TORONTO Water

ENGINEERING & CONSTRUCTION SERVICES

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

CONTRACT No. 25ECS-MI-03HA

ISSUED FOR TENDER, MARCH 18, 2025

2701 QUEEN ST.E., SCARBOROUGH, ON M4E 1H4

ARCADIS
100-175 GALAXY BOULEVARD
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GENERAL MANAGER
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JENNIFER GRAHAM HARKNESS, P.ENG.
CHIEF ENGINEER & EXECUTIVE DIRECTOR
ENGINEERING AND CONSTRUCTION SERVICES

DRAWING NUMBER:	2F-2017-08-1	G001

DRAWING INDEX

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3	2F-2017-08-3	G003	DRAWING INDEX - 2
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5	2F-2017-08-5	A001	GENERAL INFORMATION
6	2F-2017-08-6	A100	FLOOR PLANS, SECTIONS AND ELEVATIONS
7	2F-2017-08-7	A200	DETAILS AND SCHEDULES
8	2F-2017-08-8	A300	ARCHITECTURAL REMOVAL, MODIFICATION AND REINSTATEMENT WORK
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42	2F-2017-08-42	E102	FHA-ELS-MCC-0400A/B ELEVATION LAYOUT - EXISTING AND MODIFICATIONS
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47	2F-2017-08-47	E107	FHA-ELS-PDP-0401A/B ELEVATION LAYOUT
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49	2F-2017-08-49	E111	FHA-ELS-PDP-0500A/B SINGLE LINE DIAGRAM - MODIFICATIONS
50	2F-2017-08-50	E112	FHA-ELS-PDP-0500A/B ELEVATION LAYOUT - EXISTING AND MODIFICATIONS
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67	2F-2017-08-67	E205	ELECTRICAL FLOOR PLAN - PUMPING STATION BASEMENT LEVEL SWITCHGEAR ROOM
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69	2F-2017-08-69	E207	ELECTRICAL FLOOR PLAN - RMF & SERVICE BUILDING
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LICENSED PROFESSIONAL ENGINEER
P. L. MORGAN
PROVINCE OF ONTARIO
March 19/2025

WILLIAM FERNANDES, P. ENG.
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SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
DRAWING INDEX - 1

GENERAL

DESIGN:	SS	DRAFTING:	SS	CHECK:	PD	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-2		G002
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\1 GENERAL\2F-2017-08-2_G002.DWG
Layout Tab: G002
Date: 03/25/2025 Time: 10:36:30 AM

DRAWING INDEX

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78	2F-2017-08-78	I004	PROCESS & INSTRUMENTATION DIAGRAM
79	2F-2017-08-79	I005	MECHANICAL CONTROL PANEL LAYOUT
80	2F-2017-08-80	I006	MECHANICAL CONTROL PANEL WIRING
81	2F-2017-08-81	I007	SPC-RPU-2022 PLC RACK LAYOUT
82	2F-2017-08-82	I008	SPC-RPU-2022 PLC PANEL LAYOUT
83	2F-2017-08-83	I009	SPC-RPU-2022 - PANEL POWER DISTRIBUTION 1
84	2F-2017-08-84	I010	SPC-RPU-2022 - RACK 0 SLOT 03 WIRING DIAGRAM
85	2F-2017-08-85	I011	SPC-RPU-2022 - RACK 0 SLOT 04 WIRING DIAGRAM
86	2F-2017-08-86	I012	SPC-RPU-2022 - RACK 0 SLOT 05 WIRING DIAGRAM
87	2F-2017-08-87	I013	SPC-RPU-2022 - RACK 0 SLOT 06 WIRING DIAGRAM
88	2F-2017-08-88	I014	SPC-RPU-2022 - RACK 0 SLOT 07 WIRING DIAGRAM
89	2F-2017-08-89	I015	SPC-RPU-2022 - RACK 1 SLOT 04 WIRING DIAGRAM
90	2F-2017-08-90	I016	SPC-RPU-1223 - PLC RACK LAYOUT
91	2F-2017-08-91	I017	SPC-RPU-1223 - PLC PANEL LAYOUT
92	2F-2017-08-92	I018	SPC-RPU-1223 - RACK 0 SLOT 06 WIRING DIAGRAM
93	2F-2017-08-93	I019	INSTRUMENTATION FLOOR PLAN
94	2F-2017-08-94	I020	INSTALLATION DETAILS - 1
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97	2F-2017-08-97	I102	FLT-UPS-0002 POWER FAILURE WIRING DIAGRAM
98	2F-2017-08-98	I103	MCC-0400 WIRING DETAIL
99	2F-2017-08-99	I104	TIE BREAKER WIRING
100	2F-2017-08-100	I105	FILTER CV SHUTOFF CONTROL PANEL LAYOUT AND WIRING
101	2F-2017-08-101	I106	FLT-CP-0005 CONTROL PANEL
102	2F-2017-08-102	I107	FLT-CP-0006 CONTROL PANEL

Drawing: J:\W16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\1 GENERAL\2F-2017-08-4_G003.DWG
Layout: Tab: G003
Date: 03/24/2025 Time: 04:11:47 PM

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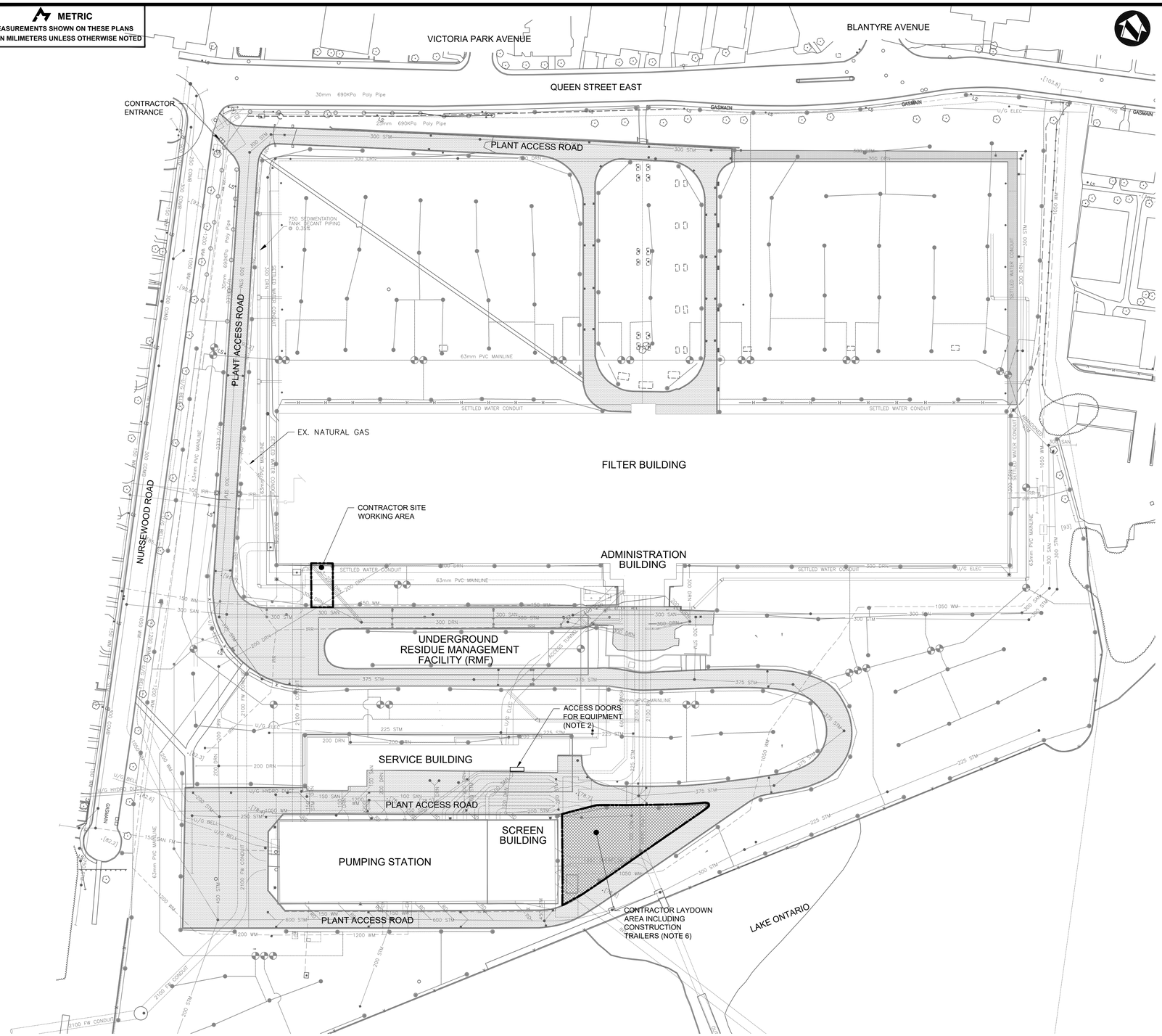
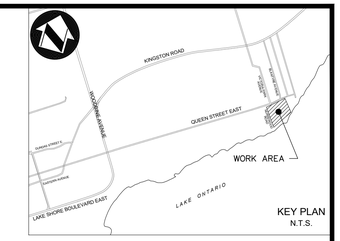
DRAWING INDEX - 2

GENERAL

DESIGN:	SS	DRAFTING:	SS	CHECK:	PD	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-3		G003
DATE:	2024-09-30						

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED





KEY PLAN
N.T.S.

GENERAL NOTES:

1. THIS DRAWING ONLY INTENDS TO SHOW CONTRACT LIMITS. THE DRAWING DOES NOT SHOW THE DETAILS OF PROPOSED WORKS.
2. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE THE SCHEDULE AND WORK ACTIVITIES WITH THE PLANT AND OTHER UTILITIES INVOLVED IN CONSTRUCTION OF THEIR OWN CONTRACT AND FACILITIES SUCH AS HYDRO, GAS, ETC.
3. EXISTING ROADS, CURBS, SIDEWALKS, PAVED AND SODDED AREAS AND FENCES DISTURBED DURING CONSTRUCTION TO BE RESTORED TO ORIGINAL CONDITION OR BETTER AND TO SATISFACTION OF THE CITY. NEATLY GRADE ALL AREAS TO MATCH ADJACENT ELEVATIONS AND PROVIDE POSITIVE DRAINAGE TO CATCH BASINS.
4. CONTRACTOR TO PROVIDE TRAILER FOR OFFICE DURING CONSTRUCTION, REFER TO SPECIFICATIONS FOR DETAILS.
5. ACCESS ROADS NOT TO BE USED FOR STORAGE OF CONSTRUCTION MATERIALS.
6. ACCESS TO CHAMBER/VENTILATION FANS NOT TO BE BLOCKED.

LEGEND:

- LAYDOWN AREA
- PLANT ACCESS ROAD

0 15 30 45 60 75m
SCALE 1:750

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R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
OVERALL SITE PLAN

CIVIL

DESIGN:	A.P.	DRAFTING:	L.A.	CHECK:	A.P.	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:750			DRAWING NUMBER:	2F-2017-08-4		G004
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\1 GENERAL\2F-2017-08-4_G004.DWG
Layout Tab: G004
Date: 03/24/2025 Time: 01:52:54 PM

ONTARIO BUILDING CODE DATA MATRIX
Part 11 - Renovation of Existing Building

11.00	Building Code Version:	O. Reg 332/12. Last Amendment O. Reg 191/14	O.B.C. REF
11.01	Project Type:	☐ ADDITION ☒ RENOVATION ☐ ADDITION & RENOVATION ☐ CHANGE OF USE Description: Upgrade of interior finishes	[A]1.1.2
11.02	Major Occupancy Classification:	Occupancy: Use: F3 LOW HAZARD INDUSTRIAL	3.1.2.1.(1)
11.03	Superimposed Major Occupancies:	☒ NO ☐ YES Description:	3.2.2.7
11.05	No. of Streets:	1	3.2.2.10 & 3.2.5.5
11.06	Building Size:	☐ SMALL ☐ MEDIUM ☐ LARGE ☒ >LARGE	T11.2.1.1.B.-N
11.08	Existing Building Classification:	Change in Major Occupancy ☐ YES ☒ NOT APPLICABLE (no change in major occupancy)	11.2.1.1
		Construction Index 1	T11.2.1.1.A
		Hazard Index 4	T11.2.1.1.B.-N
		Importance Category ☐ LOW ☐ NORMAL	4.1.2.1.(3)
		☐ HIGH ☒ POST DISASTER	5.2.2.1.(2)
11.09	Renovation Type:	☒ BASIC RENOVATION ☐ EXTENSIVE RENOVATION	11.3.3.1 11.3.3.2
11.12	Barrier Free Design:	☐ YES ☒ NO	11.3.3.2.(2)
11.13	Reduction in Performance Level:	STRUCTURAL ☐ YES ☒ NO	11.4.2.1
		BY INCREASE IN OCCUPANT LOAD ☐ YES ☒ NO	11.4.2.2
		BY CHANGE OF MAJOR OCCUPANCY ☐ YES ☒ NO	11.4.2.3
		PLUMBING ☐ YES ☒ NO	11.4.2.4
		SEWAGE SYSTEMS ☐ YES ☒ NO	11.4.2.5
		EXTENSION OF COMBUSTIBLE CONSTRUCTION ☐ YES ☒ NO	11.4.2.6
11.14	Compensating Construction:	☒ NO ☐ YES	11.4.3.1
		STRUCTURAL ☐ YES ☒ NO _ _ _ _ _ _ _ _ _ _	11.4.3.2
		BY INCREASE IN OCCUPANT LOAD ☐ YES ☒ NO _ _ _ _ _ _ _ _ _ _	11.4.3.3
		BY CHANGE OF MAJOR OCCUPANCY ☐ YES ☒ NO _ _ _ _ _ _ _ _ _ _	11.4.3.4
		PLUMBING ☐ YES ☒ NO _ _ _ _ _ _ _ _ _ _	11.4.3.5
		SEWAGE SYSTEMS ☐ YES ☒ NO _ _ _ _ _ _ _ _ _ _	11.4.3.6
		EXTENSION OF COMBUSTIBLE CONSTRUCTION ☐ YES ☒ NO _ _ _ _ _ _ _ _ _ _	11.4.3.7
11.15	Compliance Alternatives Proposed:	☒ NO ☐ YES	11.5.1
11.16	Notes:		11.5.1

All references are to Division B of the OBC unless preceded by [A] for Division A or [C] for Division C

WALL TYPES

MARK	LEGEND	DESCRIPTION	FRR	STC	ULC	REMARKS
W1		190mm CONCRETE MASONRY UNIT	1 HR	50	SB-3 TABLE 1	200mm MONOLITHIC CONC. CURB AT WALL BASE PER SB-2 TABLE 2.1.1

FIRE RESISTANCE RATING LEGEND

— — — — — — 1 HOUR FIRE RATED SEPARATION

GENERAL NOTES

1. THE CONSULTANT IS NOT RESPONSIBLE FOR INFORMATION CONCERNING THE SITE AND SURVEY INFORMATION PREPARED BY OTHERS.

2. THE CONTRACTOR SHALL SITE VERIFY THE SURVEY INFORMATION PRIOR TO PROCEEDING WITH THE WORK. FAILURE TO REPORT ANY DISCREPANCIES SHALL CONSTITUTE ACCEPTANCE OF THE SITE CONDITIONS.

3. THE CONTRACTOR SHALL REVIEW THE DRAWINGS FOR SCOPE OF DEMOLITION AND NEW WORK, INCLUDING ALL DISCIPLINES, AND SHALL COORDINATE WITH NEW WORK DRAWINGS FOR EXACT EXTENT OF ANY DEMOLITION REQUIRED.

4. SCOPE OF WORK SHALL NOT BE LIMITED TO THAT SHOWN ON THE DRAWINGS AND SHALL INCLUDE WORK REQUIRED TO ELIMINATE ALL EXISTING, ABANDONED OR REDUNDANT COMPONENTS, AND TO FACILITATE PROPER EXECUTION OF THE WORK.

5. ALL DIMENSIONS, INCLUDING EXISTING DIMENSIONS AND SETTING-OUT GEOMETRIES, SHALL BE SITE VERIFIED BY THE CONTRACTOR PRIOR TO PROCEEDING WITH THE WORK.

6. REMOVAL AND DISPOSAL OF HAZARDOUS MATERIALS SHALL BE IN ACCORDANCE WITH LOCAL REGULATIONS AND AUTHORITIES HAVING JURISDICTION.

7. UNLESS NOTED OTHERWISE, MAKE GOOD ALL AREAS DISTURBED BY EXCAVATION AND/OR INSTALLATION OF CIVIL, MECHANICAL AND ELECTRICAL SERVICES. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL DRAWINGS.

8. THE CONTRACTOR SHALL COORDINATE BASE BUILDING WORKS WITH WORK OF OTHER CONTRACTORS, INCLUDING TENANT WORKS AS REQUIRED TO FACILITATE PROPER INSTALLATION.

9. ALL OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE CONTRACT DRAWINGS AND OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CONSULTANT BEFORE PROCEEDING WITH ANY WORK INVOLVED.

10. ALL CONSTRUCTION SHALL BE IN ACCORDANCE TO THE LATEST EDITION OF THE ONTARIO BUILDING CODE.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF AND THE SAFETY IN AND AROUND THE WORKS' AREA AND OF ADJACENT PROPERTIES.

12. CONTRACTOR SHALL KEEP LOADS ON THE STRUCTURE WITHIN THE LIMITS OF THE DESIGN BOTH DURING AND AFTER CONSTRUCTION.

13. COMPLIANCE WITH CODES AND ORDINANCES GOVERNING THE WORK SHALL BE MADE AND ENFORCED BY THE GENERAL CONTRACTOR.

14. GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION

15. NOTE THAT ALL WRITTEN DIMENSIONS TAKE PRECEDENCE OVER SCALE.

16. WORKMANSHIP THROUGHOUT SHALL BE OF THE BEST QUALITY OF THE TRADE INVOLVED AND THE GENERAL CONTRACTOR SHALL COORDINATE THE WORK OF THE VARIOUS TRADES TO EXPEDITE THE JOB IN A SMOOTH AND CONTINUOUS PROCESS.

17. THE CONTRACTOR SHALL CONFINE HIS OPERATIONS ON THE SITE TO AREAS PERMITTED BY THE OWNER.

18. PROVIDE TOUCH-UP PAINT IN THE EVENT THAT PATCH AND REPAIR IS REQUIRED. MATCH EXISTING PAINT.

19. CONTRACTOR TO REMOVE AND DISPOSE OF ALL DEBRIS FROM THE PROJECT SITE.

20. PROVIDE ALL NECESSARY BLOCKING, BACKING AND FRAMING FOR LIGHT FIXTURES, ELECTRIC UNITS, RECESSED ITEMS AND ALL OTHER ITEMS AS REQUIRED.

21. ALL MATERIAL STORED ON SITE SHALL BE PROTECTED TO PREVENT DAMAGE AND DETERIORATION.

22. THE JOB SITE SHALL BE MAINTAINED IN A CLEAN AND ORDERLY CONDITION, FREE OF DEBRIS AND LITTER AND SHALL NOT BE UNREASONABLY ENCUMBERED WITH MATERIALS OR EQUIPMENT.

23. CONTRACTOR NOT TO COMMENCE CONSTRUCTION WITHOUT THE SUBMITTAL AND REVIEW OF APPROPRIATE SHOP DRAWINGS.

24. FIRE STOP ALL FLOOR PENETRATIONS, PENETRATIONS IN STAIR ENCLOSURES AND SIMILAR FIRE RATED SHAFTWAYS, PARTITIONS AND ENCLOSURES.

25. PIPING, TUBING, DUCTS, CHIMNEYS, OPTICAL FIBRE CABLES, ELECTRICAL WIRES & CABLES, TOTALLY ENCLOSED NON-COMBUSTIBLE RACEWAYS, ELECTRICAL OUTLET BOXES AND OTHER SIMILAR BUILDING SERVICES THAT PENETRATE A MEMBRANE FORMING PART OF AN ASSEMBLY REQUIRED TO HAVE A FIRE RESISTANCE RATING OR A FIRE SEAPARATION SHALL BE SEALED WITH A FIRE STOP.

26. AT ALL TRANSITIONS OF MATERIALS, JOINTS TO BE CAULKED C/W WITH BACKER ROD.

27. ALL ULC RATED WALLS ARE TO BE INSTALLED USING THE ASSEMBLY AND MATERIALS LISTED IN THE REFERENCED ULC WALL AND FLOOR.

28. ALL RATED PARTITIONS TO EXTEND TO U/S OF FLOOR OR ROOF ABOVE.

29. PROVIDE COMPRESSIBLE JOINT FILLER CONTINUOUS AT TOP OF ALL BLOCK WALLS AND PARTITIONS, CAULK JOINTS WHERE EXPOSED. PROVIDE FIRESTOP AND SMOKE SEALS AT PERIMETER JOINTS AND PENETRATIONS IN FIRE RATED PARTITIONS.

DEMOLITION NOTES

1. REPAIR CEILING, WALL AND FLOOR FINISHES DAMAGED BY DEMOLITION WORK TO MATCH EXISTING ADJACENT FINISHES.

2. REPAIR WALLS DAMAGED BY DEMOLITION TO PROVIDE SMOOTH SURFACE, WITH PATCHES DRESSED FLUSH, SMOOTH AND READY TO RECEIVE FINISH MATERIAL.

3. CONSTRUCTION IN AREAS TO BE RENOVATED SHALL BE CAREFULLY COORDINATED WITH PLANT OPS, THE CITY AND CONSULTANT PRIOR TO CONSTRUCTION. EXISTING EQUIPMENT WILL BE RELOCATED OR STORED AT OPS DIRECTION. EQUIPMENT AND/OR FURNISHINGS TO BE STORED SHALL BE PROTECTED FROM DAMAGE AND VANDALISM IN LOCATIONS ACCEPTABLE TO THE CITY AND PLANT OPS.

4. COORDINATE DEMOLITION AND CONSTRUCTION OPERATIONS WITH PLANT OPS WHERE THEY AFFECT EXISTING WORK AREAS AND NORMAL OPERATING PROCEDURES.

5. DEMOLITION EXPOSING THE INTERIOR OF THE BUILDING TO THE OUTSIDE ELEMENTS OR TO THE PUBLIC SHALL BE PROPERLY SEALED AND PROTECTED TO ELIMINATE DAMAGE FROM VANDALISM DURING CONSTRUCTION.

6. PROVIDE SCREENINGS FROM DUST, FUMES, SMOKE, WATER AND NOISE WHERE DEMOLITION REQUIRES CONSTRUCTION TO BE EXPOSED TO NORMAL OPERATIONS OF THE OCCUPANTS.

7. PATCH ALL WALL PENETRATIONS IN EXISTING FIRE RATED WALLS TO MAINTAIN THE SAME FIRE RATING OF THE EXISTING WALL/STRUCTURE. ITEMS TO REMAIN AND TO BE PROTECTED ARE DESIGNATED WITH CONTINUOUS LINES. IF DAMAGE OCCURS, PATCH, REFINISH OR REPLACE DAMAGED ITEMS AT NO COST TO THE CITY.

8. GENERAL CONTRACTOR TO PROPERLY DEMOLISH AND DISPOSE OF SITE DEMOLITION ITEMS, UNLESS OTHERWISE NOTED. RETURN TO PLANT OPS.

9. REFER TO DESIGNATED SUBSTANCE SURVEY AND FOLLOW ALL RECOMMENDED MEASURES INDICATED IN THE REPORT FOR ALL DEMOLITION WORK.

KEYPLAN

N.T.S

ABBREVIATIONS

ACT	ACOUSTICAL CEILING TILES
ALUM	ALUMINUM
CL	CENTER LINE
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CT	CERAMIC TILE
DIA	DIAMETER
DWGS	DRAWINGS
ELEC	ELECTRICAL
EPOX	EPOXY FLOOR COATING
EQ	EQUAL
EXT	EXTERIOR
FRR	FIRE RESISTANCE RATING
FD	FLOOR DRAIN
FL	FLOOR
GALV	GALVANIZED
GWB	GYPSUM WALL BOARD
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
O.C.	ON CENTER
PART	PARTITION
PREF	PRE-FINISHED
PT	PAINTED
RO	ROUGH OPENING
RM	ROOM
SS	STAINLESS STEEL
SIM	SIMILAR
SPECS	SPECIFICATIONS
SQ M	SQUARE METER
STRUCT	STRUCTURAL
TYP	TYPICAL
U/S	UNDERSIDE
W/	WITH
WD	WOOD

SYMBOLS

Section Marker

1 A101 Ref

Elevation Marker

1 A101 1 1 1

North Arrow

Elevation Datum Marker

00.000m Level

Titlemark

1 A101 View Name Scale: 1:100

Grid

XX

TAGS

Room & Unit Tags

Room Name 10101

Wall Tags

W?

Floor Tags

F?

Door Tag

101

Keynote Tag

?

Finish Tags

?

3/17/2025 8:29:44 AM

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2025.03.18
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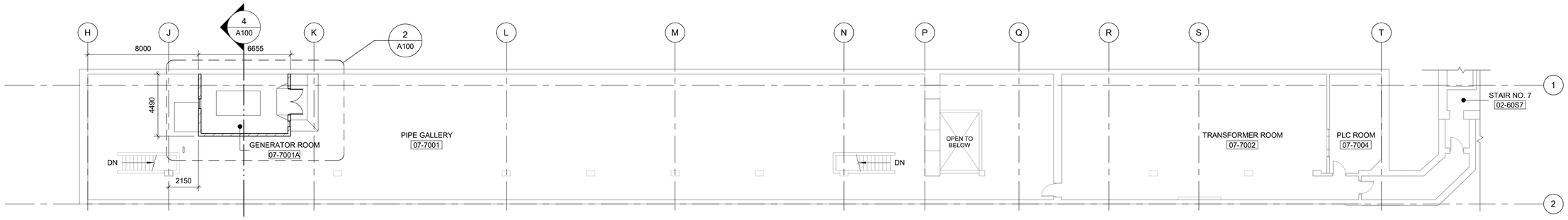
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF STANDBY GENERATOR FOR CRITICAL LOADS
GENERAL INFORMATION

ARCHITECTURAL

DESIGN:	M. K.	DRAFTING:	D. M.	CHECK:	M. K.	CONTRACT No.	25ECS-MI-03HA
SCALE:	As indicated			DRAWING NUMBER:	2F-2017-08-5		A001
DATE:	2025-03-18						



1 A100 PIPE GALLERY ROOM - FLOOR PLAN
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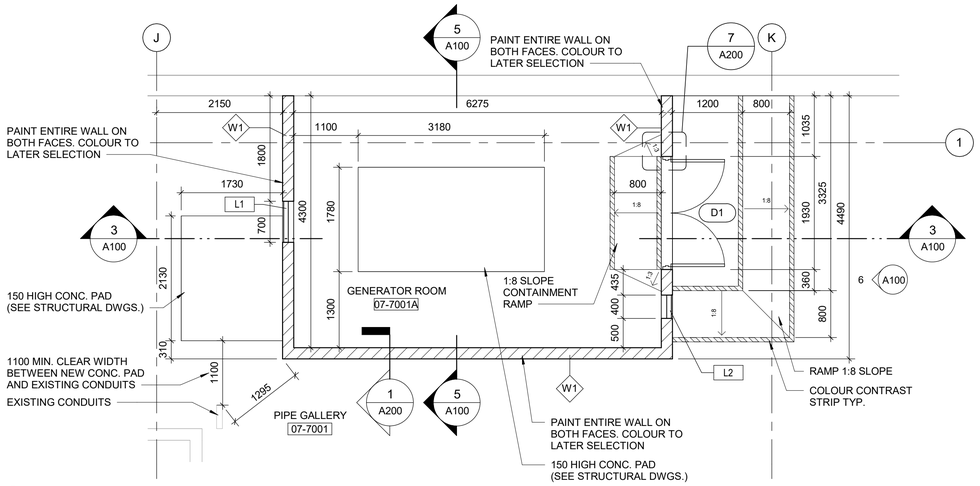
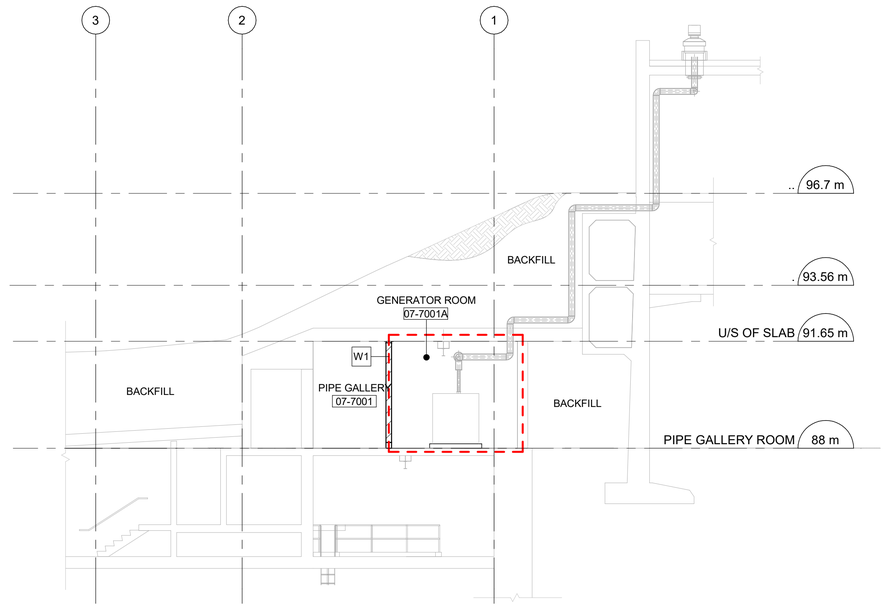
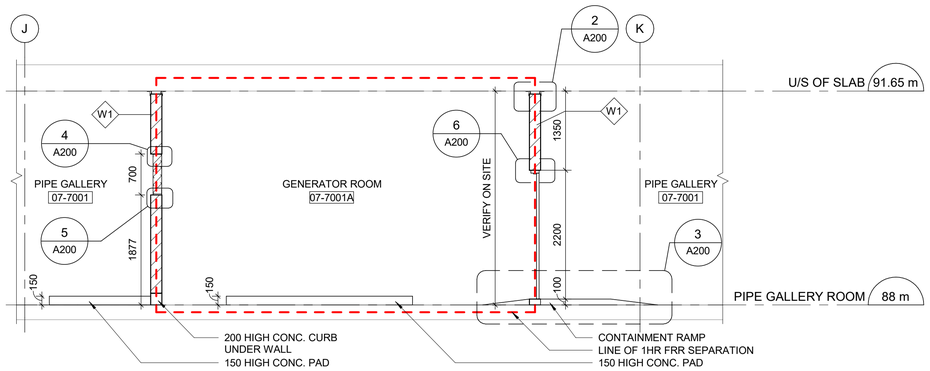


2 A100 GENERATOR ROOM - ENLARGED PLAN
Scale: 1 : 50



4 A100 SECTION C
Scale: 1 : 100



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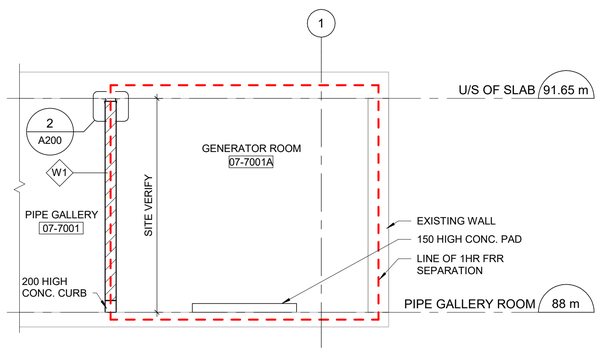

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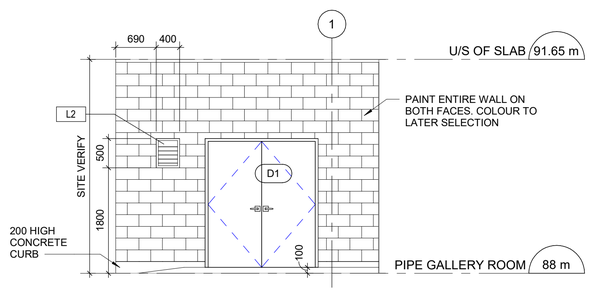

6 A100 ELEVATION - EAST WALL
Scale: 1 : 50

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INSTALLATION OF STANDBY GENERATOR FOR CRITICAL LOADS
FLOOR PLANS, SECTIONS AND ELEVATIONS

ARCHITECTURAL

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SCALE:	As indicated			DRAWING NUMBER:	2F-2017-08-6		A100
DATE:	2025-03-18						

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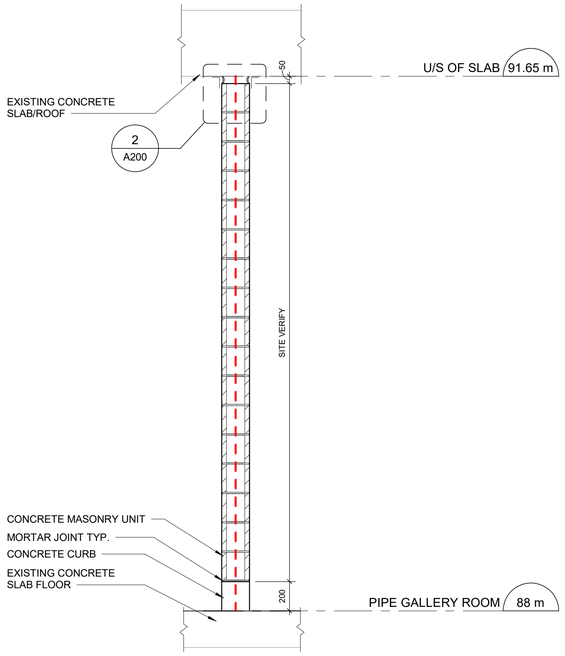

1 A200 WALL SECTION
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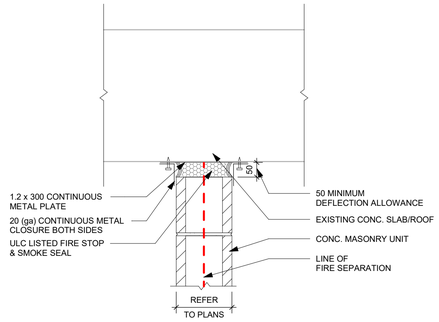

2 A200 TYP. DETAIL AT TOP OF FIRE RATED MASONRY WALL
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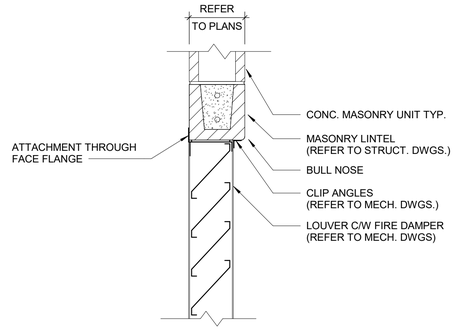
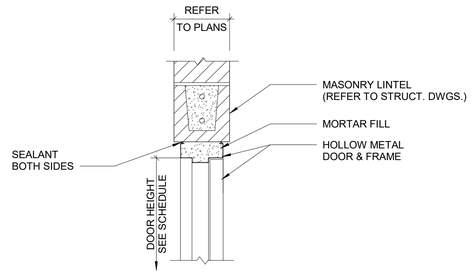
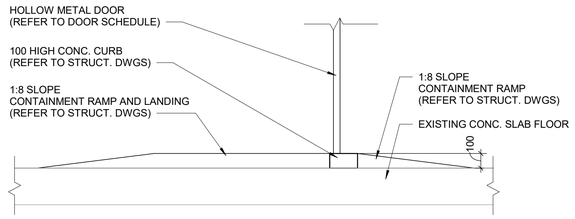


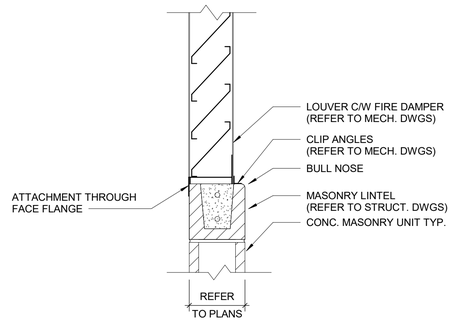
4 A200 DETAIL AT LOUVER HEAD
Scale: 1 : 10



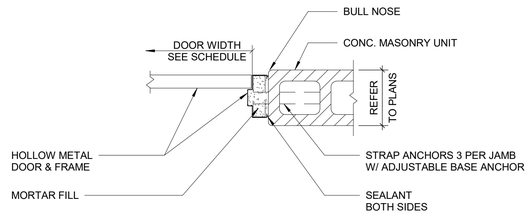
6 A200 DETAIL AT DOOR HEAD
Scale: 1 : 10



3 A200 DETAIL AT DOOR SILL
Scale: 1 : 20



5 A200 DETAIL AT LOUVER SILL
Scale: 1 : 10



7 A200 DETAIL AT DOOR JAMB
Scale: 1 : 10

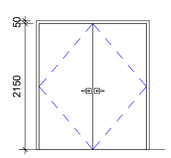
ROOM MATERIAL AND FINISH SCHEDULE

ROOM NUMBER	ROOM NAME	FLOORS		WALLS								REMARKS
				NORTH		EAST		SOUTH		WEST		
		MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	E. WALL FINISH	MATERIAL	FINISH	MATERIAL	FINISH	
07-7001A	GENERATOR ROOM	CONC.	EPOX	CMU	PT	CMU	PT	CMU	PT	CMU	PT	EPOXY FINISH TO EXTEND BY 200mm UPSTAND AT WALLS

DOOR AND FRAME SCHEDULE

NO.	LOCATION	DOOR TYPE	WIDTH	HEIGHT	THICKNESS	PANEL			FRAME		FIRE RATING	REMARKS
						MATERIAL	FINISH	GLAZING	MATERIAL	FINISH		
D1	GENERATOR ROOM	AA	2 x 915	2150	45	HM	PT	N/A	HM	PT	3/4 H	

DOOR TYPES



TYPE AA

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R.C. HARRIS WATER TREATMENT PLANT
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DETAILS AND SCHEDULES

ARCHITECTURAL

DESIGN:	M. K.	DRAFTING:	D. M.	CHECK:	M. K.	CONTRACT No.	25ECS-MI-03HA
SCALE:	As indicated			DRAWING NUMBER:	2F-2017-08-7		A200
DATE:	2025-03-18						

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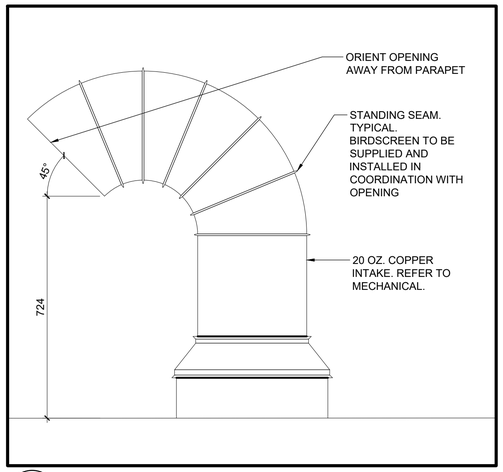
THE SOLE PURPOSE OF THIS DRAWINGS (A001, A002) IS TO PROVIDE DESCRIPTION OF THE FOLLOWING WORK :

1. SUPPORT OF STONE ABOVE THE DUCT BANK INTERVENTION.

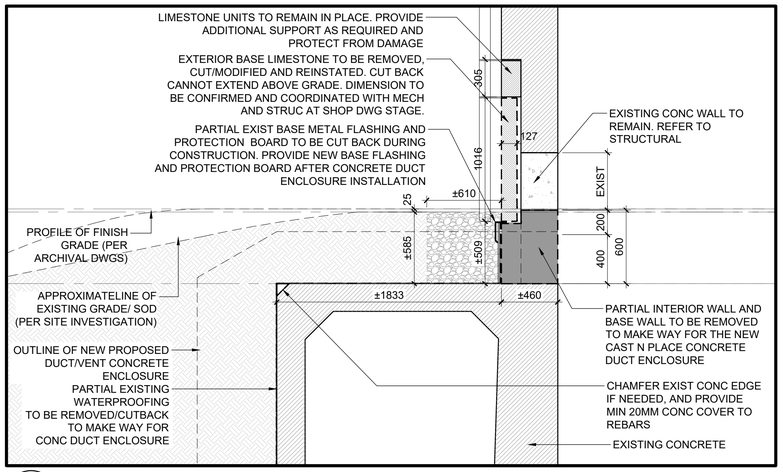
2. METAL WORK FOR SUPPLY AND EXHAUST ENCLOSURE AT THE ROOF LEVEL

3. FINISH LANDSCAPE SURFACES, INCLUDING RE-INSTATEMENT OF GRAVEL MARGIN, LIMESTONE PAVERS AND REGRADING AND SOD IN THE IMMEDIATE AREAS OF THE WORK.

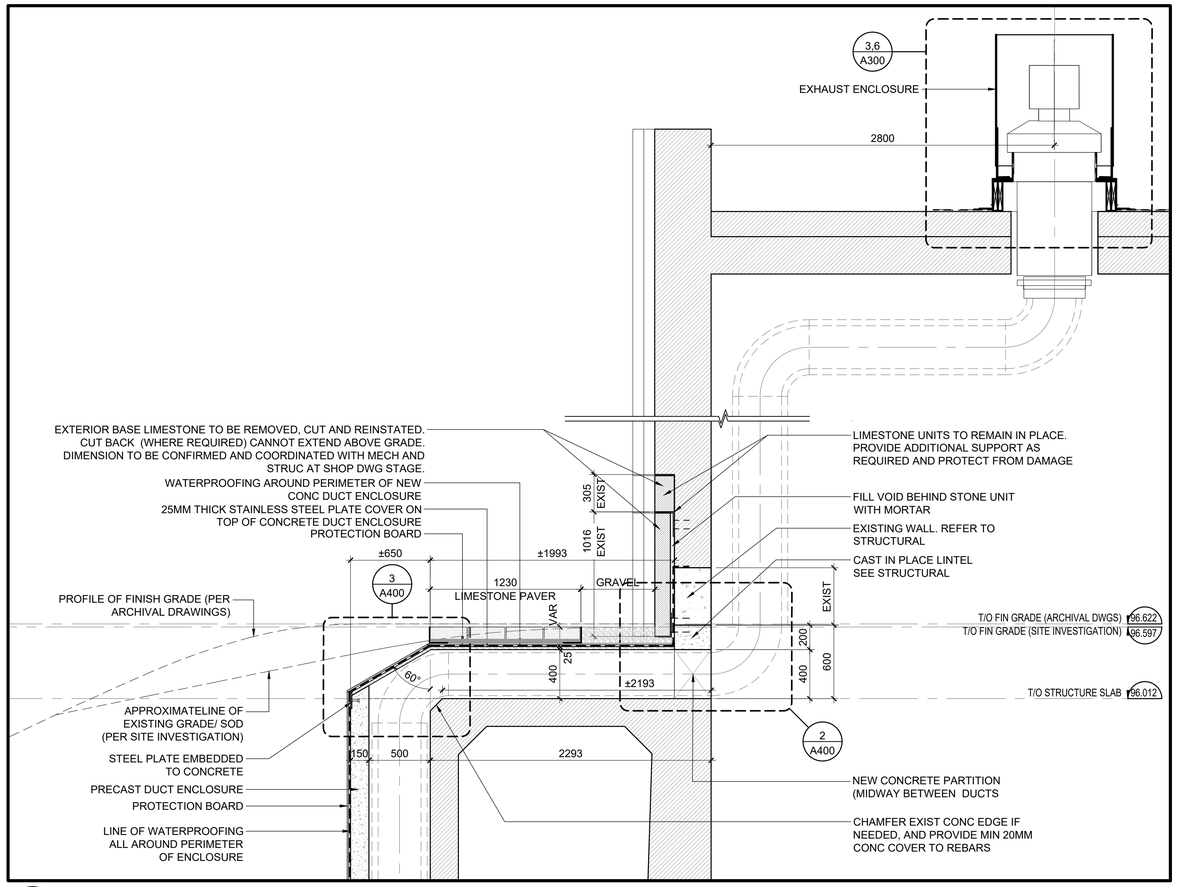
ALL OTHER WORK IS BY ARCADIS, REFER TO ARCADIS DOCUMENTATIONS.



