POSITION
- ⊣ AUX. SWITCH OPEN IN CB OPEN POSITION
- ⊤ AUX. SWITCH CLOSED IN CB CLOSED POSITION
- ⊥ AUX. SWITCH OPEN IN CB OPEN POSITION
- ⊦ MINOR DISCONNECT CONTACT CLOSED ONLY WHEN MAJOR DISCONNECT IS IN SERVICE POSITION
- ⊧ CIRCUIT BREAKER IS IN "TEST" POSITION AND "SERVICE" POSITION

BREAKER CONTACTS LEGEND:

- MULTICORE TERMINATION
- BUS WIRING TB
- △ LOCATED IN SEPARATE ENCLOSURE

30LBB LBB ANNUNCIATOR TARGET RELAY, 125VDC
250V 0.5A COILS

32P FLAG INDICATION RELAY FOR LOSS OF 32P VOLTAGE
250V 0.5A COILS

62LBB TIME RELAY, 6.0 SECS.

64D GROUND FAULT SENSING RELAY, 125VDC

86/5 LOCKOUT RELAY FOR GROUND FAULT TRANSFER TRIP

86LBB BREAKER BACKUP LOCKOUT RELAY (MANUAL RESET)

94 T CLOSING COIL OFF (ANTI-PUMP) RELAY 125VDC

102 T CLOSING TIMER (SET AT 3.5 SECS.)

127 AC SUPPLY CHANGE OVER RELAY

130 T TIME OVERCURRENT RELAY

150 L LOCAL REMOTE SWITCH, LB ON 1500V/150T

159 D.C. FEEDER BREAKER

172 ZC BREAKER CLOSING COIL 125VDC 1.8 OHM

172CC BREAKER CLOSING COIL 125VDC 45 OHM

172K CLOSING COIL CONTACTOR 125VDC 650 OHM

176 CAL-3.4-55-M1-88A D/C DEVICE

176F D/C RELAY 10-6000A SCALE) 120V, 60HZ.

176LBB LBB D.C. CURRENT SENSING RELAY

176TD D/C RELAY, TIMER 250VDC (SAT.AT 20SECS)

176X AUXILIARY RELAY FOR MAGNETIC SERIES TRIP

201 SUPERVISORY CLOSE RELAY (REMOTE CONTACT)

201B SUPERVISORY OPEN RELAY (REMOTE CONTACT)

201D SUPERVISORY TRIP RELAY (REMOTE CONTACT)

201T CONTROL SWITCH FOR TRANSFER TRIP BY-PASS

DEVICE LEGEND:

- 30LBB LBB ANNUNCIATOR TARGET RELAY, 125VDC
- 32P FLAG INDICATION RELAY FOR LOSS OF 32P VOLTAGE
- 62LBB TIME RELAY, 6.0 SECS.
- 64D GROUND FAULT SENSING RELAY, 125VDC
- 86/5 LOCKOUT RELAY FOR GROUND FAULT TRANSFER TRIP
- 86LBB BREAKER BACKUP LOCKOUT RELAY (MANUAL RESET)
- 94 T CLOSING COIL OFF (ANTI-PUMP) RELAY 125VDC
- 102 T CLOSING TIMER (SET AT 3.5 SECS.)
- 127 AC SUPPLY CHANGE OVER RELAY
- 130 T TIME OVERCURRENT RELAY
- 150 L LOCAL REMOTE SWITCH, LB ON 1500V/150T
- 159 D.C. FEEDER BREAKER
- 172 ZC BREAKER CLOSING COIL 125VDC 1.8 OHM
- 172CC BREAKER CLOSING COIL 125VDC 45 OHM
- 172K CLOSING COIL CONTACTOR 125VDC 650 OHM
- 176 CAL-3.4-55-M1-88A D/C DEVICE
- 176F D/C RELAY 10-6000A SCALE) 120V, 60HZ.
- 176LBB LBB D.C. CURRENT SENSING RELAY
- 176TD D/C RELAY, TIMER 250VDC (SAT.AT 20SECS)
- 176X AUXILIARY RELAY FOR MAGNETIC SERIES TRIP
- 201 SUPERVISORY CLOSE RELAY (REMOTE CONTACT)
- 201B SUPERVISORY OPEN RELAY (REMOTE CONTACT)
- 201D SUPERVISORY TRIP RELAY (REMOTE CONTACT)
- 201T CONTROL SWITCH FOR TRANSFER TRIP BY-PASS

NOTE:
SCHEMATIC DIAGRAM IS PRESENTED IN BREAKER OPEN AND IN SERVICE POSITION-ALL RELAYS DE-ENERGIZED.

