KANSAS CITY AREA TRANSPORTATION AUTHORITY WITH CITY OF KANSAS CITY, MISSOURI
KANSAS CITY STREETCAR AUTHORITY
PORT AUTHORITY OF KANSAS CITY, MO
KANSAS CITY STREETCAR

RIVERFRONT EXTENSION
FTA FAIN # MO-2022-002-00
KCATA PROJECT No.: 2021-SC-3P01
KCMO PROJECT No.: 89022015
ISSUED FOR BID
DECEMBER 2022
(T49N, R33W)

This work will be called Package 6 (Pkg 6) and will be posted on KCATA's website for a General Contractor bid.

These plans have been separated into different packets to assist potential subcontractors in reviewing their potential scopes of work.

https://www.kcata.org/about_kcata/entries/current_opportunities

[Diagram of the Riverfront Extension project]

Project Plan 4

PROJECT
TOWNSEND
BROOKFIELD
STREETCAR STEERING COMMITTEE

This set of plans is not for construction. These plans are intended to build interest in bidding the project.

[Contact information for project team members]
<table>
<thead>
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**NOT FOR CONSTRUCTION**
NOTES:
1. SWITCHES ARE NORMALLY CLOSED (NC) UNLESS OTHERWISE NOTED.
2. CONFIGURE TRANSFER TRIP FUNCTION TO NEXT BREAKER WHEN ADJACENT TPSS IS BYPASSED FOR EMD OPTIC CONNECTION.
3. OCC POLE MOUNTED DISCONNECT SWITCH POSITION INDICATIONS SHALL BE MONITORED AND REPORTED TO SCADA AT LOCAL TRANSMISSION SITE.
4. THE SWITCH ONLY REQUIRED TO BE CLOSED WHEN D1 TPSS IS OUT OF SERVICE. THE SWITCH MUST BE CLOSED TO PERFORM MAINTENANCE ON EITHER SOUTHBOUND OR NORTHBOUND POWER SECTIONS BETWEEN EXISTING TPSS A4 AND NEW TPSS D1.
5. TIE SWITCHING AND INTERNAL EQUIPMENT ARE TO BE CONSIDERED UNDER A SEPARATE CONTRACT. REFER TO SHEETS G043 AND SPECIFICATION 01 31 27 CONTRACT INTERFACES FOR DETAILS.

RIVERFRONT EXTENSION
TPSS D1 - SEE NOTE 5
(STA. 217+00)

NEGATIVE RETURN TO TPSS D1
2-250KCMIL CROSSBOND (TYP.)
1-350KCMIL SUPPLEMENTAL FEEDER
SOUTHBOUND ONLY
350KCMIL FEEDER TAP CONNECTIONS EVERY 500 FT MIN.
FUTURE TRANSFER TRIP FIBER OPTIC CABLE TO FUTURE TPSS

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5. TIE SWITCHING AND INTERNAL EQUIPMENT ARE TO BE CONSIDERED UNDER A SEPARATE CONTRACT. REFER TO SHEETS G043 AND SPECIFICATION 01 31 27 CONTRACT INTERFACES FOR DETAILS.
1. PROVIDE PREFABRICATED BUILDING AND EQUIPMENT UNDER THIS CONTRACT.
2. EQUIPMENT DIMENSIONS ARE APPROXIMATE. SUBMIT FINAL DIMENSIONS FOR APPROVAL.
3. NOT USED.
4. INSTALL RECTIFIER AND DC SWITCHGEAR 2" OFF OF REAR WALL. THERE SHALL BE NO GAP BEHIND THE AC SWITCHGEAR.
5. PROVIDE 1/4" GLASTIC ON INTERIOR OF DOOR AND INSULATE OVER PANIC BARS.
6. FOR ACCESS PADS AND STEPS REFER TO STRUCTURAL DRAWINGS.
7. A MOBILE WORKSTATION/CART SHALL BE PROVIDED. REFER TO SPECIFICATION 34 21 17 FOR DETAILS.
8. SEE SHEET J694 FOR FOUNDATION DETAILS.
9. INSTALL 2" X 1/4" CONTINUOUS GROUND BUSBAR AROUND ENTIRE TPSS - CONNECT EQUIPMENT GROUNDS DIRECTLY TO GROUND BUSBAR. BUSBAR SHALL BE CONNECTED TO ALL FRAME GROUND PADS.
10. EXTERIOR OF TPSS SHALL HAVE A BRICK FACADE. SEE CONTRACT SPECIFICATIONS FOR DETAILS.
11. CONTRACTOR SHALL MOUNT ALL EXTERIOR EQUIPMENT PER SUPPLIER INSTRUCTIONS.