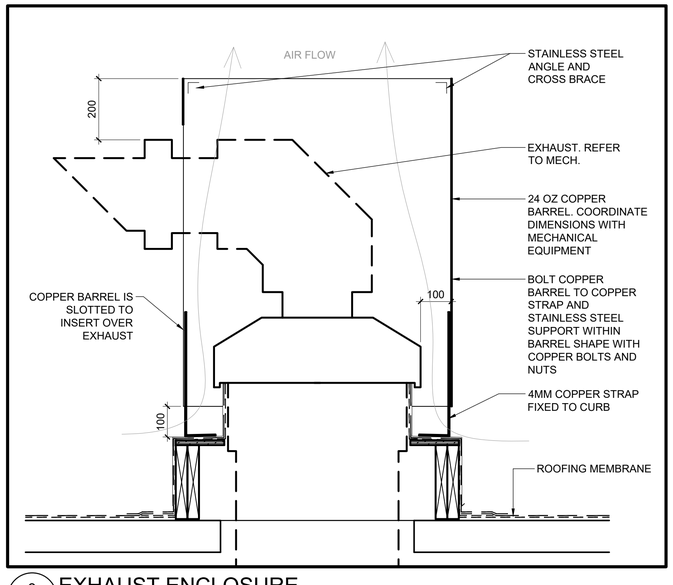
6 A300 INTAKE
SCALE : 1: 10



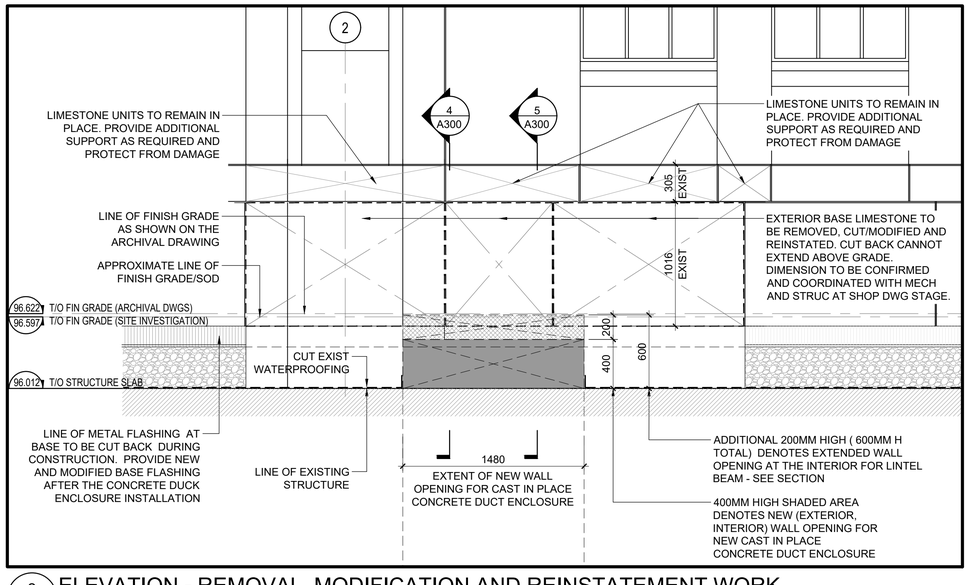
5 A300 SECTION - REMOVAL WORK
SCALE : 1: 25



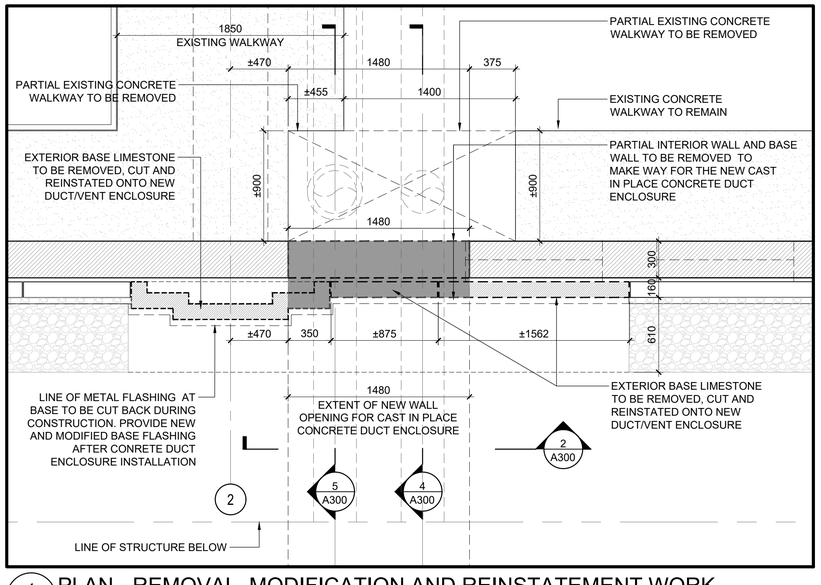
4 A300 SECTION - REINSTATEMENT WORK
SCALE : 1: 25



3 A300 EXHAUST ENCLOSURE
SCALE : 1: 10



2 A300 ELEVATION - REMOVAL, MODIFICATION AND REINSTATEMENT WORK
SCALE : 1: 25



1 A300 PLAN - REMOVAL, MODIFICATION AND REINSTATEMENT WORK
SCALE : 1: 25

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LOU DI GIRONIMO
GENERAL MANAGER
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R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF STANDBY GENERATORS FOR CRITICAL LOADS

ARCHITECTURAL REMOVAL, MODIFICATION AND REINSTATEMENT WORK

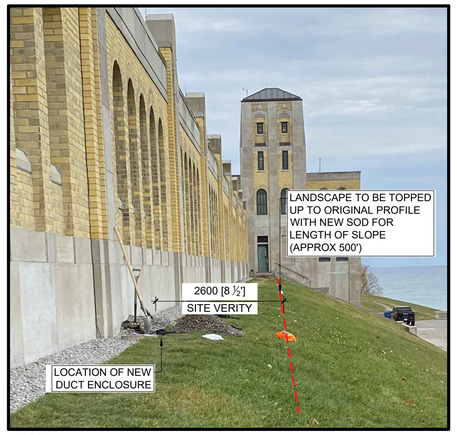
ARCHITECTURAL

DESIGN:		DRAFTING:		CHECK:		CONTRACT No.	25ECS-MI-03HA
SCALE:				DRAWING NUMBER:	2F-2017-08-8		A300
DATE:	2024-09-30						

Drawing: P:\2024\2408 RC HARRIS GENERATOR (ARCADIS)\DRAWINGS\SHEETS\2408- RC HARRIS SHEETS-A001-A002-R1.DWG
Layout Tab: A300
Date: 03/17/2025 Time: 11:44:22 AM

9 A400 IMAGE OF TEST PIT
NTS

8 A400 IMAGE OF SLOPE ON LANDSCAPE
NTS



7 A400 IMAGE OF SLOPE ON LANDSCAPE
NTS

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1. SUPPORT OF STONE ABOVE THE DUCT BANK INTERVENTION.

2. METAL WORK FOR SUPPLY AND EXHAUST ENCLOSURE AT THE ROOF LEVEL

3. FINISH LANDSCAPE SURFACES, INCLUDING RE-INSTATEMENT OF GRAVEL MARGIN, LIMESTONE PAVERS AND REGRADING AND SOD IN THE IMMEDIATE AREAS OF THE WORK.

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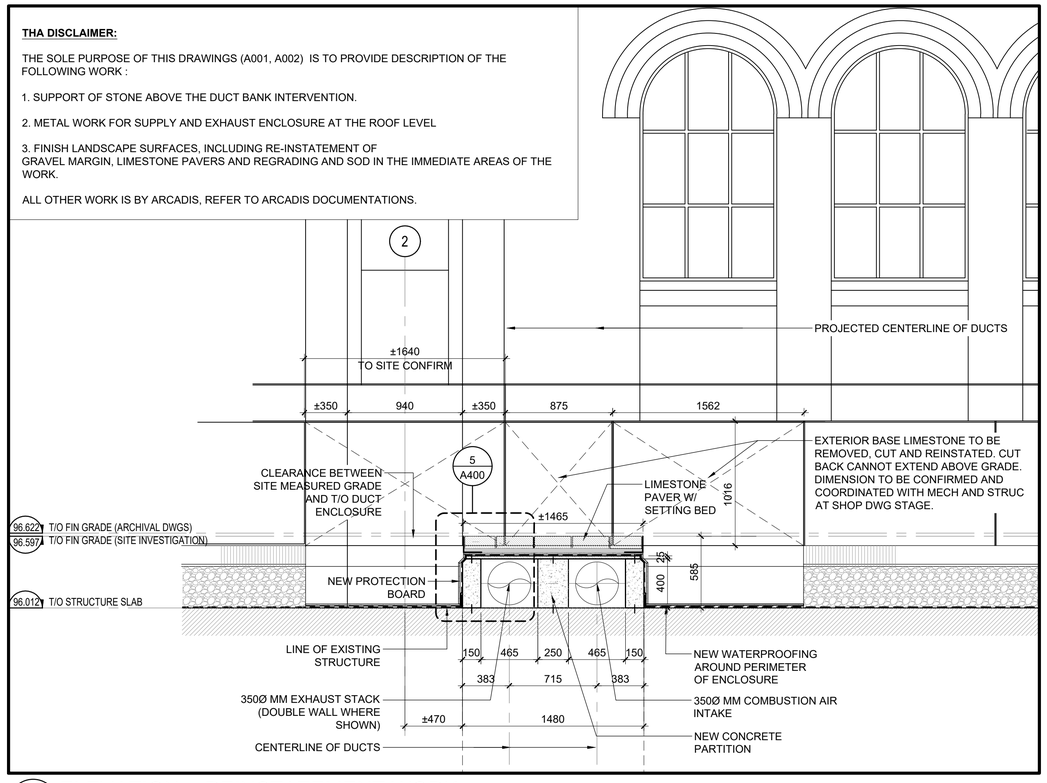

4 A400 ELEVATION - REINSTATEMENT WORK
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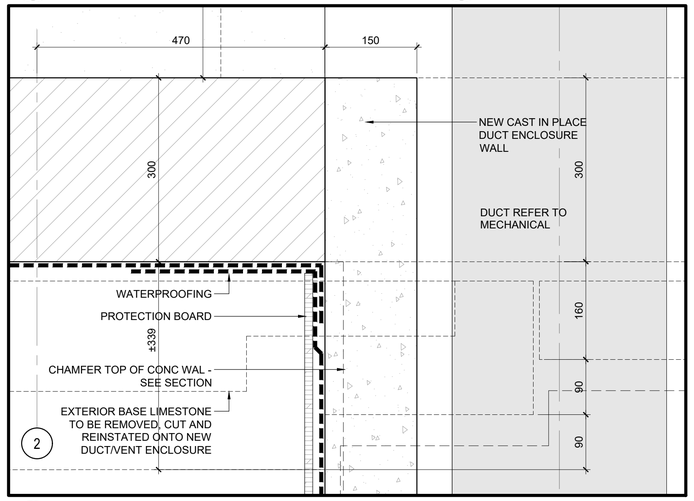
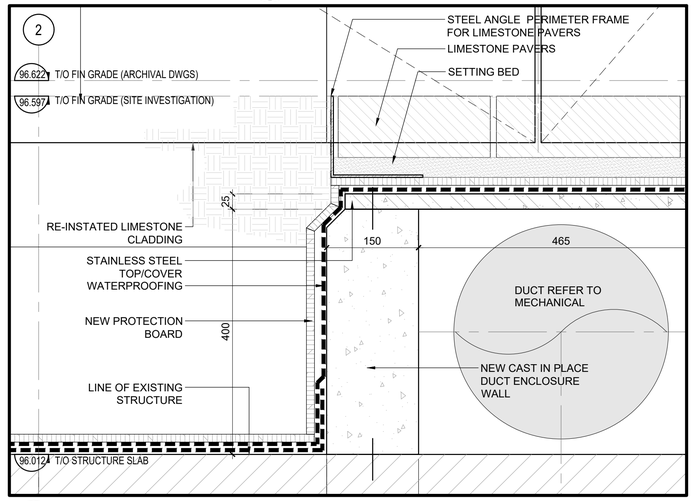
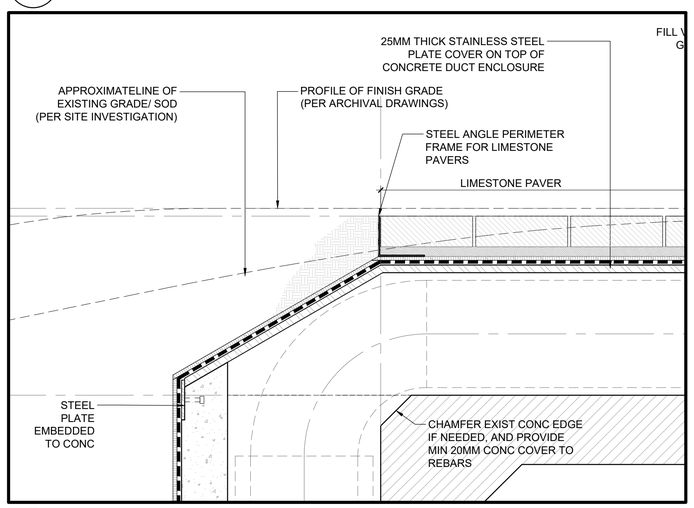


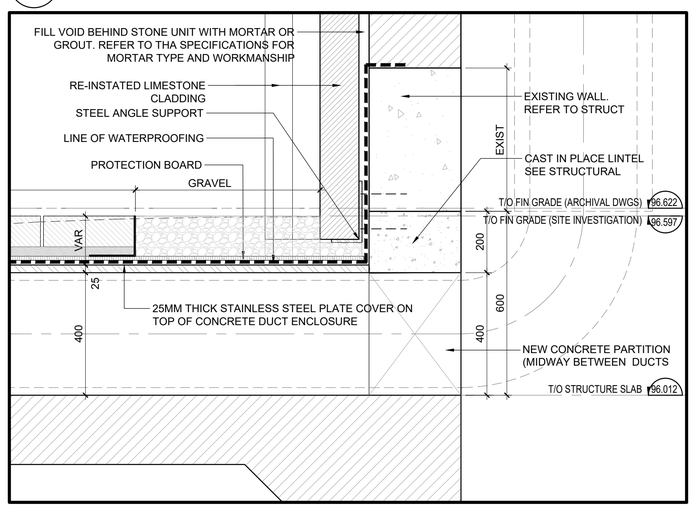
6 A400 DETAIL PLAN
SCALE : 1: 5



5 A400 DETAIL PLAN
SCALE : 1: 5



3 A400 DETAIL SECTION
SCALE : 1: 5



2 A400 DETAIL SECTION
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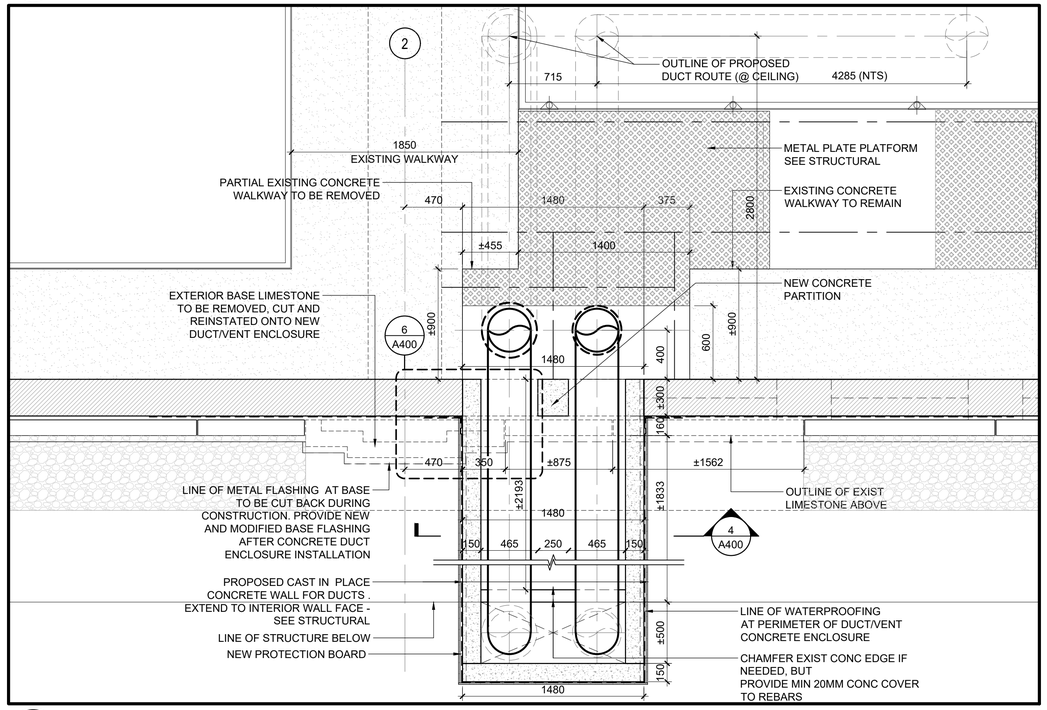

1 A400 PLAN - REINSTATEMENT WORK
SCALE : 1: 25

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LOU DI GIRONIMO GENERAL MANAGER TORONTO WATER	

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF STANDBY GENERATORS FOR CRITICAL LOADS

ARCHITECTURAL REMOVAL, MODIFICATION AND REINSTATEMENT WORK

ARCHITECTURAL

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SCALE:				DRAWING NUMBER:	2F-2017-08-9		A400
DATE:	2024-09-30						

Drawing: P:\2024\2408 RC HARRIS GENERATOR (ARCADIS)\DRAWINGS\SHEETS\2408- RC HARRIS SHEETS-A001-A002-R1.DWG
Layout Tab: A400
Date: 03/17/2025 Time: 11:43:17 AM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

GENERAL NOTES:

1. CONSTRUCTION TO BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ONTARIO BUILDING CODE AND ALL HEALTH AND SAFETY REGULATIONS (OHSA).
2. THE CONTRACTOR IS TO CHECK AND VERIFY ALL DIMENSIONS ON THE STRUCTURAL DRAWINGS WITH THE PIPING LAYOUT DRAWINGS AND ALL OTHER CONTRACT DOCUMENTS BEFORE CONSTRUCTION. ANY DISCREPANCIES OR ERRORS MUST BE REPORTED TO THE ENGINEER PRIOR TO COMMENCING OF WORK.
3. PROVIDE ALL REQUIRED TEMPORARY BRACING AND SUPPORTS FOR ALL SLABS, BEAMS, WALLS AND FRAMES. TEMPORARY BRACING AND SUPPORTS MUST BE CAPABLE OF TRANSFERRING ALL IMPOSED CONSTRUCTION AND DEAD LOADS TO THE STRUCTURE WITHOUT EXCEEDING SPECIFIED DESIGN LOADS.
4. BEFORE CASTING CONCRETE, ENSURE THAT ALL EMBEDDED ITEMS, SUCH AS ANCHOR BOLTS AND SLEEVES ARE IN POSITION AND SECURELY FASTENED IN PLACE TO THE SATISFACTION OF THE ENGINEER.
5. COORDINATE ALL STRUCTURAL WORK WITH ALL OTHER DISCIPLINES INCLUDING MECHANICAL, ELECTRICAL AND CIVIL WORKS.
6. CONTRACTOR TO PROVIDE NECESSARY MEASURES TO PROTECT PROPERTIES, STRUCTURES, EXISTING UTILITIES ADJACENT TO WORKS.
7. DAMAGE TO ADJACENT STRUCTURES, UTILITIES SHALL BE PREVENTED DURING CONSTRUCTION. ANY DAMAGE CAUSED BY THE CONSTRUCTION WORK SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CONTRACT.
8. CONTRACTOR TO REINSTATE DISTURBED AREA TO THE ORIGINAL CONDITION OR BETTER.

DESIGN CRITERIA:

1. FOR DESIGN LOADS SEE GENERAL ARRANGEMENT PLAN PERTAINING TO EACH STRUCTURE.

   1.1. APPLICABLE BUILDING CODE: 2012 ONTARIO BUILDING CODE (OBC).
   1.2. OBC IMPORTANCE CATEGORY: POST-DISASTER
   Is (ULS) = 1.25 Is (SLS) = 0.9
   Iw (ULS) = 1.25 Iw (SLS) = 0.75
   I_E (ULS) = 1.5
   1.3. SITE LOCATION: SCARBOROUGH, ONTARIO
   1.4. SNOW LOAD DATA:
   GROUND SNOW LOAD, S_s = 1.2 kPa
   ASSOCIATED RAIN LOAD, S_r = 0.4 kPa
   REFER TO ROOF PLANS FOR SNOW ACCUMULATION DIAGRAMS, IF APPLICABLE.

   1.5. RAIN LOAD DATA:
   ONE DAY RAIN (1/50) = 92mm
   1.6. WIND LOAD DATA:
   1/50 YEAR HOURLY WIND PRESSURE, q_{50} = 0.47 kPa
   EXPOSURE CATEGORY = OPEN TERRAIN
   1.7. SEISMIC LOAD DATA:
   HORIZONTAL SPECTRAL ACCELERATION VALUES
   Sa (0.2) = 0.219
   Sa (0.5) = 0.116
   Sa (1.0) = 0.06
   Sa (2.0) = 0.029
   PEAK GROUND ACCELERATION, PGA = 0.14

2. DESIGN LOADS INDICATED ARE SERVICE LOADS.
3. PIPE GALLERY AND GENERATOR ROOM
   LIVE LOAD 9.6kPa
4. TRUCK LOAD: WHEEL LOADS (AS NOTED ON PLAN).
5. BACKFILL: FILL MATERIAL,
   UNIT WEIGHT=21kN/m^3 FRICTION ANGLE = 28°
   NATIVE SOIL (SAND TO SANDY SILT/SLTY SAND)
   UNIT WEIGHT=22kN/m^3 FRICTION ANGLE = 30°

MATERIALS:

1. CONCRETE 28-DAY COMPRESSIVE STRENGTH:
   STRUCTURAL CONCRETE:
   CLASS OF EXPOSURE: A-1
   MAX. WATER-TO-CEMENTING MATERIAL RATIO: 0.4
   56 DAY COMPRESSIBLE STRENGTH: 35MPa
   MASS CONCRETE , FILL CONCRETE OR MUD SLAB:
   28 DAYS COMPRESSIVE STRENGTH: 5MPa
   UNSHRINKABLE FILL:
   56 DAYS COMPRESSIVE STRENGTH: 35MPa
2. A 50mm LEAN MIX CONCRETE MUD SLAB IS REQUIRED UNDER ALL CAST-IN-PLACE CONSTRUCTION AGAINST GROUND UNLESS NOTED OTHERWISE. EXTEND 300 MIN BEYOND FOUNDATIONS UNO.
3. ALL EXPOSED CONCRETE EDGES TO HAVE 20mm CHAMFER UNO.

CAST-IN-PLACE CONCRETE:

1. CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION CAN/CSA-A23.1 AND A23.2 (LATEST EDITIONS). CODE FOR THE DESIGN OF CONCRETE STRUCTURES CAN3-A23.3 (LATEST EDITION).
   BILLET STEEL BARS AND WELDED STEEL WIRE FABRIC FOR CONCRETE REINFORCEMENT TO G30.18 (LATEST EDITION).
2. FORMWORK AND TOLERANCES TO CONFORM TO CAN/CSA-A23.1.
3. ALL REINFORCING BARS SHALL BE SUPPORTED IN THE FORMS AND SPACED WITH STANDARD ACCESSORIES SO THAT THERE IS NO MOVEMENT DURING CONCRETE PLACEMENT.
4. REINFORCING IS TO BE GENERALLY DETAILED IN ACCORDANCE WITH R.S.I.C. MANUAL OF STANDARD PRACTICE (LATEST EDITION).
5. THE CLEAR DISTANCE BETWEEN REINFORCING STEEL AND SURFACE OF CONCRETE SHALL REFER TO STRUCTURAL TYPICAL DETAILS.
   FOR LOCATIONS WHERE 40mm AGGREGATE ARE USED, INCREASE CLEAR COVER FOR CAST-IN-PLACE CONCRETE TO 60mm.
6. ALL REINFORCING STEEL IN PLACE TO BE INSPECTED BY ENGINEER BEFORE POURING THE CONCRETE.
7. SUBMIT REINFORCING SHOP DRAWINGS BEFORE FABRICATION FOR REVIEW BY ENGINEER.
8. PROTECT ALL AREAS WHERE CONCRETE IS TO BE POURED WITH A MINIMUM OF 5Omm THICK "MUD" SLAB WHICH WILL FUNCTION AS A WORKING MAT ONLY AND WILL NOT BE CONSIDERED TO PROVIDE A CONTRIBUTION TO THE OVERALL SLAB THICKNESS.

CONSTRUCTION JOINTS:

1. CONSTRUCTION JOINTS SHALL BE LOCATED SO AS NOT TO IMPAIR THE STRENGTH OF THE STRUCTURE. THE CONTRACTOR MUST SUBMIT THE PROPOSED CONSTRUCTION JOINTS LAYOUT TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
2. WHERE A CONSTRUCTION JOINT IS TO BE MADE, THE SURFACE OF THE SET CONCRETE SHALL BE THOROUGHLY CLEANED OF FOREIGN MATTER AND LAITANCE, SATURATED WITH WATER AND LEFT IN A DAMP CONDITION WITH NO FREE WATER ON THE SURFACE IMMEDIATELY BEFORE PLACING ADJACENT CONCRETE.
3. REINFORCING STEEL PROJECTING THROUGH CONSTRUCTION JOINT SHALL BE THOROUGHLY CLEANED OF LOOSE FLAKY RUST, MUD, OIL, DRIED CONCRETE OR OTHER COATINGS WHICH WOULD REDUCE BOND.
4. A CONTINUOUS 150 WIDE PVC WATERSTOP MUST BE PROVIDED AT ALL CONSTRUCTION JOINT LOCATIONS FOR WATER TIGHT CONNECTIONS AS INDICATED ON THE TYPICAL JOINT DETAILS.
5. THE MAXIMUM SPACING OF THE CONSTRUCTION JOINTS IN CAST CONCRETE WALLS SHALL BE 11000mm. ANY VARIATION IN THIS LENGTH MUST BE APPROVED BY CONSULTANT. SUBMIT A FULL CONSTRUCTION JOINT LAYOUT PLAN FOR REVIEW BY ENGINEER.

MASONRY NOTES:

1. MASONRY WORK SHALL COMPLY TO OBC 4.1 INCLUDING TESTING AND WORKMANSHIP.
2. CONCRETE BLOCKS SHALL CONFORM TO CSA A165M H/15/A/M FOR LOAD BEARING WALLS EXPOSED TO THE WEATHER. USE HIGHER STRENGTH BLOCK WHERE SPECIFIED ON DRAWINGS.
3. CONCRETE BLOCK SHALL CONFORM TO CSA A165M/H/15/A/O FOR INTERIOR LOAD BEARING WALLS. USE HIGHER STRENGTH BLOCK WHERE SPECIFIED ON DRAWINGS.
4. CONCRETE BLOCK MIN. COMPRESSIVE STRENGTH Fm=15 MPa.
5. REINFORCE EVERY HORIZONTAL (200mm o/c) JOINT WITH HEAVY DUTY (5mm Ø WIRE)
6. REINFORCE ONE CELL ON EITHER SIDE OF CONTROL JOINT WITH 2-15M VERTICAL AND GROUT SOLID.
7. REINFORCE TWO CORES UNDER STEEL BEAM BEARING WITH 2-15M VERTICAL EACH CORE FULL HEIGHT AND GROUT SOLID. PROVIDE 2 SOLID COURSES UNDER LINTEL BEARING. NO DUCT OR VOIDS ALLOWED ET BEARING.
8. REINFORCE TWO CORES ON EITHER OF DOOR AND WINDOW OPENINGS WITH 2-15M VERTICAL EACH CORE FULL HEIGHT AND GROUT SOLID. THE 15M BARS SHALL EXTEND THROUGH BOND BEAM, CONTINUOUS TO TOP OF WALL.
9. REINFORCE TWO CORES AT ALL WALL ENDS AND AT WALL JUNCTIONS WITH 2-15M VERTICAL EACH CORE FULL HEIGHT AND GROUT SOLID.
10. MORTAR TYPE-S SHALL BE USED FOR ALL BLOCK WALLS. ALL CORE FILLS, LINTELS, PILASTERS AND BOND BEAMS TO BE FILLED WITH COARSE GROUT TO CSA A179 WITH COMPRESSIVE STRENGTH OF 12 MPa. CONTRACTOR TO TEST MORTAR AND GROUT FOR EACH WORKING DAY. MINIMUM COMPRESSIVE STRENGTH SHALL BE 12.4 MPa FOR TYPE S MORTAR AND 12.0 MPa FOR GROUT. FORWARD TEST RESULTS TO ENGINEER FOR REVIEW.
11. LINTEL - INSTALL STEEL LINTEL. PROVIDE BLOCK LINTELS ONLY IN SPECIFIC AREAS SPECIFIED IN ARCHITECTURAL DRAWINGS. BLOCK LINTEL TO BE TWO COURSE (400mm) DEEP COMPLETE WITH 2-20M TOP AND BOTTOM FOR OPENINGS 2000mm OR LESS. EXTEND REINFORCING 400mm PAST OPENINGS BOTH SIDES.
12. VERTICAL CORE FILLS TO BE CAST IN LIFTS OF 1200 (4'0") MAXIMUM. VERTICAL REINFORCING TO HAVE A MAXIMUM LENGTH OF 2000 (6'8") WITHOUT SPLICING. ALL LAPS AND ANCHORAGES IN REINFORCING TO BE 40 DIAMETER MINIMUM UNLESS NOTED OTHERWISE.
13. THERE IS NO STRAP TIE CONNECTION ALLOWED BETWEEN MASONRY WALL AND STRUCTURAL COLUMNS.
14. TEMPORARY BRACING AND SHORING TO BE PROVIDED DURING CONSTRUCTION. BRACING AND SHORING DESIGN IS THE CONTRACTORS RESPONSIBILITY.

REINFORCEMENT:

1. SEE PROJECT SPECIFICATION FOR ALL MATERIAL REQUIREMENTS.
2. THE WELDING SHALL CONFORM TO THE REQUIREMENTS OF CSA STANDARD W59 (LATEST EDITION) AND THE WELDING COMPANY AND WELDERS SHALL BE QUALIFIED UNDER THE REQUIREMENTS OF CSA STANDARD W47 (LATEST EDITION) FOR THE APPROPRIATE POSITION.
3. THE MINIMUM YIELD STRESS FOR THE REINFORCING STEEL SHALL BE 400 MPa (60 ksi).
4. ALL HOOKS SHOWN ON DRAWINGS TO BE STANDARD HOOKS CONFORMING TO CAN/CSA A23.3 UNO.

STRUCTURAL STEEL:

1. DESIGN AND CONSTRUCTION OF NEW STEEL TO CONFORM TO THE FOLLOWING CODES/STANDARDS (LATEST EDITIONS/REVISIONS):
   CSA S16 - DESIGN OF STEEL STRUCTURES
   CSA W59 - WELDED STEEL CONSTRUCTION
2. SUBMIT SHOP DRAWINGS FOR ALL NEW STEEL COMPONENTS SHOWN ON STRUCTURAL DRAWINGS.
3. HOT DIP GALVANIZING IN ACCORDANCE WITH ASTM A123/A123M.
4. STANDARD STRUCTURAL SECTIONS TO CSA G40.21M GRADE 350W. HOLLOW STRUCTURAL SECTIONS TO CSA G40.21M GRADE 350W CLASS 'H'. HOT ROLLED STEEL SHEET, PLATE AND STRIP USED IN THE FABRICATION OF WELDED ASSEMBLIES TO CSA G40.21M GRADE 300W.
5. ALL MATERIAL USED FOR THIS PROJECT SHALL BE NEW, FREE FROM DEFECTS IMPAIRING STRENGTH, DURABILITY AND APPEARANCE.
6. THE FABRICATOR SHALL BE FULLY-CERTIFIED IN ACCORDANCE WITH CSA W47.1.
7. BOLTS TO CONFORM TO ASTM A325M UNLESS NOTED OTHERWISE. BOLTS TO BE SUPPLIED WITH HARDENED WASHERS TO ASTM F436 AND HEAVY HEX NUTS TO ASTM A563.
8. HOT ROLLED STEEL SHEET, PLATE AND STRIP USED IN THE FABRICATION OF WELDED ASSEMBLIES TO CONFORM TO CSA STANDARD G40.21 GR 300W.
9. ANCHOR BOLTS: ASTM A307, ASTM A325 OR ASTM A316L, AS NOTED ON THE DRAWINGS.
10. ALL SHOP DRAWINGS SUBMITTED SHALL BEAR THE SIGNATURE AND STAMP OF A QUALIFIED PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.
11. ALL FABRICATION AND CONSTRUCTION SHALL PROCEED FROM CONTRACT DRAWINGS CERTIFIED "ISSUED FOR CONSTRUCTION".

ALUMINUM:

1. DESIGN OF ALUMINUM TO CSA S157-05/S157.1-05 (R2010) - STRENGTH DESIGN IN ALUMINUM.
2. ALUMINUM ALLOY TYPE 6061-T6, UNLESS NOTED OTHERWISE.
3. ALUMINUM IN CONTACT WITH CONCRETE OR MASONRY TO RECEIVE TWO COATS OF ALKALI RESISTANT BITUMINOUS PAINT. UPON INSTALLATION AND PRIOR TO CASTING CONCRETE THE ALUMINUM IN CONTACT WITH CONCRETE OR MASONRY SHALL RECEIVE ONE COAT OF ALKALI RESISTANT BITUMINOUS PAINT WHERE THE ORIGINAL COATING HAS BEEN DAMAGED.
4. ALL ALUMINUM SHALL BE ANODIZED UNLESS NOTED OTHERWISE.

STAINLESS STEEL:

1. DESIGN OF STAINLESS STEEL TO ASCE/SEI 8-02 SPECIFICATION FOR THE DESIGN OF COLD-FORMED STAINLESS STEEL STRUCTURAL MEMBERS (ASCE/SEI 8-02).
2. STAINLESS STEEL ALLOY TYPE 316L, UNLESS NOTED OTHERWISE.

PRECAST CHANNELS:

1. GENERAL:
   A. INCLUDED:
      I. PRECAST CHANNELS
      II. REBAR CONNECTIONS.
      III. GROUTING OF SLAB JOINTS.
2. REFERENCE MATERIAL:
   A. CSA A23, 4-09: PRECAST CONCRETE MATERIAL & CONSTRUCTION.
   B. PRECAST CONCRETE INSTITUTE (PCI): MANUAL ON DESIGN OF CONNECTIONS FOR PRECAST.
   C. PRECAST CONCRETE INSTITUTE (PCI): DESIGN HANDBOOK - PRECAST & PRESTRESSED CONCRETE.
3. SHOP DRAWING:
   A. APPROVAL DRAWINGS WILL REQUIRE A REVIEW BY THE CONTRACTOR & DESIGN FIRMS UNDER CONTRACT OF EACH PROJECT. DISCREPANCIES, QUESTIONS & VERIFICATION OF DESIGN IS REQUIRED AND RETURNED IN WRITING PRIOR TO COMMENCEMENT OF PRODUCTION.
   B. PRODUCTION DRAWINGS WILL BEAR A SIGNED AND SEALED ENGINEER STAMP, SLAB LOCATIONS, IDENTIFICATION MARKS, CONNECTION DETAILS, DIMENSIONS, OPENINGS LARGER THAN 6" IN SIZE, LOADINGS AND OTHER RELATIVE INFORMATION.
4. QUALITY ASSURANCE:
   A. CONFORMITY TO PCI MANUAL ON DESIGN OF CONNECTION FOR PRECAST PRESTRESSED CONCRETE, PCI DESIGN HANDBOOK - PRECAST & PRESTRESSED CONCRETE, CSA A23.4.
5. ACCESSORIES:
   A. BEARING PADS: 1/8" THICK MASONITE HARDBOARD, SMOOTH SIDE UP.
   B. STYROFOAM DISC: 2" THICK ON EXTERIOR WALLS ONLY IF REQUIRED.
   C. HANGER FRAMES: WELDED ANGLES USED TO PROVIDE LARGE MECHANICAL OPENINGS THROUGH PRECAST. SIZE AND CONFIGURATION VARIES WITH OPENING.
6. FINISHES:
   A. TOP SURFACE:
      I. EXTRUDED (STANDARD SURFACE FROM EXTRUDED METHOD)
      II. RAKED (ROUGHENED SURFACE TO ALLOW IMPROVED BOND WITH CONCRETE TOPPING SUPPLIED BY OTHERS).
   B. BOTTOM SURFACE:
      I. "STANDARD" STEEL FORM FINISH.
7. INSTALLATION:
   A. INSTALL CHANNELS WITH CORRESPONDING IDENTIFICATION MARK AS INDICATED ON PRODUCTION / SHOP DRAWING.
   B. PLACE BEARING PADS AND INSERT STYROFOAM DISCS IN CORES WHERE REQUIRED.
   C. DRILL OR WELD TIE STEEL REBAR CONNECTIONS AS PER PRODUCTION / SHOP DRAWINGS.
   D. GROUT JOINTS BETWEEN PRECAST SLABS.
   E. DRILL HOLES FOR PLUMBING TRADE (LOCATED IN FIELD BY OTHERS). DO NOT CUT REINFORCING STRAND UNLESS ENGINEERED IN THE DESIGN.
   F. LATEX CAULKING OF JOINTS BETWEEN PRECAST SLABS ON THE UNDERSIDE WHERE EXPOSED TO VIEW.
   G. FLOOR PREPARATION WILL VARY DEPENDING ON FINAL FLOORING MATERIAL AND FINISH.
8. INCLUDED ITEMS RELATED TO PRECAST AND INSTALLATION:
   A. DRYPACKING / INFILL OF GAP BETWEEN PRECAT AND STRUCTURE.
   B. PERIMETER CAULKING BETWEEN PRECAST AND STRUCTURE.
   C. SITE / FIELD DIMENSIONS (CONTRACTOR AND PROJECT DESIGNERS RESPONSIBLE TO PROVIDE INFORMATION DURING SHOP DRAWING APPROVAL).

TEMPORARY EARTH RETENTION SYSTEM:

1. CONTRACTOR SHALL FURNISH, ERECT, AND REMOVE AS NOTED ALL ELEMENTS OF THE TEMPORARY EARTH RETENTION SYSTEM NECESSARY TO SAFELY MAINTAIN THE REQUIRED OPEN-CUT EXCAVATION DURING THE CONSTRUCTION OF ALL BELOW GROUND WORK. ACTUAL SIZE AND LOCATION OF ALL ELEMENTS OF SYSTEM SHALL BE DETERMINED BY CONTRACTOR AND INDICATED ON SHOP DRAWINGS. CONTRACTOR DESIGN SHALL BE PERFORMED UNDER THE DIRECTION OF, AND SEALED BY, A LICENSED PROFESSIONAL ENGINEER EXPERIENCED IN THIS TYPE OF WORK. SHOP DRAWINGS, INCLUDING DETAILED SEQUENCE OF WORK, SHALL BE SUBMITTED TO ARCHITECT-ENGINEER FOR REVIEW PRIOR TO COMMENCEMENT OF ANY WORK.
2. VERIFY LOCATION OF ALL UNDERGROUND UTILITIES. ELEMENTS OF RETENTION WALL SHALL BE DESIGNED, INSTALLED, AND REMOVED SO AS TO AVOID DAMAGE TO ANY EXISTING UTILITIES. CONTRACTOR SHALL PROVIDE TEMPORARY SUPPORT AND/OR PROTECTION OF EXISTING UTILITIES WITHIN OR ADJACENT TO EXCAVATED AREA DURING CONSTRUCTION PERIOD.
3. PROVIDE SUFFICIENT CLEARANCE AROUND RETENTION SYSTEM TO ALLOW COMPLETION OF ALL WORK WITHIN EXCAVATION WITHOUT INTERFERENCE FROM ELEMENTS OF RETENTION SYSTEM.
4. PROVIDE TIEBACKS AND WALES, AS REQUIRED, OF SUFFICIENT SIZE AND SPACING TO RESIST ALL LOADS.

ABBREVIATIONS:

ADDIT	ADDITIONAL
ADH	ADHESIVE
ALT	ALTERNATIVE
ALUM	ALUMINUM
APPROX	APPROXIMATE
B	BOTTOM
B#	CASTIN-IN-PLACE BEAM TAG
BH	BOREHOLE
BLL	BOTTOM LOWER LAYER
BUL	BOTTOM UPPER LAYER
BM	BENCH MARK
C#	COLUMN TAG
CIP	CAST IN PLACE
CIRC	CIRCULAR
CTRL JT	CONTROL JOINT
COL	COLUMN
CONST JT	CONSTRUCTION JOINT
CONC	CONCRETE
CONTI	CONTINUOUS
C/W	COMPLETE WITH
CL	CLEARANCE
DIA	DIAMETER
DL	DEAD LOAD
DN	DOWN
EF	EACH FACE
EL	ELEVATION
EQ	EQUAL
EW	EACH WAY
EX	EXISTING
EXP JT	EXPANSION JOINT
EXT	EXTERIOR
F.F.	FINISHED FLOOR
FD	FLOOR DRAIN
FIN GR	FINISH GRADE
GA	GAUGE
GALV	GALVANIZED
GRAN	GRANULAR
HDG	HOT-DIP GALVANIZED
HP	HIGH POINT
HOF	HORIZONTAL OUTSIDE FACE
HIF	HORIZONTAL INSIDE FACE
HEF	HORIZONTAL EACH FACE
L	LENGTH
LP	LOW POINT
PB#	PRECAST BEAM TAG
PL	PLATE
REINF	REINFORCING
SEP JT	SEPARATION JOINT
SIM	SIMILAR
SPMDD	STANDARD PROCTOR MAXIMUM DRY DENSITY
S.S.	STAINLESS STEEL
SLS	SERVICEABILITY LIMIT STATE
STIR	STIRRUP
STD	STANDARD
SQ	SQUARE
T	TREAD
T&B	TOP AND BOTTOM
THK	THICK, THICKNESS
TLL	TOP LOWER LAYER
T/O	TOP OF
T/O CONC	TOP OF CONCRETE
TUL	TOP UPPER LAYER
TYP	TYPICAL
ULS	ULTIMATE LIMIT STATE
UNO	UNLESS NOTED OTHERWISE
U/S	UNDERSIDE
VERT	VERTICAL
VOF	VERTICAL OUTSIDE FACE
VIF	VERTICAL INSIDE FACE
VEF	VERTICAL EACH FACE
W/	WITH
W/O	WITHOUT
WS	WATERSTOP
WWF	WELDED WIRE FABRIC
&	AND
@	AT
℄	CENTRELINE
#	NUMBER
%	PER CENT
Ø	DIAMETER
I.D.	INSIDE DIAMETER
O.D.	OUTSIDE DIAMETER

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NO.	DATE	REVISIONS	INITIAL	SIGNED
A	2025-03-18	ISSUED FOR TENDER	C.H.	