LEGEND:

- TERMINAL POINT AT 1600 V D.C. SWITCHGEAR
- ⊗ TERMINAL POINT AT 12.4 KV A.C. SWITCHGEAR
- ⊠ TERMINAL POINT AT 4 KV A.C. SWITCHGEAR
- ⊡ TERMINAL POINT AT RECTIFIER CONTROL PANEL
- △ TERMINAL POINT AT TRANSFORMER CONTROL PANEL
- ▽ TERMINAL POINT AT SUPERVISORY CONTROL CABINET
- ◻ TERMINAL POINT ON FEEDER BUS
- ◼ TERMINAL POINT ON OTHER FEEDER BUS.

- ⊢ CARRIAGE SWITCH OPEN IN SERVICE POSITION
- ⊣ AUX. SWITCH OPEN IN CB OPEN POSITION
- ⊤ AUX. SWITCH CLOSED IN CB CLOSED POSITION
- ⊥ AUX. SWITCH OPEN IN CB OPEN POSITION
- ⊦ MINOR DISCONNECT CONTACT CLOSED ONLY WHEN MAJOR DISCONNECT IS IN SERVICE POSITION
- ⊧ CIRCUIT BREAKER IS IN "TEST" POSITION AND "SERVICE" POSITION

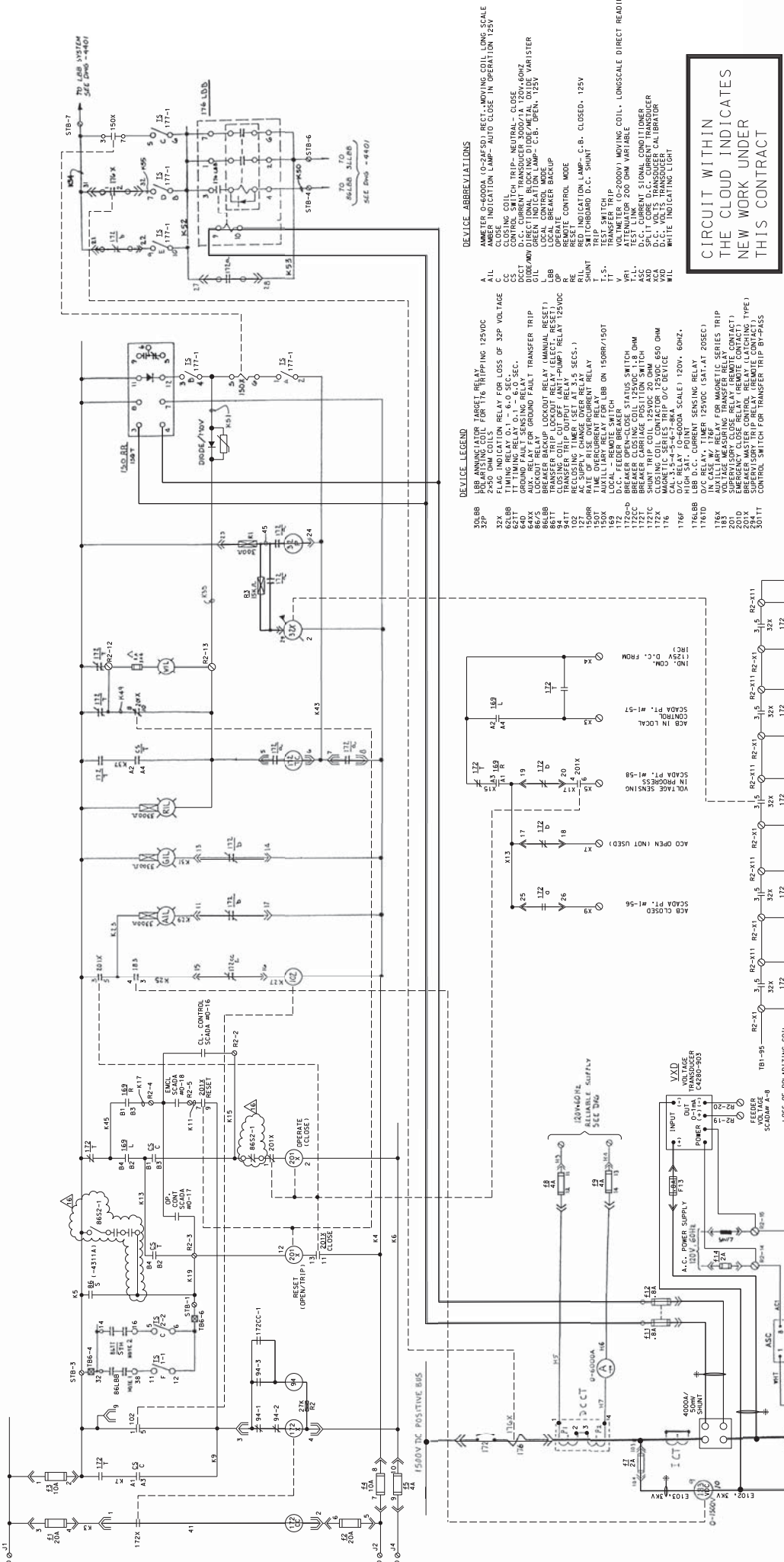
WIRING NOTE:

- * 240V VOLTAGE - THESE WIRING METHODS APPLY TO 250V/2000V.
- ** 240V VOLTAGE - THESE WIRING METHODS APPLY TO 250V/2000V.
- ** 240V VOLTAGE - THESE WIRING METHODS APPLY TO 250V/2000V.

BREAKER CONTACTS LEGEND:

- MULTICORE TERMINATION
- BUS WIRING TB
- △ LOCATED IN SEPARATE ENCLOSURE

NO.	DESCRIPTION	DATE
1	ISSUED FOR GENERAL REVISION	11/05
2	ISSUED FOR GENERAL REVISION	11/05
3	ISSUED FOR GENERAL REVISION	11/05
4	ISSUED FOR GENERAL REVISION	11/05
5	ISSUED FOR GENERAL REVISION	11/05
6	ISSUED FOR GENERAL REVISION	11/05
7	ISSUED FOR GENERAL REVISION	11/05
8	ISSUED FOR GENERAL REVISION	11/05
9	ISSUED FOR GENERAL REVISION	11/05
10	ISSUED FOR GENERAL REVISION	11/05
11	ISSUED FOR GENERAL REVISION	11/05
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13	ISSUED FOR GENERAL REVISION	11/05
14	ISSUED FOR GENERAL REVISION	11/05
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45	ISSUED FOR GENERAL REVISION	11/05
46	ISSUED FOR GENERAL REVISION	11/05
47	ISSUED FOR GENERAL REVISION	11/05
48	ISSUED FOR GENERAL REVISION	11/05
49	ISSUED FOR GENERAL REVISION	11/05
50	ISSUED FOR GENERAL REVISION	11/05



REFERENCE DRAWINGS
 LBS SYSTEM SCHEMATIC DIAGRAM 55-117-4401
 TRANSFER TRIP SCHEMATIC DIAGRAM 55-117-4402



ENGINEERING DEPARTMENT
 CHICAGO, ILLINOIS
 D.C. FEEDER BREAKER
 SECTION NO. 177
 SCHEMATIC DIAGRAM

RIVERDALE TIE STATION			
WFO BY WHIPP & BOUNE LTD	WFO	WFS	WFS
DATE FILE NO. 1/11/40	DESIGNED	CHECKED	APPROVED
BY WHIPP & BOUNE LTD	BY WHIPP & BOUNE LTD	BY WHIPP & BOUNE LTD	BY WHIPP & BOUNE LTD
DATE FILE NO. 1/11/40	DESIGNED	CHECKED	APPROVED
BY WHIPP & BOUNE LTD	BY WHIPP & BOUNE LTD	BY WHIPP & BOUNE LTD	BY WHIPP & BOUNE LTD