NOTES:

- ACCESS PAD
- SCALE: 3/4" = 1'-0"
- METERING AND STATION SERVICE TRANSFORMER: 13.2KV/120-240V DRAWDOWN FUSE TRIMMER
- 13.2KV: 1200A AC CIRCUIT BREAKER
- TYPICAL PREFABRICATED TPSS PLAN - EQUIPMENT LAYOUT PLAN
- DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED WHEN AVAILABLE. SEE NOTE 11.
NOTES:
1. EQUIPMENT DIMENSIONS ARE APPROXIMATE. SUBMIT FINAL DIMENSIONS FOR APPROVAL.
2. NOT USED.
3. SEE SHEET J694 FOR FOUNDATION DETAILS.
4. METERING EQUIPMENT AND SOCKET DETAILS SUBJECT TO APPROVAL OF UTILITY.
5. VENDOR SHALL SIZE EXTERIOR EQUIPMENT DOORS AND SUPPORTS FOR RECTIFIER AND TRANSFORMER TO ALLOW FOR REMOVAL FROM OUTSIDE THE TPSS.
6. EXTERIOR OF TPSS SHALL HAVE A BRICK FACADE. SEE CONTRACT SPECIFICATIONS FOR DETAILS.
7. CONTRACTOR SHALL MOUNT ALL EXTERIOR EQUIPMENT PER SUPPLIER INSTRUCTIONS.

The HNTB COMPANIES
INFRASTRUCTURE SOLUTIONS
300 Apollo Drive
Chelmsford, MA 01824
Phone: 978-905-4000
Certificate of Authority: 001270

HDR Engineering, Inc.
10450 Holmes Road
Suite 600
Kansas City, MO 64131-3471
816-360-2700
Certificate of Authority: 000856

KANSAS CITY STREETCAR - RIVERFRONT EXTENSION
12-23-2022

NOT FOR CONSTRUCTION

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KANSAS CITY STREETCAR - RIVERFRONT EXTENSION
12-23-2022

NOT FOR CONSTRUCTION

DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED WHEN AVAILABLE. SEE NOTE 7.
NOTES:
1. ALL DIMENSIONS ARE APPROXIMATE. SUBMIT FINAL DIMENSIONS FOR APPROVAL.
2. CONTRACTOR TO DETERMINE SIZE AND LOCATION OF TRANSFORMER AND RECTIFIER VENTILATION.
3. INSTALL 2" x 1/4" CONTINUOUS GROUND BUSBAR AROUND ENTIRE TPSS - CONNECT EQUIPMENT GROUNDS DIRECTLY TO GROUND BUSBAR.
4. INCOMING SWITCH, METERING EQUIPMENT, AND SOCKET DETAILS SUBJECT TO APPROVAL OF UTILITY.
5. REFER TO SPECIFICATIONS FOR COMMUNICATIONS RACK REQUIREMENTS.
6. PROVIDE 1/4" GLASTIC ON INTERIOR OF DOOR AND INSULATE OVER PANIC BARS.
7. INSTALL RECTIFIER AND DC SWITCHGEAR 2" OFF OF REAR WALL. THERE SHALL BE NO GAP BEHIND THE AC SWITCHGEAR.
8. CONTRACTOR SHALL MOUNT ALL EXTERIOR EQUIPMENT PER SUPPLIER INSTRUCTIONS.
9. PROVIDE MOBILE WORKSTATION/CART SHALL BE PROVIDED REFER TO SPECIFICATION 24 21 17 FOR DETAILS.
1. Secure cables along the bracket.
2. Provide enough slack in cables for surge arresters to fall away from bracket.
3. Provide fiberglass enclosure with viewing window and door locks.
4. Surge arresters shall be mounted at a minimum of 9'-6" above finished grade.
5. Contractor shall mount all exterior equipment per supplier instructions.