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2025-03-17
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PROVINCE OF ONTARIO

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TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

WILLIAM FERNANDES, P. ENG.
DIRECTOR,
WATER TREATMENT AND SUPPLY

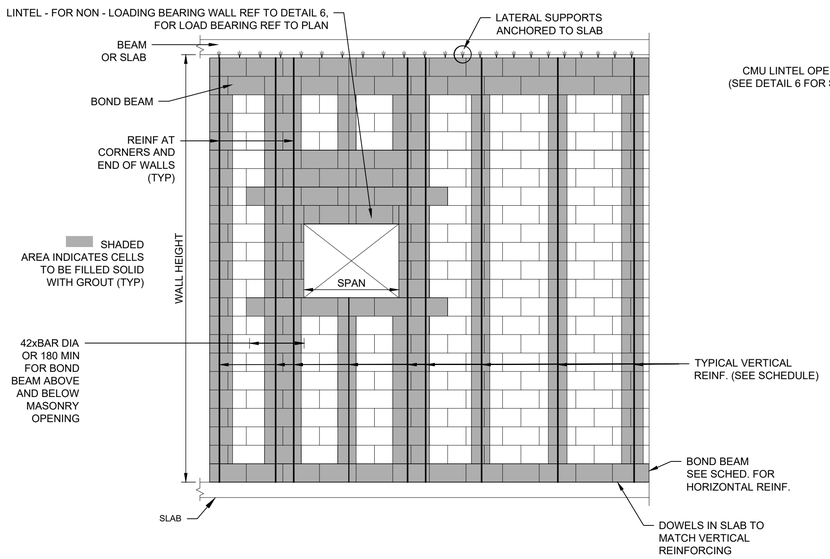
SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
GENERAL NOTES

STRUCTURE

DESIGN:	F.M.	DRAFTING:	S.P.	CHECK:	M.S.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-10		S001
DATE:	2024-09-30						

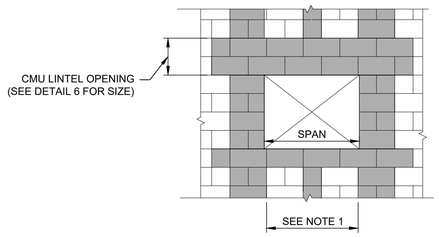
METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



NOTE:

1. PROVIDE FULL TENSION LAP IN VERTICAL REINF AS REQUIRED.

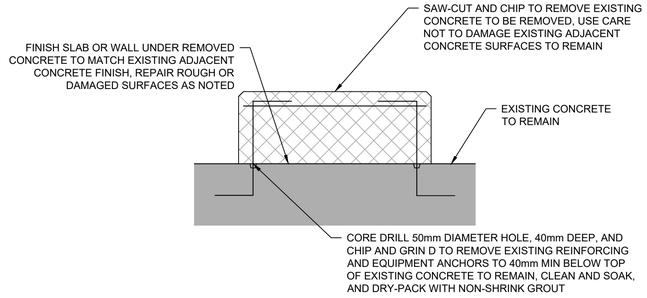
TYPICAL NEW MASONRY WALL DETAILS (1)
N.T.S.



NOTE:

1. BLOCKS ABOVE LINTELS TO BE FILLED SOLID WITH GROUT FOR HEIGHT EQUAL TO SPAN.
2. SHORE LINTELS UNTIL GROUT REACHES DESIGN STRENGTH.
3. FOR STEEL LINTELS PROVIDE STEEL PACKING PLATES TO ENSURE EVEN BEARING.
4. EXTERIOR STEEL LINTELS SHALL BE HOT DIP GALVANIZED.

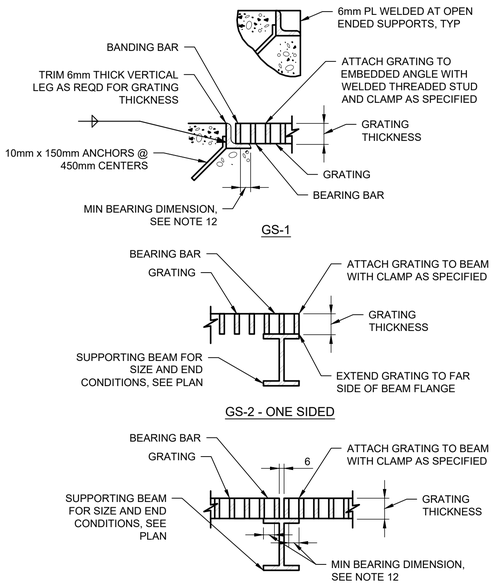
OPENING IN NEW MASONRY WALL (2)
N.T.S.



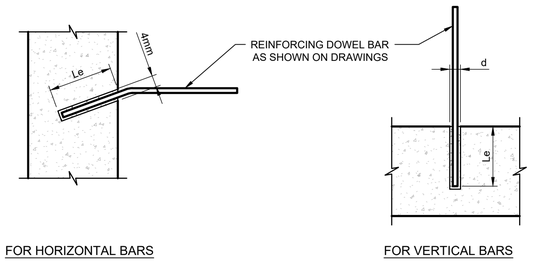
NOTE:

1. REMOVE CONCRETE OUT TO SOUND CONCRETE.
2. IF CHIPPING INTO THE SURFACE OF THE EXISTING SLAB OR WALL TO REMAIN IS REQUIRED, MAKE EDGES PERPENDICULAR TO THE SURFACE. DO NOT FEATHER EDGES.
3. FILL DEFECTIVE AREA WITH NON-SHRINK GROUT OR AN APPROVED PREPACKAGED PATCHING MATERIAL TO MATCH APPREARANCE OF ADJACENT CONCRETE SURFACES.
4. USE APPROVED BONDING AGENT ON SURFACES TO BE PATCHED PRIOR TO PLACING NON-SHRINK GROUT.
5. DEMONSTRATE METHODS FOR REPAIR USING ACTUAL MATERIALS, METHODS, AND CURING PROCEDURES REQUIRED BY MATERIAL MANUFACTURERS. CONSULT WITH BONDING AGENT MANUFACTURER AND NON-SHRINK GROUT MANUFACTURER ON TECHNIQUES.

TYPICAL CONCRETE DEMOLITION (3)
N.T.S.



STANDARD GRATING (4)
N.T.S.

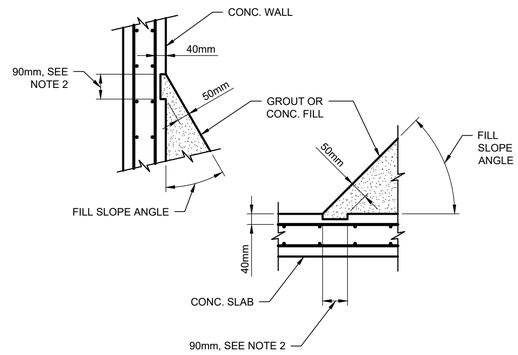


HYDRAULIC CEMENT GROUT	EPOXY GROUT
d = BAR DIA + 20mm Le : 15M - 200mm 20M - 250mm 25M - 300mm	d AND Le IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS.

NOTE:

1. DRILL HOLE OF DIAMETER AND DEPTH AS REQUIRED.
2. CLEAN HOLE OF DUST AND DEBRIS.
3. FILL HOLE WITH DOWELLING GROUT.
4. INSTALL REINFORCING DOWEL BAR AND WIPE AWAY OVERFLOW.
5. SECURE DOWEL BAR FIRMLY IN POSITION AND DO NOT DISTURB BAR FOR 24 HOURS AFTER INSTALLATION.

DOWELLING IN EXISTING CONCRETE (5)
N.T.S.



NOTE:

1. PROVIDE KEY FOR ALL FILL WHERE FILL SLOPE ANGLE TO WALL OR SLAB IS LESS THAN 45 DEGREES.
2. LENGTHEN 90mm BLOCK OUT AS REQUIRED TO MAINTAIN 50mm MINIMUM THICKNESS OF GROUT OR CONCRETE FILL.

CONCRETE OR GROUT FILL KEY (6)
N.T.S.

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ENGINEERING AND CONSTRUCTION SERVICES

WILLIAM FERNANDES, P. ENG.
DIRECTOR,
WATER TREATMENT AND SUPPLY

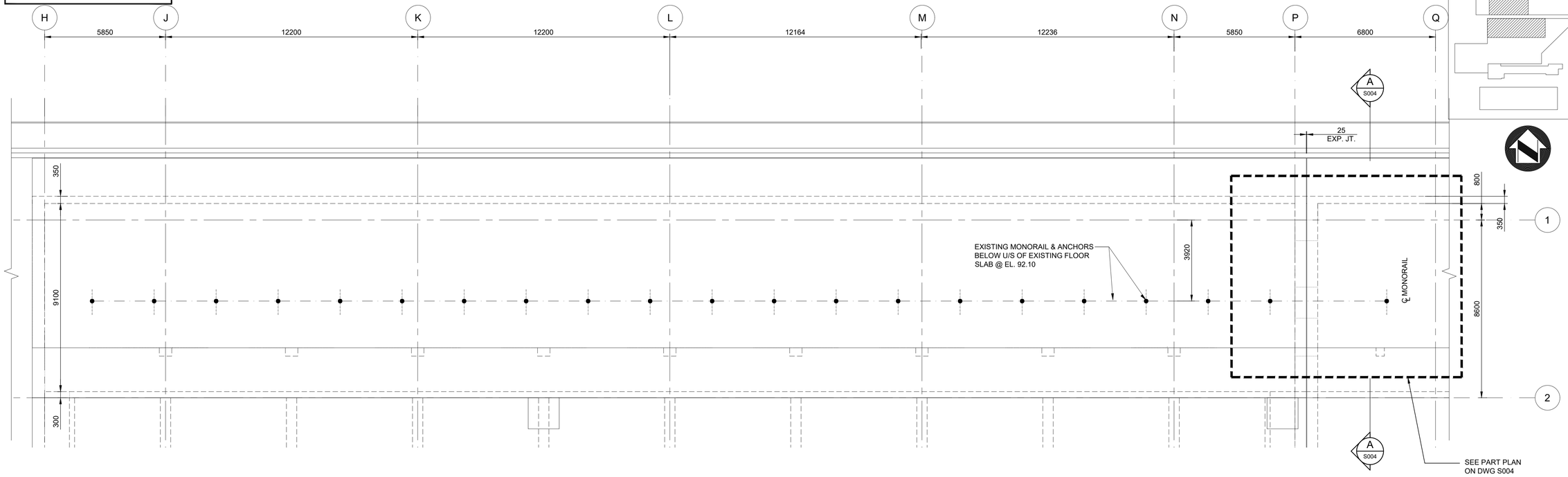
SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

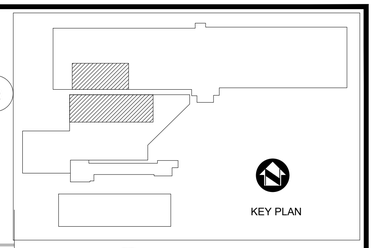
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
TYPICAL DETAILS

STRUCTURE

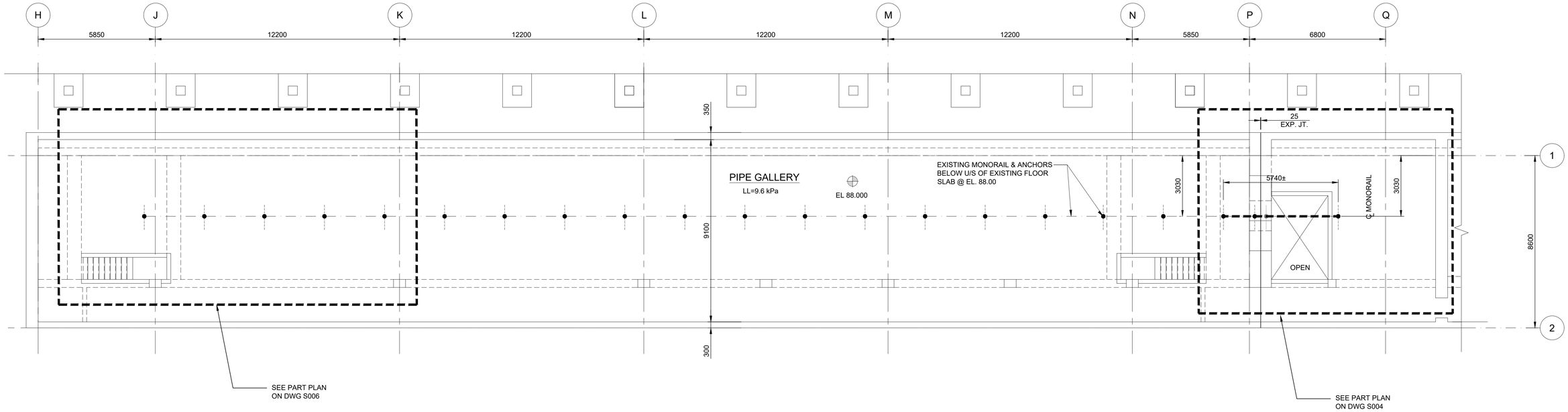
DESIGN:	F.M.	DRAFTING:	S.P.	CHECK:	M.S.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-11		S002
DATE:	2024-09-30						

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED





EXISTING ROOF PLAN AT EL. 92.10
1:100



EXISTING PLAN AT EL. 88.00
1:100

TORONTO Water

ARCADIS
100-175 GALAXY BOULEVARD
TORONTO, ONTARIO, M9W 0C9
TEL 416 679 1930 FAX 416 675 4620
www.arcadis.com

NO.	DATE	REVISIONS	INITIAL	SIGNED
A	2025-03-18	ISSUED FOR TENDER	C.H.	

LICENSED PROFESSIONAL ENGINEER
2025-03-17
M. SHEININ
100522908
PROVINCE OF ONTARIO

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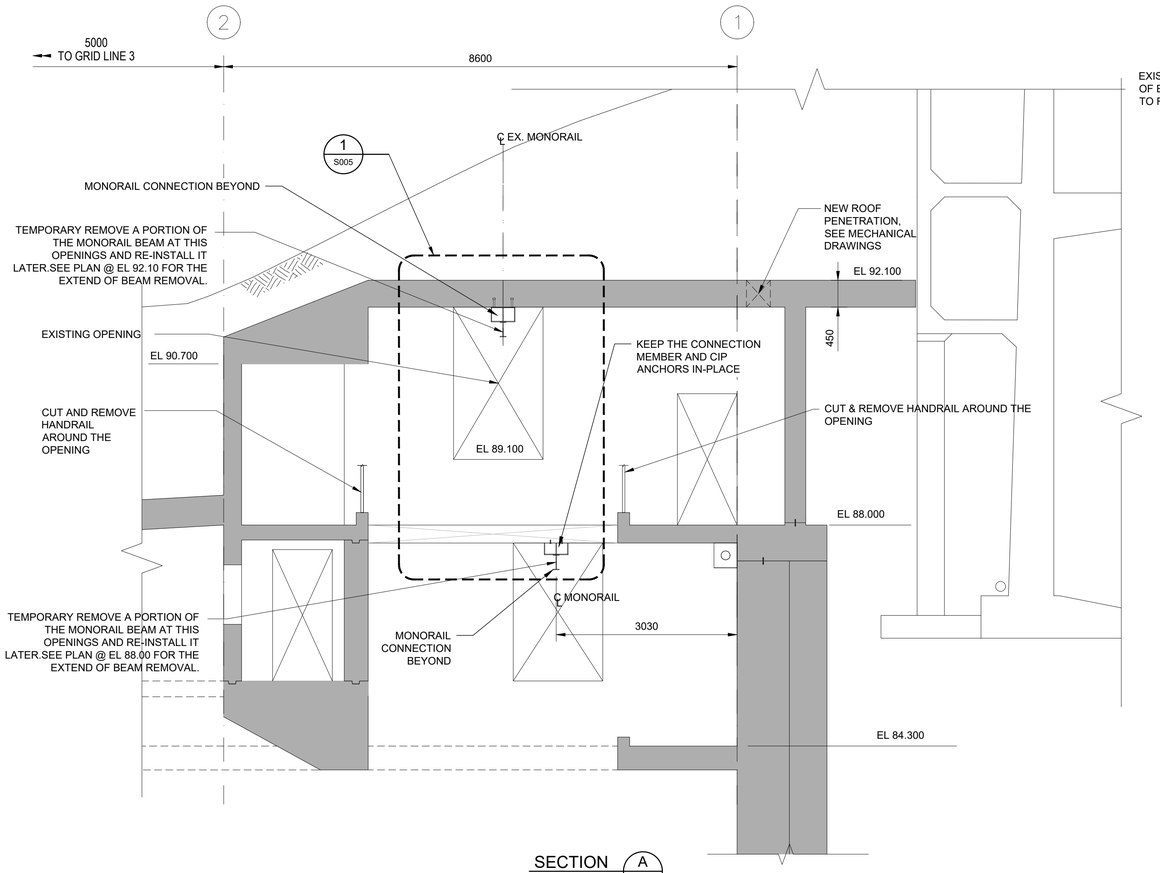
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
RMF DEMOLITION - EXISTING MONORAIL AT EL. 88.00 AND EL. 92.10

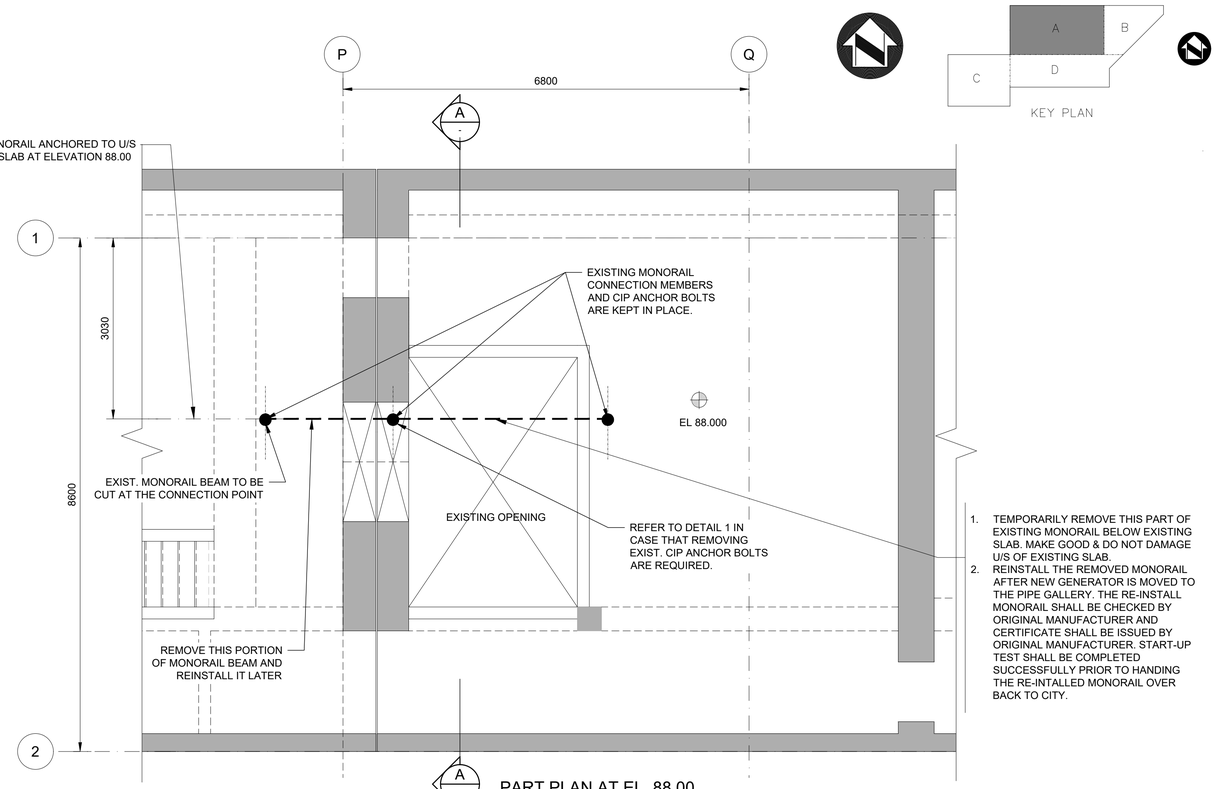
STRUCTURE

DESIGN:	F.M.	DRAFTING:	S.P.	CHECK:	M.S.	CONTRACT No.	25ECS-MI-03HA
SCALE:	AS SHOWN			DRAWING NUMBER:	2F-2017-08-12		S003
DATE:	2024-09-30						

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED



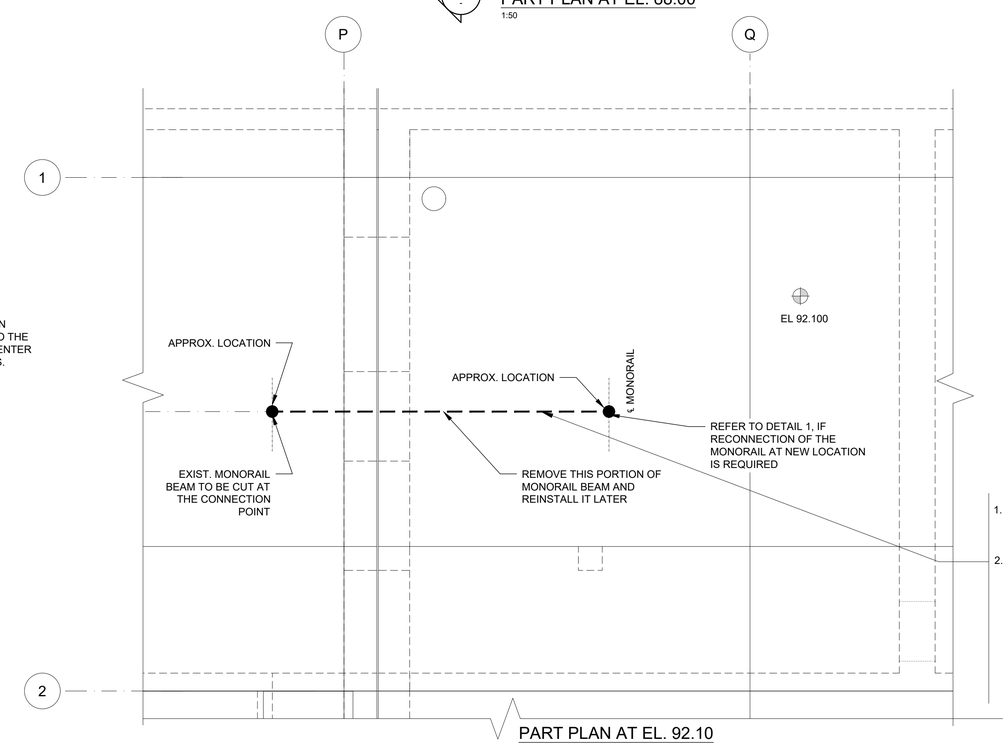
SECTION A S003
1 : 50



1. TEMPORARILY REMOVE THIS PART OF EXISTING MONORAIL BELOW EXISTING SLAB. MAKE GOOD & DO NOT DAMAGE U/S OF EXISTING SLAB.
2. REINSTALL THE REMOVED MONORAIL AFTER NEW GENERATOR IS MOVED TO THE PIPE GALLERY. THE RE-INSTALL MONORAIL SHALL BE CHECKED BY ORIGINAL MANUFACTURER AND CERTIFICATE SHALL BE ISSUED BY ORIGINAL MANUFACTURER. START-UP TEST SHALL BE COMPLETED SUCCESSFULLY PRIOR TO HANDING THE RE-INTALLED MONORAIL OVER BACK TO CITY.

A
PART PLAN AT EL. 88.00
1:50

KEY PLAN



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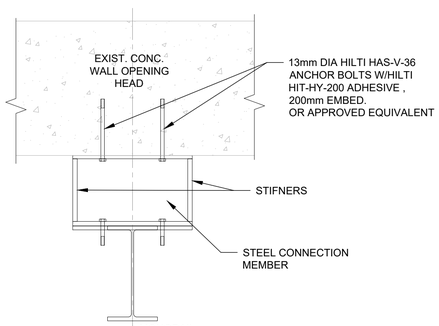
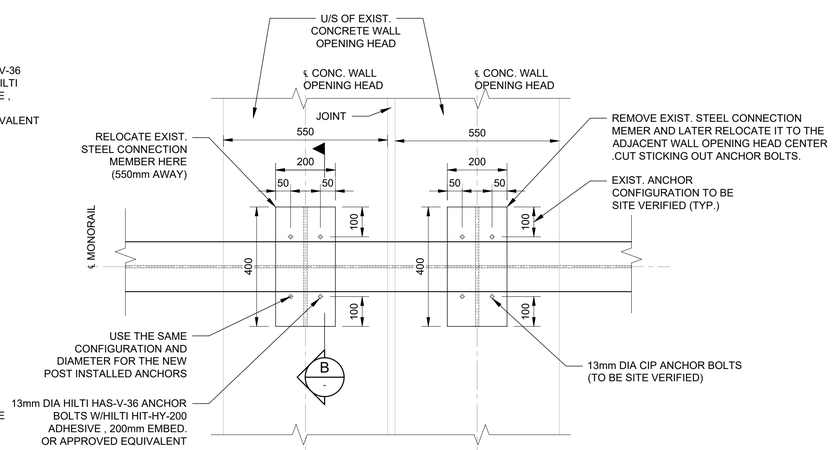
PART PLAN AT EL. 92.10
1:50



SECTION B
1 : 10



MONORAIL BEAM NEW POST-INSTALLED ANCHOR BOLTS DETAIL AT THE WALL OPENING IF REMOVING ANCHOR BOLTS ARE CONSIDERED 1 S003
1 : 20

NOTES:

1. ALL DIMENSIONS AND EXIST. MEMBER SIZES AND ANCHOR BOLT SIZES ARE ASSUMED AND MUST BE VERIFIED ON SITE.NOTIFY ARCADIS OF ANY DISCREPANCY FOR FURTHER ASSESSMENT.
2. NEW POST INSTALLED ANCHORS ARE DESIGNED FOR A TENSILE CAPACITY OF 1800 TONS.
3. CONTRACTOR SHALL SCAN THE AREAS TO IDENTIFY THE EXISTING REINFORCEMENT PATTERNS BEFORE DRILLING, IN ORDER TO AVOID DRILLING INTO EXISTING REINFORCEMENT AND ADJUST BRACKETS ACCORDINGLY. THE CONTRACTOR SHALL SUBMIT THEIR FINDINGS TO THE ENGINEER FOR REVIEW.

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R.C. HARRIS WATER TREATMENT PLANT

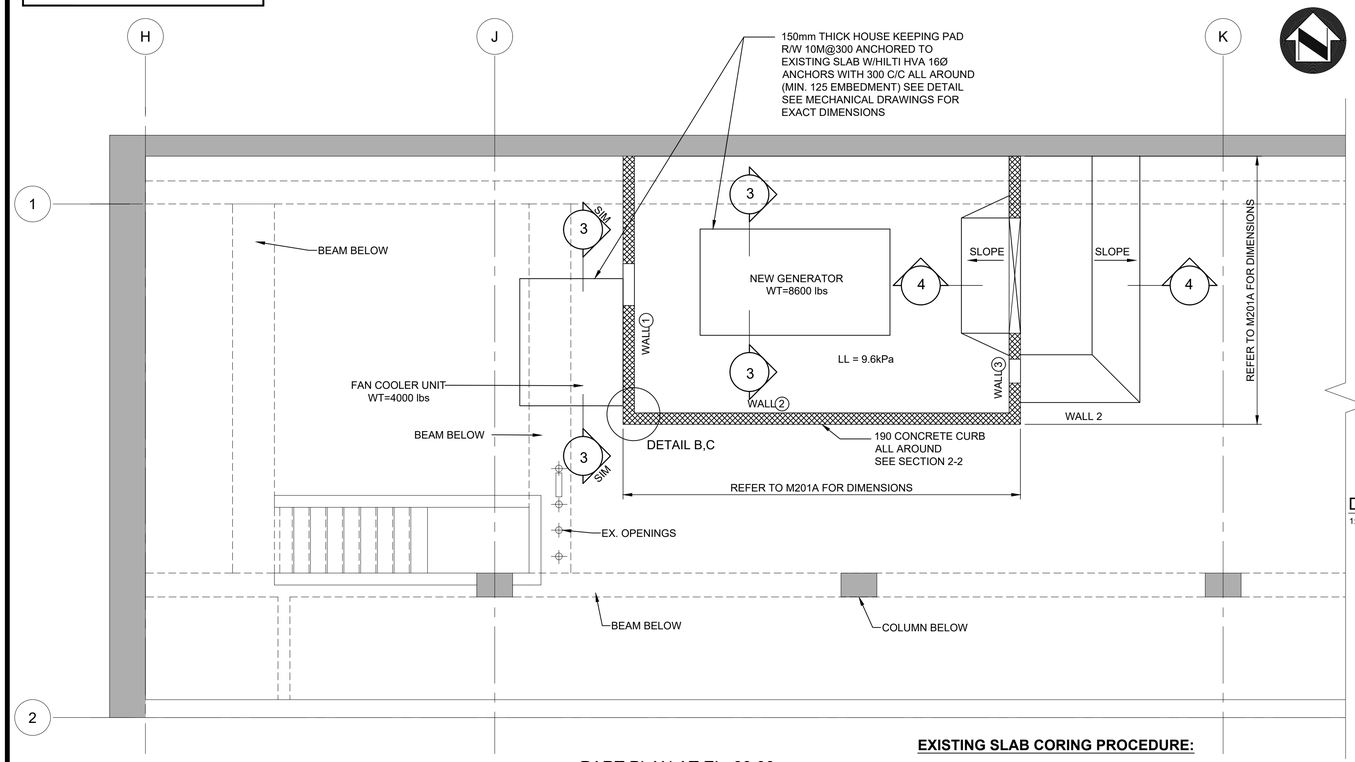
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

RMF DEMOLITION - PART PLAN AT EL. 88.00 AND SECTION

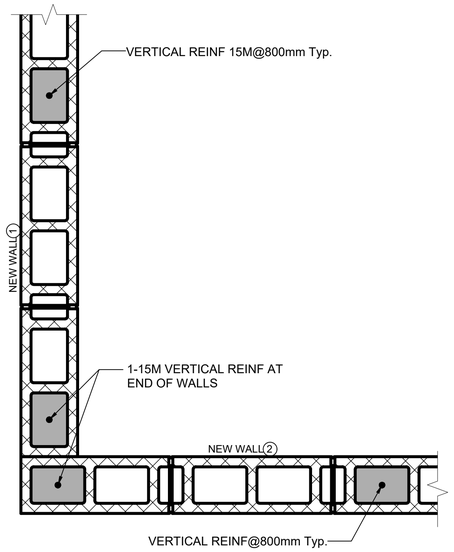
STRUCTURE

DESIGN:	F.M.	DRAFTING:	S.P.	CHECK:	M.S.	CONTRACT No.	25ECS-MI-03HA
SCALE:	AS SHOWN			DRAWING NUMBER:	2F-2017-08-13		S004
DATE:	2024-09-30						

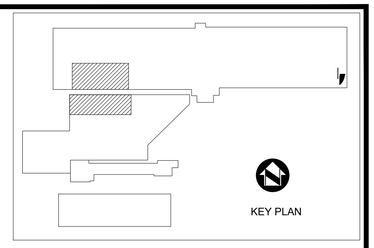
METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

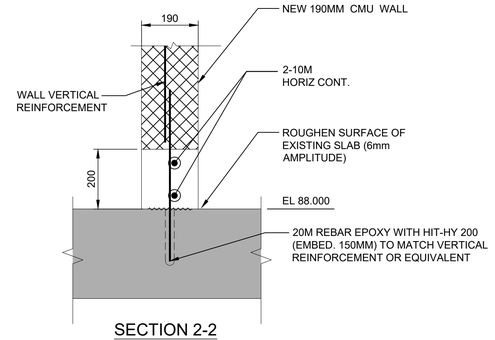


PART PLAN AT EL. 88.00
1:50

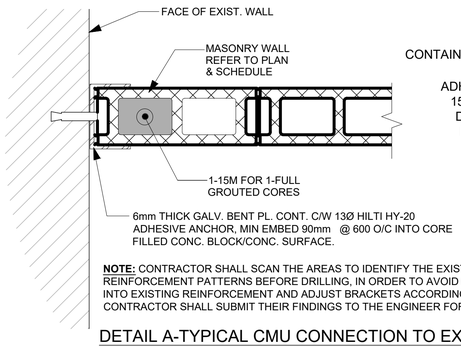


DETAIL C - TYPICAL REINFORCEMENT IN NEW CMU WALL 1 AND 2
1:10



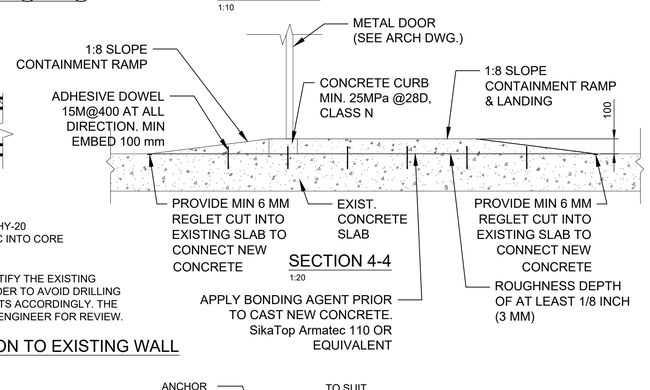


SECTION 2-2
1:10



NOTE: CONTRACTOR SHALL SCAN THE AREAS TO IDENTIFY THE EXISTING REINFORCEMENT PATTERNS BEFORE DRILLING, IN ORDER TO AVOID DRILLING INTO EXISTING REINFORCEMENT AND ADJUST BRACKETS ACCORDINGLY. THE CONTRACTOR SHALL SUBMIT THEIR FINDINGS TO THE ENGINEER FOR REVIEW.

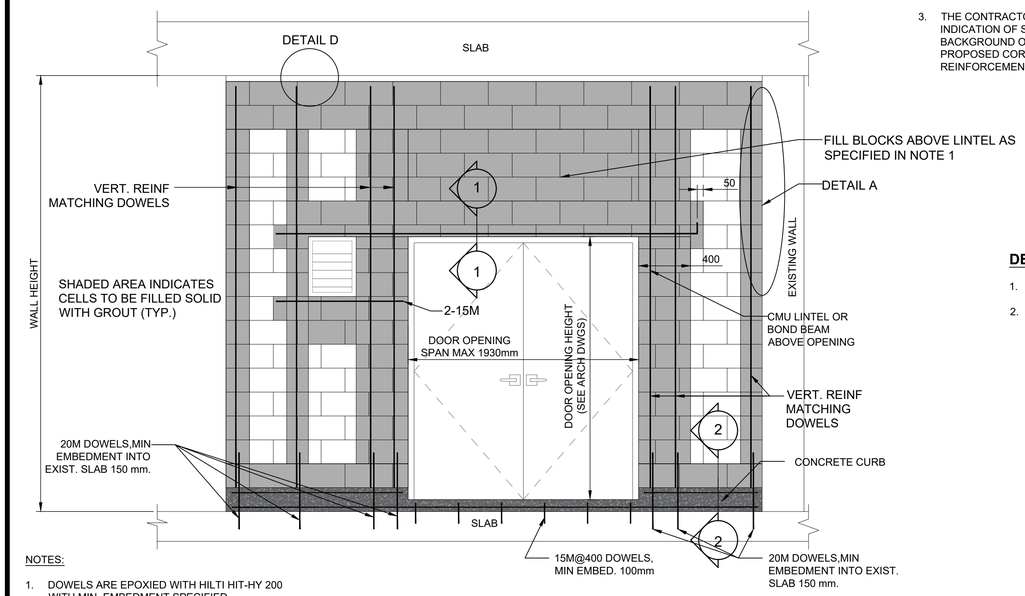
DETAIL A-TYPICAL CMU CONNECTION TO EXISTING WALL
1:10



SECTION 4-4
1:20

EXISTING SLAB CORING PROCEDURE:

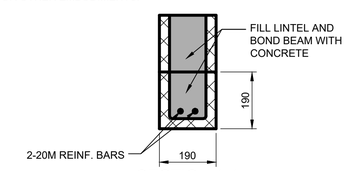
1. THE CONTRACTOR IS TO SCAN THE EXISTING SLAB TO DETECT THE LOCATION OF TOP & BOTTOM REINFORCEMENTS.
2. NO BARS ARE TO BE CUT PRIOR TO STRUCTURAL ENGINEER'S NOTIFICATION & REVIEW.
3. THE CONTRACTOR TO SUBMIT SCANNING REPORT WITH CLEAR INDICATION OF SCANNING AREA USING PROJECT DRAWINGS AS BACKGROUND ON THE PLANS OR SECTION.TO INDICATED PROPOSED CORING SIZE WITH RESPECT TO EXISTING REINFORCEMENT OR OTHER EMBODIMENTS.



NOTES:

1. DOWELS ARE EPOXIED WITH HILTI HIT-HY 200 WITH MIN. EMBEDMENT SPECIFIED
2. MAX. SPACING OF THE WALL DOWELS AND MATCHING VERTICAL REIFORCEMENT IS 800mm.
3. PROVIDE FULL TENSION LAP SPLICE FOR VERTICAL REINFORCEMENT

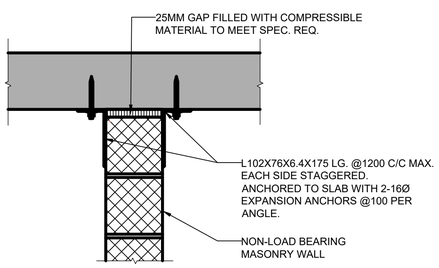
NEW MASONRY WALL 3 - DETAIL
1:25



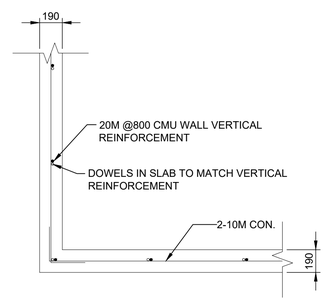
SECTION 1-1
1:10

DETAIL NOTES:

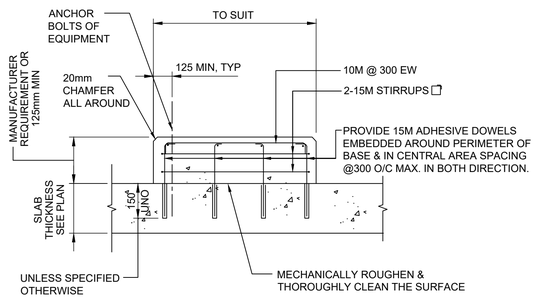
1. BLOCKS ABOVE LINTELS TO BE FILLED SOLID WITH GROUT FOR HEIGHT EQUAL TO SPAN.
2. SHORE LINTELS UNTIL GROUT REACHES DESIGN STRENGTH.



DETAIL D - LATERAL SUPPORT OF NON-LOAD BEARING MASONARY WALL
1:10



DETAIL B - TYPICAL REINFORCEMENT IN NEW CONCRETE CURB
1:25



SECTION 3-3 - CONCRETE EQUIPMENT BASE
1:10

NOTES

1. DIMENSIONS OF BASES, ANCHOR BOLTS, SIZES AND LOCATIONS TO SUIT EQUIPMENT SUPPLIED AS STIPULATED BY EQUIPMENT MANUFACTURER. (SEE MECHANICAL/PROCESS DWGS)
2. ANCHOR BOLT EMBEDMENT DETAILS, PRE-STRESSING, ETC AS REQUIRED BY EQUIPMENT MANUFACTURER.
3. FOR PUMP BASES AND OTHER DYNAMICALLY LOADED STRUCTURES REVIEW BOLT LOCATION, DEPTH AND CAPACITY WITH THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
4. USE CONCRETE WITH A SHRINKAGE COMPENSATING ADMIXTURE.
5. CONTRACTOR SHALL SCAN THE AREAS TO IDENTIFY THE EXISTING REINFORCEMENT PATTERNS BEFORE DRILLING, IN ORDER TO AVOID DRILLING INTO EXISTING REINFORCEMENT AND ADJUST BRACKETS ACCORDINGLY. THE CONTRACTOR SHALL SUBMIT THEIR FINDINGS TO THE ENGINEER FOR REVIEW.

