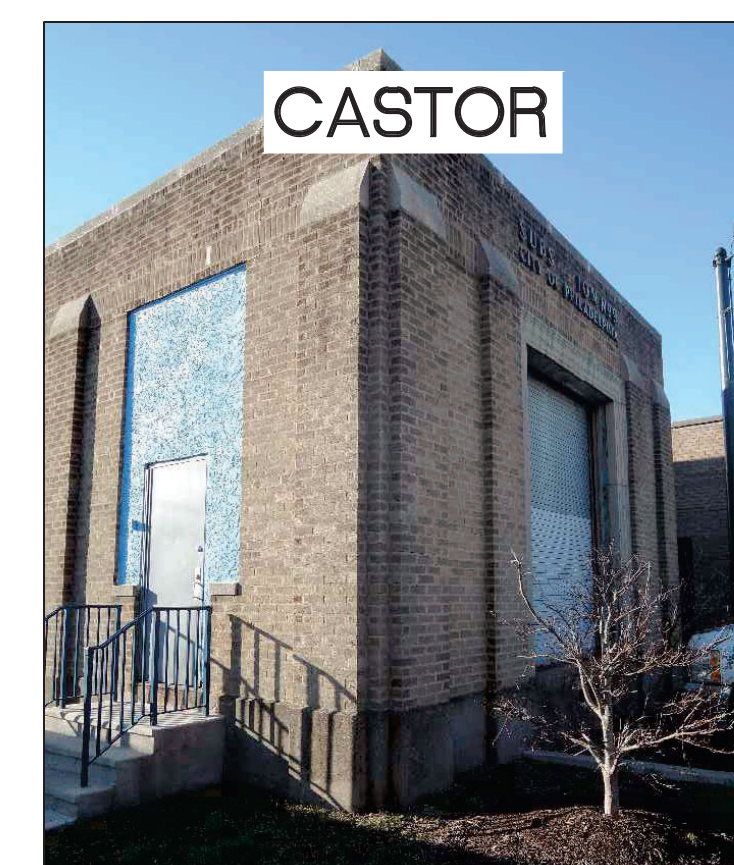
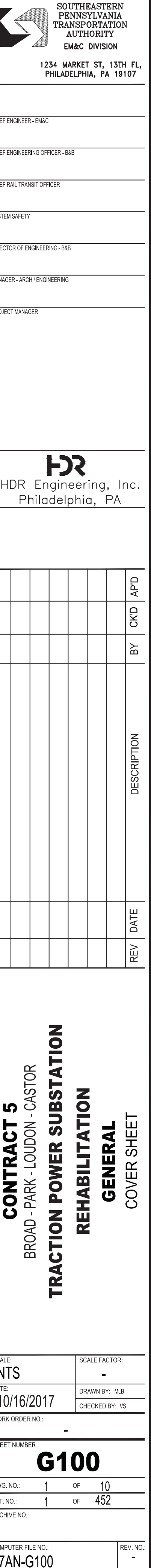




TRACTION POWER SUBSTATION REHABILITATION
CONTRACT 5
BROAD – PARK – LOUDON – CASTOR



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GENERAL

1	G100	COVER SHEET
2	G101	INDEX OF DRAWINGS – GENERAL & BROAD
3	G102	INDEX OF DRAWINGS – PARK
4	G103	INDEX OF DRAWINGS – LOUDON
5	G104	INDEX OF DRAWINGS – CASTOR
6	G105	GENERAL NOTES
7	G107	DESCRIPTION OF WORK
8	G108	SUGGESTED OVERALL STAGING
9	G109	WORKING CLEARANCES FOR ELECTRICAL EQUIPMENT
10	G110	CABLES & CONDUITS – SCHEDULE TEMPLATE

BROAD

CIVIL

11	C100	EXISTING CONDITIONS
12	C101	SITE PLAN
13	C102	CURB & PAVEMENT DETAILS

ARCHITECTURAL

14	A100	GENERAL NOTES & LEGENDS
15	A101	ABBREVIATIONS
16	A102	CODE DATA
17	A103	GROUND FLOOR REMOVAL PLAN
18	A104	MEZZANINE REMOVAL PLANS
19	A105	BASEMENT REMOVAL PLAN
20	A106	ROOF REMOVAL PLAN
21	A107	PROPOSED GROUND FLOOR PLAN
22	A108	PROPOSED MEZZANINE FLOOR PLANS
23	A109	PROPOSED BASEMENT FLOOR PLAN
24	A110	EXISTING ELEVATIONS – SHEET 1
25	A111	EXISTING ELEVATIONS – SHEET 2
26	A112	EXISTING INTERIOR ELEVATIONS – SHEET 1
27	A113	EXISTING INTERIOR ELEVATIONS – SHEET 2
28	A114	EXISTING INTERIOR ELEVATIONS – SHEET 3
29	A115	EXISTING INTERIOR ELEVATIONS – SHEET 4
30	A116	PROPOSED ELEVATIONS – SHEET 1
31	A117	PROPOSED ELEVATIONS – SHEET 2
32	A118	PHOTO DETAILS – SHEET 1
33	A119	PHOTO DETAILS – SHEET 2
34	A120	PHOTO DETAILS – SHEET 3
35	A121	MISCELLANEOUS DETAILS – SHEET 1
36	A122	MISCELLANEOUS DETAILS – SHEET 2

STRUCTURAL

37	S100	GENERAL NOTES & ABBREVIATIONS
38	S101	EXISTING CONDITIONS & REMOVAL – BASEMENT
39	S102	EXISTING CONDITIONS & REMOVAL – FIRST FLOOR
40	S103	EXISTING CONDITIONS & REMOVAL – MEZZANINE
41	S104	EXISTING CONDITIONS & REMOVAL – ROOF
42	S105	EXISTING FIRST FLOOR FRAMING PLAN
43	S106	EXISTING MEZZANINE FRAMING PLAN
44	S107	PROPOSED BASEMENT PLAN
45	S108	PROPOSED FIRST FLOOR PLAN
46	S109	PROPOSED MEZZANINE PLAN
47	S110	PROPOSED ROOF LAYOUT
48	S111	CONCRETE REPAIR DETAILS – SHEET 1
49	S112	CONCRETE REPAIR DETAILS – SHEET 2
50	S113	CONCRETE REPAIR DETAILS – SHEET 3
51	S114	FOUNDATION & PAD DETAILS
52	S115	FALL PROTECTION DETAILS – SHEET 1
53	S116	BUILDING DETAILS – SHEET 1
54	S117	BUILDING DETAILS – SHEET 2

MECHANICAL

55	M100	GENERAL NOTES, SYMBOLS & ABBREVIATIONS
56	M101	DEMOLITION BASEMENT FLOOR PLAN
57	M102	DEMOLITION FIRST FLOOR PLAN
58	M103	DEMOLITION MEZZANINE FLOOR PLAN
59	M104	DEMOLITION ROOF PLAN
60	M105	PROPOSED BASEMENT FLOOR PLAN
61	M106	PROPOSED FIRST FLOOR PLAN
62	M108	PROPOSED ROOF PLAN
63	M109	ENLARGED PLANS
64	M111	MISCELLANEOUS DETAILS