**NOTES:**

**SECTION - EXTERIOR**

**SECTION - INTERIOR**

**SIDE VIEW**

DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED WHEN AVAILABLE. SEE NOTE 5.
NOTES:
1. FOR TYPICAL TPSS LAYOUT, SEE SHEET J620 FOR DETAILS.
2. SEE SHEET J620 FOR SITE RACERAY LAYOUT.
3. GROUND GRID CONDUCTORS SHALL BE BURIED A MINIMUM OF 2'-6" BELOW GRADE.
4. GROUND GRID MUST BE CONSTRUCTED ON NATIVE SOIL ONLY. A MINIMUM OF 6" INCHES OF NATIVE SOIL, FREE FROM DEBRIS AND ROCK, MUST COVER THE TOP OF THE ENTIRE GROUND GRID AREA.
5. THE MAXIMUM GROUNDING RESISTANCE SHALL NOT EXCEED 5 OHMS.
6. CONTINUOUS GROUND BUSBAR AROUND INTERIOR OF TPSS MUST BE SHOWN. SEE SHEETS J620 THROUGH J623 FOR DETAILS. GROUND GRID SHALL BE CONNECTED TO ALL BUILDING GROUND PADS.
7. PROVIDE A MINIMUM OF 3' ASPHALT COVER OVER THE ENTIRE SITE. EXTEND THE ASPHALT COVER AT LEAST 6' BEYOND THE GROUND GRID LIMITS.
8. EVERY FENCE POST SHALL BE CONNECTED TO THE GROUND GRID PER DETAIL 12 ON SHEET J673. GATES SHALL BE CONNECTED TO THE GROUND GRID PER DETAIL 11 ON SHEET J673.
9. PROVIDE 1" CLAMS FOR EXISTING PROPERTY LINES, FENCING, GRADING, AND CONTINUATION OF DUCTBANKS.
10. EVERY SWITCHGEAR WILL BE GROUNDED BY EVERGY WITH A LOCAL GROUND ROD.
DISCONNECT SWITCH FEATURES:

- (6) 2000 AMP DISCONNECT SWITCHES
- 1000VDC SWITCH & BUSBAR INSULATION RATING
- SINGLE POLE, SINGLE THROW, BOLTED PRESSURE TYPE SWITCHES
- NON-FUSIBLE
- NON-LOAD BREAK OPERATION
- 2000 AMP MAIN BUSBAR CAPACITY
- SILVER PLATED TERMINALS
- 1 NO/NC AUX. CONTACT FOR POSITION INDICATION
- FRONT OPERATED WITH PADLOCK FEATURE
- OPERATOR HANDLE AND DOOR ARE MECHANICALLY INTERLOCKED TO PREVENT DOOR OPENING WITH THE SWITCH IN THE CLOSED POSITION
- OPERATOR HANDLE GROUNDED
- NEMA 4X PAD MOUNTED FIBERGLASS ENCLOSURE:
- ANSI 61 GRAY EXTERIOR AND WHITE INTERIOR
- CONTINUOUS STAINLESS STEEL HINGE
- DOOR PERIMETER IS FULLY GASKETED
- 3 POINT HANDLE IS PADLOCKABLE
- APPROX. WT. - 1500 LBS

NOTES:

1. DIMENSIONS PROVIDED ARE TYPICAL. FINAL DIMENSIONS SHALL BE DETERMINED BY DISCONNECT SWITCH MANUFACTURER.

2. EACH DISCONNECT SWITCH POSITION STATUS INDICATIONS SHALL BE REPORTED TO THE SAS PLC. SEE SITE SPECIFIC CONDUCTOR SCHEDULE FOR CABLE REQUIREMENTS.

3. PAD-MOUNTED DISCONNECT SWITCHES FURNISHED AND INSTALLED BY THE CONTRACTOR.
NOTES:

1. FOR COORDINATION PURPOSES ONLY. REFER TO VENDOR'S AC PANELBOARD DRAWING FOR AC PANEL LAYOUT.

2. ALL INTERNAL BUILDING WIRING AND FINAL BREAKER SIZES TO BE DETERMINED BY VENDOR (OWNER SUPPLIED) IN COORDINATION WITH THE CONTRACTOR (THIS CONTRACT). SHOP DRAWINGS TO BE PROVIDED BY THE OWNER WHEN AVAILABLE.

3. DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED AND SHOP DRAWINGS SUPPLIED WHEN AVAILABLE.

AC PANEL ADP - PANEL SCHEDULE

---

209/120 VAC PANEL 38. +9R. 43 CIRCUIT

LOAD DESCRIPTION | LOAD KVA | CB SIZE | AMPS | LOAD DESCRIPTION | LOAD KVA | CB SIZE | AMPS
--- | --- | --- | --- | --- | --- | --- | ---
INTERIOR LIGHTS | | | | EXTERIOR LIGHTS | | | |
INTERIOR RECEPTACLES | | | | EXTERIOR RECEPTACLES | | | |
HVAC #1 | | | | HVAC #2 | | | |
BATTERY CHARGER | | | | EXHAUST FAN | | | |
FIRE ALARM PANEL | | | | SMOKE DETECTOR | | | |
EXIT LIGHTS/EMERGENCY LIGHT | | | | SWITCHGEAR LIGHTS | | | |
SPARE | | | | SPARE | | | |
RECTIFIER TRANSFORMER | | | | RECTIFIER HEATERS | | | |
SPARE | | | | SPARE | | | |
SPACE | | | | SPACE | | | |
SPACE | | | | SPACE | | | |
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NOTE 2

DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED WHEN AVAILABLE.
### DC Panel DDP - Panel Schedule

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<th>Load Description</th>
<th>Load Watts</th>
<th>CB Qty No.</th>
<th>Size Amps</th>
<th>DC Qty No.</th>
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**Notes:**

1. FOR COORDINATION PURPOSES ONLY. REFER TO VENDOR’S AC PANELBOARD DRAWING FOR AC PANEL LAYOUT.
2. ALL INTERNAL BUILDING WIRING AND FINAL BREAKER SIZES TO BE DETERMINED BY VENDOR (OWNER SUPPLIED) IN COORDINATION WITH THE CONTRACTOR (THIS CONTRACT).
3. FOR THE DC DISTRIBUTION PANEL, AUXILIARY CONTACTS OF THE MAIN AND EACH BRANCH CIRCUIT BREAKERS SHALL BE ACTUALLY WIDELY TO A TERMINAL STRIP FOR CONNECTION TO THE ANNUNCIATOR AND SUPERVISORY CIRCUITS. TRIPPED OR OPEN CIRCUIT BREAKERS SHALL BE ANNUNCIATED.
4. SHOP DRAWINGS TO BE PROVIDED BY THE OWNER WHEN AVAILABLE.
5. DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED AND SHOP DRAWINGS SUPPLIED WHEN AVAILABLE.
NOTES:
1. FINAL SCHEMATICS, LOGIC, AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED BY THE VENDOR.
2. EQUIPMENT CUBICLE LIGHTING AND HEATING TO BE PROPOSED BY VENDOR. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.
3. EQUIPMENT SPECIFIC SCHEMATICS (AC SWITCHGEAR, DC SWITCHGEAR, RECTIFIER TRANSFORMER, ETC.) TO BE PROPOSED BY VENDOR. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.

120VAC FROM AC PANELBOARD (SEE SHEET J642)

INTERIOR LIGHTS

120VAC FROM AC PANELBOARD (SEE SHEET J642)

EXIT AND EMERGENCY LIGHTS

EXTerior LIGHTS

120VAC FROM AC PANELBOARD (SEE SHEET J642)
DRAFTING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED WHEN AVAILABLE.

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DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED WHEN AVAILABLE.
AND GATE

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SIGNAL INVERSION

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GREATER THAN COMPARATOR

IF THE INPUT VALUE IS GREATER THAN OR EQUAL TO THE SET POINT, THE OUTPUT BECOMES ACTIVE.

LESS THAN COMPARATOR

IF THE INPUT VALUE IS LESS THAN OR EQUAL TO THE SET POINT, THE OUTPUT BECOMES ACTIVE.

SET OVER RESET OPERATOR

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COUNTER

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EACH TIME INPUT #1 IS PULSED HIGH THE COUNTER INCREMENTS AND THE OUTPUT REFLECTS THE COUNT VALUE. WHEN INPUT #2 IS PULSED HIGH THE COUNT VALUE IS RESET.

TIME DELAY

A RISING EDGE ON THE INPUT STARTS THE TIMER. THE TIMER COUNTS AS LONG AS THE INPUT IS HIGH. IF THE TIMER EXPIRES WHILE THE INPUT IS HIGH THE OUTPUT BECOMES ACTIVE. A FALLING INPUT EDGE RESETS THE TIMER.

AND GATE

<table>
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<th>INPUT #1</th>
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OR GATE

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EXCLUSIVE OR GATE

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</tbody>
</table>

DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED WHEN AVAILABLE.