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LICENSED PROFESSIONAL ENGINEER
2025-03-17
M. SHEININ
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PROVINCE OF ONTARIO

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R.C. HARRIS WATER TREATMENT PLANT

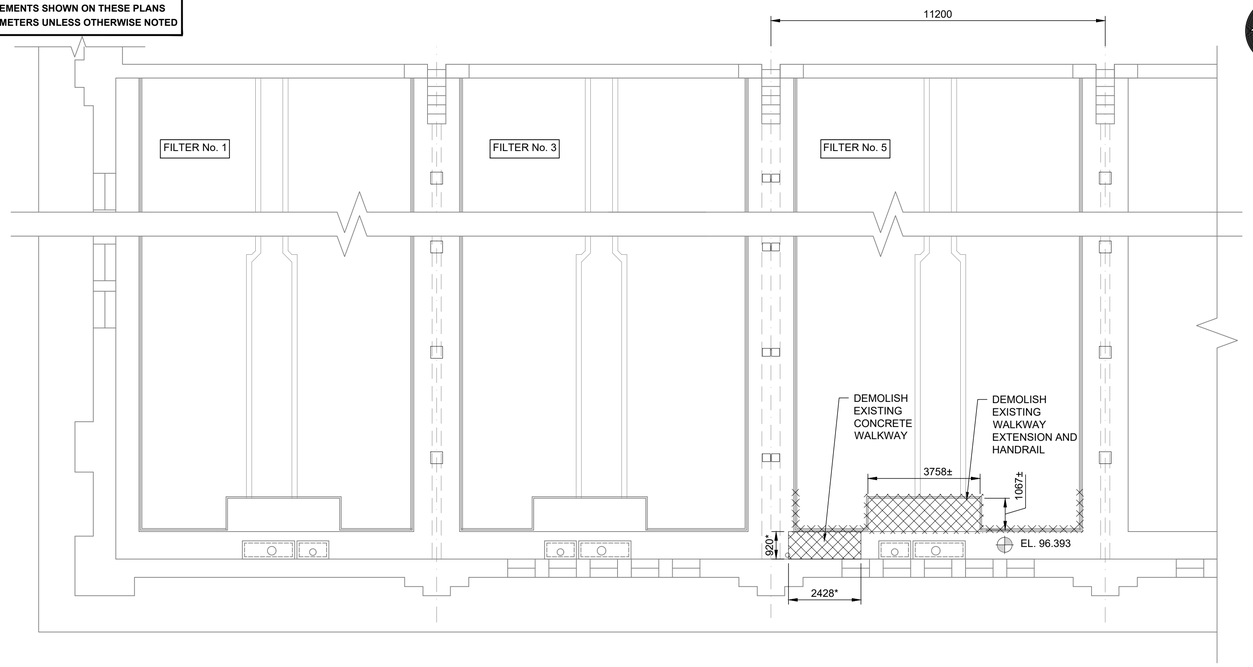
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

RMF GENERATOR PAD - PLAN AT EL. 88.00, SECTION AND DETAILS

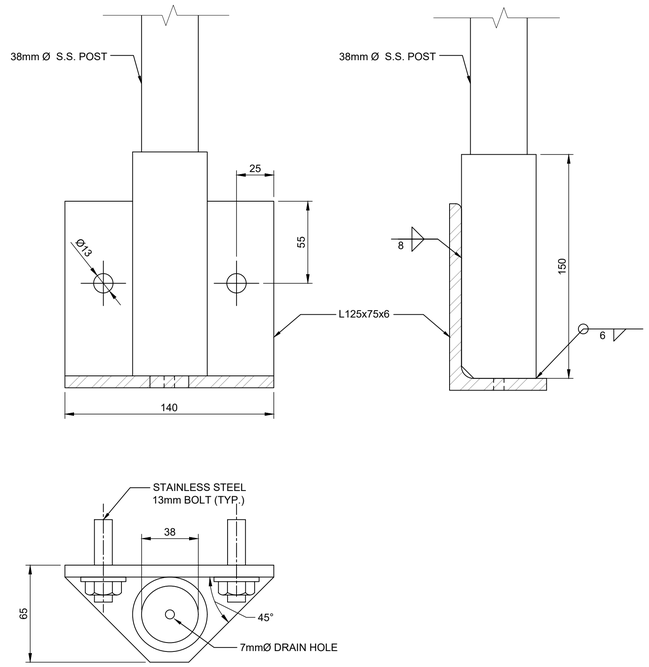
STRUCTURE

DESIGN:	F.M.	DRAFTING:	S.P.	CHECK:	M.S.	CONTRACT No.	25ECS-MI-03HA
SCALE:	AS SHOWN			DRAWING NUMBER:	2F-2017-08-14		S006
DATE:	2024-09-30						

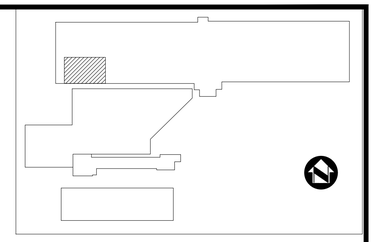
METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED



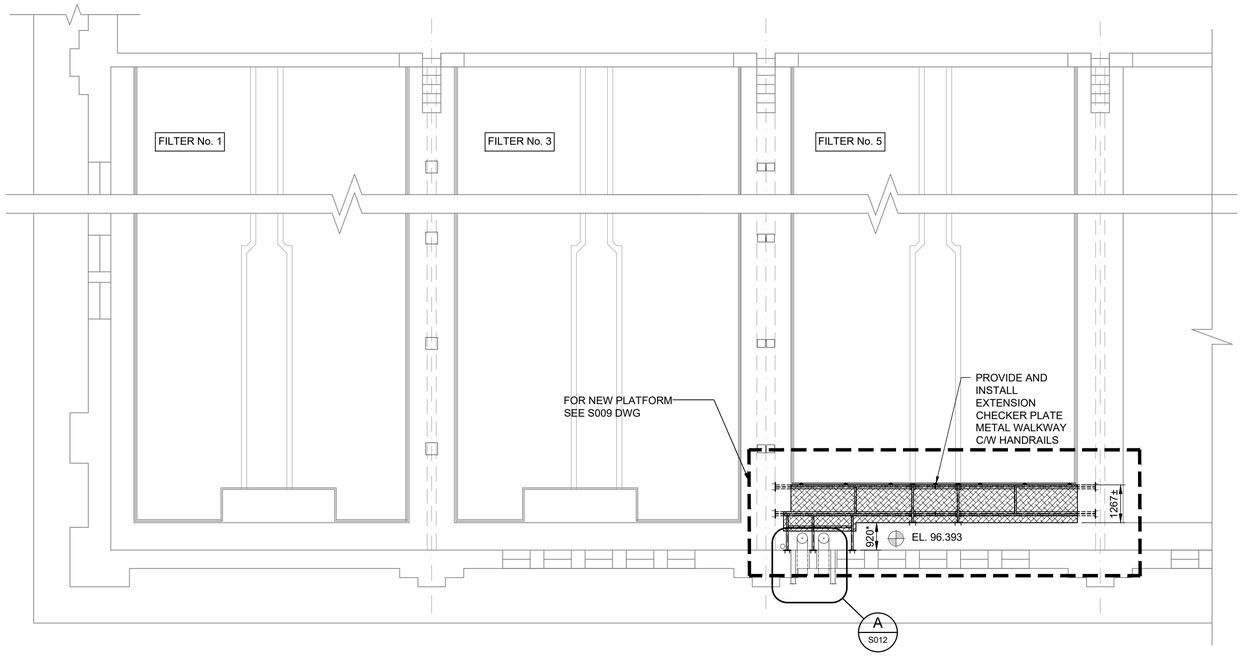
PART PLAN OF FILTER GALLERY - DEMOLITION PLAN
1:100



DETAIL OF POST HOLDER
1:2

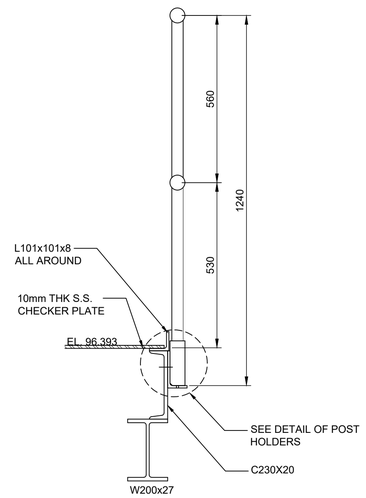


KEY PLAN

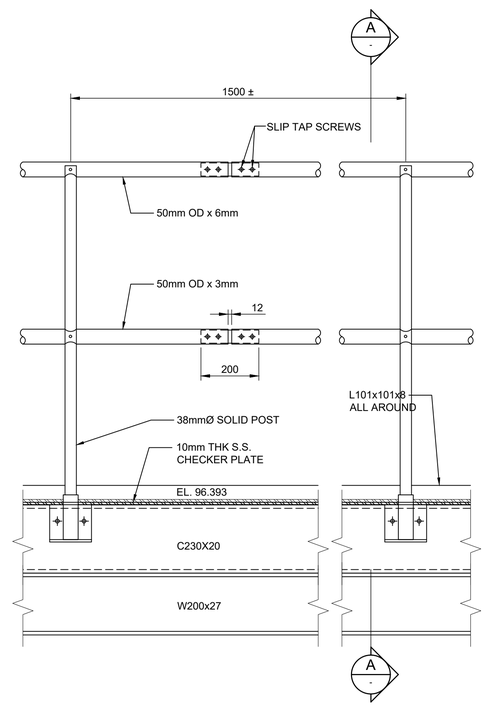


PART PLAN OF FILTER GALLERY
1:100

NOTE:
1. LIVE LOAD ON STEEL PLATFORM IS 4.8 KPa U.N.O.
2. ALL STEEL MEMBERS ARE STAINLESS STEEL OR EQUIVALENT WELDED S.S. SECTION, U.N.O.
3. * DENOTE SITE VERIFY DIMENSIONS



SECTION A
1 : 10



TYPICAL S.S. HANDRAIL ELEVATION
1:10

NOTE
NEW HAND RAIL SIZE & DIMENSION SHOULD MATCH EXISTING HANDRAIL

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LICENSED PROFESSIONAL ENGINEER 2025-03-17 M. SHEININ 100522908 PROVINCE OF ONTARIO

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R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
FILTER GALLERY - EXTEND WALKWAY LAYOUT

STRUCTURE

DESIGN:	F.M.	DRAFTING:	S.P.	CHECK:	M.S.	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:100			DRAWING NUMBER:	2F-2017-08-15		S008
DATE:	2024-09-30						

METRIC
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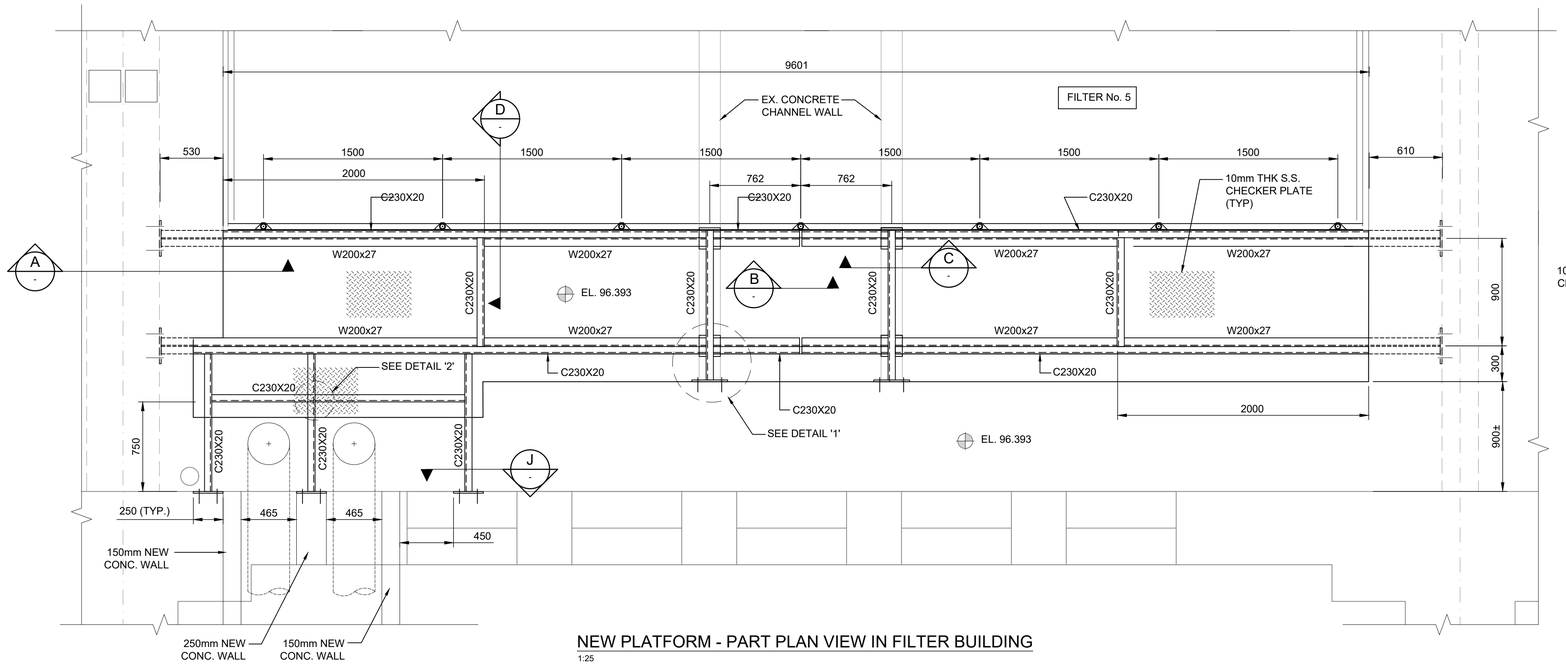
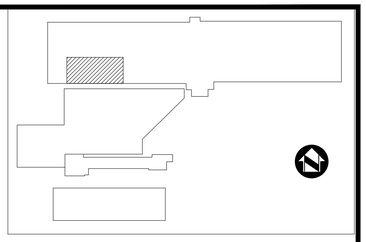
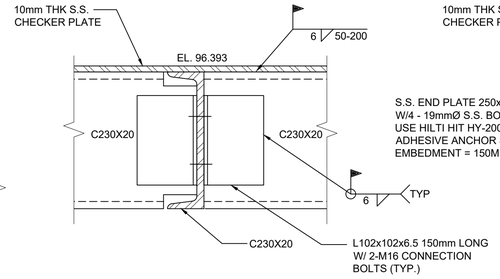


NEW PLATFORM - PART PLAN VIEW IN FILTER BUILDING
1:25

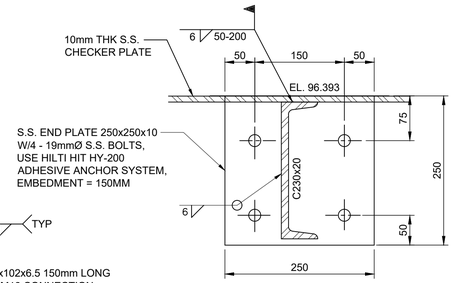
NOTE:
1. ALL NEW STRUCTURAL STEEL SHALL BE STAINLESS STEEL.



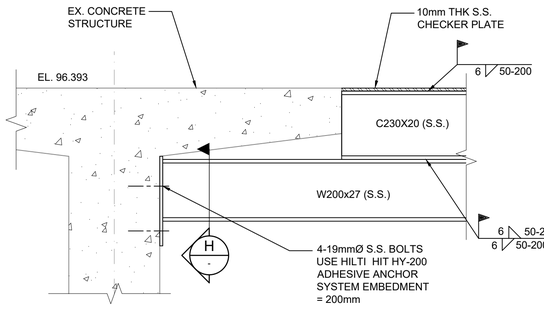
KEY PLAN



DETAIL 2
1 : 10



SECTION J
1 : 5



SECTION A
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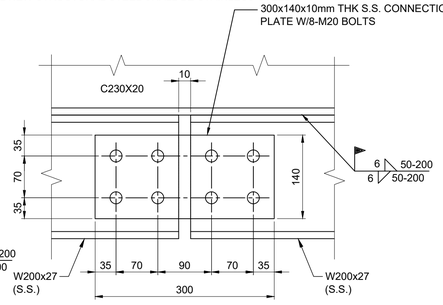
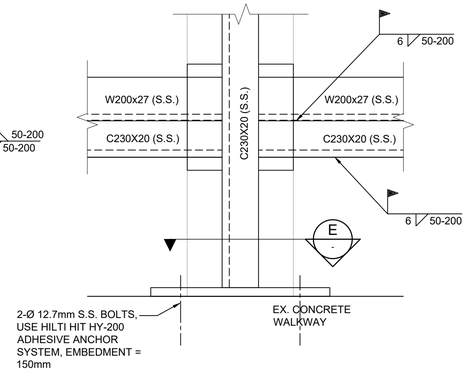


SECTION B
1 : 5



DETAIL 1
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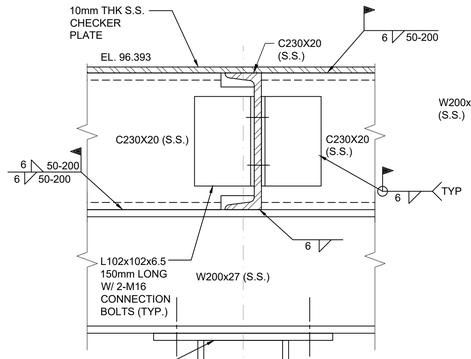

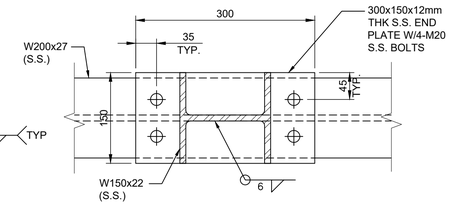

SECTION F
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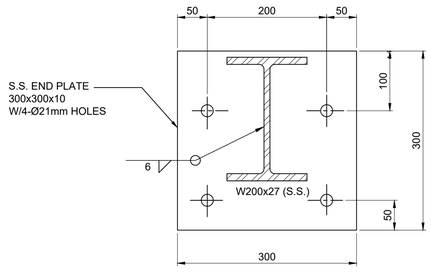
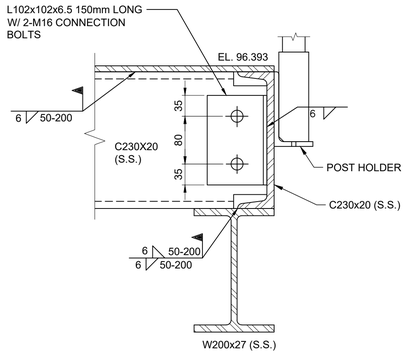


SECTION H
1 : 5



SECTION D
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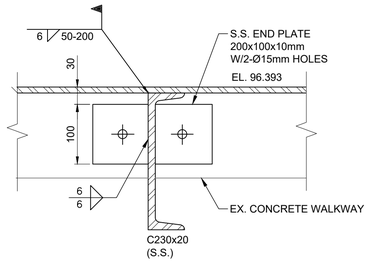

SECTION E
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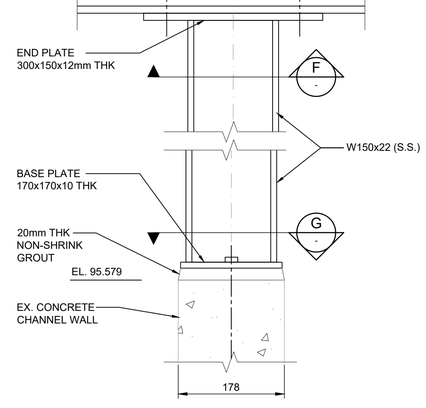

SECTION C
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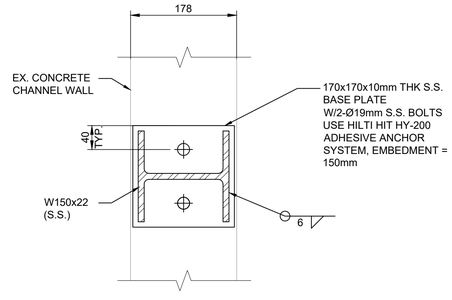

SECTION G
1 : 5

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LICENSED PROFESSIONAL ENGINEER
2025-03-17
M. SHEININ
100522908
PROVINCE OF ONTARIO

Issued for Tender

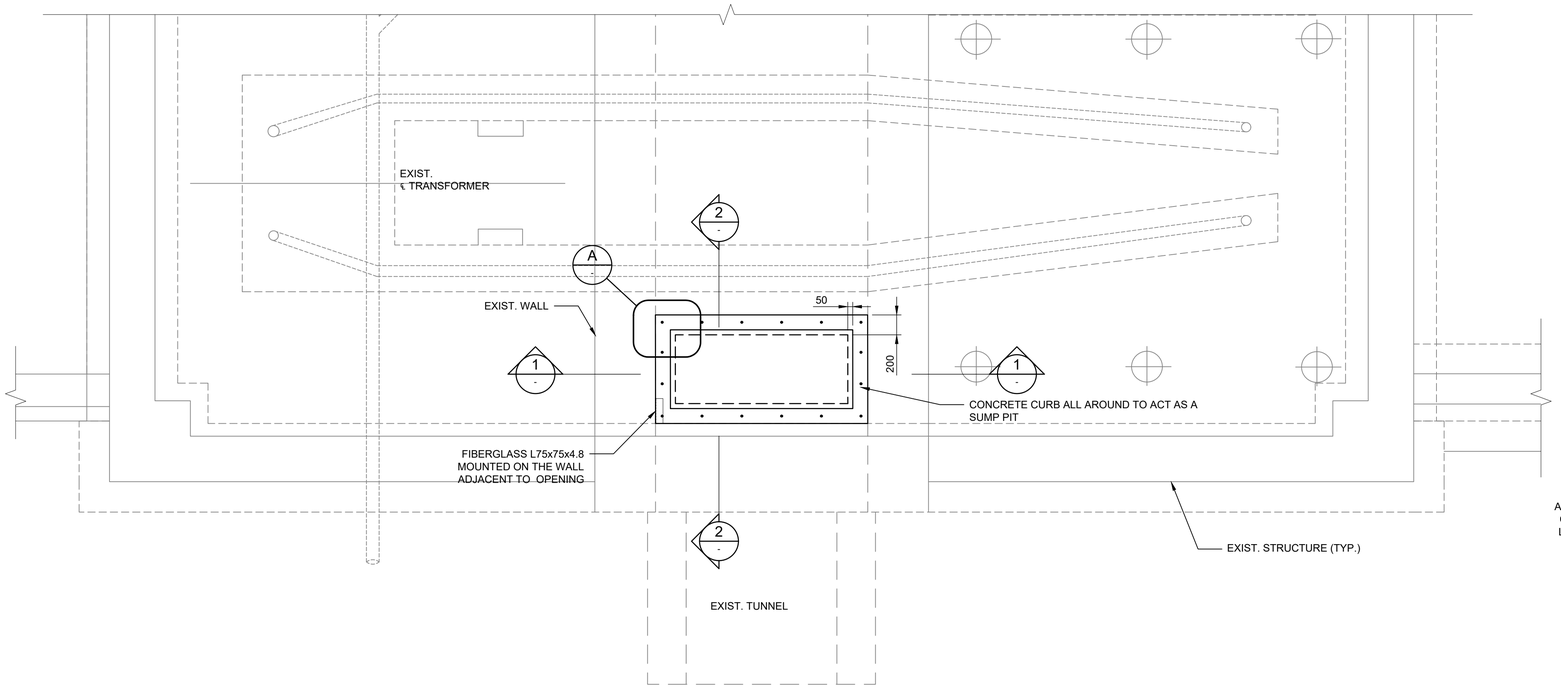
WILLIAM FERNANDES, P. ENG.	SIMON HOPTON, P. ENG.
DIRECTOR, WATER TREATMENT AND SUPPLY	DIRECTOR DESIGN & CONSTRUCTION MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
FILTER GALLERY - NEW PLATFORM PLAN, SECTIONS AND DETAILS

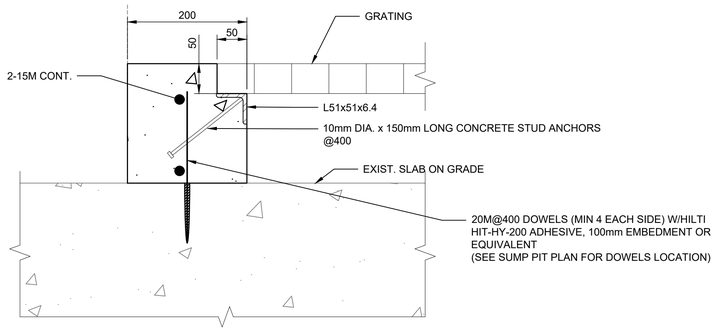
STRUCTURE

DESIGN:	F.M.	DRAFTING:	S.P.	CHECK:	M.S.	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:50			DRAWING NUMBER:	2F-2017-08-16		S009
DATE:	2024-09-30						

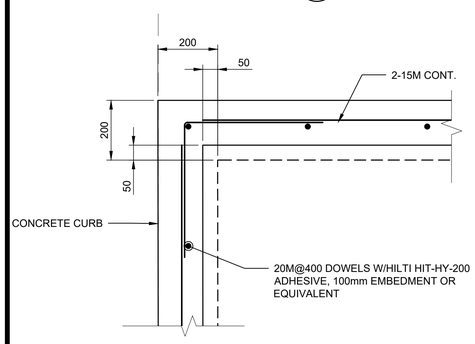
METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



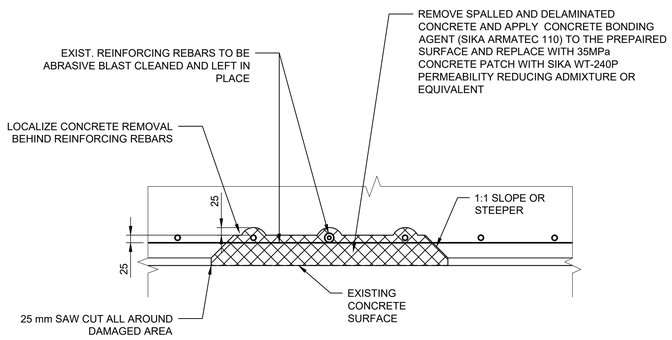
PROPOSED SUMP PIT AT THE TRANSFORMER BUILDING
1:30



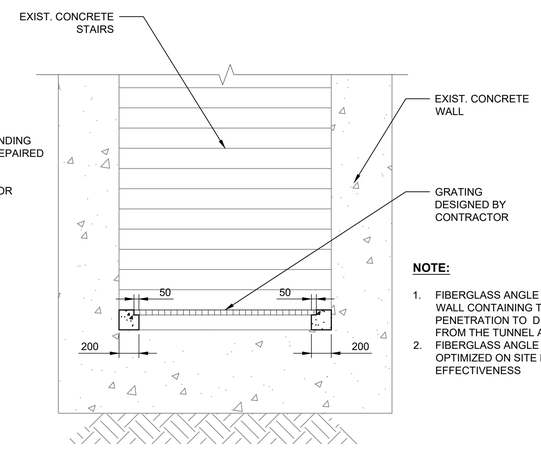
DETAIL B
1 : 5



DETAIL A
1 : 10



TYPICAL CONCRETE REPAIR DETAIL C
N.T.S.

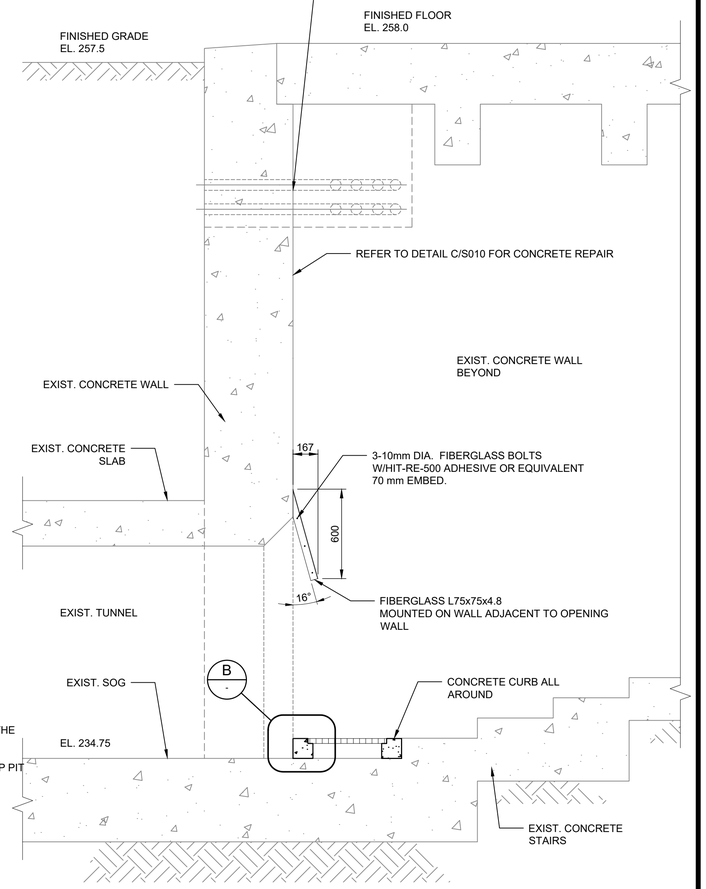


SECTION 1
1 : 20

NOTE:

1. FIBERGLASS ANGLE TO BE INSTALLED ON THE WALL CONTAINING THE CABLE DUCT PENETRATION TO DIRECT LEAKAGE AWAY FROM THE TUNNEL AND TOWARD THE SUMP PIT
2. FIBERGLASS ANGLE LOCATION TO BE OPTIMIZED ON SITE FOR MAXIMUM EFFECTIVENESS

THE CONTRACTOR IS REQUIRED TO IDENTIFY THE SOURCE OF THE LEAKAGE AND PROPOSE A SUITABLE METHOD TO SEAL IT. IT SHOULD BE NOTED THAT THE CABLES IN QUESTION ARE ACTIVE AND CAN ONLY BE UNPOWERED FOR A VERY LIMITED PERIOD. THE CONTRACTOR MUST DEVELOP AN APPROPRIATE METHOD AND STAGING PLAN FOR THE REPAIR PROCESS.



WALL SECTION 2
1 : 20

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R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

TRANSFORMER BLDG - PROPOSED SUMP PIT PLAN, SECTIONS & DETAILS

STRUCTURE

DESIGN:	F.M.	DRAFTING:	S.P.	CHECK:	M.S.	CONTRACT No.	25ECS-MI-03HA
SCALE:	AS INDICATED			DRAWING NUMBER:	2F-2017-08-17		S010
DATE:	2024-09-30						

METRIC
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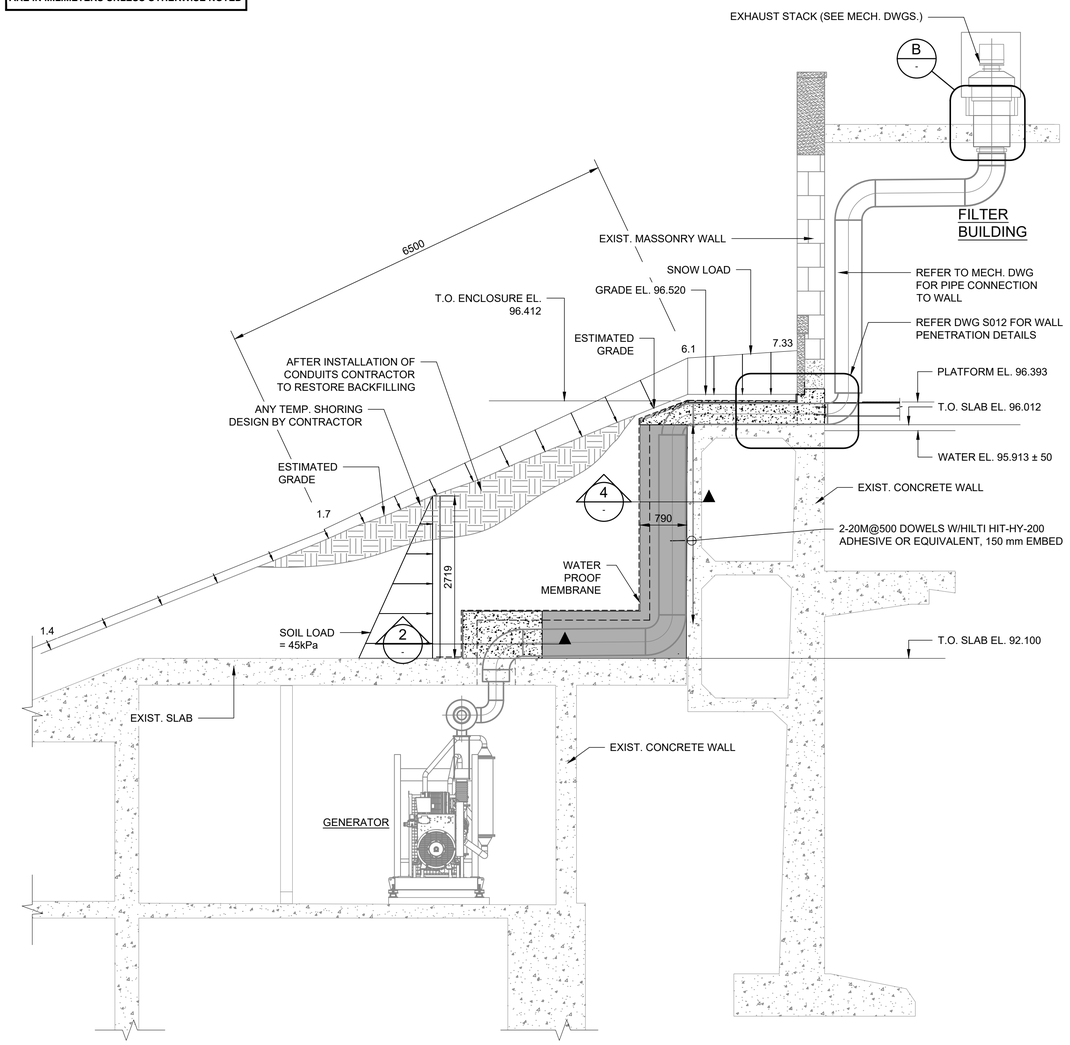
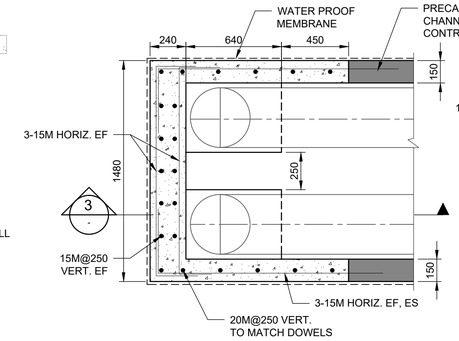
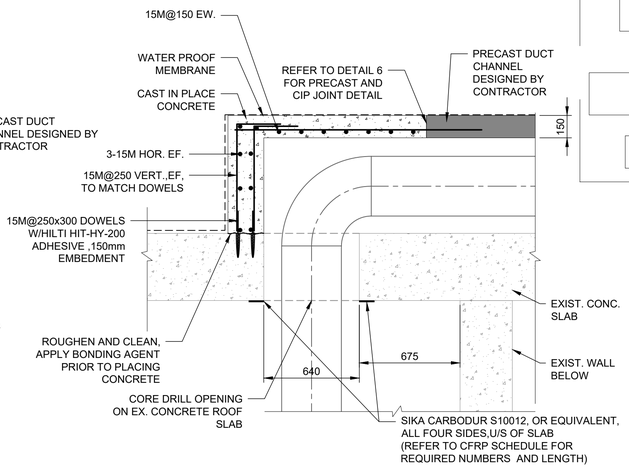


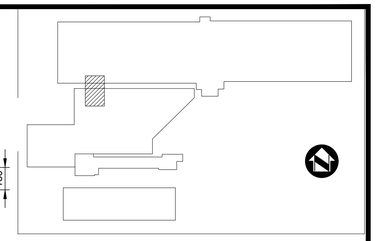
PIPE GALLERY, GENERATOR ROOM & WATER CONDUIT - ELEVATION (1) 1:50



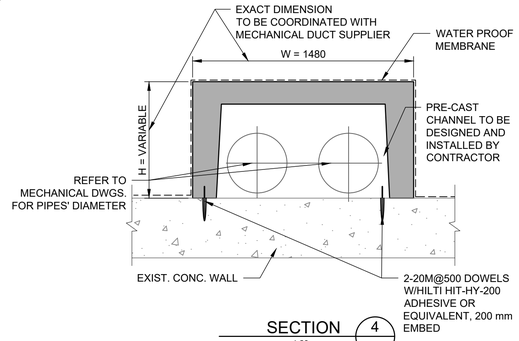
SECTION (2) 1:20



SECTION (3) 1:20



KEY PLAN



SECTION (4) 1:20

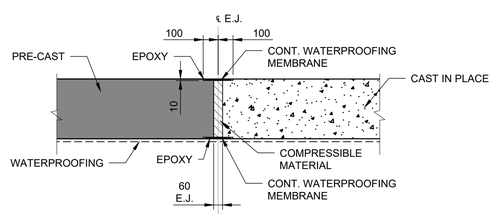
FRP SCHEDULE

CFRP REINFORCEMENT REQUIRED U/S OF ROOF SLABS, CORRESPONDING TO THE NUMBER AND SIZE OF THE CUT BOTTOM REBARS

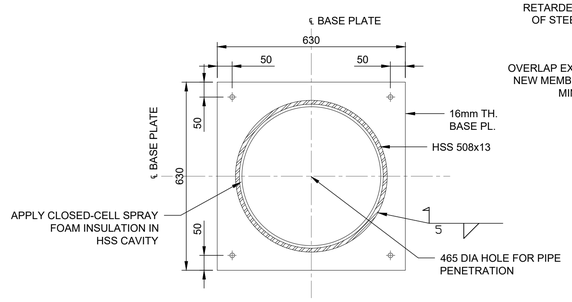
NUMBER OF 25M REBARS CUT	NUMBER OF FRP STRIPS-S10012 REQUIRED ON EACH SIDE (PARALLEL TO CUT REBAR)	NUMBER OF 30M REBARS CUT	NUMBER OF FRP STRIPS-S10012 REQUIRED ON EACH SIDE (PARALLEL TO CUT REBAR)
1	1 STRIP ON EACH SIDE	1	1 STRIP ON EACH SIDE
2	1 STRIP ON EACH SIDE	2	2 STRIP ON EACH SIDE
3	2 STRIP ON EACH SIDE	3	2 STRIP ON EACH SIDE
4	2 STRIP ON EACH SIDE	4	3 STRIP ON EACH SIDE
5	3 STRIP ON EACH SIDE	5	4 STRIP ON EACH SIDE
6	3 STRIP ON EACH SIDE	6	4 STRIP ON EACH SIDE
7	4 STRIP ON EACH SIDE	7	5 STRIP ON EACH SIDE

NOTE:

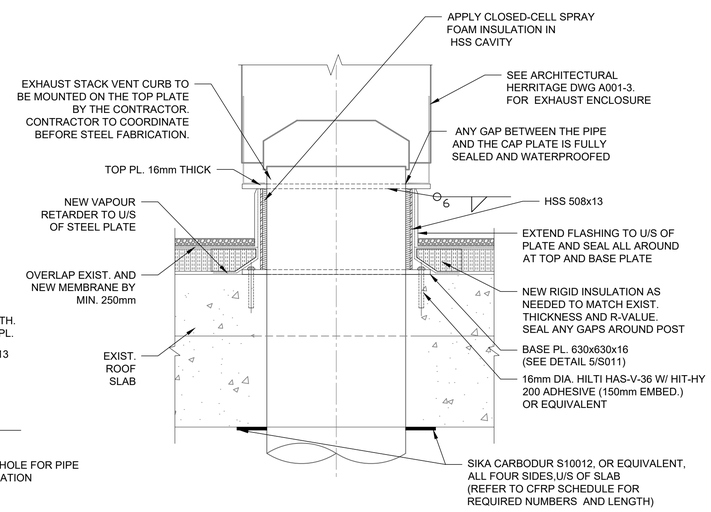
1. CFRP STRIPS SHALL EXTEND 300 MM BEYOND THE OPENING DIMENSIONS ON EACH SIDE.
2. CFRP STRIPS HAVE AN OVERLAP OF 50mm.



PRECAST AND CAST IN PLACE JOINT DETAIL (6) N.T.S.



BASE PLATE DETAIL (5) 1:10



DETAIL OF PIPE PENETRATION THROUGH ROOF SLAB AT EL. 101.08 (B) 1 : 10

NOTES:

1. ROOF OPENING TO BE COORDINATED WITH EXHAUST STACK VENT MANUFACTURER REQUIREMENTS
2. ALL COMPONENTS OF THE EXISTING ROOF ASSEMBLY REQUIRES TO BE SITE VERIFIED .SHOULD ANY DISCREPANCY ARISE, ARCADIS MUST BE INFORMED FOR NECESSARY ADJUSTMENT
3. STEEL TOP PLATE DIMENSIONS SHALL BE DETERMINED TO SUIT STACK VENT REQUIREMENTS.
4. ASSUMED WALL/ROOF SLAB REINFORCEMENT SPACING IS 250mm.
5. CONTRACTOR TO SCAN EXISTING CONCRETE SLAB/WALL FOR REINFORCEMENT DATA PRIOR TO ANY PENETRATION.
6. NO MORE THAN 7 REBARS (TOP & BOTTOM, VERTICAL & HORIZONTAL) ARE TO BE CUT ALONG THE OPENING LENGTH IN EACH WAY/FACE.
7. NO MORE THAN 4 REBAR (TOP & BOTTOM, VERTICAL & HORIZONTAL) IS TO BE CUT ALONG THE OPENING WIDTH IN EACH WAY/FACE.
8. ARCADIS MUST BE INFORMED FOR FURTHER ASSESSMENT IF ADDITIONAL REBAR CUTTING IS REQUIRED.
9. AT LEAST 60 mm COVER SHALL BE KEPT FOR REMAINING REBARS.
10. REFER TO MECH. DRAWINGS FOR STEEL PIPE SLEEVE DIAMETER.
11. CONTRACTOR SHALL SCAN & MAP THE AREAS TO IDENTIFY THE EXISTING REINFORCEMENT PATTERNS BEFORE DRILLING, IN ORDER TO AVOID DRILLING INTO EXISTING REINFORCEMENT AND ADJUST BRACKETS ACCORDINGLY. THE CONTRACTOR SHALL SUBMIT THEIR FINDINGS TO THE ENGINEER FOR REVIEW.
12. PRECAST DUCT CHANNEL SHALL BE DESIGNED BY CONTRACTOR.
13. ALL STEEL TO BE HOT DIP GALVANIZED.
14. EXISTING ASSEMBLY IS BASED ON AS-BUILT DRAWINGS, SITE VERIFY ALL COMPONENTS.