ELECTRICAL

65	E100	NOTES, SYMBOLS & ABBREVIATIONS
66	E101	DEMOLITION POWER BASEMENT FLOOR PLAN
67	E102	DEMOLITION POWER FIRST FLOOR PLAN
68	E103	DEMOLITION POWER MEZZANINE FLOOR PLAN
69	E104	DEMOLITION LIGHTING BASEMENT FLOOR PLAN
70	E105	DEMOLITION LIGHTING FIRST FLOOR PLAN
71	E106	DEMOLITION LIGHTING MEZZANINE FLOOR PLAN
72	E107	PROPOSED POWER BASEMENT FLOOR PLAN
73	E108	PROPOSED POWER FIRST FLOOR PLAN
74	E109	PROPOSED POWER MEZZANINE FLOOR PLAN
75	E110	PROPOSED LIGHTING BASEMENT FLOOR PLAN
76	E111	PROPOSED LIGHTING FIRST FLOOR PLAN
77	E112	PROPOSED LIGHTING MEZZANINE FLOOR PLAN
78	E113	DEMOLITION SINGLE LINE DIAGRAM
79	E114	PROPOSED SINGLE LINE DIAGRAM
80	E115	ELECTRICAL SCHEDULES
81	E116	PANEL SCHEDULES

FIRE ALARM

82	FA100	NOTES, SYMBOLS & ABBREVIATIONS
83	FA101	DEMOLITION BASEMENT FLOOR PLAN
84	FA102	DEMOLITION FIRST FLOOR PLAN
85	FA103	DEMOLITION MEZZANINE FLOOR PLAN
86	FA104	PROPOSED BASEMENT FLOOR PLAN
87	FA105	PROPOSED FIRST FLOOR PLAN
88	FA106	PROPOSED MEZZANINE FLOOR PLAN
89	FA107	DETAILS

TRACTION POWER

90	TP100	ABBREVIATIONS
91	TP101	LEGENDS & SYMBOLS
92	TP102	DEVICE TABLES
93	TP105	SUBSTATION SITE PLAN
94	TP106	EXISTING SINGLE LINE DIAGRAM
95	TP107	EXISTING MEZZANINE & FIRST FLOOR EQUIPMENT PLANS
96	TP108	EXISTING BASEMENT EQUIPMENT PLAN
97	TP109	PROPOSED SINGLE LINE DIAGRAM
98	TP110	STAGING ACTIVITIES & NOTES
99	TP111	STAGE 1 SINGLE LINE DIAGRAM
100	TP112	STAGE 1 MEZZANINE & FIRST FLOOR EQUIPMENT PLANS
101	TP113	STAGE 1 BASEMENT EQUIPMENT PLAN
102	TP114	STAGE 2 SINGLE LINE DIAGRAM
103	TP115	STAGE 2 MEZZANINE & FIRST FLOOR EQUIPMENT PLANS
104	TP116	STAGE 2 BASEMENT EQUIPMENT PLAN
105	TP117	STAGE 3 SINGLE LINE DIAGRAM
106	TP118	STAGE 3 MEZZANINE & FIRST FLOOR EQUIPMENT PLANS
107	TP119	STAGE 3 BASEMENT EQUIPMENT PLAN
108	TP120	PROPOSED MEZZANINE & FIRST FLOOR EQUIPMENT PLANS
109	TP121	PROPOSED BASEMENT EQUIPMENT PLAN
110	TP126	PROPOSED FIRST FLOOR EQUIPMENT ELEVATIONS
111	TP127	PROPOSED BASEMENT EQUIPMENT ELEVATIONS
112	TP132	13.2 KV CABLE & DUCT BANK
113	TP133	4.8 KV CABLE & DUCT BANK
114	TP134	BATTERY & CONTROL DIAGRAM
115	TP137	PROTECTION & RELAY SINGLE LINE DIAGRAM – SHEET 1
116	TP138	PROTECTION & RELAY SINGLE LINE DIAGRAM – SHEET 2
117	TP139	CIRCUIT BREAKER CONTROL DIAGRAMS – TYPICAL
118	TP140	DC RECTIFIER CONTROL SCHEMATIC
119	TP141	DC GROUND FAULT PROTECTION SCHEME
120	TP142	DC REMOTE CONTROL BOARD CONTROL SCHEMATIC
121	TP143	SCADA POINTS LIST
122	TP145	GROUNDING PLAN
123	TP146	GROUNDING DETAILS

COMMUNICATIONS

124	COM100	GENERAL NOTES, SYMBOLS & ABBREVIATIONS
125	COM101	DEMOLITION BASEMENT FLOOR PLAN
126	COM102	DEMOLITION FIRST FLOOR PLAN
127	COM103	INTERFACE CABINET & CABLE PLANS
128	COM104	PROPOSED BASEMENT FLOOR PLAN
129	COM105	PROPOSED FIRST FLOOR PLAN
130	COM106	SINGLE LINE DIAGRAM
131	COM107	FIBER NODE DIAGRAM



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MANAGER - ARCH / ENGINEERING

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Philadelphia, PA

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							BY
							DESCRIPTION
							DATE
							REV

CONTRACT 5
BROAD - PARK - LOUDON - CASTOR
TRACTION POWER SUBSTATION
REHABILITATION
GENERAL
INDEX OF DRAWINGS - GENERAL & BROAD

SCALE: NTS

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PARK

CIVIL

132	C200	EXISTING CONDITIONS
133	C201	SITE PLAN
134	C202	CURB & PAVEMENT DETAILS

ARCHITECTURAL

135	A200	GENERAL NOTES & LEGENDS
136	A201	ABBREVIATIONS
137	A202	CODE DATA
138	A203	GROUND FLOOR REMOVAL PLAN
139	A204	MEZZANINE REMOVAL FLOOR PLAN
140	A205	BASEMENT REMOVAL PLAN
141	A206	ROOF REMOVAL PLAN
142	A207	PROPOSED GROUND FLOOR PLAN
143	A208	PROPOSED MEZZANINE FLOOR PLAN
144	A209	PROPOSED BASEMENT FLOOR PLAN
145	A210	PROPOSED ROOF PLAN
146	A211	EXISTING ELEVATIONS – SHEET 1
147	A212	EXISTING ELEVATIONS – SHEET 2
148	A213	EXISTING INTERIOR ELEVATIONS – SHEET 1
149	A214	EXISTING INTERIOR ELEVATIONS – SHEET 2
150	A215	PROPOSED ELEVATIONS – SHEET 1
151	A216	PROPOSED ELEVATIONS – SHEET 2
152	A217	PHOTO DETAILS – SHEET 1
153	A218	PHOTO DETAILS – SHEET 2
154	A219	MISCELLANEOUS DETAILS – SHEET 1
155	A220	MISCELLANEOUS DETAILS – SHEET 2

STRUCTURAL

156	S200	GENERAL NOTES & ABBREVIATIONS
157	S201	EXISTING CONDITIONS & REMOVAL – BASEMENT
158	S202	EXISTING CONDITIONS & REMOVAL – FIRST FLOOR
159	S203	EXISTING CONDITIONS & REMOVAL – MEZZANINE
160	S204	EXISTING CONDITIONS & REMOVAL – ROOF
161	S205	PROPOSED BASEMENT PLAN
162	S206	PROPOSED FIRST FLOOR PLAN
163	S207	PROPOSED MEZZANINE PLAN
164	S208	PROPOSED ROOF PLAN
165	S209	FIRST FLOOR FRAMING PLAN
166	S210	MEZZANINE FRAMING PLAN
167	S211	CONCRETE REPAIR DETAILS – SHEET 1
168	S212	CONCRETE REPAIR DETAILS – SHEET 2
169	S213	CONCRETE REPAIR DETAILS – SHEET 3
170	S214	FOUNDATION DETAILS
171	S215	STEEL DETAILS
172	S216	FALL PROTECTION DETAILS
173	S217	BUILDING DETAILS – SHEET 1
174	S218	BUILDING DETAILS – SHEET 2
175	S219	BUILDING DETAILS – SHEET 3
176	S220	BUILDING DETAILS – SHEET 4
177	S221	BUILDING DETAILS – SHEET 5
178	S222	BUILDING DETAILS – SHEET 6