NOTES:
1. FOR COORDINATION ONLY. FINAL SCHEMATICS, LOGIC, AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED BY THE VENDOR. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.
NOTES:
1. PLC OUTPUT ACTIVATES LOCKOUT RELAY 186 & 86X.
2. THIS SIGNAL IS ACTIVE LOW.
3. FLASHING BLUE LIGHT (NEW UNACKNOWLEDGED ALARM)
   SOLID BLUE LIGHT (ACTIVE ACKNOWLEDGED ALARMS)
   BLUE LIGHT OFF (NO ACTIVE ALARMS).
4. FOR COORDINATION ONLY. FINAL SCHEMATICS, LOGIC,
   AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED
   BY THE VENDOR. SEE SHOP DRAWINGS SUPPLIED BY
   BUILDING VENDOR VIA OWNER.
AC MAIN BREAKER TO TRANSFORMER TRIPPING LOGIC

NOTES:
1. WHEN CONDITIONS ARE MET OUTPUT IS PULSED ONCE.
2. WHEN THE BREAKER IS CLOSED THIS OUTPUT IS SET HIGH.
3. THE BREAKER OPEN OUTPUT LATCH IS SET WHEN ALL CONDITIONS ARE SATISFIED FOR BREAKER CLOSE AND IT IS RESET WHEN CONDITIONS ARE SATISFIED FOR BREAKER OPEN.
4. BREAKER GROUP ALARM IS A SUMMARY ALARM. AVAILABILITY OF THIS ALARM VARIES BY MFPR MANUFACTURER.
5. FOR COORDINATION ONLY. FINAL SCHEMATICS, LOGIC, AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED BY THE VENDOR. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.

NOTES:
1. WHEN CONDITIONS ARE MET OUTPUT IS PULSED ONCE.
2. WHEN THE BREAKER IS CLOSED THIS OUTPUT IS SET HIGH.
3. THE BREAKER OPEN OUTPUT LATCH IS SET WHEN ALL CONDITIONS ARE SATISFIED FOR BREAKER CLOSE AND IT IS RESET WHEN CONDITIONS ARE SATISFIED FOR BREAKER OPEN.
4. BREAKER GROUP ALARM IS A SUMMARY ALARM. AVAILABILITY OF THIS ALARM VARIES BY MFPR MANUFACTURER.
5. FOR COORDINATION ONLY. FINAL SCHEMATICS, LOGIC, AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED BY THE VENDOR. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.
LOCAL 'OPEN' COMMAND
OPEN COMMAND
REMOTE
BREAKER IN CONNECT POSITION
BREAKER IN TEST POSITION
ACTUAL VOLTAGE VALUE
MINIMUM VOLTAGE VALUE
MAXIMUM VOLTAGE VALUE
TT ENABLED
TT RECEIVE
LOCK OUT 186
BREAKER OPENED FEEDBACK

DC FEEDER BREAKER 'TRIPPING' OPERATION

INPUT TO BREAKER TRIP CIRCUIT (NOTE 1)

OUTPUT TO BREAKER
MECHANICAL
PHYSICAL
CONDITIONS

BREAKER CLOSE
BREAKER OPEN

NOTES:
1. WHEN THE BREAKER IS CLOSED THIS OUTPUT IS SET HIGH.
2. THE BREAKER OPEN OUTPUT LATCH IS SET WHEN ALL CONDITIONS ARE SATISFIED FOR BREAKER CLOSE AND IT IS RESET WHEN CONDITIONS ARE SATISFIED FOR BREAKER OPEN.
3. BREAKER GROUP ALARM IS A SUMMARY ALARM. AVAILABILITY OF THIS ALARM VARIES BY MFPR MANUFACTURER.
4. FOR COORDINATION ONLY. FINAL SCHEMAS, LOGIC, AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED BY THE VENDOR. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.

DC UNDER VOLTAGE
(127)
DC OVER VOLTAGE
(159)
TT RECLOSE
TIME OVERCURRENT
(151)
MAGNETIC OVERCURRENT TRIP (SERIES TRIP)
DC OVER VOLTAGE
(159)
DC UNDER VOLTAGE
(127)

TT DISABLED
TT RECEIVE

STRESS RELIEF
OPEN (RECLOSE)
INTERNAL RECLOSE PULSE GENERATED (SEE BREAKER CLOSE LOGIC)

OUTPUT TO BREAKER TRIP CIRCUIT (NOTE 1)

BREAKER MECHANICAL PHYSICAL CONDITIONS

BREAKER CLOSE BREAKER OPEN

NOTES:
1. WHEN THE BREAKER IS CLOSED THIS OUTPUT IS SET HIGH.
2. THE BREAKER OPEN OUTPUT LATCH IS SET WHEN ALL CONDITIONS ARE SATISFIED FOR BREAKER CLOSE AND IT IS RESET WHEN CONDITIONS ARE SATISFIED FOR BREAKER OPEN.
3. BREAKER GROUP ALARM IS A SUMMARY ALARM. AVAILABILITY OF THIS ALARM VARIES BY MFPR MANUFACTURER.
4. FOR COORDINATION ONLY. FINAL SCHEMAS, LOGIC, AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED BY THE VENDOR. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.