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LICENSED PROFESSIONAL ENGINEER 2025-03-17 M. SHEININ 100522908 PROVINCE OF ONTARIO

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R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

PIPE GALLERY, GENERATOR ROOM & WATER CONDUIT - SECTION ELEVATION & DETAILS

STRUCTURE

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SCALE:	AS INDICATED			DRAWING NUMBER:	2F-2017-08-18		S011
DATE:	2024-09-30						

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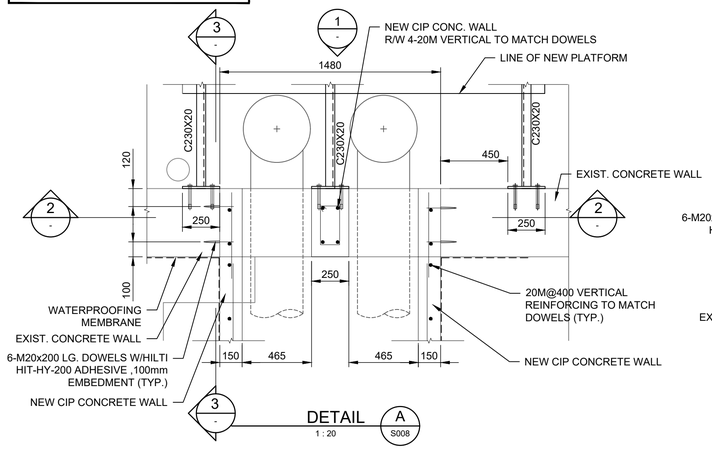
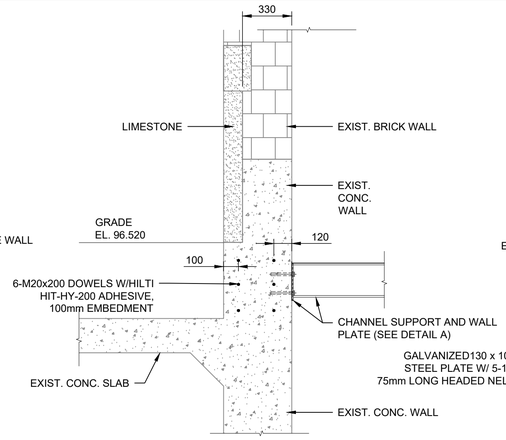
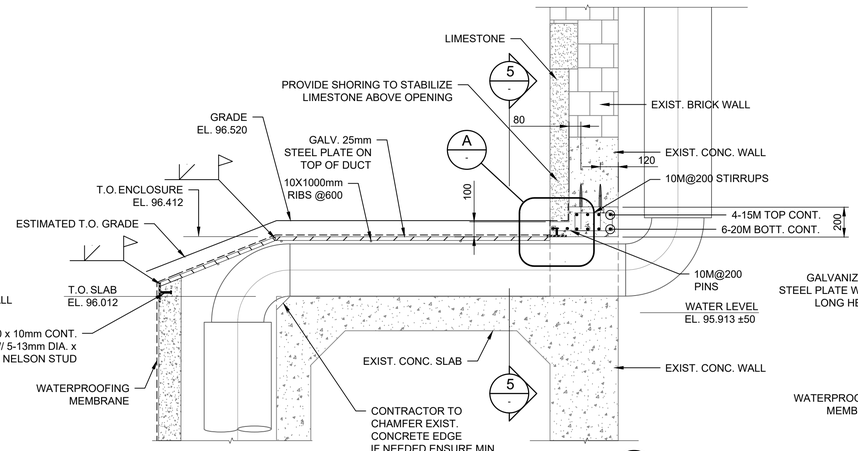


DETAIL A (S008)
1 : 20



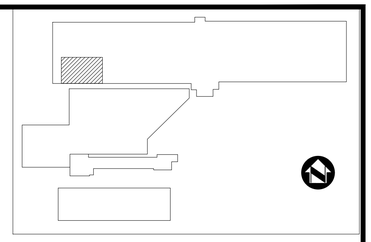
SECTION 3
1:20



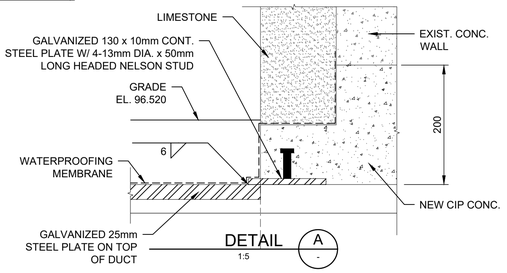
SECTION 4
1:20

NOTE:

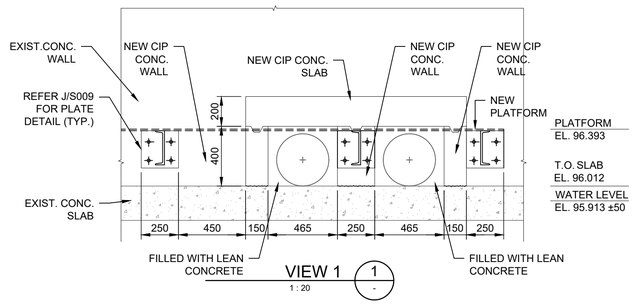
1. TOP OF CONCRETE ENCLOSURE AND PRECAST CHANNEL DUCT NOT TO EXCEED GRADE LEVEL



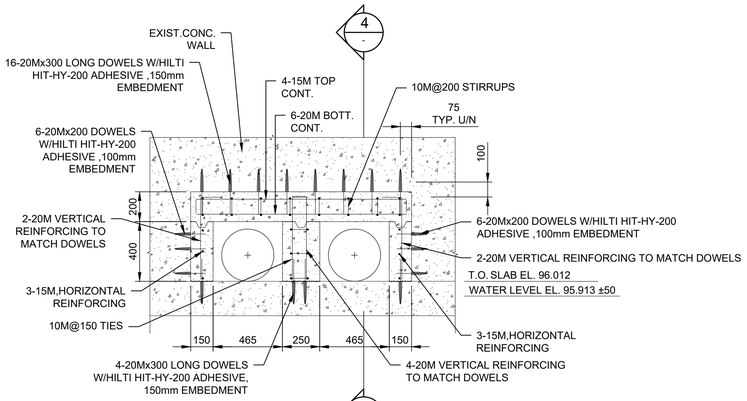
KEY PLAN



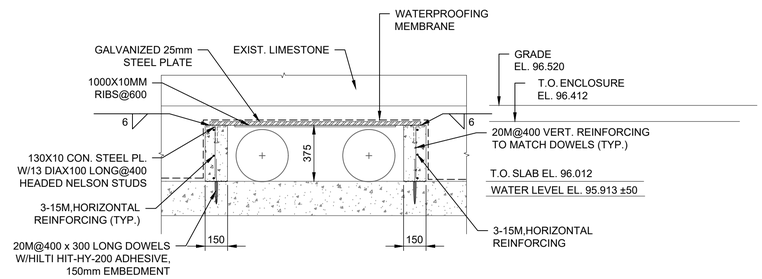
DETAIL A
1:5



VIEW 1
1 : 20



SECTION 2
1:20



SECTION 5
1:20

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STRUCTURE

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SCALE:	AS INDICATED			DRAWING NUMBER:	2F-2017-08-19		S012
DATE:	2024-09-30						

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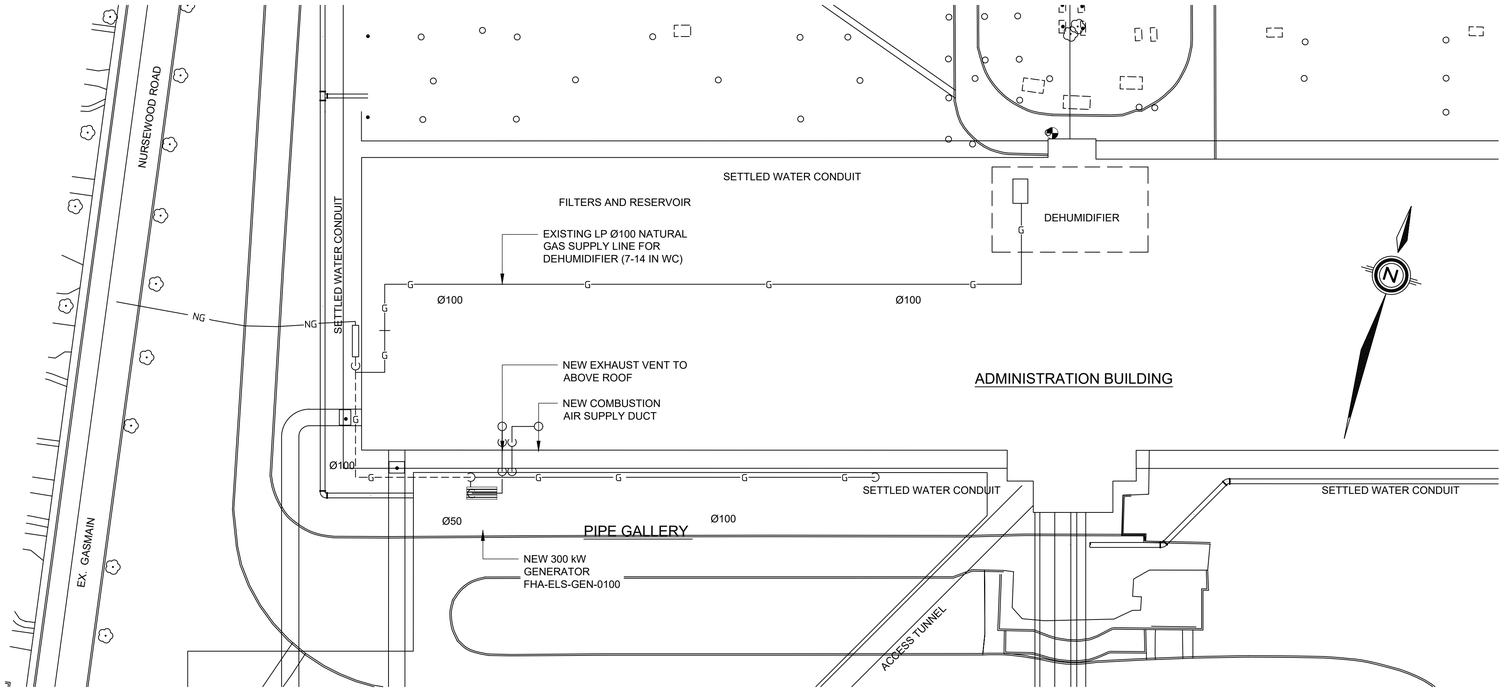
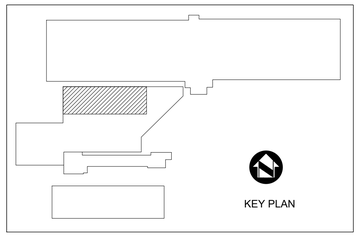


SITE PLAN 1
1:500



FAN COIL AND FAN SCHEDULE

UNIT NO.	LOCATION	CAPACITY (CFM)	SERVICE	MANUF.	MODEL	S.P. (INCH OF WATER)	MOTOR					RPM	WEIGHT (LBS)	REMARKS
							HP	ENCL	VOLT	PHASE	HZ			
FHA-ACC-FN-0101	GENERATOR ROOM	12000	COOLING	DAIKIN	SWP033JLS	2.78	15.2	ODP	575	3	60	1892	4100	INTERLOCKED WITH GENERATOR OPERATION CONTROLLED BY ROOM THERMOSTAT, COIL GUARD FOR COPPER PROTECTION
FHA-ACC-FC-0102	GENERATOR ROOM	1300	EXHAUST	PENN BARRY	PND-015-09114-SC	0.1	0.25	7-EXP C2D1	115	1	60	1703	88	INTERLOCKED WITH NATURAL GAS DETECTOR
FHA-ACC-FN-0100	GENERATOR ROOM	700	COMBUSTION AIR SUPPLY	PENN BARRY	SQX150-0041GP	0.25	0.25	7-EXP C2D1	208	1	60	715	110	INTERLOCKED WITH GENERATOR OPERATION

DAMPER SCHEDULE

DAMPER FUNCTION	DAMPER TAG	DAMPER ACTUATOR					MANUFACTURER	MODEL	SIZE (mm)	REMARKS
		OPR	CFM	VOLTAGE	PHASE	HZ				
COMBUSTION DAMPER	FLA-ACC-DM-6821	PARALLEL	700	24-240V	1	60	ARROW UNITED	AFDTI-25LT	500x500	FAIL OPEN, POWER CLOSE ACTUATOR C/W END SWITCH

SUMP PUMP SCHEDULE

MARK NO.	SERVICE	PERFORMANCE						MOTOR			REMARKS
		FLUID	FLOW RATE	HEAD (FT)	MANUFACTURER	MODEL	PRESSURE (PSI)	HP	V/PH/HZ	AMPS	
SP-100	POWER TUNNEL	PUMPED NPW	549.6 L/HR	5	LITTLE GIANT	1-ABS	4.3	1/150	115/1/60	1.1	
SP-101	POWER TUNNEL	PUMPED NPW	30 L/MIN	15	LITTLE GIANT	5-ASP	9.1	1/6	115/1/60	5	INCLUDES SELF-CONTAINED SUMP CONTAINER

GRILLES & DIFFUSERS

MARK NO.	SERVICE	PERFORMANCE				
		MATERIAL	SIZE	OPPOSED BLADE DAMPER	MANUFACTURER	MODEL
A	AIR SUPPLY	STAINELSS STEEL	AS SHOWN	NO	EH PRICE	720D
B	AIR SUPPLY	STAINELSS STEEL	AS SHOWN	YES	EH PRICE	720D
C	FAN COIL INLET	STAINELSS STEEL	AS SHOWN	NO	EH PRICE	720D
D	FAN COIL SUPPLY	ALUMINUM	AS SHOWN	YES	TUTTLE & BAILEY	A54

HEATER SCHEDULE

MARK NO.	SERVICE	PERFORMANCE							MOTOR			REMARKS
		POWER	VOLTS	PHASE	AMPS	APPROX AIR TEMP RISE	MANUFACTURER	MODEL	HP	VOLTS	PHASE	
EUH03904	GENERATOR ROOM	5 KW	208	1	27	35°F (19°C)	HEATREX	238 SERIES	1/4	208	1	DISCONNECT CONTROLLED BY REMOTE THERMOSTAT, C/W SWIVEL BRACKET FOR WALL INSTALLATION, C/W PILOT LIGHT, C/W DISCONNECT SWITCH AND MAGNETIC CONTRACTOR
EUH03905	GENERATOR ROOM	5 KW	208	1	27	35°F (19°C)	HEATREX	238 SERIES	1/4	208	1	DISCONNECT CONTROLLED BY REMOTE THERMOSTAT, C/W SWIVEL BRACKET FOR WALL INSTALLATION, C/W PILOT LIGHT, C/W DISCONNECT SWITCH AND MAGNETIC CONTRACTOR

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TORONTO

LICENSED PROFESSIONAL ENGINEER
Y. Z. WANG
100123402
PROVINCE OF ONTARIO

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ENGINEERING AND CONSTRUCTION SERVICES

WILLIAM FERNANDES, P. ENG.
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R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
GENERAL LAYOUT

MECHANICAL

DESIGN:	J.S.	DRAFTING:	J.S.	CHECK:	J.H.	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:500			DRAWING NUMBER:	2F-2017-08-20		M001
DATE:	2024-09-30						

Drawing: \\ARCADIS-NL.LOCAL\DFS\AIBI_PJ\TORONTO\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\5 MECH\2F-2017-08-20_M001.DWG
Layout Tab: M001
Date: 03/24/2025 Time: 03:25:12 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED

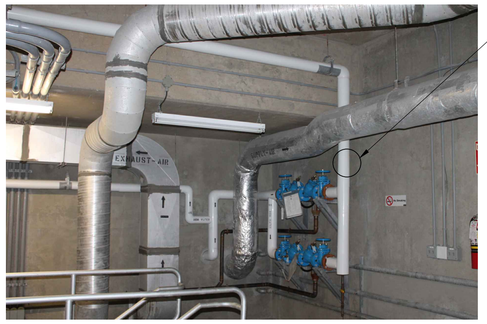
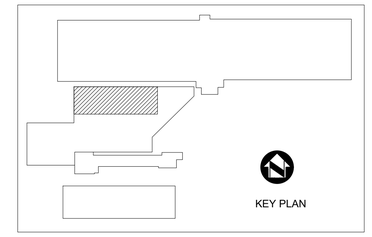
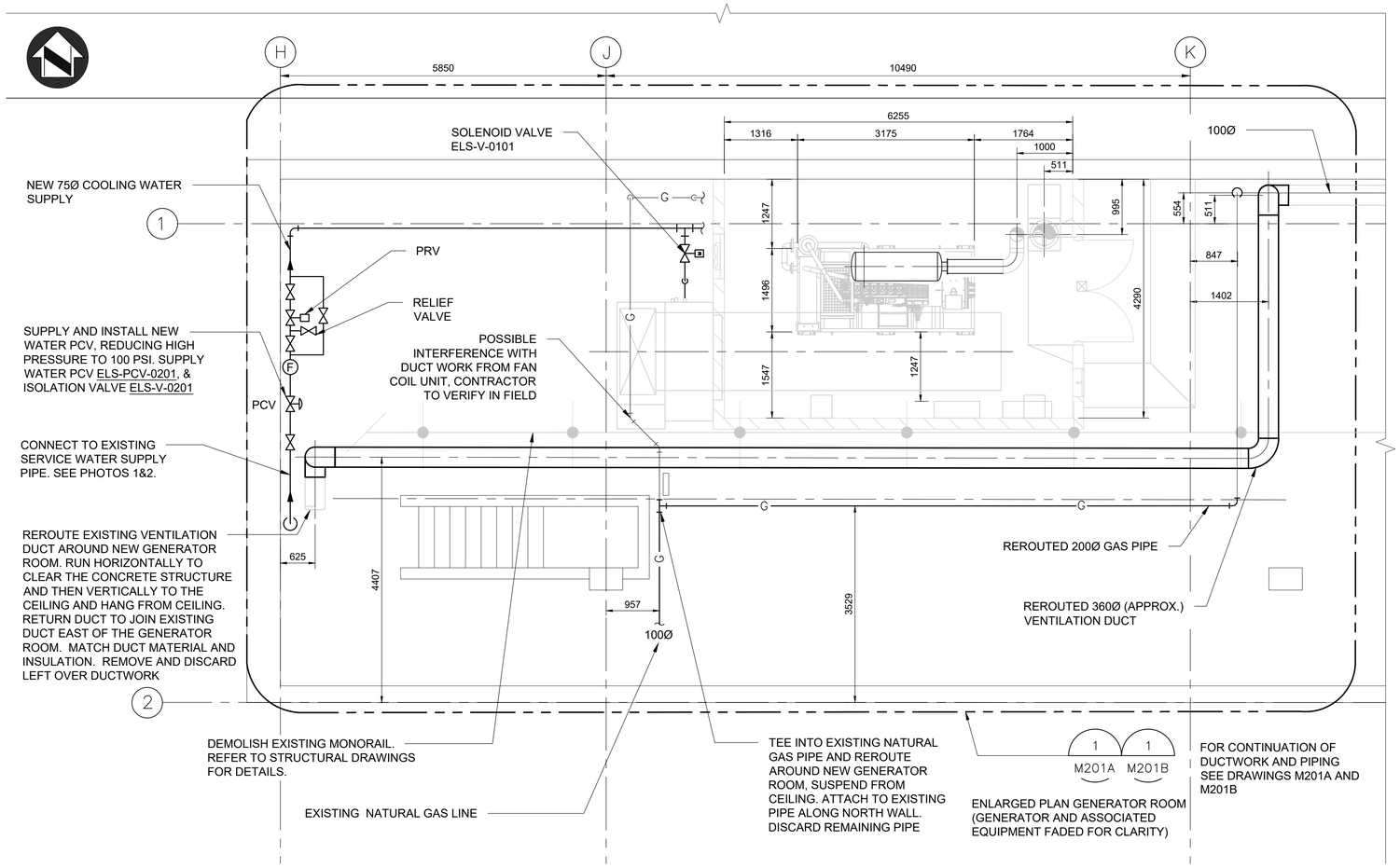


PHOTO 1 - SW CORNER OF PIPE GALLERY
N.T.S.

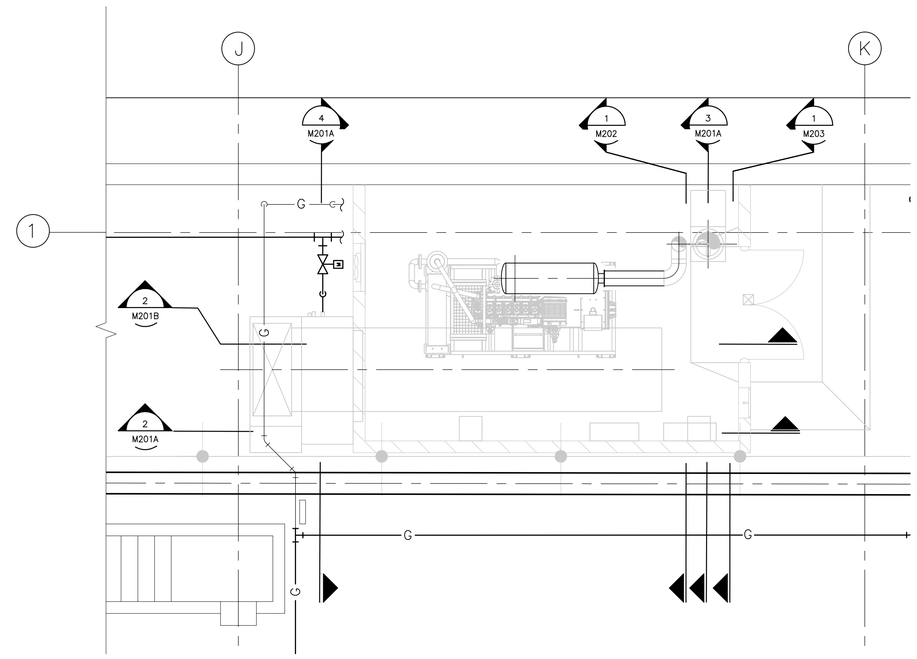
PHOTO 2 - SW CORNER - DETAIL
N.T.S.

NOTE:
1. NATURAL GAS MODIFICATION TO BE DONE IN 2 DAYS DURING SPRING, SUMMER OR FALL OR 8 HOURS DURING THE WINTER AND COORDINATED WITH PLANT OPERATIONS.
2. PROVIDE VENTLESS PCV FOR GAS SUPPLY TO GENERATOR.
3. GAS PIPE TO BE PURGED OF AIR AFTER MODIFICATION.
4. COOLING WATER SUPPLY CAPACITY OF MIN. 66 GPM AT 100 PSI.
5. ALL DIMENSIONS PROVIDED SHALL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CARRYING OUT ANY WORK.





PIPING GALLERY RENOVATIONS AND DEMOLITION - PLAN VIEW 1
1:50



GENERATOR ROOM SECTIONS 2
1:50

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NO.	DATE	REVISIONS	INITIAL	SIGNED
A	2025-03-18	ISSUED FOR TENDER	K.C	

TORONTO
TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER Y. Z. YAN(S) 100123402 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.	SIMON HOPTON, P. ENG.
DIRECTOR, WATER TREATMENT AND SUPPLY	DIRECTOR DESIGN & CONSTRUCTION MAJOR INFRASTRUCTURE

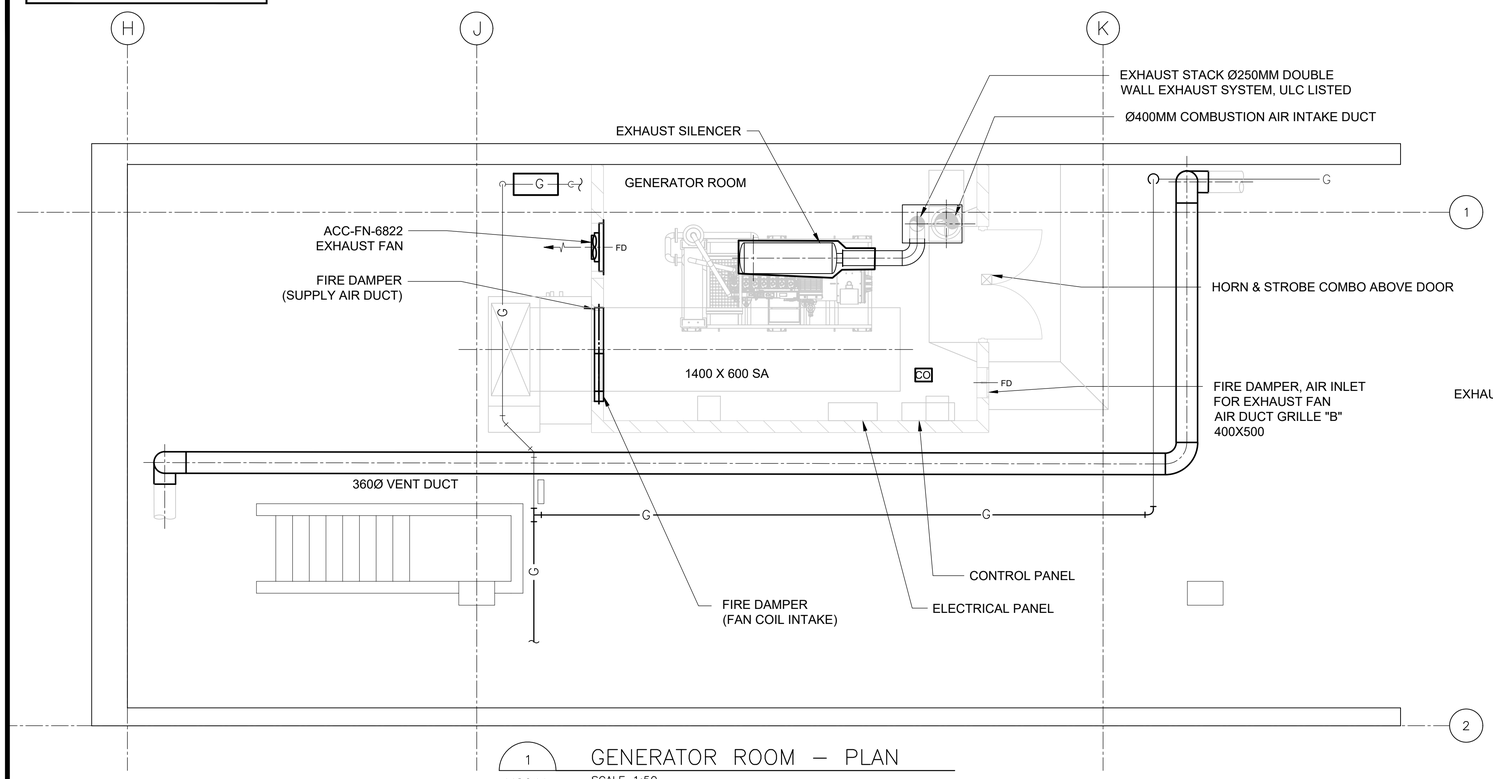
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
PIPE GALLERY RENOVATIONS AND DEMOLITION

MECHANICAL

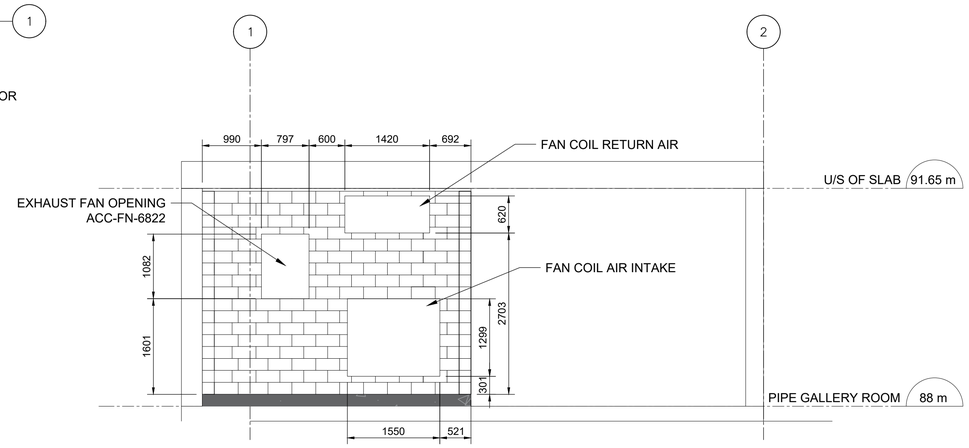
DESIGN:	J.S.	DRAFTING:	J.S.	CHECK:	J.H.	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:50			DRAWING NUMBER:	2F-2017-08-21		M201
DATE:	2024-09-30						

Drawing: \\ARCADIS-NL.LOCAL\DFS\AIBI_PJ\TORONTO\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\5 MECH\2F-2017-08-21_M201.DWG
Layout Tab: M201
Date: 03/24/2025 Time: 03:25:34 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED

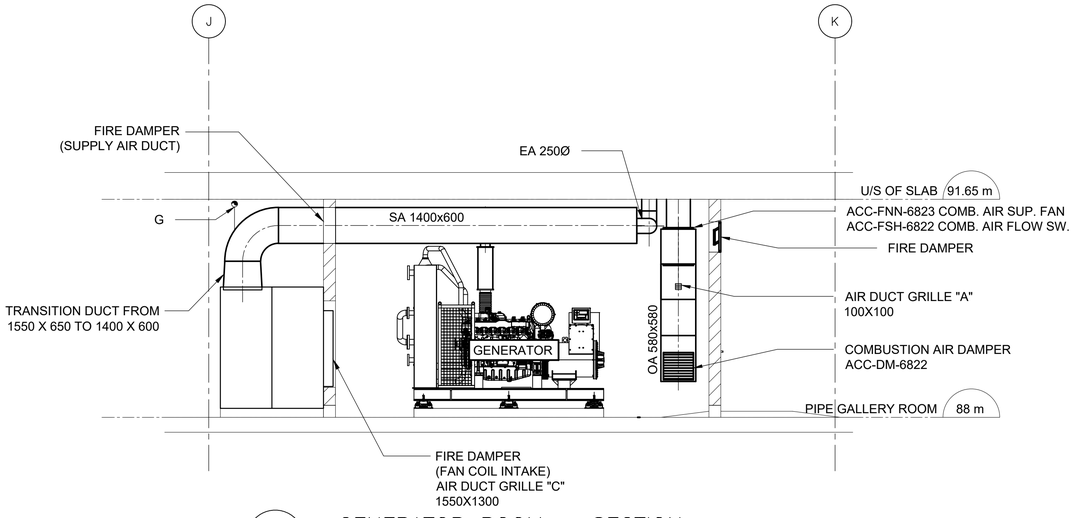


1 M201A GENERATOR ROOM – PLAN
SCALE 1:50

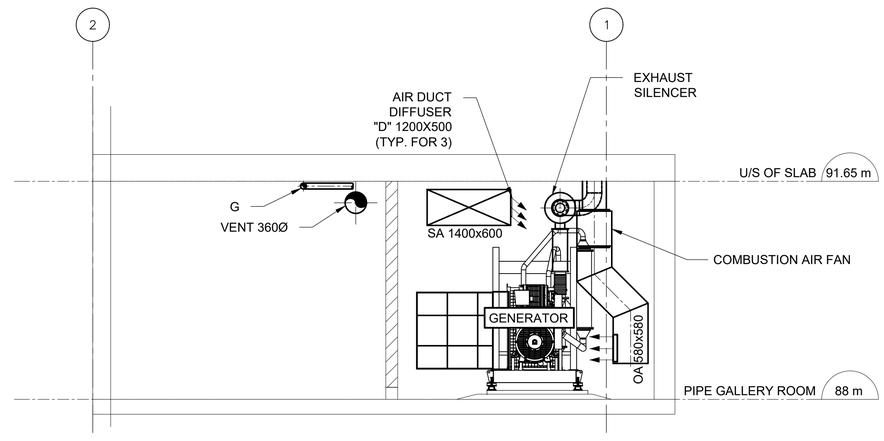


4 M201A GENERATOR ROOM – MASONRY WALL DETAIL
SCALE 1:50

NOTES:
- CONTRACTOR TO CONFIRM OPENING DIMENSIONS



2 M201A GENERATOR ROOM – SECTION
SCALE 1:50



3 M201A GENERATOR ROOM – SECTION
SCALE 1:50

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A	2025-03-18	ISSUED FOR TENDER	K.C	

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ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
Y. C. YAHNG
100122402
Mar 18 2025
PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.	SIMON HOPTON, P. ENG.
DIRECTOR, WATER TREATMENT AND SUPPLY	DIRECTOR DESIGN & CONSTRUCTION MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
ENLARGED PLAN GENERATOR ROOM HVAC

MECHANICAL

DESIGN:	B. BEALE	DRAFTING:	A. GILROY	CHECK:	B. BEALE	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:50			DRAWING NUMBER:	2F-2017-08-22		M201A
DATE:	2024-09-30						

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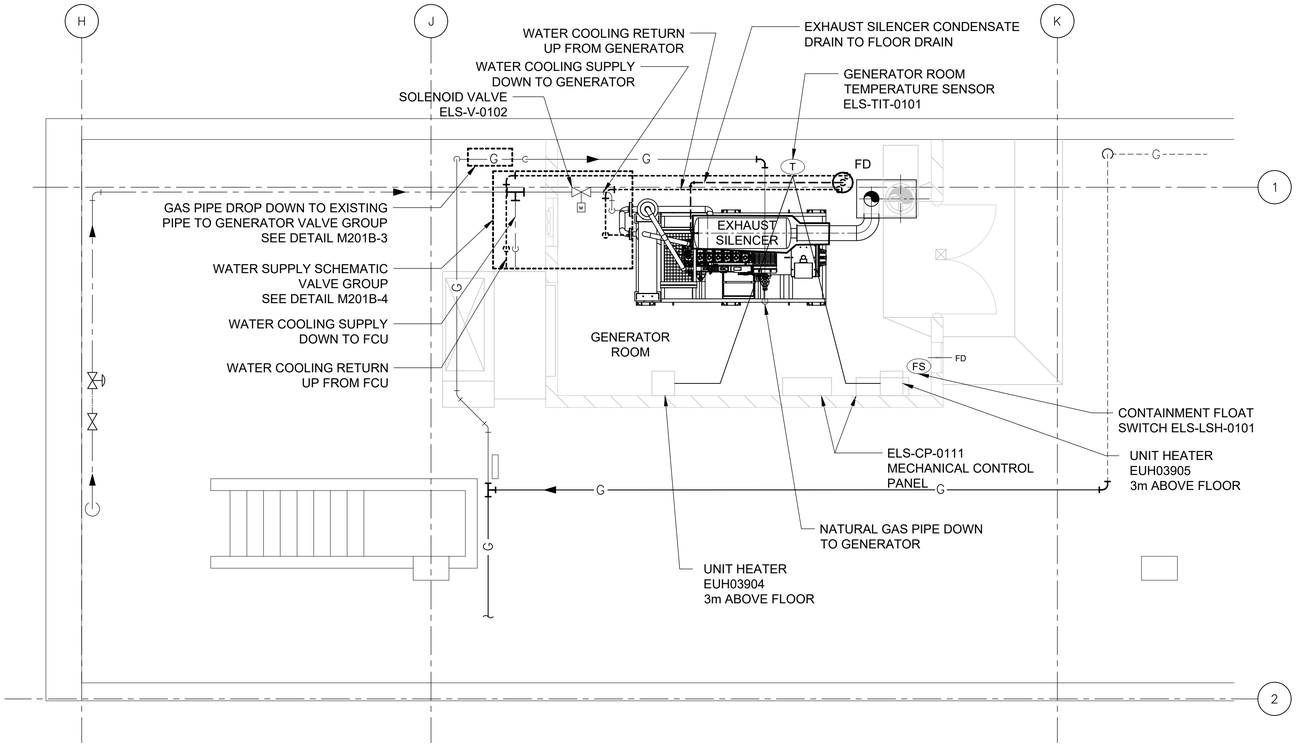
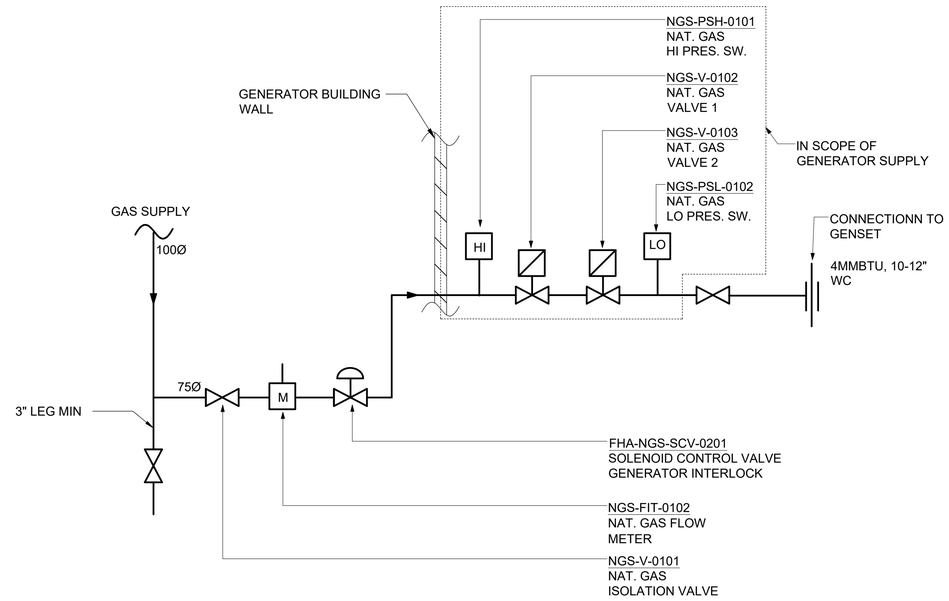
Layout Tab: M201A
Date: 03/24/2025 Time: 03:25:55 PM

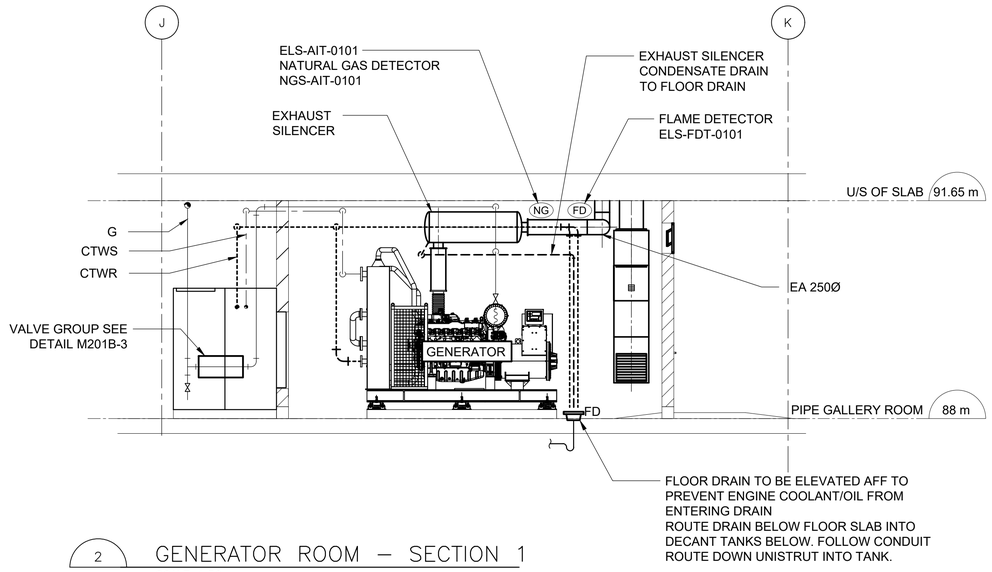
METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED



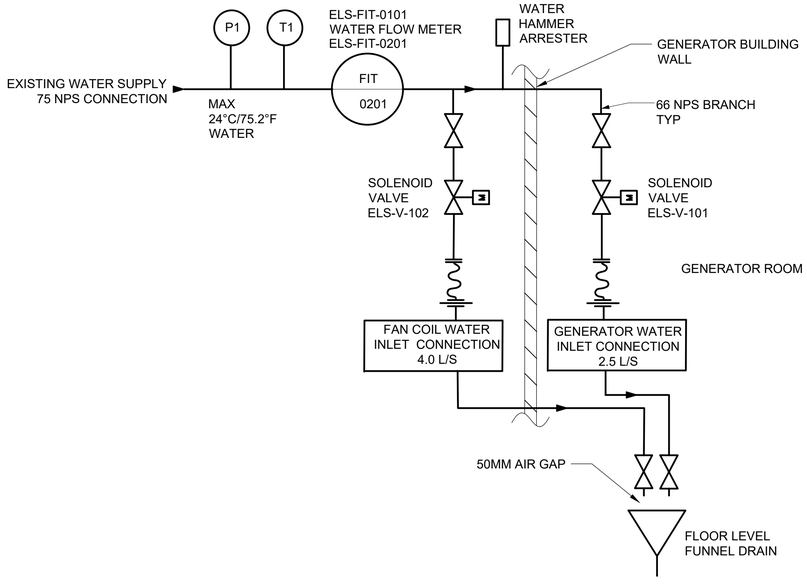
1 M201B GENERATOR ROOM – PLAN
SCALE 1:50



3 M201B NATURAL GAS TO GENERATOR CONNECTION SCHEMATIC
SCALE NTS



2 M201B GENERATOR ROOM – SECTION 1
SCALE 1:50



4 M201B WATER SUPPLY SCHEMATIC FOR FAN COIL UNIT AND GENERATOR
SCALE NTS

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TORONTO
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ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER Y. Z. HWANG 100102402 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.
DIRECTOR,
WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

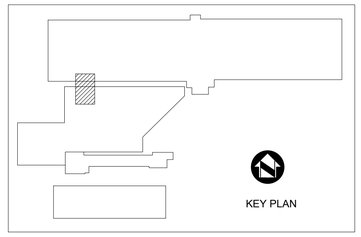
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
ENLARGED PLAN GENERATOR ROOM PIPING

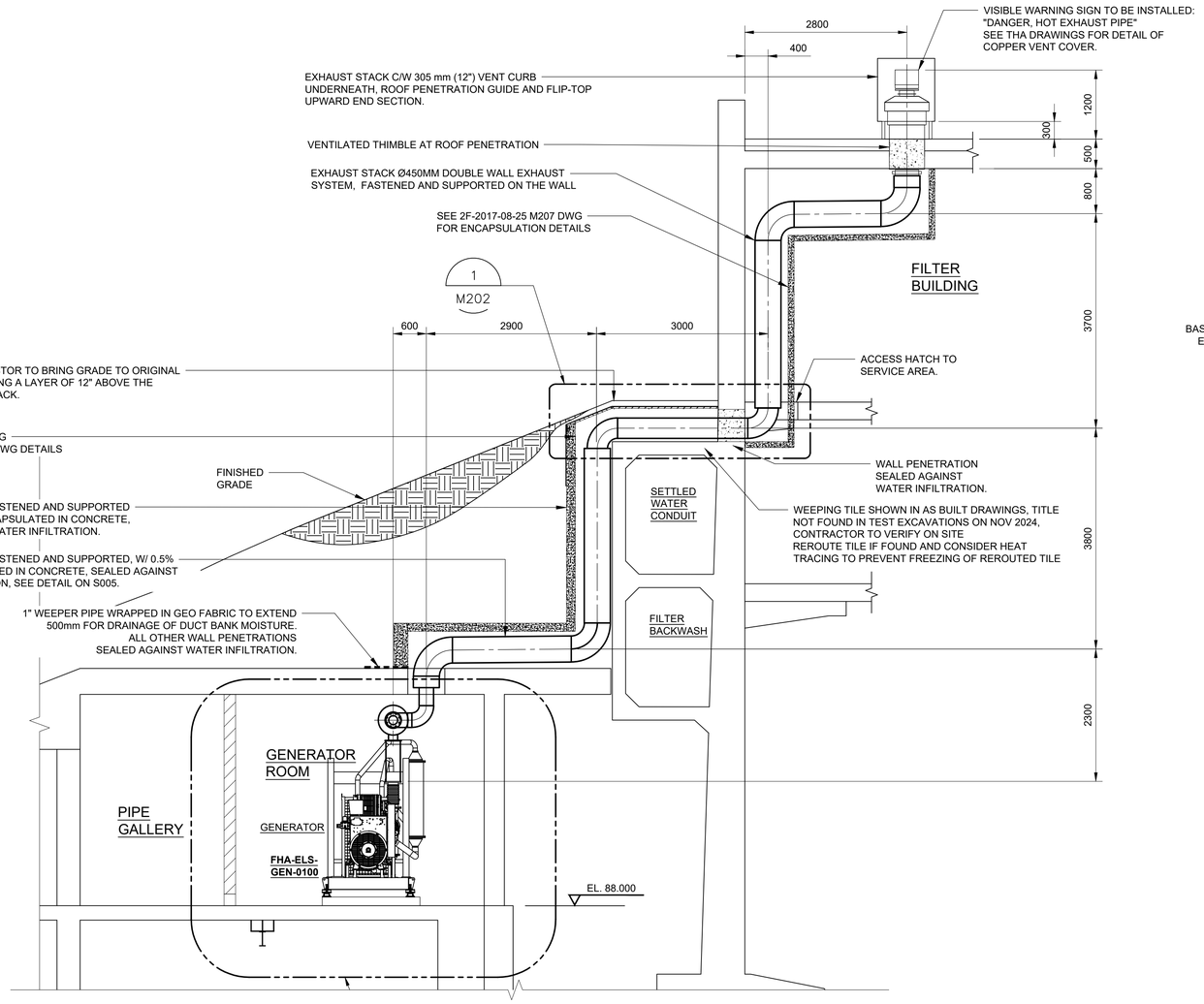
MECHANICAL

DESIGN:	B. BEALE	DRAFTING:	A. GILROY	CHECK:	B. BEALE	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:50			DRAWING NUMBER:	2F-2017-08-23		M201B
DATE:	2024-09-30						

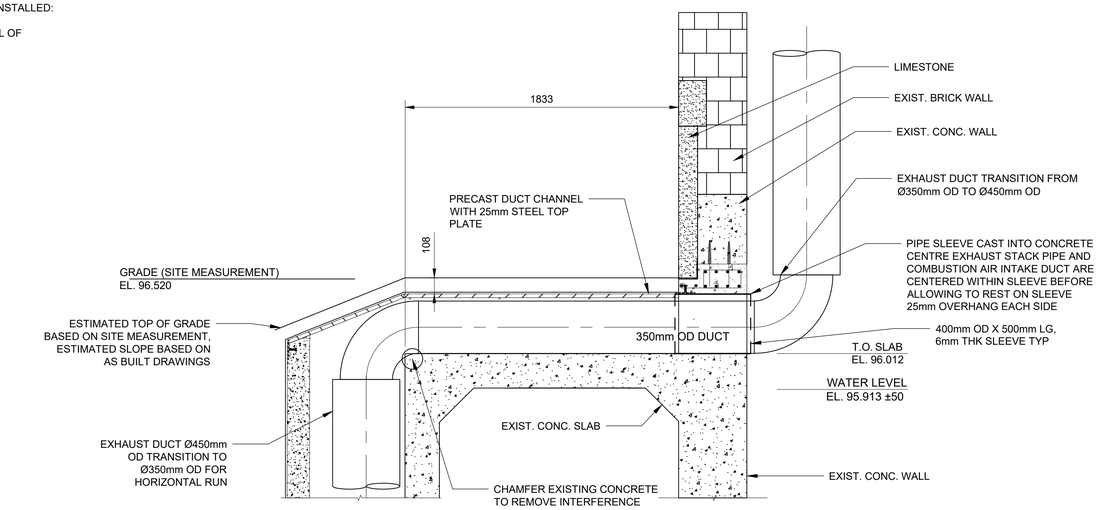
Drawing: \\ARCADIS-NL.LOCAL\DFS\AIBI_PJ\TORONTO\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\5 MECH\2F-2017-08-23_M201B.DWG
Layout Tab: M201B
Date: 03/24/2025 Time: 03:26:13 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED





PIPE GALLERY GENERATOR - EXHAUST STACK ELEVATION
SECTION A - M207 (1)
1:50



1 M202 FILTER GALLERY WALL PENETRATION DETAIL
SCALE 1:20

NOTES:
- THE EXHAUST STACK SHALL NOT TERMINATE WITHIN 6 FT (1.8 M) OF AN AIR-SUPPLY INLET
- A VENT USED IN A SPECIAL VENTING SYSTEM WITH POSITIVE VENT PRESSURE AND PASSING THROUGH THE ROOF SHALL EXTEND AT LEAST 18" (450 mm) AND THE SAME DISTANCE ABOVE ANY OBSTRUCTION WITHIN A HORIZONTAL DISTANCE OF 18" (450 mm).
- THE EXHAUST STACK SHALL BE LISTED UNDER CSA 760°C (1400°F) INDUSTRIAL CHIMNEYS CAN/ULC-C959
- EXHAUST STACK TO BE 450 mm (17.75") OD DOUBLE WALL EXHAUST SYSTEM, BASED ON DURAVENT DURASTACK PRO MODEL DIS4/2 C/W SUPPORTS AND ACCESSORIES, OR EQUIVALENT.
- EXHAUST STACK INSTALLED UNDER GRADE IN PREFABRICATED CONCRETE DUCT BANK AND WATER SEALED.
- EXHAUST GAS SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND LOCAL CODES.
- ALL EXHAUST STACK SUPPORTS TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND APPLICABLE CODES.
- CONTRACTOR TO SUPPLY AND INSTALL FRAMING FOR SILENCER SUPPORT, C/W VIBRATION ISOLATORS.
- ALL PARTS, ACCESSORIES, SUPPORTS AND MATERIALS TO BE SUPPLIED BY THE SAME MANUFACTURER.
- SEE DWGS S008, S011 & S012 FOR STRUCTURAL DETAILS.
- ALL DIMENSIONS PROVIDED SHALL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CARRYING OUT ANY WORK.