MECHANICAL

179	M200	GENERAL NOTES, SYMBOLS & ABBREVIATIONS
180	M201	DEMOLITION BASEMENT FLOOR PLAN
181	M202	DEMOLITION FIRST FLOOR PLAN
182	M203	DEMOLITION MEZZANINE FLOOR PLAN
183	M204	DEMOLITION ROOF PLAN
184	M205	PROPOSED BASEMENT FLOOR PLAN
185	M206	PROPOSED FIRST FLOOR PLAN
186	M207	PROPOSED MEZZANINE FLOOR PLAN
187	M208	PROPOSED ROOF PLAN
188	M209	ENLARGED PLANS
189	M210	SCHEDULES
190	M211	MISCELLANEOUS DETAILS
191	M212	MISCELLANEOUS DETAILS

ELECTRICAL

192	E200	NOTES, SYMBOLS & ABBREVIATIONS
193	E201	DEMOLITION POWER BASEMENT FLOOR PLAN
194	E202	DEMOLITION POWER FIRST FLOOR PLAN
195	E203	DEMOLITION POWER MEZZANINE FLOOR PLAN
196	E204	DEMOLITION LIGHTING BASEMENT FLOOR PLAN
197	E205	DEMOLITION LIGHTING FIRST FLOOR PLAN
198	E206	DEMOLITION LIGHTING MEZZANINE FLOOR PLAN
199	E207	PROPOSED POWER BASEMENT FLOOR PLAN
200	E208	PROPOSED POWER FIRST FLOOR PLAN
201	E209	PROPOSED POWER MEZZANINE FLOOR PLAN
202	E210	PROPOSED LIGHTING BASEMENT FLOOR PLAN
203	E211	PROPOSED LIGHTING FIRST FLOOR PLAN
204	E212	PROPOSED LIGHTING MEZZANINE FLOOR PLAN
205	E213	DEMOLITION SINGLE LINE DIAGRAM
206	E214	PROPOSED SINGLE LINE DIAGRAM
207	E215	ELECTRICAL SCHEDULES
208	E216	PANEL SCHEDULES – SHEET 1
209	E217	PANEL SCHEDULES – SHEET 2

FIRE ALARM

210	FA200	NOTES, SYMBOLS & ABBREVIATIONS
211	FA201	DEMOLITION BASEMENT FLOOR PLAN
212	FA202	DEMOLITION FIRST FLOOR PLAN
213	FA203	DEMOLITION MEZZANINE FLOOR PLAN
214	FA204	PROPOSED BASEMENT FLOOR PLAN
215	FA205	PROPOSED FIRST FLOOR PLAN
216	FA206	PROPOSED MEZZANINE FLOOR PLAN
217	FA207	DETAILS

TRACTION POWER

218	TP200	ABBREVIATIONS
219	TP201	LEGENDS & SYMBOLS
220	TP202	DEVICE TABLES
221	TP205	SUBSTATION SITE PLAN
222	TP206	EXISTING SINGLE LINE DIAGRAM
223	TP207	EXISTING MEZZANINE & FIRST FLOOR EQUIPMENT PLANS
224	TP208	EXISTING BASEMENT EQUIPMENT PLAN
225	TP209	PROPOSED SINGLE LINE DIAGRAM
226	TP210	STAGING ACTIVITIES & NOTES
227	TP211	STAGE 1 SINGLE LINE DIAGRAM
228	TP212	STAGE 1 MEZZANINE & FIRST FLOOR EQUIPMENT PLANS
229	TP213	STAGE 1 BASEMENT EQUIPMENT PLAN
230	TP214	STAGE 2 SINGLE LINE DIAGRAM
231	TP215	STAGE 2 MEZZANINE & FIRST FLOOR EQUIPMENT PLANS
232	TP216	STAGE 2 BASEMENT EQUIPMENT PLAN
233	TP217	STAGE 3 SINGLE LINE DIAGRAM
234	TP218	STAGE 3 MEZZANINE & FIRST FLOOR EQUIPMENT PLANS
235	TP219	STAGE 3 BASEMENT EQUIPMENT PLAN
236	TP220	PROPOSED MEZZANINE & FIRST FLOOR EQUIPMENT PLANS
237	TP221	PROPOSED BASEMENT EQUIPMENT PLAN
238	TP226	PROPOSED FIRST FLOOR EQUIPMENT ELEVATIONS
239	TP227	PROPOSED BASEMENT EQUIPMENT ELEVATIONS
240	TP232	13.2 KV CABLE & CONDUIT DUCT BANK
241	TP233	4.8 KV CABLE & DUCT BANK
242	TP234	BATTERY & CONTROL DIAGRAM
243	TP237	PROTECTION & RELAY SINGLE LINE DIAGRAM – SHEET 1
244	TP238	PROTECTION & RELAY SINGLE LINE DIAGRAM – SHEET 2
245	TP239	CIRCUIT BREAKER CONTROL DIAGRAMS – TYPICAL
246	TP240	DC RECTIFIER CONTROL SCHEMATIC
247	TP241	DC GROUND FAULT PROTECTION SCHEME
248	TP242	DC REMOTE CTL BRD CONTROL SCHEMATIC – SHEET 1
249	TP243	DC REMOTE CTL BRD CONTROL SCHEMATIC – SHEET 2
250	TP244	SCADA POINTS LIST
251	TP245	GROUNDING PLAN
252	TP246	GROUNDING DETAILS

COMMUNICATIONS

253	COM200	GENERAL NOTES, SYMBOLS & ABBREVIATIONS
254	COM201	DEMOLITION BASEMENT FLOOR PLAN
255	COM202	DEMOLITION FIRST FLOOR PLAN
256	COM204	PROPOSED BASEMENT FLOOR PLAN
257	COM205	PROPOSED FIRST FLOOR PLAN
258	COM206	SINGLE LINE DIAGRAM
259	COM203	INTERFACE CABINET & CABLE PLAN
260	COM207	FIBER NODE DIAGRAM



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HDR Engineering, Inc.
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CONTRACT 5
BROAD - PARK - LOUDON - CASTOR
TRACTION POWER SUBSTATION
REHABILITATION
GENERAL
INDEX OF DRAWINGS - PARK

SCALE NTS	SCALE FACTOR -
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WORK ORDER NO. -	
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CIVIL

ARCHITECTURAL

STRUCTURAL

MECHANICALELECTRICAL

FIRE ALARM

TRACTION POWER

COMMUNICATIONS

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SYSTEM SAFETY

DIRECTOR OF ENGINEERING - B&B

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Philadelphia, PA

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CONTRACT 5
BROAD - PARK - LOUDON - CASTOR
TRACTION POWER SUBSTATION
REHABILITATION
GENERAL
INDEX OF DRAWINGS - LOUDON

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	CHECKED BY: VS

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SHEET NUMBER:

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SHT. NO.:	4	OF	452

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CASTOR

CIVIL

377	C400	EXISTING CONDITIONS
378	C401	SITE PLAN
379	C402	FENCE & SIGN DETAILS

ARCHITECTURAL

380	A400	GENERAL NOTES & LEGENDS
381	A401	ABBREVIATIONS
382	A402	CODE DATA
383	A403	GROUND FLOOR REMOVAL PLAN
384	A404	ROOF REMOVAL PLAN
385	A405	PROPOSED GROUND FLOOR PLAN
386	A406	PROPOSED ROOF PLAN
387	A407	EXISTING ELEVATIONS
388	A408	PROPOSED ELEVATIONS
389	A409	PHOTO DETAILS – SHEET 1
390	A410	PHOTO DETAILS – SHEET 2
391	A411	MISCELLANEOUS DETAILS

STRUCTURAL

392	S400	GENERAL NOTES & ABBREVIATIONS
393	S401	EXISTING CONDITIONS & REMOVAL – MAIN FLOOR
394	S402	EXISTING CONDITIONS & REMOVAL – ROOF
395	S403	PROPOSED MAIN FLOOR PLAN
396	S404	PROPOSED ROOF PLAN
397	S405	ROOF FRAMING PLAN
398	S406	BUILDING ELEVATIONS
399	S407	CONCRETE REPAIR DETAILS – SHEET 1
400	S408	CONCRETE REPAIR DETAILS – SHEET 2
401	S409	CONCRETE REPAIR DETAILS – SHEET 3
402	S410	FOUNDATION DETAILS – SHEET 1
403	S411	FOUNDATION DETAILS – SHEET 2
404	S412	BUILDING DETAILS – SHEET 1
405	S413	BUILDING DETAILS – SHEET 2

MECHANICAL

406	M400	GENERAL NOTES, SYMBOLS & ABBREVIATIONS
407	M401	DEMOLITION FLOOR PLAN
408	M402	PROPOSED FLOOR PLAN
409	M403	ENLARGED PLAN
410	M404	SCHEDULES
411	M405	MISCELLANEOUS DETAILS

ELECTRICAL

412	E400	NOTES, SYMBOLS & ABBREVIATIONS
413	E401	DEMOLITION POWER FLOOR PLAN
414	E402	DEMOLITION LIGHTING FLOOR PLAN
415	E403	PROPOSED POWER FLOOR PLAN
416	E404	PROPOSED LIGHTING FLOOR PLAN
417	E405	DEMOLITION SINGLE LINE DIAGRAM
418	E406	PROPOSED SINGLE LINE DIAGRAM
419	E407	ELECTRICAL SCHEDULES
420	E408	PANEL SCHEDULES

FIRE ALARM

421	FA400	NOTES, SYMBOLS & ABBREVIATIONS
422	FA401	DEMOLITION FLOOR PLAN
423	FA402	PROPOSED FLOOR PLAN
424	FA403	DETAILS

TRACTION POWER

425	TP400	ABBREVIATIONS
426	TP401	LEGENDS & SYMBOLS
427	TP402	DEVICE TABLES
428	TP405	EXISTING/PROPOSED SUBSTATION SITE PLAN
429	TP406	EXISTING SINGLE LINE DIAGRAM
430	TP407	EXISTING EQUIPMENT PLAN
431	TP409	PROPOSED SINGLE LINE DIAGRAM
432	TP410	STAGING ACTIVITIES & NOTES
433	TP411	STAGE 1 SINGLE LINE DIAGRAM
434	TP412	STAGE 1 EQUIPMENT PLAN
435	TP420	PROPOSED EQUIPMENT PLAN
436	TP426	PROPOSED EQUIPMENT ELEVATIONS
437	TP432	13.2 KV CABLE & DUCT PLAN
438	TP434	BATTERY & CONTROL DIAGRAM
439	TP437	PROTECTION & RELAY SINGLE LINE DIAGRAM – SHEET 1
440	TP438	PROTECTION & RELAY SINGLE LINE DIAGRAM – SHEET 2
441	TP439	CIRCUIT BREAKER CONTROL DIAGRAMS – TYPICAL
442	TP440	DC RECTIFIER CONTROL SCHEMATIC
443	TP441	DC GROUND FAULT PROTECTION SCHEME
444	TP442	SCADA POINTS LIST
445	TP445	GROUNDING PLAN
446	TP446	GROUNDING DETAILS

COMMUNICATIONS

447	COM400	GENERAL NOTES, SYMBOLS & ABBREVIATIONS
448	COM401	DEMOLITION FLOOR PLAN
449	COM402	PROPOSED FLOOR PLAN
450	COM404	SINGLE LINE DIAGRAM
451	COM403	INTERFACE CABINET & CABLE PLAN
452	COM407	FIBER NODE DIAGRAM



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DIRECTOR OF ENGINEERING- R&B

MANAGER -ARCH / ENGINEERING

PROJECT MANAGER



HDR Engineering, Inc.
Philadelphia, PA

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							BY
							DESCRIPTION
							REV
							DATE

CONTRACT 5
BROAD - PARK - LOUDON - CASTOR

TRACTION POWER SUBSTATION
REHABILITATION
GENERAL

INDEX OF DRAWINGS - CASTOR

SCALE
NTS

SCALE FACTOR
-

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GENERAL NOTES:

1. THE NOTES ARE APPLICABLE TO ALL TRACTION POWER SUBSTATIONS (TPSSs) AND ALL WORKS UNDER THIS CONTRACT PACKAGE.
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS INCLUDING THE SPECIFICATIONS AND THE DRAWINGS AND REQUIREMENTS/GUIDELINES SPECIFIED IN THE LATEST EDITIONS OF NATIONAL ELECTRICAL CODE (NEC), NATIONAL ELECTRICAL SAFETY CODE (NESC) AND AREMA.
3. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE APPLICABLE FEDERAL, STATE AND LOCAL CODES, RULES, AND REGULATIONS HAVING JURISDICTION OVER ANY PORTION OF WORK SPECIFIED IN THESE DOCUMENTS.
4. THE DRAWINGS INDICATE SPECIFIC DESIGN INTENT. THE DESIGN/BUILD CONTRACTOR (HEREAFTER REFERRED TO AS 'CONTRACTOR'), SHALL DEVELOP THE FINAL DESIGN BASED ON THESE INTENTS. THE INTENTS MAY BE MODIFIED WITH SEPTA APPROVAL ONLY.
5. THE CONSTRUCTION WORK INCLUDING DEMOLITION AND REMOVALS FOR BROAD, PARK AND LOUDON TPSS WILL BE DONE IN STAGES MAKING SURE THAT ONE TRANSFORMER-RECTIFIER LINE-UP IS ALWAYS OPERATIONAL, UNLESS OTHERWISE STATED. REFER TO THE STAGING PLANS OF INDIVIDUAL TPSS IN THE 'TP DRAWINGS' FOR DETAILS.
6. THE CONTRACTOR SHALL, PRIOR TO COMMENCEMENT OF WORK, TAKE EXACT MEASUREMENTS TO VERIFY ALL DIMENSIONS SHOWN ON THE DRAWINGS AS WELL AS OBTAIN OTHER NECESSARY DIMENSIONS FOR THE PURPOSE OF PREPARING FINAL DESIGN SUBMITTALS. SHOP DRAWINGS AND ANY OTHER DRAWINGS PREPARED BY THE CONTRACTOR SHALL INCLUDE A STATEMENT CERTIFYING THAT THOSE HAVE BEEN PREPARED IN ACCORDANCE WITH THE FIELD-MEASURED DIMENSIONS.
7. THE SEPTA PROJECT MANAGER SHALL BE NOTIFIED IN WRITING OF ANY CONDITIONS THAT VARY FROM THOSE SHOWN ON THE DRAWINGS. THE CONTRACTOR'S WORK SHALL NOT VARY FROM THE DRAWINGS WITHOUT THE WRITTEN APPROVAL OF SEPTA.
8. THE CONTRACTOR SHALL COORDINATE WITH PECO FOR ALL WORK RELATED TO THE UTILITY, IN COORDINATION WITH THE SEPTA PROJECT MANAGER.
9. THE CONTRACTOR SHALL IDENTIFY ALL UNDERGROUND UTILITIES BY HAND DIGGING AND / OR OTHER APPROVED MEANS PRIOR TO MECHANICAL EXCAVATION. ANY DAMAGE TO THE EXISTING UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS OWN COST.
10. ALL ABANDONED EQUIPMENT AND EQUIPMENT CABLES SHALL BE REMOVED FROM THE TPSS UNLESS OTHERWISE NOTED, AND PROPERLY DISPOSED OFF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
11. THE CONTRACTOR SHALL DEVELOP AND FURNISH DETAILED POWER AND CONTROL CABLE DRAWINGS AND SCHEDULES AND EQUIPMENT INTERCONNECTION DIAGRAMS FOR APPROVAL OF SEPTA, AND INSTALL ALL CABLES AS PER APPROVED PLAN.
12. THE CONTRACTOR SHALL COOPERATE WITH SEPTA'S REPRESENTATIVES AND ALL OTHER CONTRACTORS PERFORMING WORK ON THIS JOB SITE DURING THE PERFORMANCE OF THIS CONTRACT.
13. THE CONTRACTOR SHALL OBTAIN AND INCUR THE COST OF ALL REQUIRED PERMITS AND CERTIFICATES. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIRED PERMITS.
14. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE THE WORK OF ALL OTHER SUBCONTRACTORS FOR THIS PROJECT. THE CONTRACTOR IS ALSO RESPONSIBLE FOR COORDINATION WITH SEPTA AND OTHER EXTERNAL AGENCIES.
15. THE CONTRACTOR SHALL COORDINATE THE WORK WITH OTHER CONTRACTORS AND AGENCIES SO AS TO MINIMIZE THE REQUIREMENT OF TPSS OUTAGES.
16. THE CONTRACTOR SHALL SCHEDULE HIS WORK AS DIRECTED BY SEPTA WHICH WILL TAKE INTO ACCOUNT OPERATIONAL CONTINGENCIES IN THE SYSTEM TO ENSURE CONTINUED OPERATION OF THE TRAIN SERVICES.
17. THE CONTRACTOR SHALL TAKE CARE TO MAINTAIN A SAFE AND SECURE WORK AREA AT ALL TIMES THROUGH THE USE OF, AMONG OTHER THINGS, SAFETY EQUIPMENT, FENCING, PROTECTIVE BARRIERS, TEMPORARY DIRECTIONAL SIGNAGE AND FALL PROTECTION.
18. ACCESS TO THE WORK SITE AND STORAGE OF MATERIALS AND EQUIPMENT ON THE PREMISES SHALL BE APPROVED BY SEPTA.
19. THE CONTRACTOR SHALL KEEP THE ADJACENT WORK AREAS, STAGING AREAS AND BUILDING ACCESS AREAS CLEAN OF DEBRIS, AND WILL BE RESPONSIBLE FOR ALL MAINTENANCE AND CLEANING OF THESE AREAS DURING THE COURSE OF THE PROJECT.
20. SEPTA REQUIRES ALL PERSONNEL WORKING ON THEIR PROPERTY TO HAVE SEPTA PHOTO IDENTIFICATION. SEPTA WILL ARRANGE TO HAVE THE IDENTIFICATION CARDS MADE AT THE BEGINNING OF THE CONTRACT AND THROUGHOUT THE DURATION OF THE CONTRACT.
21. SHOULD UNFORESEEN CONDITIONS OR OTHER CAUSES NECESSITATE CONSTRUCTION DETAILS NOT IN ACCORDANCE WITH THESE DRAWINGS, THE CONTRACTOR SHALL NOTIFY SEPTA.
22. THE CONTRACTOR SHALL PROTECT ALL AREAS IN SUCH A MANNER AS TO ELIMINATE HAZARDS TO PERSONS AND PROPERTY, TO MINIMIZE INTERFERENCE WITH USE OF ADJACENT AREAS, UTILITIES AND STRUCTURES OR INTERRUPTION OF SUCH UTILITIES.
23. ANY GROUND PENETRATIONS SHALL BE COORDINATED WITH ON-SITE PERSONNEL PRIOR TO COMMENCING CONSTRUCTION.
24. THE CONTRACTOR SHALL MAINTAIN WORKING CLEARANCE FROM ALL LIVE PARTS AS SPECIFIED BY SEPTA. CLEARANCE LESS THAN THESE WILL REQUIRE AN OUTAGE OR SEPTA APPROVED PROTECTIVE BARRIER.

25. SEPTA SAFETY PROCEDURES FOR PROTECTION AND OUTAGES SHALL BE ADHERED TO AT ALL TIMES.
26. THE CONTRACTOR SHALL COMPLY WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS AND ENVIRONMENTAL PROTECTION AGENCY (EPA) REGULATIONS. THE CONTRACTOR SHALL TAKE PROPER HEALTH AND SAFETY MEASURES WHEN EXCAVATING AND PERFORMING EARTH MOVING ACTIVITIES.
27. ALL ELECTRIFIED FACILITIES SUCH AS UNDERGROUND AND EXPOSED CABLES, ASSOCIATED ISOLATING SWITCHES AND OTHER ASSOCIATED EQUIPMENT SHALL BE CONSIDERED LIVE AT ALL TIMES (UNLESS DE-ENERGIZED AND PROPERLY GROUNDED). PRIOR TO START OF ANY WORK ALL SEPTA SAFETY INSTRUCTIONS SHALL BE COMPLIED WITH. AFFECTED SECTIONS SHALL BE DE-ENERGIZED AND GROUNDED IN ACCORDANCE WITH SEPTA PROCEDURES.
28. PRIOR TO COMMENCING WORK OBTAIN WRITTEN PERMISSION TO WORK ON THE EXISTING TRANSFORMERS, RECTIFIERS, CIRCUIT BREAKERS AND OTHER ASSOCIATED EQUIPMENT, AFTER SEPTA HAS DE-ENERGIZED AND OPENED ALL SWITCHES; AND APPLIED PROTECTIVE GROUNDS.
29. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL INSPECT DELIVERED MATERIALS AND EQUIPMENT FOR ANY DEFECTS.
30. THE CONTRACTOR ALONG WITH THE ONSITE SEPTA INSPECTOR IS RESPONSIBLE FOR A DAILY VISUAL INSPECTION OF THE EXISTING FIRE ALARM SYSTEM TO ASSURE IT IS FUNCTIONALLY OPERATIONAL AND WITHOUT TROUBLE, PRIOR TO COMMENCING WITH ANY WORK WITHIN THE TPSS.
31. THE CONTRACTOR SHALL ADVISE THE ONSITE SEPTA INSPECTOR OF ANY ANTICIPATED WORK DURING THAT DAY THAT COULD OR WOULD ADVERSELY IMPACT THE FIRE ALARM SYSTEM.