CIRCUIT WITHIN THE CLOUD INDICATES NEW WORK UNDER THIS CONTRACT

DEVICE ABBREVIATIONS

ALL AMERICAN ELECTRIC CO. MOVING COIL LONG SCALE
 CLOSE CONTACT LAMP - 400 LUMENS IN POSITION 125A
 CONTROL SWITCH TRIP - NEUTRAL - CLOSE
 D.C.T. CURRENT TRANSDUCER 3000/1A 20V/60HZ
 GROUND FAULT SENSING RELAY - SEC.
 GREEN INDICATION LAMP - C.B. OPEN - 125V
 LOCAL BREAKER BACKUP
 OPERATE CONTROL MODE
 RESET RE-ENERGIZE
 SEQUENCE CONTROL
 TRIP UNIT 150
 TRANSFER TRIP
 VOLTAGE SENSING RELAY
 WATT METER 0-2000W MOVING COIL LONGSCALE DIRECT READING
 TEST LAMP
 T.L. THERMAL LIMIT
 S.C.T. CURRENT TRANSDUCER
 D.C. VOLTS TRANSDUCER
 MCA
 M.C.A. MOVING COIL
 WIL WHITE INDICATING LIGHT

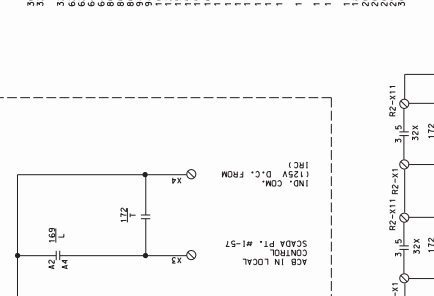
DEVICE LEGEND

LBS ANNUNCIATOR TARGET RELAY
 32P FLAG INDICATION RELAY FOR LOSS OF 32P VOLTAGE
 32X TIMING RELAY 0 - 6.0 SECS.
 62LBB GROUND FAULT SENSING RELAY
 64D LOCKOUT RELAY FOR GROUND FAULT TRANSFER TRIP
 86/5 BREAKER BACKUP LOCKOUT RELAY (MANUAL RESET)
 86LBB CLOSING COIL CUT OFF (ANTI-PUMP) RELAY 125VDC
 94 T CLOSING COIL CUT OFF (ANTI-PUMP) RELAY 125VDC
 102 RE-ENERGIZE RELAY (SET AT 3.5 SECS.)
 127 AC SUPPLY CHANGE OVER RELAY
 130T TIME OVERCURRENT RELAY
 150T LOCAL - REMOTE SWITCH LBS ON 1500V/150T
 166 D.C. FEEDER BREAKER
 172C BREAKER CLOSING POSITION SWITCH
 172C BREAKER CLOSING POSITION SWITCH
 172C CLOSING COIL CONTACTOR 125VDC 650 OHM
 172C CLOSING COIL CONTACTOR 125VDC 650 OHM
 176 CAL 3.5-45-M1-884
 176F D/C RELAY 10-6000A SCALE 120V/ 60HZ.
 176LBB LBS D.C. CURRENT SENSING RELAY
 176TD D/C RELAY, TIMER 25VDC (SAT AT 20SEC)
 176X ADVILLARY RELAY FOR MAGNETIC SERIES TRIP
 201 SUPERVISORY CLOSE RELAY (REMOTE CONTACT)
 201 SUPERVISORY OPEN RELAY (REMOTE CONTACT)
 201 SUPERVISORY TRIP RELAY (REMOTE CONTACT)
 201T CONTROL SWITCH FOR TRANSFER TRIP BY-PASS

NOTES:
 SCHEMATIC DIAGRAM IS PRESENTED IN BREAKER OPEN AND IN SERVICE POSITION. ALL RELAYS BE-ENERGIZED.

LEGEND:

- TERMINAL POINT AT 1500 V.D.C. SWITCHGEAR
- TERMINAL POINT AT 12.5 KV A.C. SWITCHGEAR
- TERMINAL POINT AT 4 KV A.C. SWITCHGEAR
- △ TERMINAL POINT AT RECTIFIER CONTROL PANEL
- ▽ TERMINAL POINT AT TRANSFORMER CONTROL PANEL
- TERMINAL POINT AT TRANSFER TRIP & LBS SWITCHBOARD
- ▾ TERMINAL POINT AT SUPERVISORY CONTROL CABINET
- TERMINAL POINT AT BUS FAULT RELAY PANEL OR BUS BAR OVERCURRENT PROTECT. PANELS.
- LAST WIRE NO. 860



BREAKER CONTACTS LEGEND:

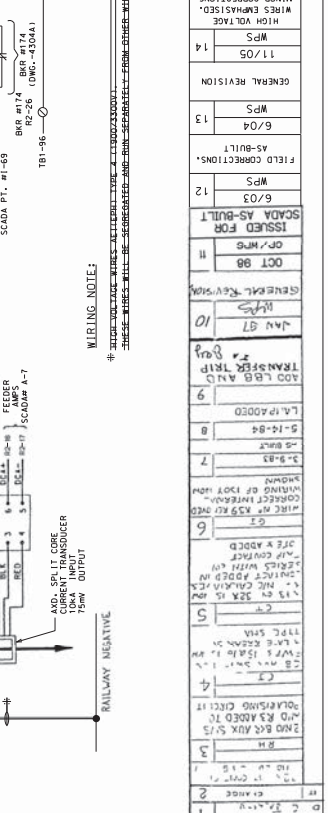
- MULTIPLE TERMINATION
- BUS WIRING TO
- △ LOCATED IN SEPARATE ENCLOSURE
- ⊥ CARRIAGE SWITCH OPEN IN SERVICE
- ⊥ AUX. SWITCH OPEN IN CB OPEN POSITION
- ⊥ AUX. SWITCH CLOSED IN CB CLOSED POSITION
- ⊥ AUX. SWITCH OPEN IN CB OPEN POSITION
- ⊥ AUX. SWITCH CLOSED IN CB CLOSED POSITION
- ⊥ MINOR DISCONNECT CONTACT CLOSED ONLY WHEN MAJOR DISCONNECT CONTACT IS OPEN
- ⊥ CIRCUIT BREAKER IS IN TEST POSITION AND 'SERVICE' POSITION

WIRING NOTICE:

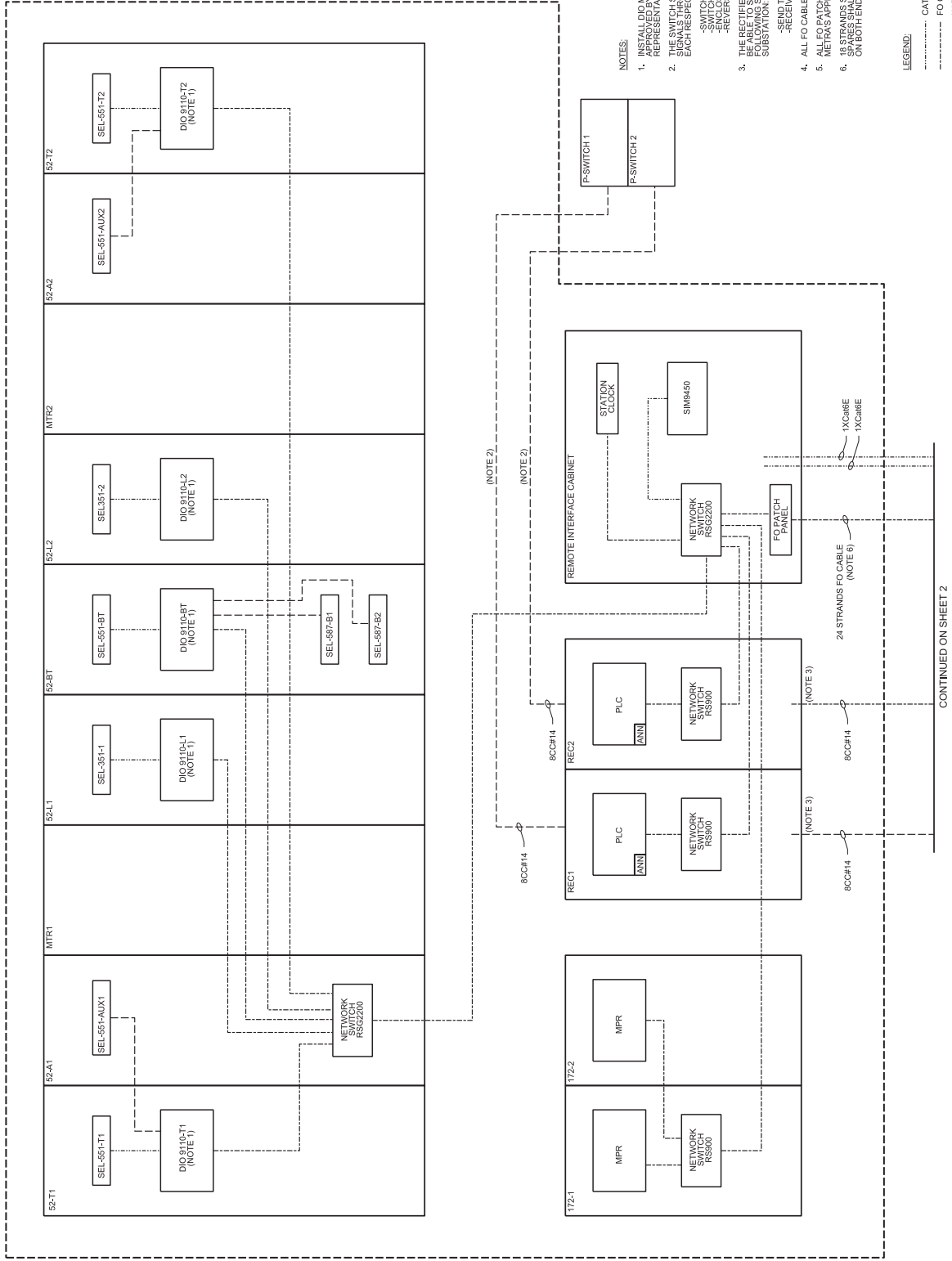
1000V VOLTAGE WIRE - YELLOW
 # 2000V VOLTAGE WIRE - RED
 # 1500V VOLTAGE WIRE - GREEN
 # 125V VOLTAGE WIRE - BLUE