TORONTO Water

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TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER Y. Z. WANG 100123402 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG. DIRECTOR, WATER TREATMENT AND SUPPLY	SIMON HOPTON, P. ENG. DIRECTOR DESIGN & CONSTRUCTION MAJOR INFRASTRUCTURE

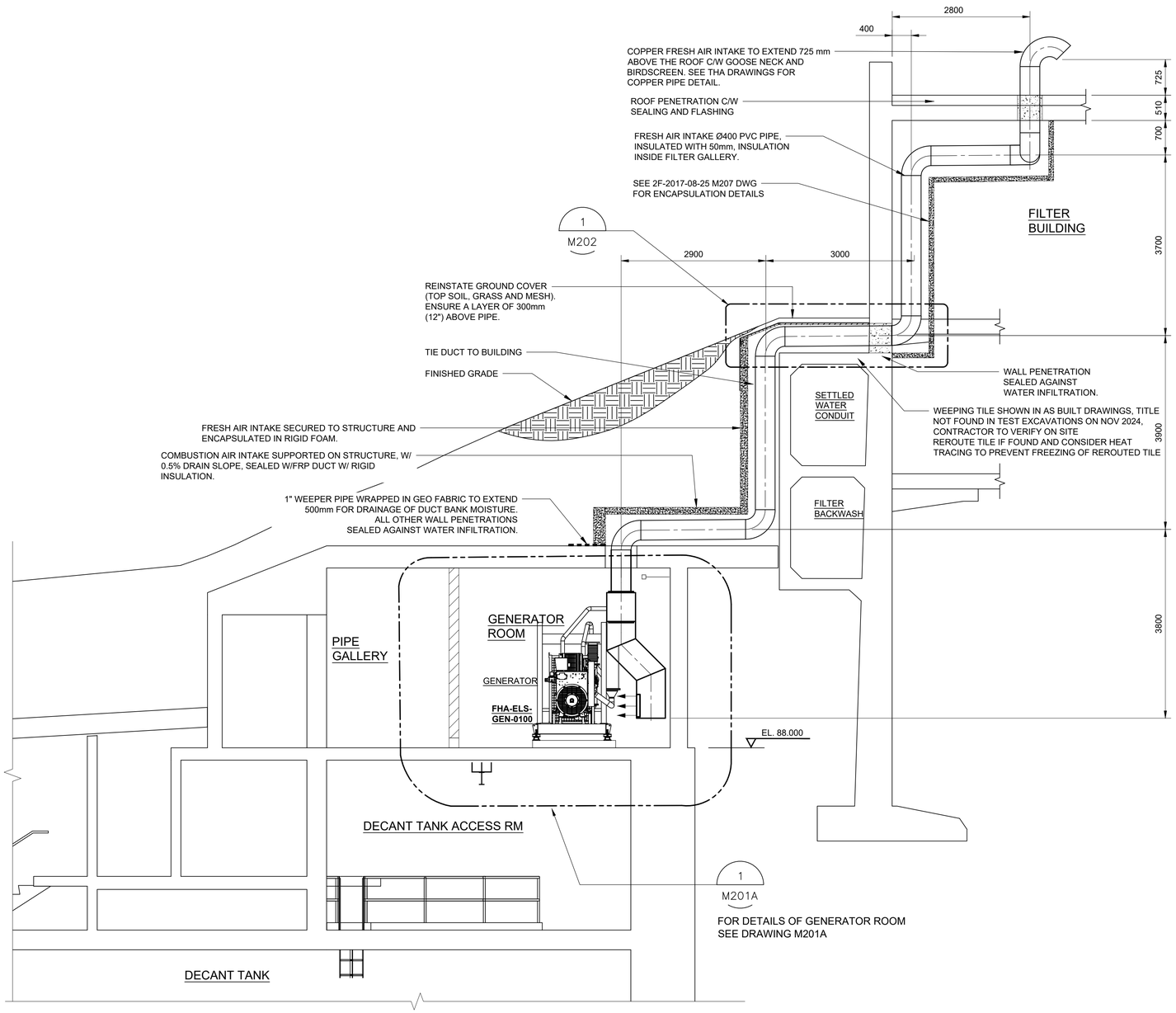
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
PIPE GALLERY - EXHAUST STACK SECTION, ELEVATION

MECHANICAL

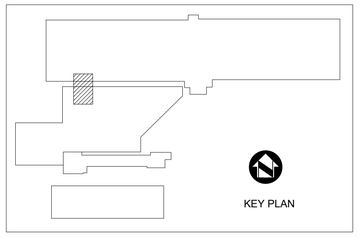
DESIGN:	J.S.	DRAFTING:	J.S.	CHECK:	J.H.	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:50			DRAWING NUMBER:	2F-2017-08-24		M202
DATE:	2024-09-30						

Drawing: \\ARCADIS-NL.LOCAL\DFS\AIBI_PJ\TORONTO\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\5 MECH\2F-2017-08-24_M202.DWG
Layout: Tab: M202
Date: 03/24/2025 Time: 03:26:35 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED



PIPE GALLERY GENERATOR - FRESH AIR INTAKE
SECTION B - M207 (1)
1:50



NOTES:
- THE FRESH AIR INTAKE SHALL BE AT LEAST 16.4 FT (5 M) AWAY FROM ANY GENERATOR EXHAUST VENT.
- ALL DIMENSIONS ARE APPROXIMATE,TO BE CONFIRMED BY THE CONTRACTOR BEFORE ORDERING OR CONSTRUCTION.
- ALL DIMENSIONS PROVIDED SHALL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CARRYING OUT ANY WORK

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NO.	DATE	REVISIONS	INITIAL	SIGNED
A	2025-03-18	ISSUED FOR TENDER	K.C	

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ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER Y. Z. YAANG 100112240402 Mar 18 2025 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.
DIRECTOR,
WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

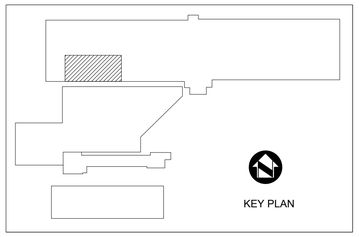
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
PIPE GALLERY - COMBUSTION AIR INTAKE SECTION, ELEVATION

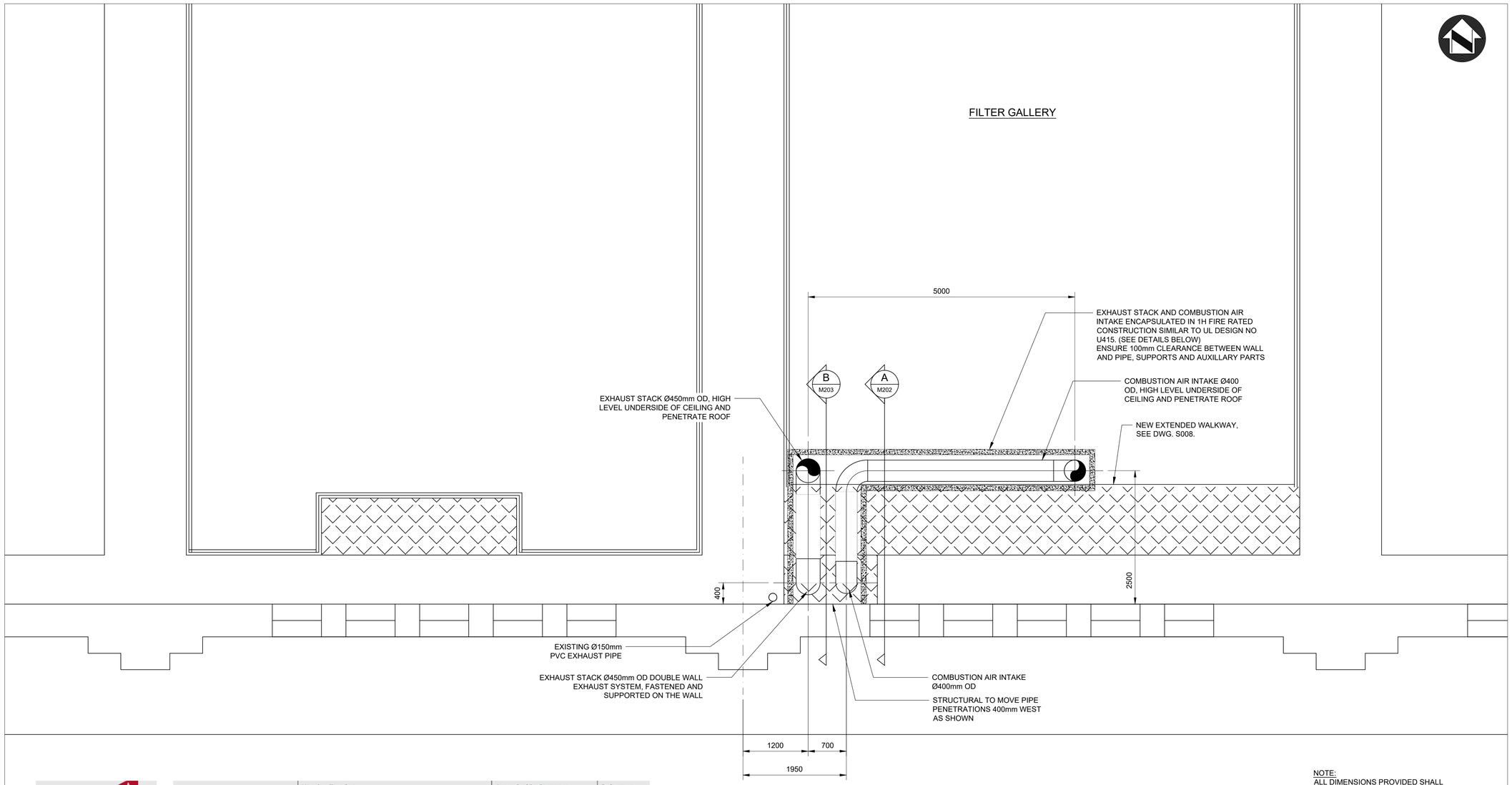
MECHANICAL

DESIGN:	J.S.	DRAFTING:	J.S.	CHECK:	J.H.	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:50			DRAWING NUMBER:	2F-2017-08-25		M203
DATE:	2024-09-30						

Drawing: \\ARCADIS-NL.LOCAL\DFS\AIBI_PJ\TORONTO\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\5 MECH\2F-2017-08-25_M203.DWG
Layout Tab: M203
Date: 03/24/2025 Time: 03:26:55 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED

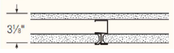




FILTER GALLERY LAYOUT 1
1:40

NOTE:
ALL DIMENSIONS PROVIDED SHALL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CARRYING OUT ANY WORK

ONE-HOUR FIRE-RATED CONSTRUCTION

	Non-loadbearing		Acoustical Performance		Reference	
Construction Detail	Description	Test Number	STC	Test Number	ARL	Index
wt. 8  3¼"	• 5/8" USG Sheetrock® Brand Firecode® X Panels, joints finished • 2-1/2" USG C-H studs 25 gauge 24" o.c. • 1" USG Sheetrock® Brand Gypsum Liner Panels	**UL Design U415, System A or U469**	39	USG-040901 Based on 4" C-H studs 25 gauge	SA926	1

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A	2025-03-18	ISSUED FOR TENDER	K.C	

TORONTO

LICENSED PROFESSIONAL ENGINEER
Y. Z. WANG
100123402
PROVINCE OF ONTARIO

TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

WILLIAM FERNANDES, P. ENG.	SIMON HOPTON, P. ENG.
DIRECTOR, WATER TREATMENT AND SUPPLY	DIRECTOR DESIGN & CONSTRUCTION MAJOR INFRASTRUCTURE

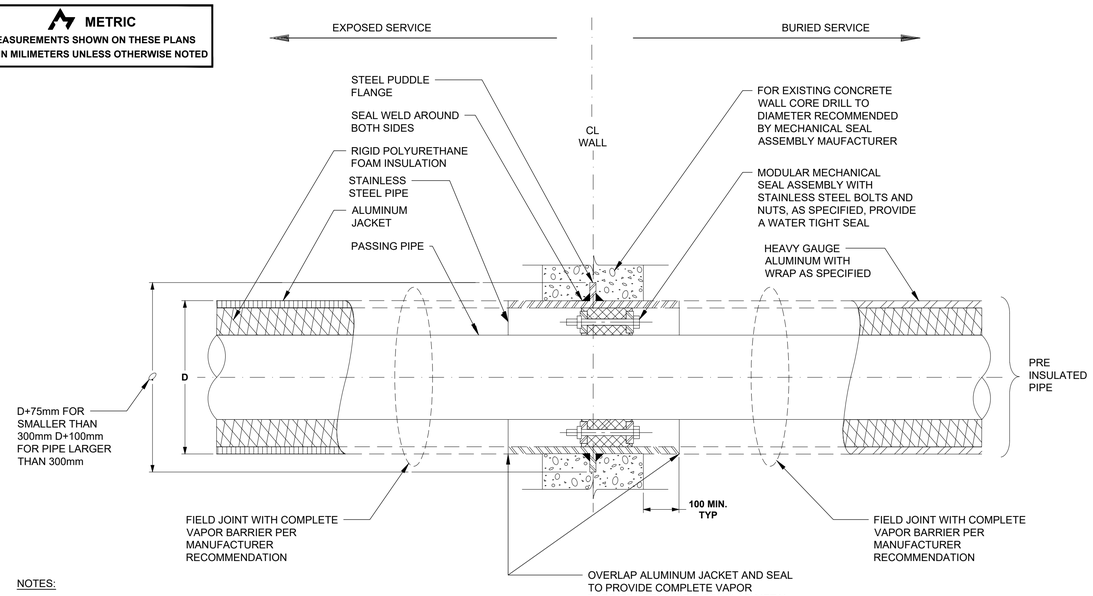
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
FILTER GALLERY PLATFORM LAYOUT

MECHANICAL

DESIGN:	J.S.	DRAFTING:	J.S.	CHECK:	J.H.	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:40			DRAWING NUMBER:	2F-2017-08-26		M207
DATE:	2024-09-30						

Drawing: \\ARCADIS-NL.LOCAL\DFS\AIBI_PJ\TORONTO\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\5 MECH\2F-2017-08-26_M207.DWG
Layout: Tab: M207
Date: 03/24/2025 Time: 03:27:16 PM

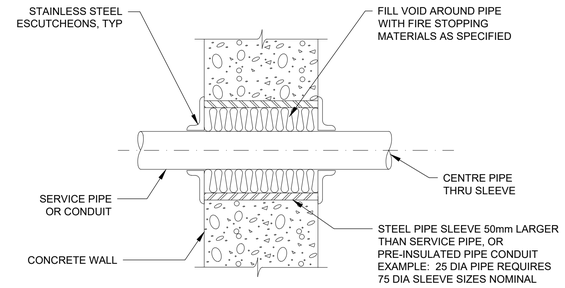
METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



NOTES:

1. WHERE EXISTING CONCRETE STRUCTURE IS TO BE CORE DRILLED,THE CONTRACTOR SHALL ULTRASONIC TEST OR X-RAY THE AREA FOR EMBEDDED ITEMS BEFORE CORE DRILLING CAN PROCEED.
2. IF EMBEDDED ITEMS ARE FOUND, NOTIFY SITE SUPERVISOR IMMEDIATELY.

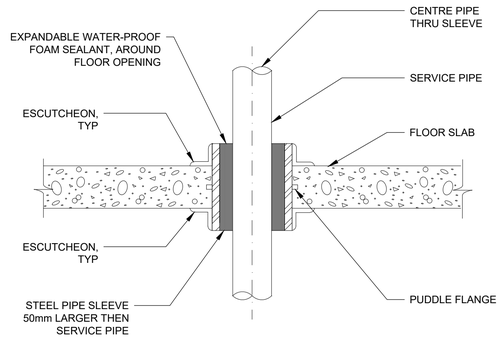
WALL PENETRATION SEAL (1)
N.T.S.



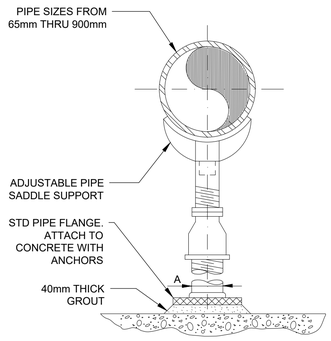
NOTES:

1. DETAIL APPLIES TO PRE-INSULATED PIPE

PIPE WALL PENETRATION (2)
N.T.S.

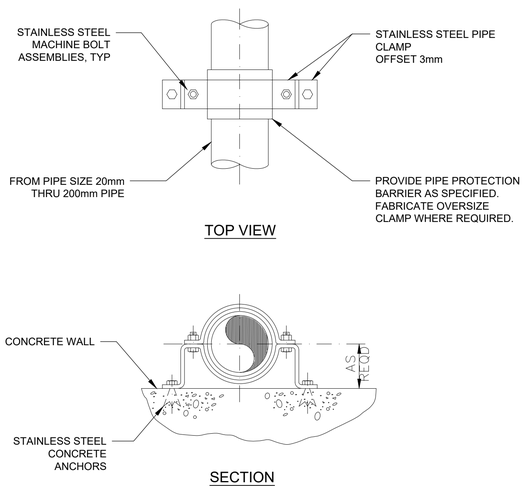


PIPE FLOOR PENETRATION (3)
N.T.S.

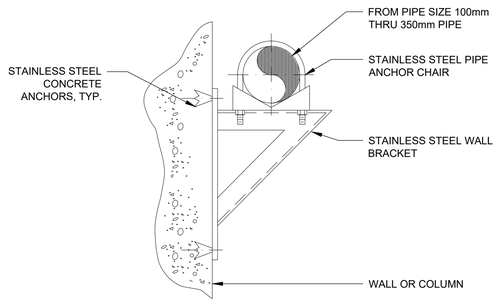


DIMENSION TABLE	
PIPE SIZE (DIA)	A (DIA)
65	65
80	65
100	75
150	75
200	75
250	75
300	75
350	100
400	100
500	150
600	150
750	150
900	150

PIPE SUPPORT - FLOOR MOUNTED (4)
N.T.S.



PIPE SUPPORT - VERTICAL WALL MOUNTED (5)
N.T.S.



NOTES:

1. WALL BRACKET SHALL BE MEDIUM OR HEAVY DUTY DEPENDING ON PIPE LOAD REQUIREMENTS.
2. NOT FOR USE WITH PVC PIPE.

PIPE SUPPORT - HORIZONTAL WALL MOUNTED (6)
N.T.S.

TORONTO Water

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NO.	DATE	REVISIONS	INITIAL	SIGNED
A	2025-03-18	ISSUED FOR TENDER	K.C	

TORONTO
TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER Y. Z. WANG 100123402 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.	SIMON HOPTON, P. ENG.
DIRECTOR, WATER TREATMENT AND SUPPLY	DIRECTOR DESIGN & CONSTRUCTION MAJOR INFRASTRUCTURE

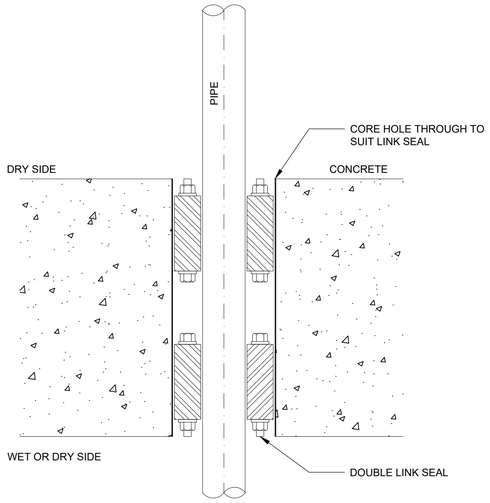
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
MECHANICAL DETAILS - 1

MECHANICAL

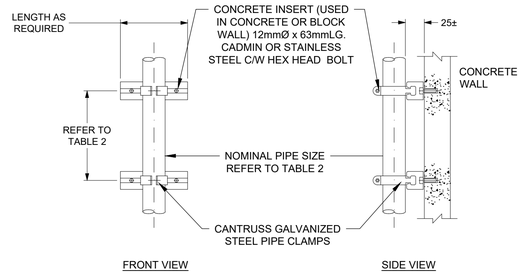
DESIGN:	J.S.	DRAFTING:	J.S.	CHECK:	J.H.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-27		M208
DATE:	2024-09-30						

Drawing: \\ARCADIS-NL.LOCAL\DFS\AIBI_PJ\TORONTO\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\5 MECH\2F-2017-08-27_M208.DWG
Layout: Tab: M208
Date: 03/24/2025 Time: 03:27:33 PM

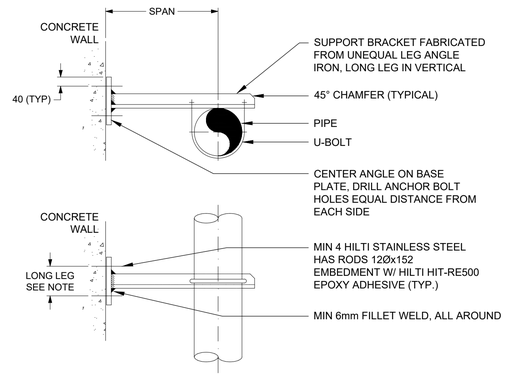
METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



PIPE THROUGH FLOOR OR WALL W/ DOUBLE LINK SEAL (1)
N.T.S.



PIPE SUPPORT SPACING (2)
N.T.S.

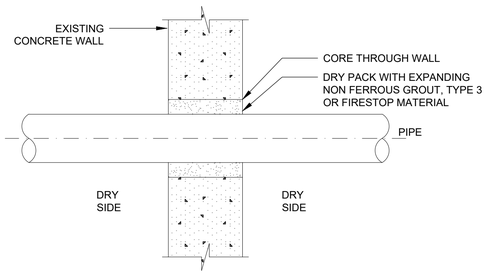


NOTES:

- CONCRETE INSERTS - 454kg. MAXIMUM RECOMMENDED LOAD IN GOOD CONCRETE PER INSERT ADJUST TO SUIT APPLICATION
- APPLICABLE FOR PIPES WALL MOUNTED IN THE HORIZONTAL OR VERTICAL POSITION
- REFER TO U-BOLT MANUFACTURERS DATA FOR CORRECT SIZE AND RECOMMENDED LOAD
- SAFE TOTAL LOAD IN KILOGRAMS WITH A MAXIMUM DEFLECTION OF 6mm
- ALL MATERIALS TO BE 316 STAINLESS STEEL, GRADE 2D
- FOR PVC PIPE USE 316 STAINLESS STEEL PIPE CLAMPS

ANGLE	150x100x10
BASE PLATE	300x200x10
RODS	12Øx135

PIPE SUPPORT (3)
N.T.S.



PIPE PASSING THROUGH AN EXISTING WALL
PIPE GROUTED IN PLACE

PIPE WALL PENETRATION (4)
N.T.S.

TABLE 2:

NOMINAL PIPE DIA. (mm)	MAXIMUM DISTANCE BETWEEN PIPE SUPPORTS		
	STAINLESS STEEL	COPPER	PLASTIC
10 TO 20	1500	1500	CONTINUOUS
25	1500	1500	1500
32	1500	1500	1500
38	1500	1500	1500
50	3000	1500	1500
65	3000	1500	1500
75	3000	3000	1500
100	3000	3000	1500
150	4500	3000	1500

PIPE SUPPORT SPACING CHART (5)
N.T.S.

Drawing: \\ARCADIS-NL.LOCAL\DFS\AIBI_PJ\TORONTO\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\5 MECH\2F-2017-08-28_M209.DWG
Layout Tab: M209
Date: 03/24/2025 Time: 03:27:46 PM

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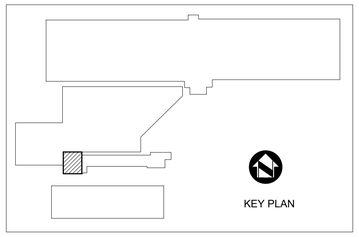
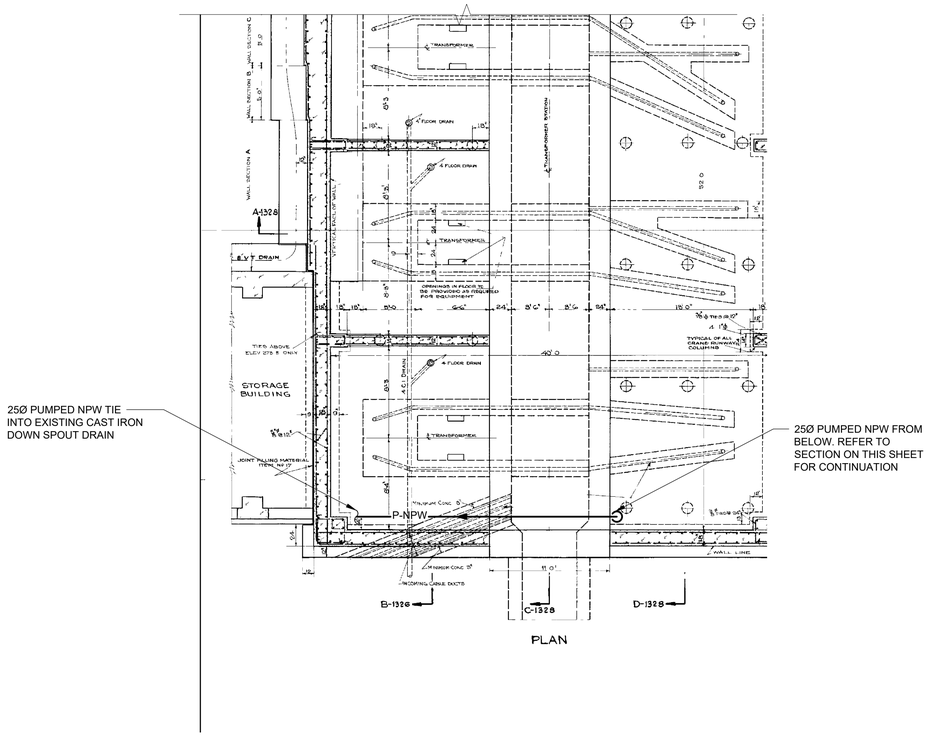
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
MECHANICAL DETAILS - 2

MECHANICAL

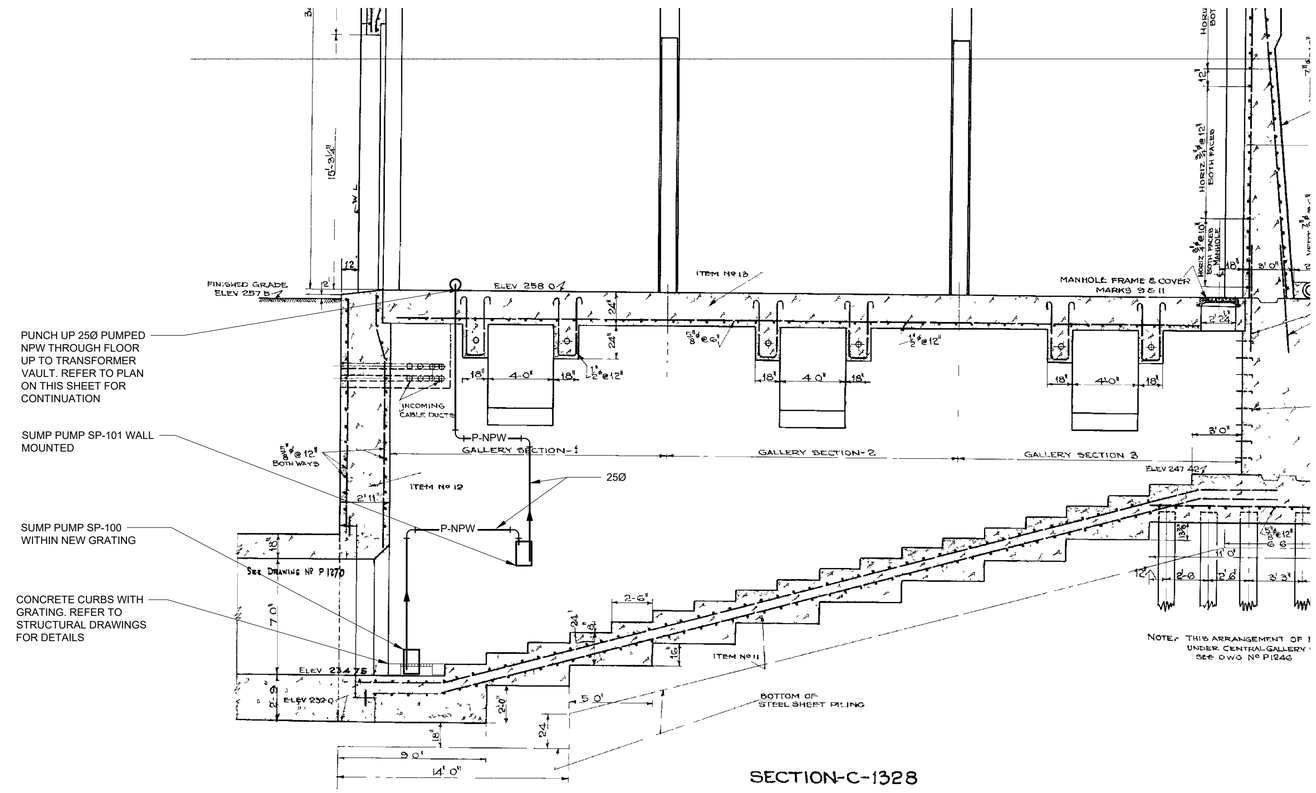
DESIGN:	J.S.	DRAFTING:	J.S.	CHECK:	J.H.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-28		M209
DATE:	2024-09-30						

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED





FLOOR PLAN OF TRANSFORMER BUILDING (1)
1:50



ELEVATION OF TUNNEL BELOW TRANSFORMER VAULT (1)
1:50

NOTE:
ALL DIMENSIONS PROVIDED SHALL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CARRYING OUT ANY WORK

Drawing: \\ARCADIS-NL.LOCAL\DFS\AIBI_PJ\TORONTO\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\5 MECH\2F-2017-08-29_M210.DWG
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Date: 03/24/2025 Time: 03:28:03 PM

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LICENSED PROFESSIONAL ENGINEER Y. Z. IWANIS 100123402 Mar 18/2025 PROVINCE OF ONTARIO

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DIRECTOR, WATER TREATMENT AND SUPPLY	DIRECTOR DESIGN & CONSTRUCTION MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
TRANSFORMER TUNNEL SUMP PUMP - PLAN AND ELEVATION

MECHANICAL

DESIGN:	J.S.	DRAFTING:	J.S.	CHECK:	J.H.	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:50			DRAWING NUMBER:	2F-2017-08-29		M210
DATE:	2024-09-30						

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

TERMINAL BLOCK LEGEND

- DEVICE TERMINAL — TB DT
- TERMINAL BLOCK IN MCC / SWITCHGEAR — TB MCC
- TERMINAL BLOCK IN LOCAL PANEL — TB P
- TERMINAL BLOCK IN RPU (PLC) — TB PLC
- TERMINAL BLOCK IN CENTRAL BACKUP PANEL (CBP) — TB CBP
- TERMINAL BLOCK IN AREA CONTROL PANEL (ACP) — TB ACP
- TERMINAL BLOCK IN TERMINAL (JUNCTION) BOX — TB JB
- TERMINAL BLOCK OF FIRE ALARM DETECTOR IN SWITCHGEAR — TB FA

COIL CONTACTS

- CONTACT, NORMALLY OPEN — TB CO
- CONTACT, NORMALLY CLOSED — TB CC
- TD — NORMALLY OPEN CONTACT TIME DELAY CLOSING — CO TD C
- TD — NORMALLY CLOSED CONTACT TIME DELAY OPENING — CO TD O
- TD — NORMALLY OPEN CONTACT TIME DELAY OPENING WHEN DE-ENERGIZED — CO TD O.DE-ENRG
- TD — NORMALLY CLOSED CONTACT TIME DELAY CLOSING WHEN DE-ENERGIZED — CC TD C.DE-ENRG

RELAY COILS

- CR — CONTROL RELAY — CR
- M — MOTOR STARTER — M
- X-XX SEC. TR — PNEUMATIC TIMER WITH ADJUSTABLE TIMING RANGE AS SHOWN — TR
- X-XX SEC. TR — ELECTRIC TIMER WITH ADJUSTABLE TIMING RANGE AS SHOWN — TR EL
- SC — SOLENOID — SC
- L / U — LATCHING RELAY — LR
- OL — THERMAL OVERLOAD — OL

PUSHBUTTONS & SWITCHES

- XS — FOOT SWITCH NORMALLY OPEN — XS O
- XS — FOOT SWITCH NORMALLY CLOSED — XS C
- XS — TOGGLE SWITCH — XT
- MECHANICAL CONNECTION — MC
- MECHANICAL CONNECTION WITH INTERLOCK — MC INT
- NORMALLY OPEN PUSHBUTTON — PB O
- NORMALLY CLOSED PUSHBUTTON — PB C
- NORMALLY OPEN MUSHROOM HEAD PUSHBUTTON — PB O MH
- NORMALLY CLOSED MUSHROOM HEAD PUSHBUTTON — PB C MH
- XXX YYY SS — TWO POSITION SELECTOR SWITCH OPENED — SS 2O
- XXX YYY SS — TWO POSITION SELECTOR SWITCH CLOSED — SS 2C
- XXX YYY SS — SPRING RETURN SELECTOR SWITCH OPENED — SS SR O
- XXX YYY SS — SPRING RETURN SELECTOR SWITCH CLOSED — SS SR C
- XXX ZZZ YYY SS — THREE POSITION SELECTOR SWITCH OPENED — SS 3O
- XXX ZZZ YYY SS — THREE POSITION SELECTOR SWITCH CLOSED — SS 3C

ADDITIONAL CONTACT:

- HS — NORMALLY OPEN CONTACT OF SELECTOR SWITCH / PUSHBUTTON — HS O
- HS — NORMALLY CLOSED CONTACT OF SELECTOR SWITCH / PUSHBUTTON — HS C

NOTE:

"XXX" :
MAINTENANCE, LOCAL, MANUAL, HAND, START, OPEN

"YYY" :
REMOTE, AUTO, STOP, CLOSE

"ZZZ" :
OFF, LOCAL(ONLY WHEN "XXX" USED FOR MAINTENANCE), STOP(ONLY WHEN "YYY" USED FOR VALVE CLOSE)

1. ANY OTHER COMBINATION SHOULD BE APPROVED BY CITY.
2. USE ADDITIONAL CONTACT AS MUCH AS NEEDED.

PUSHBUTTONS & SWITCHES (FOR ELECTRICAL DRAWING)

- H O A — 3 POSITION SELECTOR SWITCH — SS 3P TOP
- L R — 2 POSITION SELECTOR SWITCH — SS 2P TOP
- PUSH BUTTON N.O., MOMENTARY CONTACT — PB NO
- PUSH BUTTON N.C., MOMENTARY CONTACT — PB NC
- PUSH BUTTON, MOMENTARY CONTACT, WITH N.O. & N.C. CONTACTS — PB NO+NC
- L R — SELECTOR SWITCH, 2 POSITION — SS 2P

MISCELLANEOUS

- A — CIRCUIT BREAKER — CB
- A — FUSE — FU
- 600V 120V — CONTROL TRANSFORMER VOLTAGE & RATING INDICATED AS APPLICABLE — CTV
- V — BATTERY — BT
- AUDIBLE DEVICE — HN
- L R — WIRE DESIGNATOR — W D
- ETM — ELAPSED TIME METER — KI
- OHMS R — RESISTOR WITH OHMS INDICATOR — RR
- SCR — SCR
- RECTIFIER, DIODE — R DIODE
- CAPACITOR, GENERAL — CAP.GEN

LIMIT SWITCHES

- ZS — NORMALLY OPEN — ZS O
- ZS — NORMALLY CLOSED — ZS C
- ZS — HELD CLOSED NORMALLY OPEN — ZS HC
- ZS — HELD OPEN NORMALLY CLOSED — ZS HO
- ZS — MAINTAINED OPEN — ZS MO
- ZS — MAINTAINED CLOSED — ZLS MC

INPUT/OUTPUT STATIC DEVICES

- DO CARD, M, DO — NORMALLY OPEN ISOLATED DIGITAL OUTPUT M DENOTES MOMENTARY — DO O.ISO.
- DO CARD, M — NORMALLY CLOSED ISOLATED DIGITAL OUTPUT M DENOTES MOMENTARY — DO C.ISO.
- DO CARD, M — NORMALLY OPEN NON-ISOLATED DIGITAL OUTPUT M DENOTES MOMENTARY — DO O.NON-ISO.
- DO CARD, M — NORMALLY CLOSED NON-ISOLATED DIGITAL OUTPUT M DENOTES MOMENTARY — DO C.NON-ISO.
- DI CARD, DI — DIGITAL INPUT ISOLATED — DI ISO
- DI CARD, DI — DIGITAL INPUT NON-ISOLATED — DI NON-ISO
- AI CARD, AI — ANALOG INPUT 4-20MA UNLESS NOTED — AI
- AO CARD, AO — ANALOG OUTPUT 4-20MA UNLESS NOTED — AO
- PI CARD, PI — PULSE INPUT ISOLATED — PI ISO.
- PI CARD, PI — PULSE INPUT NON-ISOLATED — PI NON-ISO.
- PO CARD, PO — PULSE OUTPUT ISOLATED — PO ISO.
- PO CARD, PO — PULSE OUTPUT NON-ISOLATED — PO NON-ISO.