A. EXAMPLES OF TASKS THAT COULD OR WOULD IMPACT THE FIRE ALARM SYSTEM INCLUDE BUT ARE NOT LIMITED TO:

I. CUTTING.

II. WELDING.

III. BRAZING.

IV. SOLDERING.

V. DEMOLITION OF BUILDING MATERIALS THAT RESULTS IN ABOVE NORMAL AIRBORNE DUST AND /OR PARTICULATES.

VI. REMOVAL OF THE FIRE ALARM PANEL POWER.

VII. REMOVAL OF THE FIRE ALARM PANEL.

VIII. REMOVAL OR DISCONNECTING TERMINAL OR PERIPHERAL DEVICES, I.E., INITIATING CIRCUIT DEVICES DETECTORS, PULL STATIONS, ETC.

IX. REMOVAL OR DISCONNECTING TERMINAL OR PERIPHERAL DEVICES, I.E., NOTIFICATION CIRCUIT DEVICES, AUDIBLE OR VISUAL NOTIFICATION APPLIANCES, ETC.

X. EXPOSING THE FIRE ALARM SYSTEM TO WEATHER RELATED ELEMENTS, RAIN, EXCESSIVE HEAT OR EXCESSIVE COLD.

B. WHERE ANY OF THE ABOVE CONDITIONS EXIST, THE FIRE ALARM SYSTEM IS TO BE SILENCED, AND THE HUMAN MACHINE INTERFACE (HMI) IS TO BE NOTIFIED OF POTENTIAL ALARMS RELATED TO THE WORK BEING PERFORMED.
32. WHEN THE FIRE ALARM SYSTEM IS INTENTIONALLY IMPAIRED IT IS INCUMBENT UPON THE CONTRACTOR TO REMAIN WATCHFUL FOR ANY CIRCUMSTANCE OR EVENT THAT WARRANTS THE ACTIVATION OF THE FIRE ALARM SYSTEM. SHOULD A CIRCUMSTANCE OR EVENT ARISE DURING A PERIOD WHEN THE FIRE ALARM SYSTEM IS IMPAIRED, THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING 911 TO REPORT THE EVENT.
33. AT THE COMPLETION OF EACH WORK DAY THE FIRE ALARM SYSTEM IS TO BE RETURNED TO NORMAL OPERATIONAL STATUS. THIS WILL REQUIRE THE CONTRACTOR TO ASSURE THAT ALL ALARMS THAT MAY HAVE ACCRUED DURING THE WORK DAY HAVE BEEN CLEARED AND THE SYSTEM IS CAPABLE OF BEING PLACED IN FULL FUNCTIONAL SERVICE. IF THE SYSTEM IS NOT ABLE TO BE RESTORED THE CONTRACTOR SHALL ADVISE THE ONSITE SEPTA INSPECTOR, WHO AT THAT TIME WILL MAKE THE DECISION AS TO ORGANIZE A FIRE WATCH AND/OR HAVE THE CONTRACTOR CALL IN HIS FIRE ALARM SERVICE PROVIDER TO MAKE THE NECESSARY REPAIRS. IN ALL CASES THE CONTRACTOR IS RESPONSIBLE FOR THE OPERATION OF THE FIRE ALARM SYSTEM ONCE THE WORK IN THE TPSS BEGINS AND UNTIL THE WORK IN THE TPSS IS COMPLETE.
34. THE DEMOLITION OF THE EXISTING FIRE ALARM SYSTEM WILL NOT COMMENCE UNTIL THE NEW FIRE ALARM SYSTEM IS FULLY INSTALLED AND ACCEPTED BY THE AUTHORITY HAVING JURISDICTION AND SEPTA.



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SYSTEM SAFETY

DIRECTOR OF ENGINEERING - R&B

MANAGER - ARCH / ENGINEERING

PROJECT MANAGER



HDR Engineering, Inc.
Philadelphia, PA

							APD
							CKD
							BY
							DESCRIPTION
							DATE
							REV

CONTRACT 5
BROAD - PARK - LOUDON - CASTOR
TRACTION POWER SUBSTATION
REHABILITATION
GENERAL
GENERAL NOTES

SCALE NTS	SCALE FACTOR -
DATE: 10/16/2017	DRAWN BY: MB CHECKED BY: VS
WORK ORDER NO.: -	
SHEET NUMBER G105	
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50% SUBMISSION
NOT FOR CONSTRUCTION

DATE PRINTED: 10/21/2025

STATUS: 30% SUBMISSION

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DESCRIPTION OF WORK:

1. CONSTRUCTION CONTRACT NUMBER 5 CONSISTS OF UPGRADING EXISTING TRACTION POWER SUBSTATIONS (TPSS) LOCATED AT BROAD, PARK AND LOUDON ON THE SEPTA BROAD STREET SUBWAY LINE AND CASTOR ON THE ROUTE 59 TRACKLESS TROLLEY OF THE CITY TRANSIT DIVISION (CTD). THE REHABILITATION SHALL REPLACE ALL MAIN TRACTION POWER EQUIPMENT, INCLUDING CABLES, AND MISCELLANEOUS ACCESSORY COMPONENTS AT THE FACILITIES.
2. THE REHABILITATION WORK SHALL BE INITIATED IN THE FOLLOWING ORDER FOR THE BROAD STREET SUBWAY LINE. FIRST BROAD AND LOUDON, THEN PARK. THE REHABILITATION OF CASTOR TPSS SHALL BE DONE INDEPENDENT OF THE ABOVE.
3. COMPLETION OF THE 50% DESIGN TO 100% LEVEL:

A. COMPLETING THE 50% DESIGN SUPPLIED WITH THE CONTRACT DOCUMENTS AND SPECIFICATIONS TO A 100% LEVEL.

B. SIGNING AND SEALING THE DRAWINGS, REPORTS AND SPECIFICATIONS.
4. SITE DEMOLITION AND CLEARING FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. CLEARING AND GRUBBING INCLUDING REMOVAL AND DISPOSAL OF DEBRIS AND ABANDONED EQUIPMENT.

B. SELECTIVE DEMOLITION OF PIPES, CONDUITS, DUCT BANKS, MANHOLES, FUEL TANKS AND METAL CASES.

C. RECYCLE SCRAP METAL.

D. TEST, THEN DISPOSE OF AS HAZARDOUS WASTE SCRAP MATERIAL, STORAGE TANK AND CONTAMINATED SOIL.
5. SITE FENCING:

A. CONSTRUCT NEW CHAIN LINK FENCING AROUND BUILDING AND EQUIPMENT YARD INCLUDING SWINGING GATE AT CASTOR TPSS.

B. REPLACE THE EXISTING CHAIN LINK SECURITY GATE AT PARK TPSS. REPLACE THE IRON FENCE IN THE ALLEY AT PARK AND LOUDON TPSS.
6. SITE UTILITIES FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. PROTECT IN PLACE SITE UTILITIES AS INDICATED ON THE CONTRACT DRAWINGS.
7. GRADING, STORM WATER SYSTEM AND SEDIMENTATION CONTROL FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. GRADE AT SITE IN ACCORDANCE WITH CONTRACT DRAWINGS.