BY LOP

16	HS	ISSUED FOR R10
15	WFS, RM	07/28/17
14	MINOR CORRECTIONS	MINOR CORRECTIONS
13	WFS	11/05
12	WFS	6/04
11	WFS	6/03
10	WFS	6/03
9	WFS	6/03
8	WFS	6/03
7	WFS	6/03
6	WFS	6/03
5	WFS	6/03
4	WFS	6/03
3	WFS	6/03
2	WFS	6/03
1	WFS	6/03



NEW PREFABRICATED SUBSTATION



CONTINUED ON SHEET 2

LOCATION NAME: RIVERDALE SUBSTATION		LOCATION NUMBER: SP/RES	
TITLE: STATION CONTROL ARCHITECTURE EXISTING BUILDING AND INTERFACES SHEET 1 OF 2		DISTRICT: PROJECT NO. 042624-PT10000	
DESIGNED BY: DREW N. EMZ		SHEET NO.: SS-17.5-5000	
CHECKED BY: METRA P. S. SZENT		DATE: JUNE 12, 2017	
DATE: JUNE 12, 2017		SCALE: 1" = 1'	
DATE: JUNE 12, 2017		FILE PATH: I:\S	

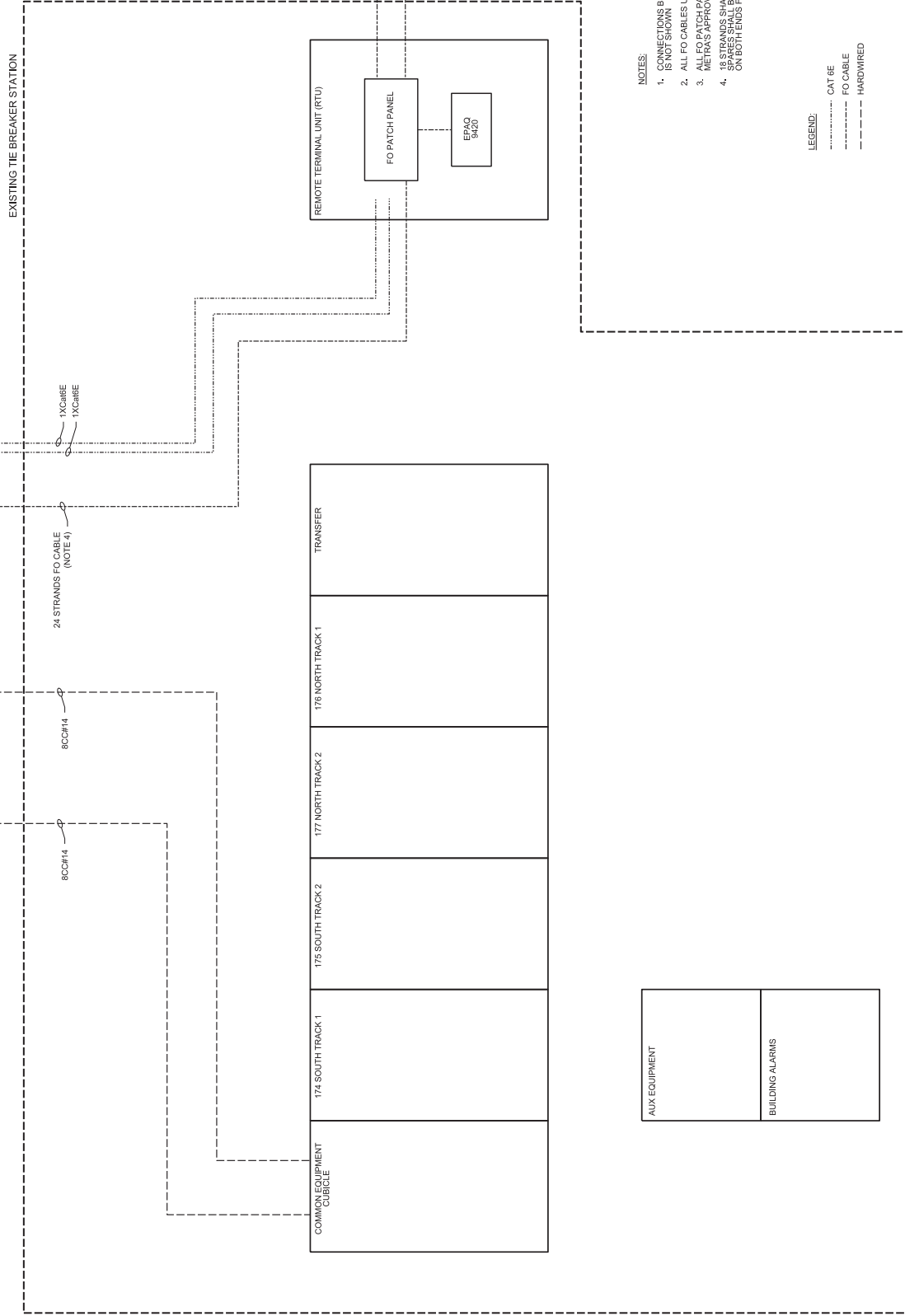
LTK Engineering Services
 571 W. JACKSON BOULEVARD
 CHICAGO, ILLINOIS 60601

Metra
 METRA REGIONAL
 571 W. JACKSON BOULEVARD
 CHICAGO, ILLINOIS 60601

REV	DATE	BY	APP	DESCRIPTION
0	1/29/2017	AA	ER	ISSUED FOR BID

PRINTED ON 50LITES