TEMPERATURE ELEMENTS

- TE — THERMOCOUPLE — TE
- TE — SINGLE ELEMENT RTD — TE SINGLE
- TE — DUAL ELEMENT RTD — TE DUAL

PROCESS SWITCHES

- TORQUE SWITCH NORMALLYCLOSED OPEN ON INCREASE TORQUE — WS C
- TORQUE SWITCH NORMALLY OPEN CLOSE ON INCREASE TORQUE — WS O
- LIQUID LEVEL SWITCH NORMALLY OPEN CLOSE ON RISE — LS O
- LIQUID LEVEL SWITCH NORMALLY CLOSED OPEN ON RISE — LS C
- FLOW SWITCH NORMALLY OPEN CLOSE ON INCREASE FLOW — FS O
- FLOW SWITCH NORMALLY CLOSED OPEN ON INCREASE FLOW — FS C
- PRESSURE SWITCH NORMALLY OPEN CLOSE ON RISE — PS O
- PRESSURE SWITCH NORMALLY CLOSED OPEN ON RISE — PS C
- TEMPERATURE SWITCH NORMALLY OPEN CLOSE ON RISE — TS NO CL ON RISE
- TEMPERATURE SWITCH NORMALLY CLOSED OPEN ON RISE — TS NC O ON RISE
- VIBRATION SWITCH NORMALLY CLOSED OPEN ON FAILURE — VS NC O ON FAIL

PILOT LIGHTS & METERS

- ANN — ANNUNCIATOR — AL
- X — PILOT LIGHT — PL
- X — PUSH TO TEST PILOT LIGHT — PL PUSH

LETTER(S) INSIDE SYMBOL INDICATES COLOR AS FOLLOWS:

A = AMBER	G = GREEN	R = RED
B = BLUE	O = ORANGE	W = WHITE
C = CLEAR	OP = OPALESCENT	

- XXX XI — METER

LETTER(S) INSIDE SYMBOL INDICATES ELECTRICAL DEVICE AS FOLLOWS:

AM = AMMETER	VAR = VARMETER
AH = AMPERE HOUR	VARH = VARHOUR METER
PF = POWER FACTOR	W = WATTMETER
V = VOLTMETER	WH = WATTHOUR METER
VA = VOLT AMMETER	

CONDUCTORS

- CONDUCTOR
- CONDUCTORS NOT CONNECTED
- CONDUCTORS CONNECTED
- CONDUCTOR SHIELD
- CONDUCTOR SHIELD
- CONDUCTOR SHIELD, TWISTED PAIR
- EARTH GROUND
- CHASSIS GROUND
- NEUTRAL
- SEPARABLE CONNECTOR

- EXISTING
- REMOVE
- NEW

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TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER — X. D. SHEN 100121127 — MAR. 19, 2025 — PROVINCE OF ONTARIO

WILLIAM FERNANDES, P.ENG
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WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

ELECTRICAL LEGEND & ABBREVIATIONS - 1

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-30		E001
DATE:	2024-09-30						

Drawing: C:\USERS\TUNG17~1\APPDATA\LOCAL\TEMP\ACPUBLISH_3536\2F-2017-08-30-E001.DWG
Layout Tab: E001
Date: 03/19/2025 Time: 12:31:27 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

ELECTRICAL SYMBOLS – SINGLE LINE DIAGRAM

- BUS DUCT
- BREAKER, MEDIUM AND HIGH VOLTAGE
- CIRCUIT BREAKER
- HIGH AND MEDIUM VOLTAGE DRAWOUT CIRCUIT BREAKER
- HIGH VOLTAGE FUSED INTERRUPTER SWITCH
- FUSE DISCONNECT TERMINAL BLOCK
- HIGH VOLTAGE UNFUSED INTERRUPTER SWITCH
- DRAWOUT OR PLUG–IN CONNECTION
- DRAWOUT CIRCUIT BREAKER (LOW VOLTAGE)
- DISCONNECT SWITCH
- DISCONNECT SWITCH FUSED
- DISCONNECT SWITCH NON–INSULATED
- DISCONNECT SWITCH WITH GROUNDING
- FUSE
- SW — SWITCH
- TRANSFER SWITCH
- MTR — METER
- DM — DIGITAL METER
- TRANSFORMER, POWER AND DISTRIBUTION
- TR kVA — TRANSFORMER
- AUTOTRANSFORMER
- 600V / 120V — CONTROL TRANSFORMER
- POTENTIAL TRANSFORMER
- CURRENT TRANSFORMER
- ZERO SEQUENCE CURRENT TRANSFORMER
- BUSHING CURRENT TRANSFORMER
- M M_SIZE M_RTG — MOTOR INDUCTION TYPE
- M M_SIZE M_RTG — MOTOR SYNCHRONOUS TYPE
- VFD — VARIABLE FREQUENCY DRIVE
- SS — SOFT STARTER (BLOCK)
- SOFT STARTER
- RECTIFIER
- INVERTER
- DIODE
- MS — MOTOR STARTER
- MANUAL STARTER
- OVERLOAD
- CONTACTOR
- REVERSE CONTACTOR
- CAPACITOR OR REACTOR
- INDUCTOR
- SOLENOID
- LIGHTNING ARRESTER
- SURGE PROTECTION
- TVSS — TRANSIENT VOLTAGE SURGE SUPPRESSOR
- SURGE CAPACITOR
- HEATER
- BATTERY
- DELTA CONNECTION
- WYE CONNECTION
- SOLID GROUNDED NEUTRAL
- RESISTOR GROUNDED NEUTRAL
- GROUND
- CABLE POTHEAD
- WIRE CONNECTION
- WIRES NOT CONNECTED
- RTD — RESISTANCE TEMPERATURE DETECTOR
- K — KEY INTERLOCK
- E — ELECTRICAL INTERLOCK
- M — MECHANICAL INTERLOCK
- G — GENERATOR
- RESISTOR OR HEATER
- VARIABLE RESISTOR
- STU/ LSIG — POWER CIRCUIT BREAKER WITH ELECTRONIC TRIP UNIT LETTERS DENOTE PROTECTION FUNCTIONS
- 15A, 2 — MOTOR STARTER WITH INSTANTANEOUS TRIP CIRCUIT PROTECTOR, CONTACTOR AND THERMAL OVERLOAD RELAY. THE CONTINUOUS CURRENT RATING AND STARTER SIZE AS INDICATED

ELECTRICAL ABBREVIATIONS

AC	ALTERNATING CURRENT
A/C	AIR CONDITIONING
ACT	ACTUATOR
AF	AMPERE FRAME
ANN	ANNUNCIATOR
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BAT	BATTERY
BKR	BREAKER
C	CONDUCTOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCT	CIRCUIT
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY
CT	CURRENT TRANSFORMER
DC	DIRECT CURRENT
DG	DIESEL GENERATOR
DM	DIGITAL METERING
DS	DISCONNECT SWITCH
EF	EXHAUST FAN
ELU	EMERGENCY LIGHTING UNIT
EP	EXPLOSION PROOF
ESTOP	EMERGENCY STOP
ETM	ELAPSED TIME METER
F	FUSE
FA	FIRE ALARM
FPR	FEDER PROTECTION RELAY
FVR	FULL VOLTAGE REVERSING
FVNR	FULL VOLTAGE NON REVERSING
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
GPR	GENERATOR PROTECTION RELAY
H–O–A	HAND OFF AUTOMATIC
HTR	HEATER
HZ	HERTZ
HVAC	HEATING, VENTILATION, AIR CONDITIONING
JB	JUNCTION BOX
KCMIL	THOUSAND CIRCULAR MILS
kVA	KILOVOLT–AMPERES
kVAR	KILOVOLT–AMPERES REACTIVE
LA	LIGHTNING ARRESTOR
LB	LOAD BREAK
LP	LIGHTING PANEL
L/R	LOCAL/REMOTE
LSG	LONG, SHORT AND GROUND FAULT PROTECTION
LSIG	LONG, SHORT, INSTANTANEOUS AND GROUND FAULT PROTECTION
LTG	LIGHTING
M	MOTOR
MCC	MOTOR CONTROL CENTRE
M–O–A	MANUAL–OFF–AUTOMATIC
MPR	MOTOR PROTECTION RELAY
MTR	METER
MTS	MANUAL TRANSFER SWITCH
N	NEUTRAL
NC	NORMALLY CLOSED
NO	NORMALLY OPENED
NEC	NATIONAL ELECTRICAL CODE
O/L	OVERLOAD
ONAN	OIL NATURAL AIR NATURAL
ONAF	OIL NATURAL AIR FORCE
P	PUMP
PB	PUSH BUTTON
P&ID	PROCESS AND INSTRUMENTATION DIAGRAM
PDP	POWER DISTRIBUTION PANEL
PM	POWER METERING
PNL	PANEL
PNLB	PANELBOARD
PLC	PROGRAMMABLE LOGIC CONTROLLER
PS	POWER SUPPLY
PT	POTENTIAL TRANSFORMER
RPU	REMOTE PROCESSING UNIT
RTD	RESISTANCE TEMPERATURE DETECTOR
RTU	REMOTE TERMINAL UNIT
SEN	SENSOR
SHLD	SHIELDED
SN	SOLID NEUTRAL
SOL	SOLENOID
S/S	SUBSTATION
SW	SWITCH
SWG	SWITCHGEAR
TB	TIE BREAKER
TDR	TIME DELAY RELAY
TR	TRANSFORMER
TS	TRANSFER SWITCH
UPS	UNINTERRUPTIBLE POWER SUPPLY
VFD	VARIABLE FREQUENCY DRIVE
VT	VOLTAGE TRANSFORMER
WP	WEATHER PROOF
XFMR	TRANSFORMER

STANDARD FUNCTION NUMBERS

27	UNDER VOLTAGE RELAY
37	UNDER CURRENT/UNDER POWER RELAY
38	BEARING RTD RELAY
46	CURRENT UNBALANCE RELAY
47	PHASE REVERSAL RELAY
49	STATOR RTD RELAY
50	INSTANTANEOUS OVERCURRENT
50G	INSTANTANEOUS GROUND FAULT
51	AC TIME OVERCURRENT
51G	AC TIME GROUND FAULT
52	AC CIRCUIT BREAKER
59	OVERVOLTAGE RELAY
81	FREQUENCY RELAY
86	LOCK–OUT RELAY

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ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
X. D. SHEN
100121127
MAR. 19, 2025
PROVINCE OF ONTARIO

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INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
ELECTRICAL LEGEND & ABBREVIATIONS - 2

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-31		E002
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-31-E002.DWG
Layout Tab: E002
Date: 03/19/2025 Time: 12:31:39 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED

ELECTRICAL SYMBOLS

ELECTRICAL LAYOUT

- TR kVA — TRANSFORMER
- TR kVA — WALL MOUNTED TRANSFORMER
- WALL MOUNTED TRANSFORMER AND PANELBOARD
- PB — WALL MOUNTED PANELBOARD
- PB — FLUSH WALL MOUNTED PANELBOARD
- M — MOTOR
- P — PUMP
- MV — MOTORIZED VALVE
- MD — MOTORIZED DAMPER
- MS — MOTOR STARTER
- SW — DISCONNECT SWITCH
- CONTROL STATION
- JB — JUNCTION BOX / PULL BOX (PB)
- LP-XX — LIGHTING PANEL
- TYPE — LIGHT FIXTURE
- LIGHT FIXTURE
- CEILING MOUNTED FIXTURE
- WALL MOUNTED FIXTURE
- EMERGENCY LIGHTING UNIT
- EMERGENCY LIGHTING UNIT (REMOTE)
- CEILING FAN
- WALL MOUNTED FAN
- SUPPLY FAN
- EXHAUST FAN
- UNIT HEATER
- FLOAT SWITCH
- CABLE STRESS CONE
- MH — MANHOLE
- HYDRO POLE

- SINGLE RECEPTACLE
- DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE SPLIT
- WELDING RECEPTACLE
- SPECIAL PURPOSE RECEPTACLE
- COUNTERTOP RECEPTACLE DUPLEX
- COUNTERTOP SPLIT RECEPTACLE DUPLEX
- $ — SINGLE POLE SWITCH (LIGHT)
- DISCONNECT HANDLE
- SELECTOR SWITCH
- EMERGENCY PUSH BUTTON
- H — HUMIDISTAT
- T — THERMOSTAT
- CCTV — SECURITY CAMERA
- PC — PHOTO CELL
- TYPE — SENSOR
- MOTION SENSOR
- CARD READER / KEY PAD (KP)
- SP — SECURITY ALARM PANEL
- S — SPEAKER
- BUZZER
- BELL
- SA — SOUND ALARM
- KP — KEYPAD
- ES — ELECTRIC STRIKE
- C — DOOR CONTACT
- C E — DOOR CONTACT EXPLOSION PROOF
- C — OVERHEAD DOOR CONTACT
- FIRE ALARM PULL STATION
- STROBE / HORN FIRE ALARAM
- FAP — FIRE ALARM PANEL
- CP — CONTROL PANEL
- LP — LIGHTING PANEL
- HEAT DETECTOR
- SMOKE DETECTOR
- SA — SMOKE ALARM
- CO — FIRE DETECTOR
- FD — STROBE LIGHT
- STR — CARBON MONOXIDE
- TELEPHONE OUTLET
- TV CABLE OUTLET
- TELEPHONE DATA OUTLET
- DATA OUTLET

GENERAL NOTE:
THIS IS A GENERAL ELECTRICAL SYMBOL SHEET. SOME SYMBOLS OR NOTATIONS MAY NOT BE USED ON THIS PROJECT.

TORONTO Water

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A	2025-03-18	ISSUED FOR TENDER	T.S.	

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TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
X. D. SHEN
100121127
MAR. 19, 2025
PROVINCE OF ONTARIO

WILLIAM FERNANDES, P.ENG
DIRECTOR
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SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

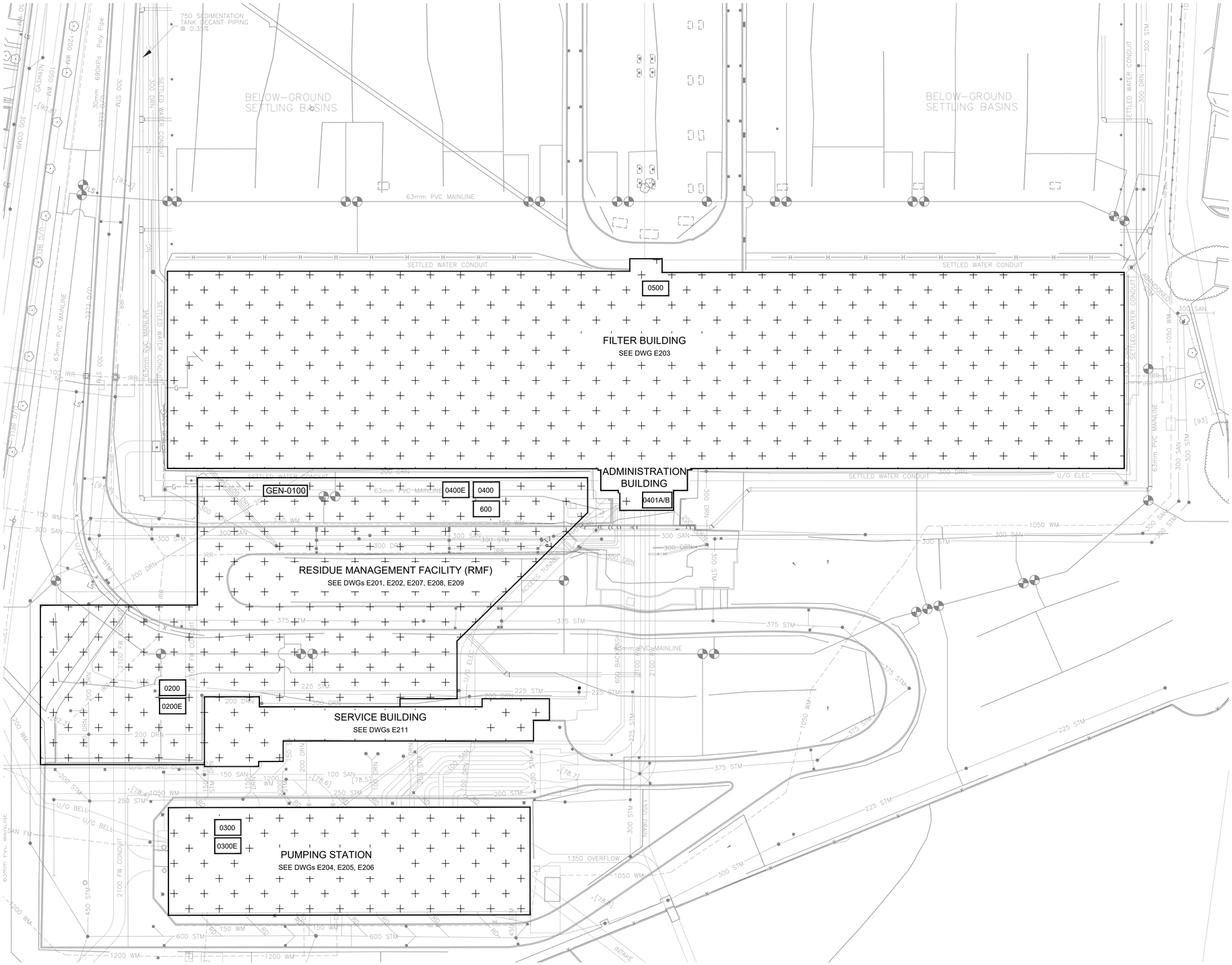
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

ELECTRICAL LEGEND & ABBREVIATIONS - 3

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-32		E003
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-32-E003.DWG
Layout Tab: E003
Date: 03/19/2025 Time: 12:31:54 PM



0200	EXISTING FHA-ELS-MCC-0200 IN RESIDUE MANAGEMENT FACILITY (RMF) REFER TO DWG E207 FOR LOCATION DETAILS.
0200E	NEW FHA-ELS-PDP-0200E IN RESIDUE MANAGEMENT FACILITY (RMF) REFER TO DWG E207 FOR LOCATION DETAILS.
0300	EXISTING FHA-ELS-PDP-0300 IN PUMPING STATION - SWITCHGEAR ROOM REFER TO DWG E205 FOR LOCATION DETAILS.
0300E	NEW FHA-ELS-PDP-0300E IN PUMPING STATION - SWITCHGEAR ROOM REFER TO DWG E205 FOR LOCATION DETAILS.
0400	EXISTING FHA-ELS- MCC-0400 IN RESIDUE MANAGEMENT FACILITY (RMF) - ELECTRICAL ROOM REFER TO DWG E202 FOR LOCATION DETAILS.
0400E	NEW FHA-ELS- PDP-0400E IN RESIDUE MANAGEMENT FACILITY (RMF) - ELECTRICAL ROOM REFER TO DWG E202 FOR LOCATION DETAILS.
0401A/B	NEW FHA-ELS- PDP-0401A/B IN ADMIN BLDG BASEMENT LEVEL - ELECTRICAL ROOM REFER TO DWG E203 FOR LOCATION DETAILS.
0500	EXISTING FHA-ELS-PDP-0500 IN FILTER BUILDING REFER TO DWG E203 FOR LOCATION DETAILS.
0600	EXISTING FHA-ELS-MCC-0600 IN RESIDUE MANAGEMENT FACILITY (RMF) - ELECTRICAL ROOM REFER TO DWG E202 FOR LOCATION DETAILS.
GEN-0100	NEW NATURAL GAS STANDBY GENERATOR FHA-ELS-GEN-0200 LOCATED IN PIPE GALLERY REFER TO DWG E201 FOR LOCATION DETAILS

EXISTING

NEW

REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

OVERALL SITE PLAN

N.T.S.

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-33-E004.DWG
Layout: E004
Date: 03/19/2025 Time: 12:32:11 PM

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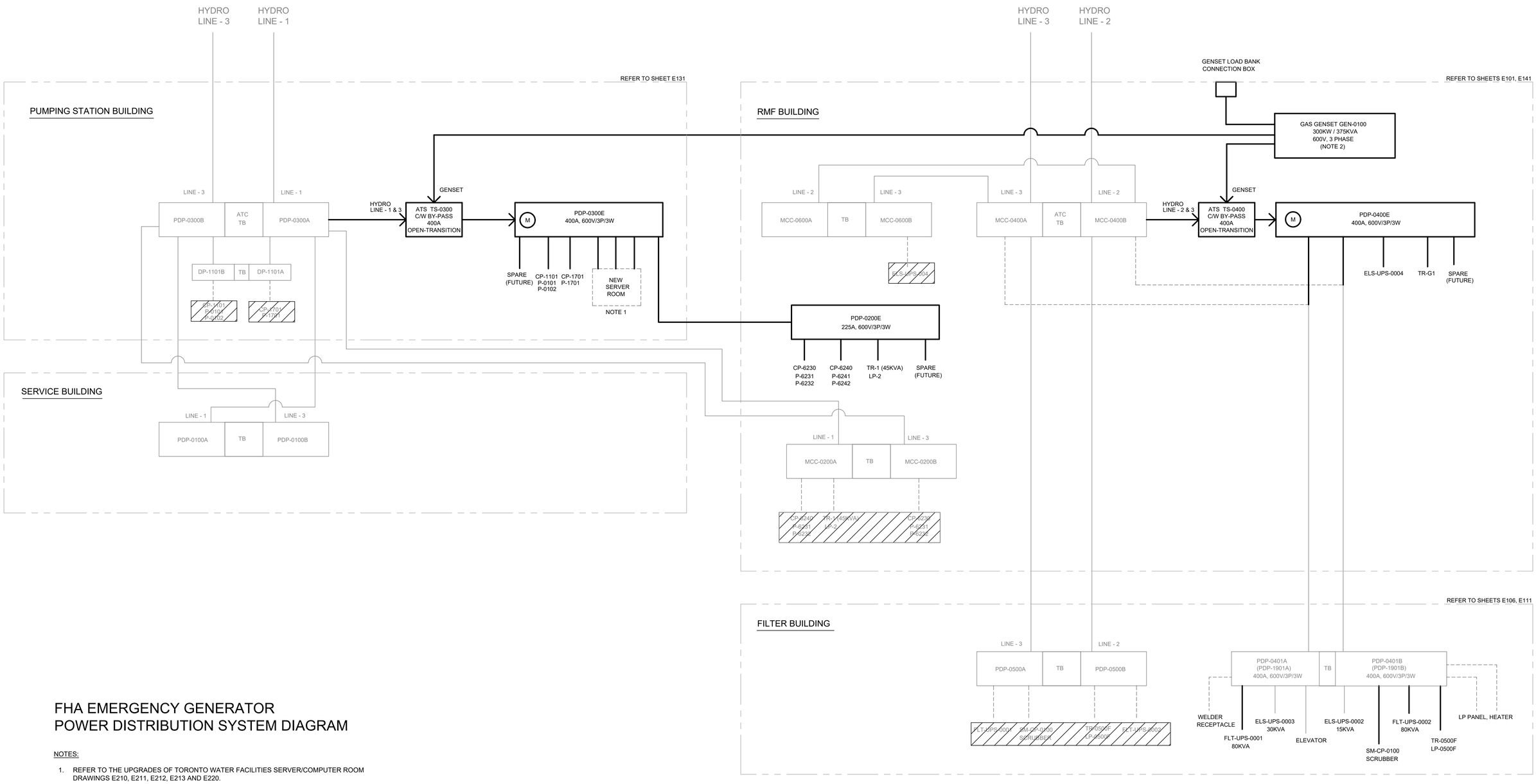
OVERALL SITE PLAN

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-33		E004
DATE:	2024-09-30						

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED



FHA EMERGENCY GENERATOR POWER DISTRIBUTION SYSTEM DIAGRAM

NOTES:

1. REFER TO THE UPGRADES OF TORONTO WATER FACILITIES SERVER/COMPUTER ROOM DRAWINGS E210, E211, E212, E213 AND E220.
2. THIS GENERATOR WILL NOT BE OPERATED IN PARALLEL WITH UTILITY AND WILL NOT BE USED FOR LOAD DISPLACEMENT PURPOSES.

LEGEND:

———	NEW
———	EXISTING
- - - -	FEEDER REMOVE / RELOCATE
TEXT	EXISTING LOAD ON EMERGENCY POWER
(M)	METER

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MASTER POWER SYSTEM BLOCK DIAGRAM

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-34		E010
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-34-E010.DWG
Layout Tab: E010
Date: 03/19/2025 Time: 12:32:23 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

NO NEW DESIGN ON THIS DRAWING. EXISTING DRAWING FOR REFERENCE ONLY.

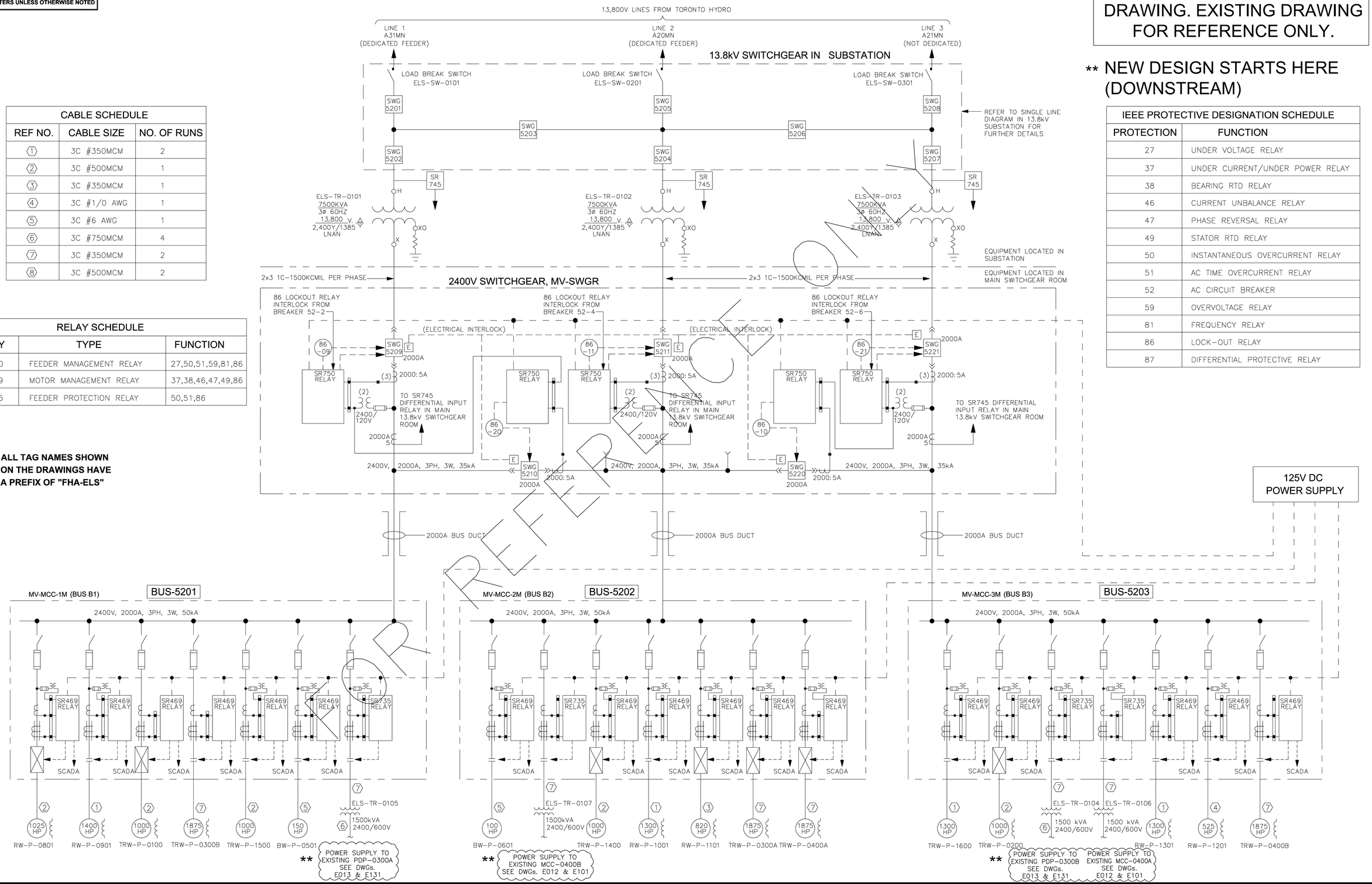
** NEW DESIGN STARTS HERE (DOWNSTREAM)

CABLE SCHEDULE		
REF NO.	CABLE SIZE	NO. OF RUNS
1	3C #350MCM	2
2	3C #500MCM	1
3	3C #350MCM	1
4	3C #1/0 AWG	1
5	3C #6 AWG	1
6	3C #750MCM	4
7	3C #350MCM	2
8	3C #500MCM	2

RELAY SCHEDULE		
RELAY	TYPE	FUNCTION
SR750	FEEDER MANAGEMENT RELAY	27,50,51,59,81,86
SR469	MOTOR MANAGEMENT RELAY	37,38,46,47,49,86
SR735	FEEDER PROTECTION RELAY	50,51,86

IEEE PROTECTIVE DESIGNATION SCHEDULE	
PROTECTION	FUNCTION
27	UNDER VOLTAGE RELAY
37	UNDER CURRENT/UNDER POWER RELAY
38	BEARING RTD RELAY
46	CURRENT UNBALANCE RELAY
47	PHASE REVERSAL RELAY
49	STATOR RTD RELAY
50	INSTANTANEOUS OVERCURRENT RELAY
51	AC TIME OVERCURRENT RELAY
52	AC CIRCUIT BREAKER
59	OVERVOLTAGE RELAY
81	FREQUENCY RELAY
86	LOCK-OUT RELAY
87	DIFFERENTIAL PROTECTIVE RELAY

NOTE: ALL TAG NAMES SHOWN ON THE DRAWINGS HAVE A PREFIX OF "FHA-ELS"



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TORONTO WATER
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LICENSED PROFESSIONAL ENGINEER X. D. SHEN 100121127 MAR. 19, 2025 PROVINCE OF ONTARIO

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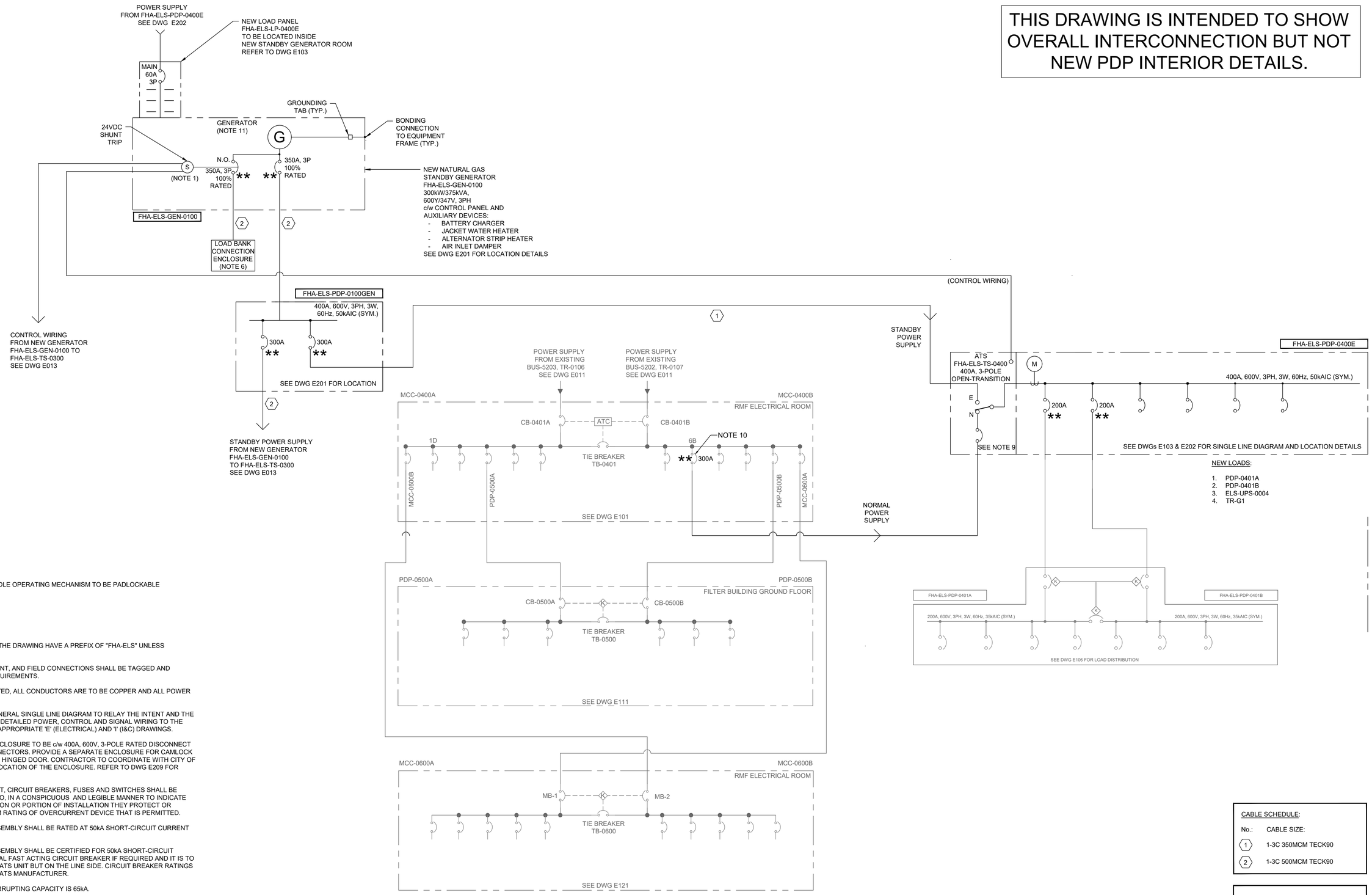
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
MASTER SINGLE LINE DIAGRAM

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-35		E011
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-35-E011.DWG
Layout: E011
Date: 03/19/2025 Time: 12:32:38 PM

THIS DRAWING IS INTENDED TO SHOW OVERALL INTERCONNECTION BUT NOT NEW PDP INTERIOR DETAILS.



OVERALL GENERAL SINGLE LINE DIAGRAM 1

** CIRCUIT BREAKER's HANDLE OPERATING MECHANISM TO BE PADLOCKABLE IN THE 'OFF' POSITION.

NOTES:

1. 'S' DENOTES SHUNT TRIP.
2. ALL TAG NAMES SHOWN ON THE DRAWING HAVE A PREFIX OF "FHA-ELS" UNLESS OTHERWISE NOTED.
3. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
4. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
5. THIS DRAWING SHOWS A GENERAL SINGLE LINE DIAGRAM TO RELAY THE INTENT AND THE SCOPE OF WORK ONLY. FOR DETAILED POWER, CONTROL AND SIGNAL WIRING TO THE PLANT PLCs, REFER TO THE APPROPRIATE 'E' (ELECTRICAL) AND 'I' (I&C) DRAWINGS.
6. LOAD BANK CONNECTION ENCLOSURE TO BE c/w 400A, 600V, 3-POLE RATED DISCONNECT SWITCH AND CAMLOCK CONNECTORS. PROVIDE A SEPARATE ENCLOSURE FOR CAMLOCK CONNECTIONS AND A FRONT HINGED DOOR. CONTRACTOR TO COORDINATE WITH CITY OF TORONTO FOR THE EXACT LOCATION OF THE ENCLOSURE. REFER TO DWG E209 FOR LOCATION DETAILS.
7. AT EACH DISTRIBUTION POINT, CIRCUIT BREAKERS, FUSES AND SWITCHES SHALL BE MARKED, ADJACENT THERETO, IN A CONSPICUOUS AND LEGIBLE MANNER TO INDICATE CLEARLY WHICH INSTALLATION OR PORTION OF INSTALLATION THEY PROTECT OR CONTROL AND THE MAXIMUM RATING OF OVERCURRENT DEVICE THAT IS PERMITTED.
8. EACH NEW ATS AND PDP ASSEMBLY SHALL BE RATED AT 50kA SHORT-CIRCUIT CURRENT RATING.
9. EACH NEW ATS AND PDP ASSEMBLY SHALL BE CERTIFIED FOR 50kA SHORT-CIRCUIT CURRENT RATING. ADDITIONAL FAST ACTING CIRCUIT BREAKER IF REQUIRED AND IT IS TO BE PLACED INSIDE THE NEW ATS UNIT BUT ON THE LINE SIDE. CIRCUIT BREAKER RATINGS TO BE AS REQUIRED BY THE ATS MANUFACTURER.
10. THE CIRCUIT BREAKER INTERRUPTING CAPACITY IS 65kA.
11. THIS GENERATOR WILL NOT BE OPERATED IN PARALLEL WITH UTILITY AND WILL NOT BE USED FOR LOAD DISPLACEMENT PURPOSES.

CABLE SCHEDULE:

No.:	CABLE SIZE:
1	1-3C 350MCM TECK90
2	1-3C 500MCM TECK90

EXISTING
NEW

TORONTO Water

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MAR. 19, 2025
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R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

OVERALL GENERAL SINGLE LINE DIAGRAM 1

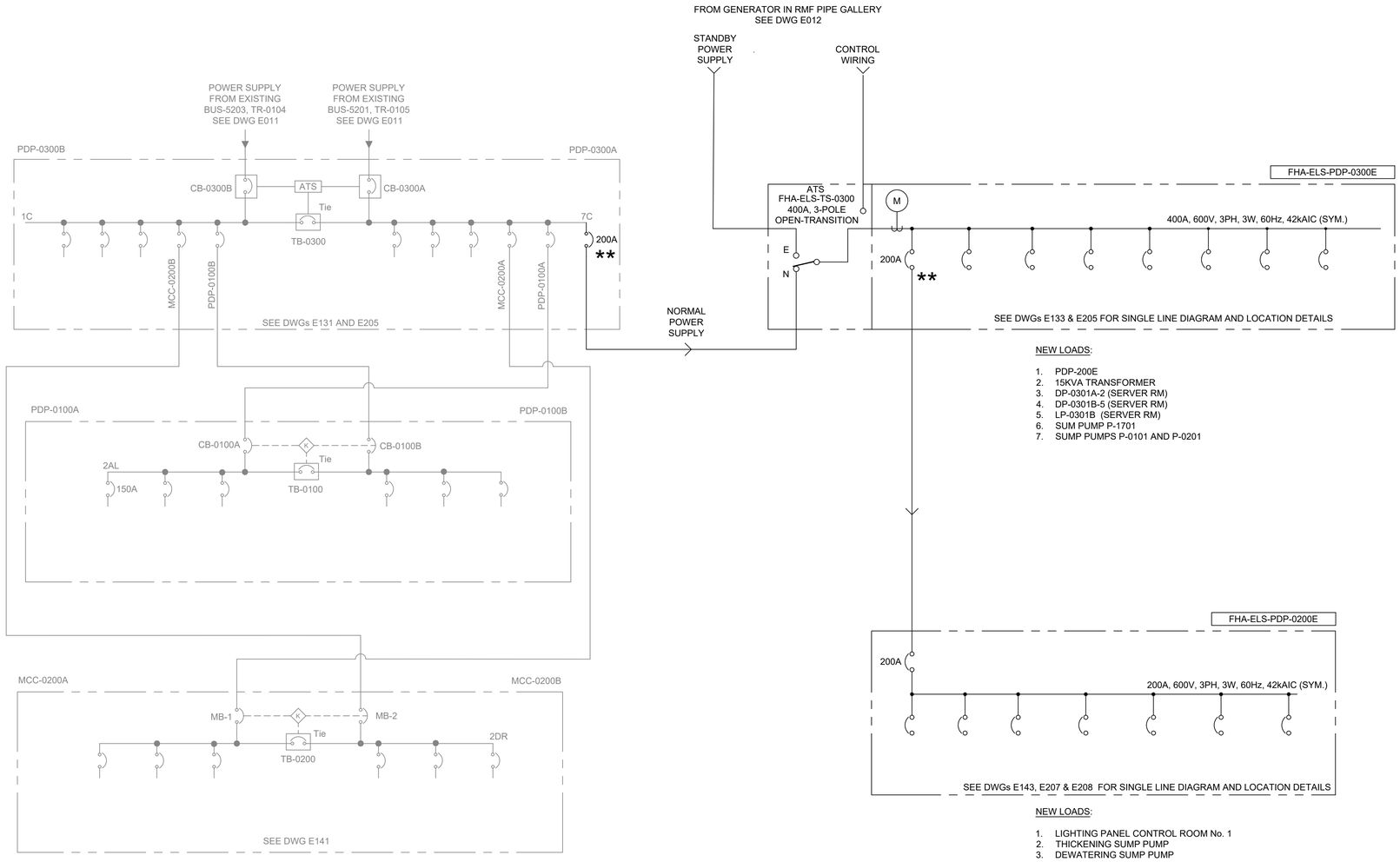
ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-36		E012
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-36-E012.DWG
Layout Tab: E012
Date: 03/19/2025 Time: 12:32:53 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

THIS DRAWING IS INTENDED TO SHOW OVERALL INTERCONNECTION BUT NOT NEW PDP INTERIOR DETAILS.



NEW LOADS:

1. PDP-200E
2. 15KVA TRANSFORMER
3. DP-0301A-2 (SERVER RM)
4. DP-0301B-5 (SERVER RM)
5. LP-0301B (SERVER RM)
6. SUM PUMP P-1701
7. SUMP PUMPS P-0101 AND P-0201

NEW LOADS:

1. LIGHTING PANEL CONTROL ROOM No. 1
2. THICKENING SUMP PUMP
3. DEWATERING SUMP PUMP

** CIRCUIT BREAKER's HANDLE OPERATING MECHANISM TO BE PADLOCKABLE IN THE 'OFF' POSITION.

NOTES:

1. 'S' DENOTES SHUNT TRIP.
2. ALL TAG NAMES SHOWN ON THE DRAWING HAVE A PREFIX OF "FHA-ELS" UNLESS OTHERWISE NOTED.
3. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
4. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
5. THIS DRAWING SHOWS A GENERAL SINGLE LINE DIAGRAM TO RELAY THE INTENT AND THE SCOPE OF WORK ONLY. FOR DETAILED POWER, CONTROL AND SIGNAL WIRING TO THE PLANT PLCS, REFER TO THE APPROPRIATE 'E' (ELECTRICAL) AND 'I' (I&C) DRAWINGS.
6. AT EACH DISTRIBUTION POINT, CIRCUIT BREAKERS, FUSES AND SWITCHES SHALL BE MARKED, ADJACENT THERETO, IN A CONSPICUOUS AND LEGIBLE MANNER TO INDICATE CLEARLY WHICH INSTALLATION OR PORTION OF INSTALLATION THEY PROTECT OR CONTROL AND THE MAXIMUM RATING OF OVERCURRENT DEVICE THAT IS PERMITTED. RULE 2-100(3).