B. PROVIDE SEDIMENTATION CONTROL TO INCLUDE FILTER FABRIC, FILTER BAGS FOR INLET PROTECTION; STORM PROTECTION.
8. EQUIPMENT YARD PADS FOR CASTOR TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. CONSTRUCT NEW ELECTRICAL EQUIPMENT PADS AS INDICATED ON THE CONTRACT DRAWINGS.
9. CAST-IN-PLACE CONCRETE FOUNDATIONS FOR CASTOR TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. CONSTRUCT FOUNDATIONS FOR OUTDOOR ELECTRICAL EQUIPMENT AS INDICATED ON THE CONTRACT DRAWINGS.
10. CONTROL SYSTEMS FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. DEMOLISH EXISTING CONCRETE EQUIPMENT PADS AND REFINISH FLOOR.

B. RELOCATE EXISTING BATTERIES AND OTHER AUXILIARY POWER SUPPLY EQUIPMENT TO FACILITATE THE WORK.

C. NEW PROTECTION AND CONTROL PANELS:

1) INSTALLATION OF NEW PROTECTION AND CONTROL PANELS.

2) DECOMMISSION AND REMOVE EXISTING CONTROL PANELS AFTER COMMISSIONING OF ALL NEW EQUIPMENT.

3) INSTALLATION OF CABLE TRAYS AND CABLE LADDER.
11. STRUCTURAL REPAIRS TO EXISTING MASONRY WALLS FOR EACH TPSS IN CONTRACT NO. 5:

A. REMOVE VEGETATION FROM WALL JOINTS.

B. REMOVE EFFLORESCENCE FROM WALL FACE.

C. REPAIR SPALLED AREAS. SEAL CONCRETE.

D. SEAL CONCRETE.

E. REFINISH/REPAIR MASONRY WALLS AND BRICK FENCE POSTS.

F. REPAIR ROOF SYSTEM EXCEPT AT BROAD WHERE A SEPTA PROJECT IS UNDERWAY.
12. WORK THAT WILL BRING EACH TPSS IN CONSTRUCTION CONTRACT NO. 5 INTO COMPLIANCE WITH ALL RELEVANT CODES, REGULATIONS, STANDARDS, ETC.:

A. CAGING OF ACCESS LADDERS.

B. SIGNAGE.

C. ADD DOORS AND STAIRS.
13. MECHANICAL AND HVAC SYSTEM FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. ENERGY RECOVERY VENTILATOR UNITS.

B. ELECTRIC UNIT HEATER.

C. HEAT PUMP.

D. EXHAUST FAN IN BATTERY ROOM.

- E. AIR CONDITIONING SPLIT SYSTEM FOR BATTERY ROOM.
- F. LOUVERS WITH DAMPERS.
- G. EMERGENCY EYE WASH IN BATTERY ROOM.
- H. HVAC UNIT.
- I. ELECTRICAL CONTROLS AND SENSORS.
- J. POWER CONNECTIONS, CONDUCTORS IN RACEWAYS AND SUPPORTS.
14. ARCHITECTURAL SYSTEM FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. SEAL OPENINGS.

B. REPLACE OR REPAIR WINDOWS AND DOORS.

C. REPLACE ROLL-UP DOORS AS INDICATED ON THE CONTRACT DRAWINGS.
15. AUXILIARY POWER SYSTEM, TO INCLUDE ALL CABLING AND AC POWER PANEL TO RECEIVE POWER FROM EXISTING PECO SUPPLY FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5.

A. TPSS BATTERY SYSTEM (136 V DC SYSTEM):

1) RELOCATE, TEMPORARILY IF REQUIRED, EXISTING BATTERIES TO FACILITATE THE WORK IN THE CONTROL ROOM.

2) INSTALL NEW BATTERIES. INSTALL NEW BATTERY CHARGERS.

3) INSTALL NEW DC TO AC INVERTER.

4) REMOVE EXISTING BATTERY SYSTEM AND DISPOSE PER SEPTA INSTRUCTIONS.

B. NEW 136 V DC POWER PANEL.

C. AC POWER PANEL TO PROVIDE POWER FOR LIGHTING AND NEW EQUIPMENT.

D. AUXILIARY POWER CONDUITS, BOXES AND CONDUCTORS.

E. DISCONNECT SWITCHES.

F. AUXILIARY TRANSFORMER(S).

G. BONDING AND GROUNDING.

H. NEW OUTDOOR CABLE RACEWAY SYSTEMS AS REQUIRED.
16. LIGHTING FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. SITE LIGHTING TO SUIT NEW EQUIPMENT ARRANGEMENT.

B. INDOOR LIGHTING, RECEPTACLES.
17. FIRE ALARM AND INTRUSION DETECTION FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. FIRE ALARM SYSTEM.

B. INTRUSION DETECTION SYSTEM, INCLUDING CCTV SYSTEM.

C. CONTROLS IN INTERFACE WITH HVAC FOR SHUT DOWN.
18. COMMUNICATION AND SCADA SYSTEM FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5:

A. PROVIDE REMOTE TERMINAL UNIT (RTU) WITH INTEGRATED TPSS GATEWAY COMPUTER.

B. SCADA CONDUITS OR CABLE TRAYS AND CABLES FOR INDICATION AND CONTROL CIRCUITS.

C. TPSS CONTROLS AND SENSORS.

D. MODIFICATION OF SCADA HOST COMPUTER IS BY SEPTA. PROVIDE LABOR FOR TESTING.

E. REPLACING THE COMMUNICATION CABLE FROM THE TPSS TERMINATION CABINET TO THE NEAREST OUTDOOR JUNCTION BOX.
19. TRACTION POWER AND SEPTA EMERGENCY AC AND DC POWER SYSTEMS EQUIPMENT, FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5, TO INCLUDE INCOMING MEDIUM VOLTAGE SUPPLY, 15 KV AC SWITCHGEAR (FOR 13.2 KV CIRCUITS), TRACTION TRANSFORMER RECTIFIERS SETS, AUXILIARY AND SIGNAL POWER TRANSFORMERS, 15 KV SWITCHGEAR (FOR 4.8KV CIRCUITS), 1000 V DC SWITCHGEAR, TRACTION RETURN SYSTEM, AUXILIARY POWER SUPPLY NETWORK, TRACTION POWER AND RETURN CABLES, RAIL RETURN BUS, RETURN CABLES INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING (AS INDICATED ON THE CONTRACT DRAWINGS):

A. 15 KV AC INCOMING/FEEDER CIRCUIT BREAKERS:

1) SEVEN (7) BREAKERS EACH AT BROAD AND PARK TPSS.

2) EIGHT (8) AT LOUDON TPSS.

3) THREE (3) AT CASTOR TPSS.

B. ONE (1) 15 KV AC TIE CIRCUIT BREAKER AT EACH OF BROAD, PARK AND LOUDON TPSS.

C. 700 V DC CIRCUIT BREAKERS WITH A WITHDRAWABLE DIRECT ACTING TRIP ELEMENT:

1) TWO (2) CATHODE BREAKERS AT EACH OF BROAD, PARK AND LOUDON TPSS.

2) TEN (10) FEEDDER BREAKERS AT BROAD, NINE (9) FEEDER BREAKERS AT PARK AND ELEVEN (11) AT LOUDON TPSS.

3) THREE (3) STATION SERVICE BREAKERS EACH AT LOUDON AND PARK TPSS, FIVE (5) STATION SERVICE BREAKERS AT BROAD TPSS.