DC UNDER VOLTAGE
(127)
DC OVER VOLTAGE
(159)
TT RECLOSE
TIME OVERCURRENT
(151)
MAGNETIC OVERCURRENT TRIP (SERIES TRIP)
DC OVER VOLTAGE
(159)
DC UNDER VOLTAGE
(127)

TT DISABLED
TT RECEIVE

STRESS RELIEF
OPEN (RECLOSE)
INTERNAL RECLOSE PULSE GENERATED (SEE BREAKER CLOSE LOGIC)

OUTPUT TO BREAKER TRIP CIRCUIT (NOTE 1)

BREAKER MECHANICAL PHYSICAL CONDITIONS

BREAKER CLOSE BREAKER OPEN

NOTES:
1. WHEN THE BREAKER IS CLOSED THIS OUTPUT IS SET HIGH.
2. THE BREAKER OPEN OUTPUT LATCH IS SET WHEN ALL CONDITIONS ARE SATISFIED FOR BREAKER CLOSE AND IT IS RESET WHEN CONDITIONS ARE SATISFIED FOR BREAKER OPEN.
3. BREAKER GROUP ALARM IS A SUMMARY ALARM. AVAILABILITY OF THIS ALARM VARIES BY MFPR MANUFACTURER.
4. FOR COORDINATION ONLY. FINAL SCHEMAS, LOGIC, AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED BY THE VENDOR. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.

DC UNDER VOLTAGE
(127)
DC OVER VOLTAGE
(159)
TT RECLOSE
TIME OVERCURRENT
(151)
MAGNETIC OVERCURRENT TRIP (SERIES TRIP)
DC OVER VOLTAGE
(159)
DC UNDER VOLTAGE
(127)

TT DISABLED
TT RECEIVE

STRESS RELIEF
OPEN (RECLOSE)
INTERNAL RECLOSE PULSE GENERATED (SEE BREAKER CLOSE LOGIC)

OUTPUT TO BREAKER TRIP CIRCUIT (NOTE 1)

BREAKER MECHANICAL PHYSICAL CONDITIONS

BREAKER CLOSE BREAKER OPEN

NOTES:
1. WHEN THE BREAKER IS CLOSED THIS OUTPUT IS SET HIGH.
2. THE BREAKER OPEN OUTPUT LATCH IS SET WHEN ALL CONDITIONS ARE SATISFIED FOR BREAKER CLOSE AND IT IS RESET WHEN CONDITIONS ARE SATISFIED FOR BREAKER OPEN.
3. BREAKER GROUP ALARM IS A SUMMARY ALARM. AVAILABILITY OF THIS ALARM VARIES BY MFPR MANUFACTURER.
4. FOR COORDINATION ONLY. FINAL SCHEMAS, LOGIC, AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED BY THE VENDOR. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.
NOTES:
1. WHEN CONDITIONS ARE MET OUTPUT IS PULSED ONCE.
2. WHEN THE BREAKER IS CLOSED THIS OUTPUT IS SET HIGH.
3. THE BREAKER OPEN OUTPUT LATCH IS SET WHEN ALL CONDITIONS ARE SATISFIED FOR BREAKER CLOSE AND IT IS RESET WHEN CONDITIONS ARE SATISFIED FOR BREAKER OPEN.
4. THERE ARE 3 TEST PAUSE Timers. The time used depends on the current test cycle count. In the event that the number of test cycles is set greater than three after the third test cycle the same time is used.
5. ALL TIMER DURATIONS ARE PROGRAMMABLE VIA THE FRONT DISPLAY.
6. FOR COORDINATION ONLY. FINAL SCHEMATICS, LOGIC, AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED BY THE VENDOR. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.
NEGATIVE DISCONNECT SWITCH LOGIC

NEG DISC. SWITCH 89N CLOSED

NEG DISC. SWITCH 89N OPENED

NEGATIVE SWITCH CLOSED LIGHT

NEGATIVE SWITCH OPENED LIGHT

OUTPUT TO SAS PLC

POSITIVE DISCONNECT SWITCH LOGIC

POS DISC. SWITCH 89P CLOSED

POS DISC. SWITCH 89P OPENED

POSITIVE SWITCH CLOSED LIGHT

POSITIVE SWITCH OPENED LIGHT

OUTPUT TO SAS PLC

NOTES:

1. FOR COORDINATION ONLY. FINAL SCHEMATICS, LOGIC, AND FUNCTIONAL REQUIREMENTS SHALL BE DEVELOPED BY VENDOR. SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.
NOTES:
1. FOR COORDINATION PURPOSES.
2. SEE SHOP DRAWINGS SUPPLIED BY BUILDING VENDOR VIA OWNER.

DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED WHEN AVAILABLE.
CONTRACTOR SHALL CONFIGURE TRANSFER TRIP FUNCTION BETWEEN ADJACENT TPSS DC MULTIFUNCTION RELAYS USING THE COMMUNICATIONS SYSTEM FOR FIBER OPTIC CONNECTION. SEE SPECIFICATIONS FOR ADDITIONAL DETAILS.

2. PROVIDE ONE ENGINEERING LAPTOP PER THE SPECIFICATIONS (BY BUILDING VENDOR).

3. SHOP DRAWINGS SHALL BE PROVIDED BY THE BUILDING VENDOR VIA OWNER WHEN AVAILABLE.
1. Ground conductor "TEE" connections shall be used at all ground grid intersections around the perimeter of the ground grid.
2. Ground conductor "CROSS" connections shall be used at all ground grid intersections within the perimeter of the ground grid.
3. Cadweld type connections listed for reference only and does not preclude any other manufacturer.
4. Drill and tap for 2-hole Nema lugs.
5. Compression type ground connections are acceptable where not in contact with ground/earth, burndy or approved equal.
6. Pre-drill copper busbar for Nema 2 hole lugs.
7. For vinyl coated fencing, remove coating and clean surface prior to making grounding connections. After making connections, coat exposed fence post surface and connections with a zinc rich paint.

STEEL PLATE CONNECTION
SCALE: NOT TO SCALE

GROUND CONDUCTOR TEE CONNECTION
SCALE: NOT TO SCALE

GROUND ROD CONNECTION
SCALE: NOT TO SCALE

GATE GROUNDING CONNECTION
SCALE: NOT TO SCALE

FENCE POST GROUNDING CONNECTION
SCALE: NOT TO SCALE

GROUND CONDUCTOR TO 2-HOLE TERMINAL CONNECTION
SCALE: NOT TO SCALE

GROUND CONDUCTOR TO REBAR CONNECTION
SCALE: NOT TO SCALE

GROUND CONDUCTOR TP STEEL PIPE CONNECTION
SCALE: NOT TO SCALE

GROUNDING MAT DETAIL
SCALE: NOT TO SCALE

TYPICAL GROUND BUSBAR
SCALE: NOT TO SCALE

GROUND WELL DETAIL
SCALE: NOT TO SCALE
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<td>EPR</td>
<td>2000 V</td>
<td>60 °C</td>
<td>J030</td>
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</table>
| D1-HV1        | FUSED LOAD BREAK | FUSED METERING CABINET | TPFD-D1U1 | 3A / C404 | BY LOCAL UTILITY | BY LOCAL UTILITY | BY LOCAL UTILITY | BY LOCAL UTILITY | BY LOCAL UTILITY | J030 | |}

Notes:
1. See Sheet J630 for TPSS D1 site raceway layout.
DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED WHEN AVAILABLE.

NOTES:
1. NOT USED.
2. HEADER INFORMATION SHALL BE VIEWABLE AT ALL TIMES.
3. EXTEND GUI TO FULL DIMENSIONS OF HMI SCREEN.
4. THERE SHALL BE A MINIMUM OF 36 WINDOWS.
5. TOUCH WINDOW TO ACKNOWLEDGE ALARMS.
NOTES:
1. NOT USED.
2. HEADER INFORMATION SHALL BE VIEWABLE AT ALL TIMES.
3. EXTEND GUI TO FULL DIMENSIONS OF HMI SCREEN.

KANSAS CITY STREETCAR
TPSS A1-89
CONTROL

BREAKER LOCAL/REMOTE
STATUS INDICATION (TYP.)

BREAKER CONTROL WINDOW (TYP.)

ANIMATE SWITCH STATUS
OPEN/CLOSE (TYP.)

POSITIVE DC BUS
NEGATIVE BUS

ILLUMINATED BUS SHOWING
ENERGIZED STATUS
(TYP. FOR ALL BUS)

BREAKER LOCAL/REMOTE
STATUS INDICATION (TYP.)

BREAKER CONTROL WINDOW (TYP.)