CONTINUED ON SHEET 1



AUX EQUIPMENT	
BUILDING ALARMS	

- NOTES:
1. CONNECTIONS BETWEEN EXISTING EQUIPMENT IS NOT SHOWN
 2. ALL FO CABLES USED SHALL BE MULTIMODE.
 3. ALL FO PATCH PANELS SHALL BE SUBJECT TO METRA'S APPROVAL.
 4. 18 STRANDS SHALL BE KEPT AS SPARES. ALL SPARES SHALL BE PROPERLY TERMINATED ON BOTH ENDS FOR FUTURE USE.

LEGEND:
 CAT 6E
 - - - - - FO CABLE
 - - - - - HARDWIRED

CAD FILE NUMBER: SPRESS		DISTRICT: SS-17,5-5001	
LOCATION NAME: RIVERDALE SUBSTATION		PRODUCT NO. GANZER-P10202	
TITLE: STATION CONTROL ARCHITECTURE EXISTING BUILDING AND INTERFACES SHEET 2 OF 2		SHEET NO. SS-17,5-5001	
DESIGNED BY: DREWYN LEMZ		METRA LOGO METRA ENGINEERING SERVICES 571 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601	
CHECKED BY: METRA P.M. S. GERRAT		DATE: JUNE 12, 2017	
PRIMARY CONSULTANT: LTK Engineering Services		SUB CONSULTANT:	
SEAL SIGNATURE: 		ISSUED FOR BID DESCRIPTION	
REV	DATE	BY	APP
0	12/20/17	AA	ER