4) ONE (1) CATHODE BREAKERS AND TWO (2) FEEDER BREAKERS AT CASTOR TPSS.

D. TWO (2) 4 MVA TRANSFORMER RECTIFIER SETS AT EACH OF BROAD, PARK, AND LOUDON TPSS.

- E. ONE (1) 1 MVA TRANSFORMER RECTIFIER SET AT CASTOR TPSS.
- F. ONE (1) 2 MVA LIGHTING AND POWER TRANSFORMER (13.2 KV/4.8 KV) AT EACH OF BROAD, PARK AND LOUDON TPSS.
- G. AUXILIARY TRANSFORMERS (13.2 KV/120-208 V):

1) TWO (2) EACH 150 KVA AT BROAD, PARK, AND LOUDON TPSS.

2) ONE (1) EACH 45 KVA AT CASTOR TPSS.
- H. POTENTIAL AND CURRENT TRANSFORMERS (PTS, CTS).
- I. 500 KW DIESEL GENERATOR SET WITH INTEGRATED LOAD BANK AT 25% OF NAMEPLATE RATING AT BROAD TPSS.
- J. 500 KW RECTIFIER AT BROAD TPSS.
- K. 4.8 KV AC WITHDRAWABLE CIRCUIT BREAKERS (15 KV RATED):

1) NINE (9) AT BROAD TPSS.

2) SIX (6) AT PARK TPSS.

3) FIVE (5) AT LOUDON TPSS.
- L. MANUAL DISCONNECT SWITCHES.
- M. DC CURRENT SHUNTS.
- N. SURGE ARRESTERS.
- O. RENEWAL OF ALL HIGH VOLTAGE BUSES, WIRES, CONNECTIONS, INSULATORS, CONDUIT, ETC.
- P. REPLACE EXISTING RETURN RAIL/GROUND BUSSES, INSTALL NEW RETURN RAIL/GROUND BUSSES AND RETURN RAIL CABLES FROM THE TPSSs TO THE NEAREST MANHOLE. COORDINATE REPLACEMENT WITH SEPTA.
- Q. GROUND GRID WITH GROUND BUSES AND CONNECTIONS TO THE EQUIPMENT AND PERIMETER FENCING. INSTALL NEW GROUND GRID AND ASSOCIATED CONDUCTORS TO SUPPLEMENT AND/OR REPLACE THE EXISTING GROUND GRID AND ALL EQUIPMENT CONNECTIONS. THIS SHALL INCLUDE RETURN CIRCUIT CONNECTIONS IN THE AREAS AFFECTED BY THE NEW AND EXISTING EQUIPMENT.
20. RECOVER REDUNDANT ASSETS AND RETURN TO SEPTA (SPARES/ASSET VALUE) FOR EACH TPSS IN CONSTRUCTION CONTRACT NO. 5.
21. DEMOLITION, REMOVAL AND DISPOSAL OF EQUIPMENT:

A. ALL CIRCUIT BREAKERS INSIDE BUILDING AFTER SEPTA HAS REMOVED ASBESTOS CONTAINING COMPONENTS. COORDINATE WITH SEPTA FOR THE DETAILS AND SCHEDULE. SEPTA WILL REMOVE PARTS FROM EXISTING CIRCUIT BREAKERS BEFORE REMOVING EXISTING CIRCUIT BREAKERS FROM THE PROJECT SITE.

B. ALL TRANSFORMER-RECTIFIER SETS.

C. ALL AUXILIARY TRANSFORMERS.

D. GENERATOR-RECTIFIER SET AT BROAD TPSS AND ALL ITS ATTACHMENTS INCLUDING ACTIVE AND ABANDONED FUEL TANKS.

E. ALL PTS, CTS, DISCONNECT SWITCHES.

F. 125 V DC BATTERIES, BATTERY CHARGERS.
22. TESTING, COMMISSIONING, TRAINING AND PLACING INTO REVENUE SERVICE OF ALL COMPONENTS AND EQUIPMENT TO MAKE A COMPLETE OPERATING SYSTEM; FOLLOWED BY POST COMMISSIONING TESTING.
23. FINAL DESIGN, PROCURE MATERIALS, MANUFACTURE, FACTORY TESTING, DELIVERY AND STORAGE OF COMPONENTS AND MATERIALS, INSTALLATION, ALL FIELD TESTING, COMMISSIONING AND BRINGING INTO REVENUE SERVICE ALL COMPONENTS NECESSARY FOR IMPLEMENTATION OF FULL AND CORRECT OPERATION OF THE TPSSs.
24. PERFORM ALL WORK BASED ON THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL DEVELOP THE FINAL DESIGN DRAWINGS AND SPECIFICATIONS FOR REVIEW AND APPROVAL BY SEPTA. CONSTRUCTION WORK SHALL NOT BE COMMENCED UNTIL SEPTA HAS APPROVED THE FINAL DESIGN DRAWINGS AND SPECIFICATIONS.
25. VERIFY AND UPDATE ALL DESIGN REQUIREMENTS PRIOR TO COMMENCEMENT OF DETAILED/FINAL DESIGN.
26. THE TPSS FUNCTIONALITY WILL REMAIN AS EXISTS TODAY, EXCEPT FOR THE CHANGES AS SPECIFIED IN THE CONTRACT DRAWINGS.
27. ABATEMENT OR REMEDIATION OF CONTAMINATED OR HAZARDOUS MATERIALS.
28. VERIFICATION OF EXISTING CONDITIONS INCLUDING UTILITIES.
29. FINAL CONSTRUCTION PLANS FOR ALL TPSS WORK INCLUDING TEMPORARY STRUCTURES, SIGNED AND SEALED BY AN ENGINEER LICENSED IN THE COMMONWEALTH OF PENNSYLVANIA.
30. FINAL CONSTRUCTION SPECIFICATIONS FOR ALL TPSS WORK INCLUDING TEMPORARY STRUCTURES, SIGNED AND SEALED BY AN ENGINEER LICENSED IN THE COMMONWEALTH OF PENNSYLVANIA.
31. ALL PERMITS REQUIRED TO PERFORM CONSTRUCTION WORK FROM MUNICIPAL AUTHORITY HAVING JURISDICTION OF THE WORK SITE.
32. WORK PLANS THAT ARE FULLY COORDINATED WITH THE SEPTA OPERATIONS MANAGER.
33. SUPPORT SEPTA PUBLIC INVOLVEMENT INITIATIVE WITH TECHNICAL INFORMATION AND PRESENTATION GRAPHICS.
34. PROVIDE TEMPORARY POWER.
35. AS-BUILT DRAWINGS.

50% SUBMISSION
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CHIEF ENGINEERING OFFICER-8&B

CHIEF RAIL TRANSIT OFFICER

SYSTEM SAFETY

DIRECTOR OF ENGINEERING-8&B

MANAGER-ARCH/ENGINEERING

PROJECT MANAGER



HDR Engineering, Inc.
Philadelphia, PA

									APD
									CKD
									BY
									DESCRIPTION
									DATE
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CONTRACT 5
BROAD - PARK - LOUDON - CASTOR
TRACTION POWER SUBSTATION
REHABILITATION
GENERAL
DESCRIPTION OF WORK

SCALE NTS	SCALE FACTOR -
DATE 10/16/2017	DRAWN BY: MB CHECKED BY: VS
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