GND BUS
GND

TO RUNNING RAILS

NOTE 3

DRAWING FOR CONTRACTOR
COORDINATION PURPOSES. TPSS SHALL
BE OWNER SUPPLIED WHEN AVAILABLE.
### NOTES:

1. **NOT USED.**
2. **HEADER INFORMATION SHALL BE VIEWABLE AT ALL TIMES.**
3. **EXTEND GUI TO FULL DIMENSIONS OF HMI SCREEN.**

### TPSS HMI EVENT LOG SCREEN LAYOUT

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</table>

**Drawing for Contractor Coordination Purposes. TPSS shall be Owner Supplied When Available.**

---

**KANSAS CITY STREETCAR - RIVERFRONT EXTENSION**

**TRACTION POWER**

**Typical TPSS HMI Event Log Screen Layout**

---

**NOT FOR CONSTRUCTION**

---

**THIS SET OF PLANS IS NOT FOR CONSTRUCTION. THESE PLANS ARE INTENDED TO MEET THE NEEDS OF THE PROJECT.**
NOTES:
1. NOT USED.
2. HEADER INFORMATION SHALL BE VIEWABLE AT ALL TIMES.
3. EXTEND GUI TO FULL DIMENSIONS OF HMI SCREEN.

DRAWING FOR CONTRACTOR COORDINATION PURPOSES. TPSS SHALL BE OWNER SUPPLIED WHEN AVAILABLE.
CIP CONCRETE NOTES:
1. REFER TO THE PROJECT SPECIFICATIONS FOR CONCRETE WORK SHOWN ON THIS SHEET.
2. MINIMUM EDGE OR PLATE CONCRETE COMpressive STRENGTH SHALL BE 3,000 PSI, WITH A MINIMUM AGGREGATE SIZE.
3. THE FOLLOWING MINIMUM COVER SHALL BE PROVIDED FOR REBAR:
   | CONCRETE | MINIMUM COVER |
   |          |               |
   | 3"       | 5"            |
4. PROVIDE 3/4" CHISELHEADED REBAR AT ALL CORNERS AND JOINTS; ALL SHAPES MAY BE TREATED IN THE FIELD.
5. CONCRETE SHALL BE CURED UNDER SPECIFICATION REQUIREMENTS UNLESS SPECIFICALLY NOTED OTHERWISE.
6. CONCRETE PLACING SHOULd BE COMPLETE WITHIN 24 HOURS OF MIXING; CEMENT ITSELF PERIODICALLY.
7. CONCRETE PLACING SHOULD BE COMPLETE WITHIN 24 HOURS OF MIXING; CEMENT ITSELF PERIODICALLY.
8. STAIRS FOR CONCRETE PLACING SHOULd BE COMPLETE WITHIN 24 HOURS OF MIXING; CEMENT ITSELF PERIODICALLY.
9. CONCRETE SHALL BE TREATED TO MINIMUM FINISH.
10. ANCHORS SHALL BE UP TO A REPUTABLE MANUFACTURER SUCH AS HAY, SHAUGHNESSY, OR HILL. ALL ANCHORS SHALL BE MOUNTED BETWEEN THE Secondary FOUNDATION SLAB AND THE CONCRETE PLACING SHOULd BE COMPLETE WITHIN 24 HOURS OF MIXING; CEMENT ITSELF PERIODICALLY.
11. WHEN FILLING HOLES FOR ANCHORS, NO EXCESS CONCRETE MATERIAL SHALL BE USED. CONCRETE SHALL BE FULL AND UNBROKEN, FILL ALL MISTAKES PRIOR TO CASTING CONCRETE.

TPSS FOUNDATION NOTES:
   d: 0.75-0.0.125

KANSAS CITY STREETCAR - RIVERFRONT EXTENSION
TRACTION POWER SYSTEM
TYPICAL SUBSTATION FOUNDATION DETAIL

NOT FOR CONSTRUCTION

This set of plans is intended to aid in the design and construction of the project.
NOTES:

1. VERIFY CONCRETE STUDY LOCATION AND PDG SIZE REQUIREMENTS WITH THE DISCONNECT SWITCH MANUFACTURER.

2. THE FOUNDATION PLAN IS SHOWN FOR A TYPICAL SIX DISCONNECT SWITCH ARRANGEMENT. PROVIDE FOUNDATION FOR OTHER SWITCH ARRANGEMENTS ACCORDINGLY.

3. SEE ELECTRICAL SITE PLANS FOR CONDUITS.

4. THE FOLLOWING DESIGN PARAMETERS ARE BASED ON THE SITE-REVIEW REPORT KANSAS CITY STREETCAR EXTENSION ISSUED BY TST GEOCONSULTANTS, INC.
   DATED MAY 31, 2023
   1.1, HLD SOIL BEARING PRESSURE 1500 PSF
   1.2, FOOTING FRONT DEPTH 3'-0"