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

OVERALL GENERAL SINGLE LINE DIAGRAM 2

TORONTO Water

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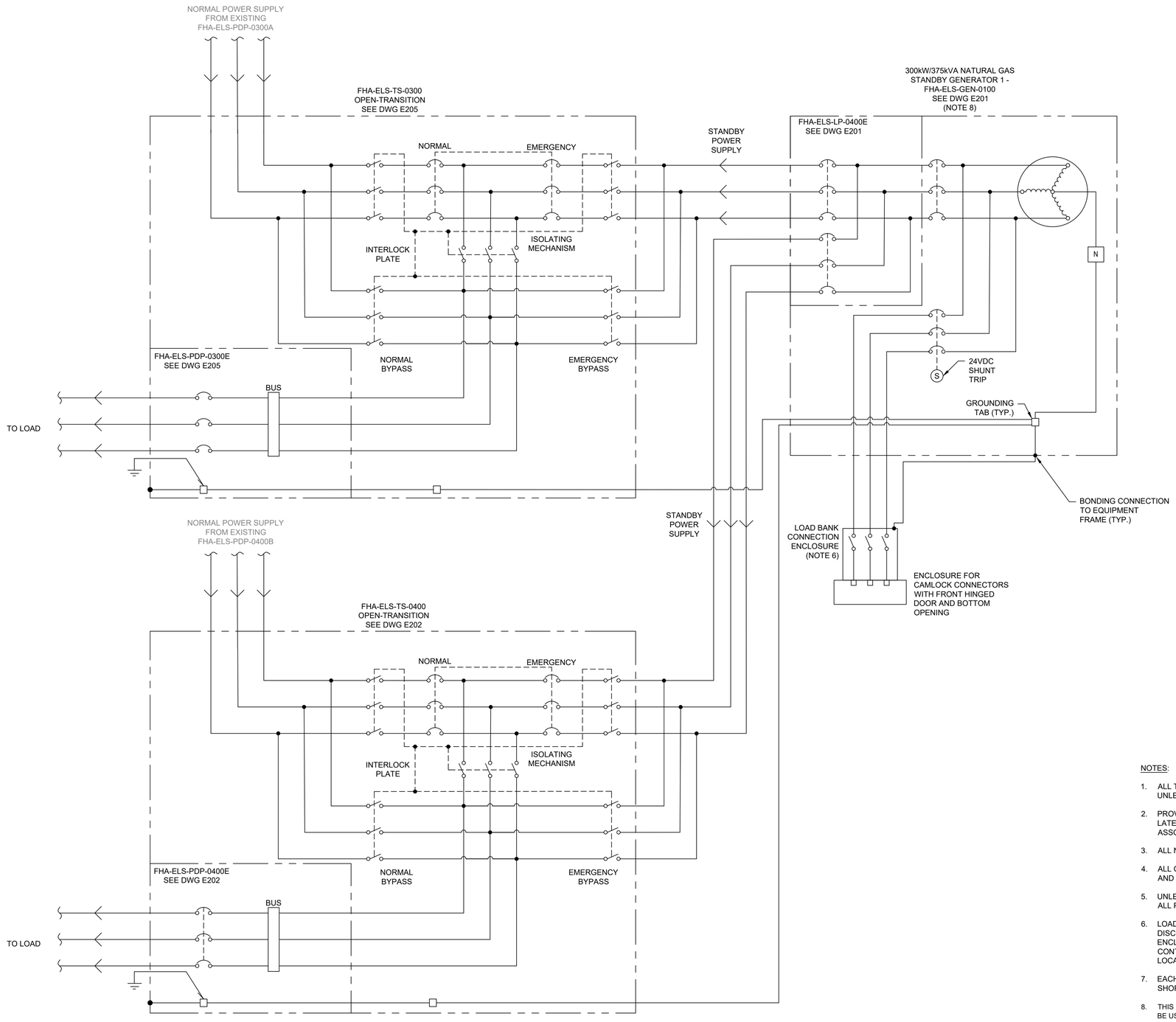
OVERALL GENERAL SINGLE LINE DIAGRAM 2

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-37		E013
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-37-E013.DWG
Layout Tab: E013
Date: 03/19/2025 Time: 12:33:05 PM



NOTES:

1. ALL TAG NAMES SHOWN ON THE DRAWING HAVE A PREFIX OF "FHA-ELS" UNLESS OTHERWISE NOTED.
2. PROVIDE COMPLETE GROUNDING SYSTEM FOR ALL EQUIPMENT AS PER THE LATEST EDITION OF THE ONTARIO ELECTRICAL SAFETY CODE AND ASSOCIATED BULLETINS.
3. ALL NEW ATS UNITS TO BE PROVIDED WITH DOUBLE SIDED BYPASS ISOLATION.
4. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
5. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
6. LOAD BANK CONNECTION ENCLOSURE TO BE c/w 400A, 600V, 3-POLE RATED DISCONNECT SWITCH AND CAMLOCK CONNECTORS. PROVIDE A SEPARATE ENCLOSURE FOR CAMLOCK CONNECTIONS AND A FRONT HINGED DOOR. CONTRACTOR TO COORDINATE WITH CITY OF TORONTO FOR THE EXACT LOCATION OF THE ENCLOSURE. REFER TO DWG E209 FOR LOCATION DETAILS.
7. EACH NEW ATS AND PDP ASSEMBLY SHALL BE CERTIFIED FOR 50kA SHORT-CIRCUIT CURRENT RATING.
8. THIS GENERATOR WILL NOT BE OPERATED IN PARALLEL WITH UTILITY AND WILL NOT BE USED FOR LOAD DISPLACEMENT PURPOSES.

EXISTING
NEW

ATS (DOUBLE SIDED BYPASS ISOLATION) & STANDBY GENERATOR WIRING SCHEMATIC

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ATS & STANDBY GENERATOR WIRING SCHEMATIC

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-38		E014
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-38-E014.DWG
Layout Tab: E014
Date: 03/19/2025 Time: 12:33:15 PM

SEQUENCE OF OPERATION

NORMAL CONDITIONS:

- HYDRO UTILITY POWER IS PROVIDED TO THE PLANT THROUGH THREE (3) INDEPENDENT LINES;
- TWO (2) DEDICATED FEEDERS LINE 1 AND LINE 2, AND ONE (1) NON-DEDICATED FEEDER LINE 3.

1. LINE 1 SUPPLIES POWER TO BUS-5201 WHICH SUPPLIES POWER TO PDP-300A THROUGH TRANSFORMER TR-0105. LINE 2 SUPPLIES POWER TO BUS-5202, WHICH SUPPLIES POWER TO MCC-0400B THROUGH TRANSFORMER TR-0107. LINE 3 SUPPLIES POWER TO BUS-5203, WHICH SUPPLIES POWER TO PDP-0300B & MCC-0400A THROUGH TRANSFORMER TR-104 & TR-0106 RESPECTIVELY.
2. PDP-0300A (HYDRO LINE 1) SUPPLIES POWER TO NEW PDP-0300E & PDP-0200E.
3. MCC-0400B (HYDRO LINE 2) SUPPLIES POWER TO NEW PDP-0400E & PDP-0401A/B.
4. THE NEW STANDBY GENERATOR IS OFF AND SET TO AUTO.
5. THE AUTOMATIC TRANSFER SWITCHES TS-0300 & TS-0400 ARE SET TO AUTO AND THEIR UTILITY SIDE (NORMAL) CIRCUIT BREAKER IS CLOSED.
6. TS-0300 IS POWERED THROUGH AND MONITOR POWER AT PDP-0300A.
7. TS-0400 IS POWERED THROUGH AND MONITOR POWER AT MCC-0400B.
8. PDP-0300's TIE BREAKER TB-0300 IS OPEN.
9. MCC-0400's TIE BREAKER TB-0401 IS OPEN.

EMERGENCY CONDITIONS 1 (GENERATOR REMAINS OFF):

- THE NEW STANDBY GENERATOR IS OFF AND SET TO AUTO.
- THE AUTOMATIC TRANSFER SWITCHES TS-0300 & TS-0400 ARE SET TO AUTO AND THEIR UTILITY SIDE CIRCUIT BREAKER IS CLOSED.

SCENARIOS:

1. HYDRO UTILITY POWER LINE 3 (OFF) - LINE 1 (ON) - LINE 2 (ON):

1.1. POWER INTERRUPTION TO PDP-0300B. NO INTERRUPTION TO PDP-0300A. TIE BREAKER TB-0300 CLOSES AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS AND POWER IS RESTORED TO PDP-0300B VIA PDP-0300A THROUGH LINE 1 ALONE. TS-0300 DETECTS POWER RESTORATION ON PDP-0300A WITHIN 45 SECONDS TIME DELAY. STANDBY GENERATOR STAYS OFF.

1.2. POWER INTERRUPTION TO MCC-0400A . NO INTERRUPTION TO MCC-0400B & PDP-0400E. TIE BREAKER TB-0401 CLOSES AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS AND POWER IS RESTORED TO MCC-0400A VIA MCC-0400B THROUGH LINE 2 ALONE. TS-0400 DETECTS POWER RESTORATION ON PDP-0400A WITHIN 45 SECONDS TIME DELAY. STANDBY GENERATOR STAYS OFF.

2. HYDRO UTILITY POWER LINE 3 (ON) - LINE 1 (OFF) - LINE 2 (ON):

2.1. POWER INTERRUPTION TO PDP-300A & PDP-300E. NO INTERRUPTION TO PDP-0300B. TS-0300 DETECTS LOSS OF POWER ON PDP-0300A AND ATS 45 SECONDS (ADJUSTABLE) TIME DELAY COUNT STARTS. TIE BREAKER TB-0300 CLOSES AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS AND POWER IS RESTORED TO PDP-0300A & PDP-0300E VIA PDP-0300B THROUGH LINE 3 ALONE. TS-0300 DETECTS POWER RESTORATION ON PDP-0300A WITHIN 45 SECONDS TIME DELAY. STANDBY GENERATOR STAYS OFF.

3. HYDRO UTILITY POWER LINE 3 (ON) - LINE 1 (ON) - LINE 2 (OFF):

3.1. POWER INTERRUPTION TO MCC-0400B & PDP-0400E. NO INTERRUPTION TO MCC-0400A. TS-0400 DETECTS LOSS OF POWER ON MCC-0400B AND ATS 45 SECONDS (ADJUSTABLE) TIME DELAY COUNT STARTS. TIE BREAKER TB-0400 CLOSES AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS AND POWER IS RESTORED TO MCC-0400B & PDP-0400E VIA MCC-0400A THROUGH LINE 3 ALONE. TS-0300 DETECTS POWER RESTORATION ON MCC-0400B WITHIN 45 SECONDS TIME DELAY. STANDBY GENERATOR STAYS OFF.

4. HYDRO UTILITY POWER LINE 3 (ON) - LINE 1 (OFF) - LINE 2 (OFF):

4.1. POWER INTERRUPTION TO PDP-300A & PDP-300E. NO INTERRUPTION TO PDP-0300B. TS-0300 DETECTS LOSS OF POWER ON PDP-0300A AND ATS 45 SECONDS (ADJUSTABLE) TIME DELAY COUNT STARTS. TIE BREAKER TB-0300 CLOSES AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS AND POWER IS RESTORED TO PDP-0300A & PDP-0300E VIA PDP-0300B THROUGH LINE 3 ALONE. TS-0300 DETECTS POWER RESTORATION ON PDP-0300A WITHIN 45 SECONDS TIME DELAY. STANDBY GENERATOR STAYS OFF.

4.2. POWER INTERRUPTION TO MCC-0400B & PDP-0400E. NO INTERRUPTION TO MCC-0400A. TS-0400 DETECTS LOSS OF POWER ON MCC-0400B AND ATS 45 SECONDS (ADJUSTABLE) TIME DELAY COUNT STARTS. TIE BREAKER TB-0400 CLOSES AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS AND POWER IS RESTORED TO MCC-0400B & PDP-0400E VIA MCC-0400A THROUGH LINE 3 ALONE. TS-0300 DETECTS POWER RESTORATION ON MCC-0400B WITHIN 45 SECONDS TIME DELAY. STANDBY GENERATOR STAYS OFF.

EMERGENCY CONDITIONS 2 (GENERATOR POWERS PART ESSENTIAL LOAD):

- THE NEW STANDBY GENERATOR IS OFF AND SET TO AUTO.
- THE AUTOMATIC TRANSFER SWITCHES TS-0300, TS-0400 ARE SET TO AUTO AND THEIR UTILITY SIDE CIRCUIT BREAKER IS CLOSED.
- TS-0300 IS POWERED THROUGH AND MONITOR POWER AT PDP-0300A.
- TS-0400 IS POWERED THROUGH AND MONITOR POWER AT MCC-0400B.

SCENARIOS:

1. HYDRO UTILITY POWER LINE 3 (OFF) - LINE 1 (OFF) - LINE 2 (ON):

1.1. POWER INTERRUPTION TO PDP-0300A/B & PDP-0300E. TIE BREAKER TB-0300 CLOSES AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS. TS-0300 DETECTS LOSS OF POWER ON PDP-0300A, ATS 45 SECONDS (ADJUSTABLE) TIME DELAY COUNT STARTS. AFTER APPROXIMATELY 45 SECONDS (ADJUSTABLE), IF POWER IS STILL UNDETECTED, TS-0300 WILL SEND A SIGNAL TO THE STANDBY GENERATOR TO START. ONCE THE GENERATOR REACHES OPTIMUM PERFORMANCE TS-0300 UTILITY (NORMAL) SIDE WILL OPEN FIRST, THEN THE EMERGENCY SIDE WILL CLOSE, PROVIDING POWER TO PDP-0300E FROM THE STANDBY GENERATOR.

1.2. POWER INTERRUPTION TO MCC-0400A . NO INTERRUPTION TO MCC-0400B & PDP-0400E. TIE BREAKER TB-0401 CLOSES AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS AND POWER IS RESTORED TO MCC-0400A VIA MCC-0400B THROUGH LINE 2 ALONE. TS-0400 DETECTS POWER RESTORATION ON PDP-0400A WITHIN 45 SECONDS TIME DELAY. STANDBY GENERATOR STAYS OFF.

2. HYDRO UTILITY POWER LINE 3 (OFF) - LINE 1 (ON) - LINE 2 (OFF):

2.1. POWER INTERRUPTION TO MCC-400A/B & PDP-400E. TIE BREAKER TB-0401 CLOSES AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS. TS-0400 DETECTS LOSS OF POWER ON MCC-0400B, ATS 45 SECONDS (ADJUSTABLE) TIME DELAY COUNT STARTS. AFTER APPROXIMATELY 45 SECONDS (ADJUSTABLE), IF POWER IS STILL UNDETECTED, TS-0400 WILL SEND A SIGNAL TO THE STANDBY GENERATOR TO START. ONCE THE GENERATOR REACHES OPTIMUM PERFORMANCE TS-0400 UTILITY (NORMAL) SIDE WILL OPEN FIRST, THEN THE EMERGENCY SIDE WILL CLOSE, PROVIDING POWER TO PDP-0400E FROM THE STANDBY GENERATOR.

2.2. POWER INTERRUPTION TO PDP-0300B. NO INTERRUPTION TO PDP-0300A. TIE BREAKER TB-0300 CLOSES AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS AND POWER IS RESTORED TO PDP-0300B VIA PDP-0300A THROUGH LINE 1 ALONE. TS-0300 DETECTS POWER RESTORATION ON PDP-0300A WITHIN 45 SECONDS TIME DELAY. STANDBY GENERATOR STAYS OFF.

3. HYDRO UTILITY POWER LINE 3 (ON) - LINE 1 (OFF) - LINE 2 (ON) - TB-0300 (FAULT)

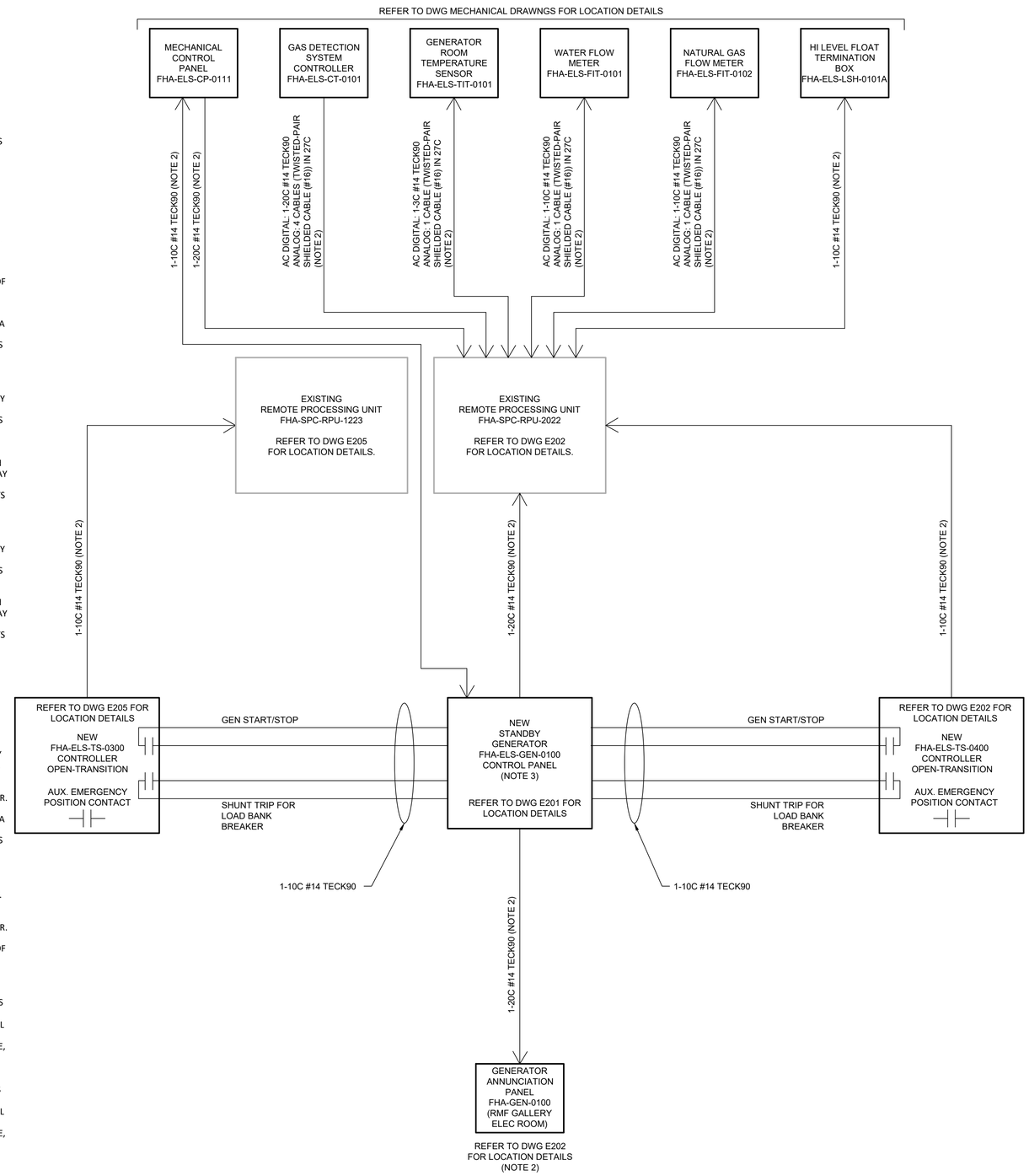
3.1. POWER INTERRUPTION TO PDP-0300A & PDP-0300E. NO INTERRUPTION TO PDP-0300B & MCC-0400A/B. TS-0300 DETECTS LOSS OF POWER ON PDP-0300A, ATS 45 SECONDS (ADJUSTABLE) TIME DELAY COUNT STARTS. TIE BREAKER TB-0300 FAILS TO CLOSE AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS. AFTER APPROXIMATELY 45 SECONDS (ADJUSTABLE), IF POWER IS STILL UNDETECTED ON PDP-0300A, TS-0300 WILL SEND A SIGNAL TO THE STANDBY GENERATOR TO START. ONCE THE GENERATOR REACHES OPTIMUM PERFORMANCE TS-0300 UTILITY (NORMAL) SIDE WILL OPEN FIRST, THEN THE EMERGENCY SIDE WILL CLOSE, PROVIDING POWER TO PDP-0300E FROM THE STANDBY GENERATOR.

4. HYDRO UTILITY POWER LINE 3 (ON) - LINE 1 (ON) - LINE 2 (OFF) - TB-0400 (FAULT):

4.1. POWER INTERRUPTION TO MCC-0400B & PDP-400E. NO INTERRUPTION TO MCC-0400A & PDP-0300A/B. TS-0400 DETECTS LOSS OF POWER ON MCC-0400B, ATS 45 SECONDS (ADJUSTABLE) TIME DELAY COUNT STARTS. TIE BREAKER TB-0400 FAILS TO CLOSE AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS. AFTER APPROXIMATELY 45 SECONDS (ADJUSTABLE), IF POWER IS STILL UNDETECTED ON MCC-0400B, TS-0400 WILL SEND A SIGNAL TO THE STANDBY GENERATOR TO START. ONCE THE GENERATOR REACHES OPTIMUM PERFORMANCE TS-0400 UTILITY (NORMAL) SIDE WILL OPEN FIRST, THEN THE EMERGENCY SIDE WILL CLOSE, PROVIDING POWER TO PDP-0400E FROM THE STANDBY GENERATOR.

5. HYDRO UTILITY POWER LINE 3 (ON) - LINE 1 (OFF) - LINE 2 (OFF) - TB-0300 (FAULT) OR TB-0400 (FAULT):

5.1. POWER INTERRUPTION TO PDP-300A & PDP-300E, MCC-400B & PDP-400E. NO INTERRUPTION TO PDP-0300B & MCC-400A. TS-0300 & TS-0400 DETECT LOSS OF POWER ON PDP-0300A & MCC-0400B RESPECTIVELY, ATS 45 SECONDS (ADJUSTABLE) TIME DELAY COUNT STARTS. TIE BREAKER TB-0300 OR TB-0400 FAILS TO CLOSE AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS. AFTER APPROXIMATELY 45 SECONDS (ADJUSTABLE), IF POWER IS STILL UNDETECTED ON PDP-0300A OR MCC-0400B, TS-0300 OR TS-0400 WILL SEND A SIGNAL TO THE STANDBY GENERATOR TO START. ONCE THE GENERATOR REACHES OPTIMUM PERFORMANCE, TS-0300 OR TS-0400 UTILITY (NORMAL) SIDE WILL OPEN FIRST, THEN THE EMERGENCY SIDE WILL CLOSE, PROVIDING POWER TO PDP-0300E OR PDP-0400E RESPECTIVELY FROM THE STANDBY GENERATOR.



TYPICAL BLOCK DIAGRAM FOR CONTROL WIRING

NOTES:

1. ALL TAG NAMES SHOWN ON THE DRAWING HAVE A PREFIX OF "FHA-ELS" UNLESS OTHERWISE NOTED.
2. REFER TO I&C DRAWING I004 FOR TERMINAL & SIGNAL DETAIL REQUIREMENTS.
3. THIS GENERATOR WILL NOT BE OPERATED IN PARALLEL WITH UTILITY AND WILL NOT BE USED FOR LOAD DISPLACEMENT PURPOSES.

SEQUENCE OF OPERATION (CONT'D)

EMERGENCY CONDITIONS 3 (GENERATOR POWERS FULL ESSENTIAL LOAD):

THE NEW STANDBY GENERATOR IS OFF AND SET TO AUTO.

- THE AUTOMATIC TRANSFER SWITCHES TS-0300, TS-0400,ARE SET TO AUTO AND THEIR UTILITY SIDE CIRCUIT BREAKER IS CLOSED.
- TS-0300 IS POWERED THROUGH AND MONITOR POWER AT PDP-0300A.
- TS-0400 IS POWERED THROUGH AND MONITOR POWER AT MCC-0400B.

SCENARIOS:

1. HYDRO UTILITY POWER LINE 3 (OFF) - LINE 1 (OFF) - LINE 2 (OFF):

1.1. POWER INTERRUPTION TO PDP-300A/B & PDP-300E, MCC-400A/B & PDP-400E. TS-0300 & TS-0400 DETECT LOSS OF POWER ON PDP-0300A & MCC-0400B RESPECTIVELY. ATS 45 SECOND (ADJUSTABLE) TIME DELAY COUNT STARTS. AFTER APPROXIMATELY 45 SECONDS (ADJUSTABLE), IF POWER IS STILL UNDETECTED ON PDP-0300A AND MCC-0400B, TS-0300 AND TS-0400 WILL SEND A SIGNAL TO THE STANDBY GENERATOR TO START. ONCE THE GENERATOR REACHES OPTIMUM PERFORMANCE, TS-0300 AND TS-0400 UTILITY (NORMAL) SIDE WILL OPEN FIRST, THEN THE EMERGENCY SIDE WILL CLOSE, PROVIDING POWER TO PDP-0300E AND PDP-0400E FROM THE STANDBY GENERATOR.

2. HYDRO UTILITY POWER LINE 3 (ON) - LINE 1 (OFF) - LINE 2 (OFF) - TB-0300 (FAULT) - TB-0401 (FAULT):

2.1. POWER INTERRUPTION TO PDP-300A & PDP-300E, MCC-400B & PDP-400E. NO INTERRUPTION TO PDP-0300B & MCC-400A. TS-0300 & TS-0400 DETECT LOSS OF POWER ON PDP-0300A & MCC-0400B RESPECTIVELY. ATS 45 SECONDS (ADJUSTABLE) TIME DELAY COUNT STARTS. TIE BREAKERS TB-0300 AND TB-0400 FAIL TO CLOSE AFTER A TIME DELAY OF APPROXIMATELY 5-10 SECONDS. AFTER APPROXIMATELY 45 SECONDS (ADJUSTABLE), IF POWER IS STILL UNDETECTED ON PDP-0300A AND MCC-0400B, TS-0300 AND TS-0400 WILL SEND A SIGNAL TO THE STANDBY GENERATOR TO START. ONCE THE GENERATOR REACHES OPTIMUM PERFORMANCE TS-0300 AND TS-0400 UTILITY (NORMAL) SIDE WILL OPEN FIRST, THEN THE EMERGENCY SIDE WILL CLOSE, PROVIDING POWER TO PDP-0300E AND PDP-400E FROM THE STANDBY GENERATOR.

NORMAL POWER RETURNS:

1. WHEN ONE OR TWO, OR ALL OF THE UTILITY LINES (LINE 1, LINE 2 AND/OR LINE 3) RETURN, POWER TO PDP-0300A AND/OR PDP-0300B, MCC-0400A AND/OR MCC-0400B IS RESTORED.
2. IF TS-0300 AND/OR TS-0400 DETECT(S) UTILITY (NORMAL) POWER THE CORRESPONDING ATS WILL SWITCH TO NORMAL POSITION (OPEN-TRANSITION TRANSFER) AFTER A SHORT TIME DELAY .
3. WHEN BOTH TS-0300 AND TS-0400 HAVE TRANSITIONED TO UTILITY (NORMAL) POWER FOR A PERIOD OF TIME (ADJUSTABLE), THE STANDBY GENERATOR WILL START ITS NORMAL SHUT DOWN SEQUENCE.
4. WHEN ALL ATS's HAVE DISCONNECTED FROM THE STANDBY GENERATOR, THE GENERATOR WILL RUN FOR A SHORT TIME APPROXIMATELY 5-10 MINUTES TO COOL OFF, AND THEN IT WILL SHUT DOWN

FOR MAINTENANCE:

1. AFTER THE GENERATOR SYSTEM IS TESTED AND COMMISSIONED, PROPER LOCK-OUT PROCEDURES SHOULD BE DEVELOPED AND PUT IN PLACE BY PLANT ELECTRICAL MAINTENANCE AND OPERATORS IN ORDER TO ISOLATE POWER TO THE EMERGENCY SYSTEM BUSES WHEN MAINTENANCE IS BEING PERFORMED ON THEM AND/OR OTHER EQUIPMENT:
   a. TS-0300 AND TS-0400 SHOULD BE IN THE OFF POSITION.
   b. ALL ASSOCIATED UPSTREAM MAIN BREAKERS TO THE STANBY BUSES SHALL BE LOCKED OUT ALL THE WAY UP TO THE RELEVANT GENERATOR FEEDER BREAKER(S).

LOAD TESTING:

1. DURING LOAD TESTING IF ANY ATS DETECTS UTILITY POWER LOSS, A SIGNAL WILL BE SENT TO OPEN LOAD BANK SHUNT TRIP BREAKER TO DISCONNECT THE LOAD BANK FROM GENERATOR.

EXISTING
NEW

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NO.	DATE	REVISIONS	INITIAL	SIGNED
A	2025-03-18	ISSUED FOR TENDER	T.S.	

TORONTO

TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER X. D. SHEN 100121127 MAR. 19, 2025 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P.ENG
DIRECTOR
WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

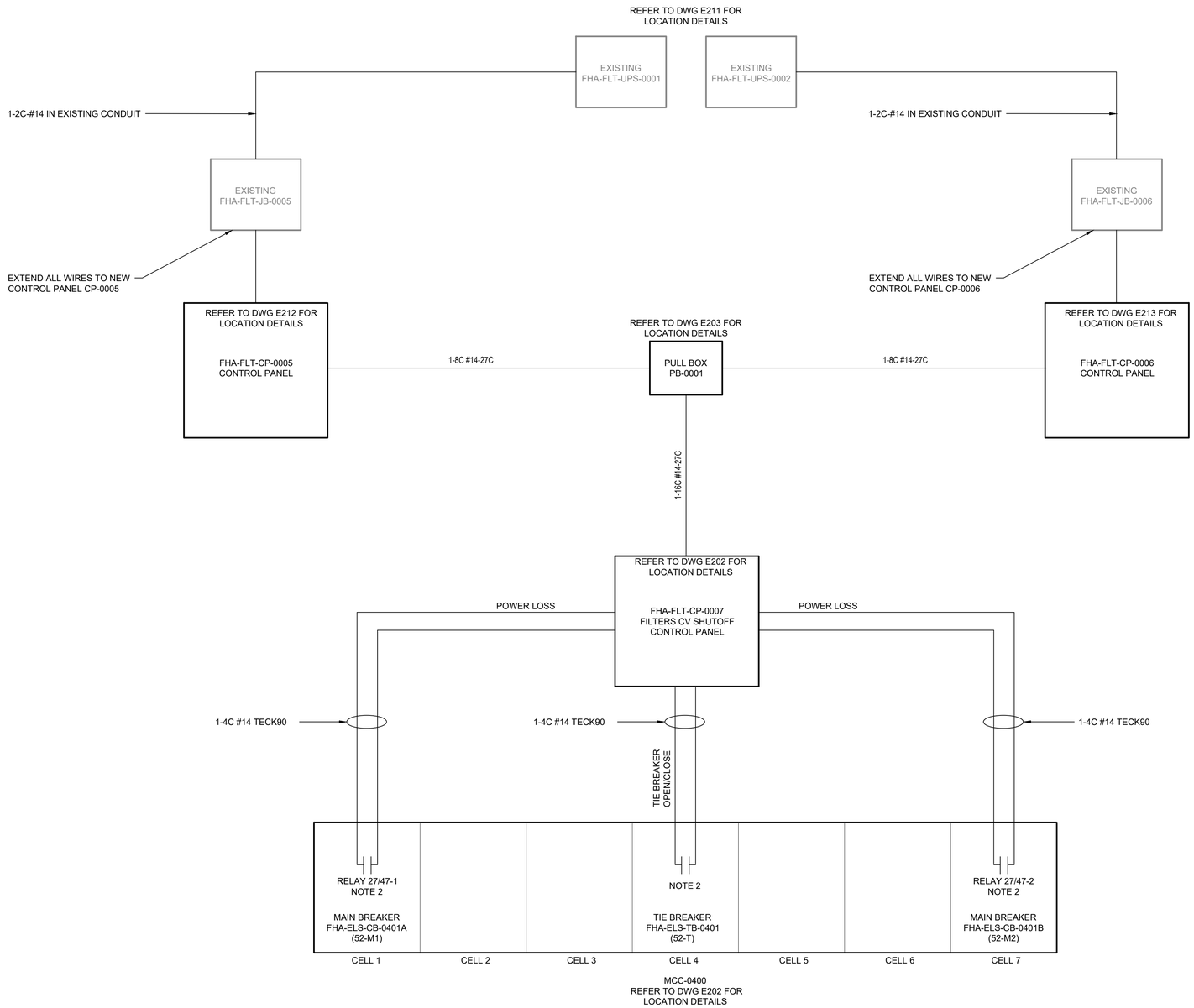
R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
ATS & GENERATOR CONTROL WIRING BLOCK DIAGRAM

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-39		E015
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-39-E015.DWG
Layout Tab: E015
Date: 03/19/2025 Time: 02:53:22 PM



NOTES:

1. REFER TO THE FOLLOWING I&C DRAWINGS FOR TERMINAL & SIGNAL DETAIL REQUIREMENTS.
   I105: FILTER CV PANEL
   I106: FHA-FLT-CP-0005
   I107: FHA-FLT-CP-0006
2. CONTRACTOR TO COORDINATE WITH MCC-0400 MANUFACTURER (EATON) TO PROVIDE FOLLOWING (3) N.O. DRY CONTACTS. REFER TO EXISTING MCC-0400 SHOP DRAWING IN APPENDIX AND I&C DRAWINGS I103, I104 FOR REFERENCE. PROVIDE UPDATED MCC-0400 SHOP DRAWING.
   1. POWER SOURCE #1 : LOSS OF UTILITY POWER VOLTAGE (VA VOLTAGE MONITORING RELAY 27/47-1)
   2. POWER SOURCE #2 : LOSS OF UTILITY POWER VOLTAGE (VA VOLTAGE MONITORING RELAY 27/47-2).
   3. TIE BREAKER 52-T: OPEN/CLOSE

TYPICAL BLOCK DIAGRAM FOR CONTROL WIRING

EXISTING
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INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
FILTER CV PANEL CONTROL WIRING BLOCK DIAGRAM

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-40		E016
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-40-E016.DWG
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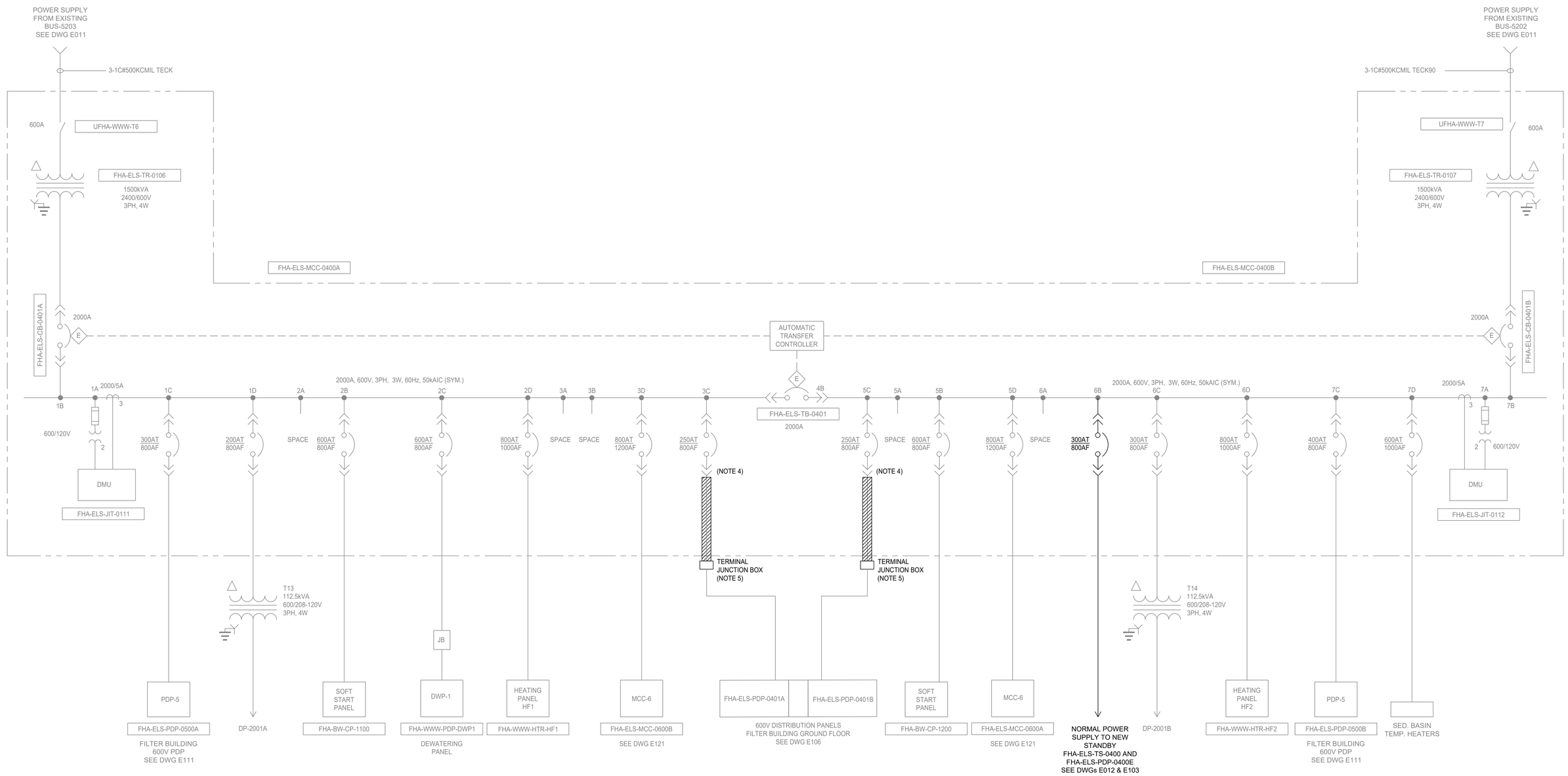

** CIRCUIT BREAKER's HANDLE OPERATING MECHANISM TO BE PADLOCKABLE IN THE 'OFF' POSITION.

NOTES:

1. CELLS 2A, 3A, 3B, 5A, 6A ARE FOR SPACE.
2. EXISTING CIRCUIT BREAKER TO BE SET TO 300A TRIP.
3. WHEN RELOCATING OR REMOVING EQUIPMENT, SHOULD ANY CIRCUITS BE ABANDONED,THE CONDUCTORS TO THESE CIRCUITS MUST BE REMOVED OR PROPERLY TERMINATED AS DETAILED IN RULE 2-130, RULE 12-114, RULE 12-3000 AND BULLETIN 12-25-*.
4. MCC CUBICLE TO BE SPARE.
5. DISCONNECT EXISTING FHA-ELS-PDP-0401A/B FEEDER CABLES FROM EXISTING FHA-ELS-MCC-0400A/B. PROVIDE TERMINAL JUNCTION BOXES TO EXTEND EXISTING FEEDER CABLES TO THE ADJACENT NEW FHA-ELS-PDP-0400E VIA 250KCMIL CABLES. SEE DRAWING E103.

FHA-ELS-MCC-0400A/B SINGLE LINE DIAGRAM - MODIFICATIONS

CABLE SCHEDULE:

No.:	CABLE SIZE:
1	1-3C 400MCM TECK90

EXISTING

NEW

REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

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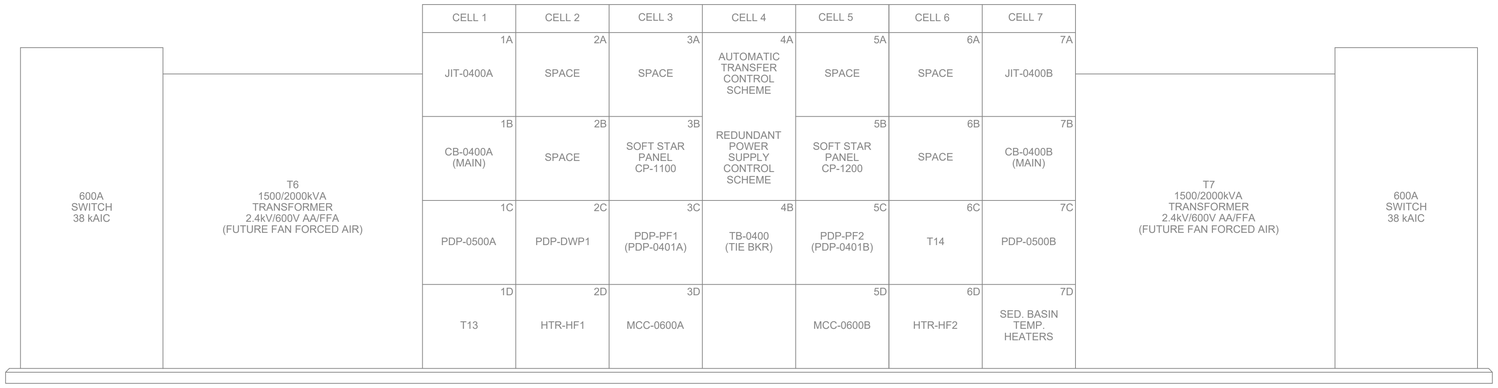
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

FHA-ELS-MCC-0400A/B SINGLE LINE DIAGRAM - MODIFICATIONS

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-41		E101
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-41-E101.DWG
Layout: E101
Date: 03/19/2025 Time: 12:33:49 PM



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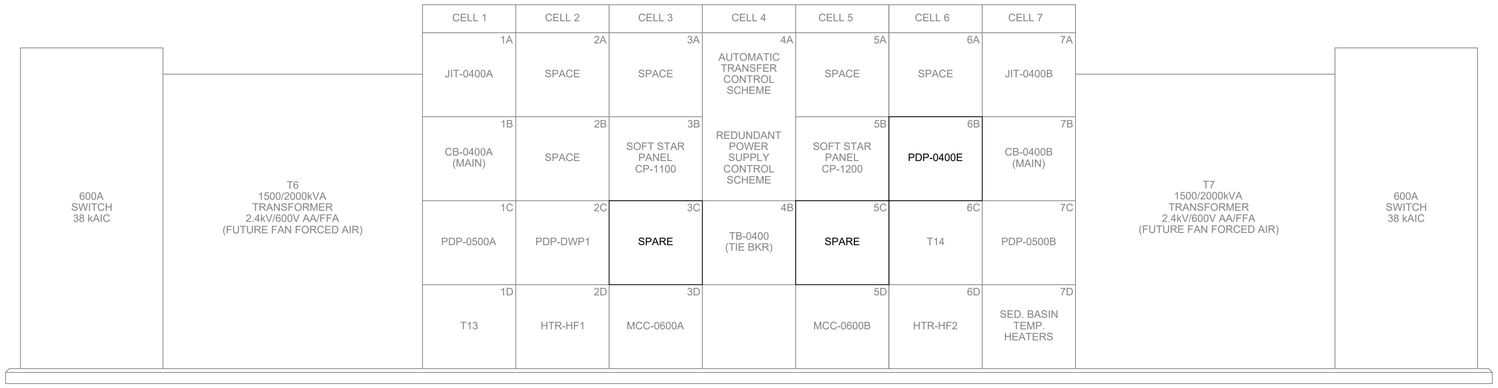

MODIFICATIONS

ELECTRICAL CHARACTERISTICS:

600 VOLTS	MAIN BUS 2000A
3 PH	SCCR: 50kAIC (SYM.)
3 WIRE	BUS BRACING: 50kAIC (SYM.)
60 Hz	ENCLOSURE TYPE: CSA II SPRINKLER PROOF

NOTES:

1. REFER TO DWG E202 FOR LOCATION DETAILS.
2. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.

FHA-ELS-MCC-0400A/B ELEVATION LAYOUT - EXISTING AND MODIFICATIONS

N.T.S.

EXISTING
NEW

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R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

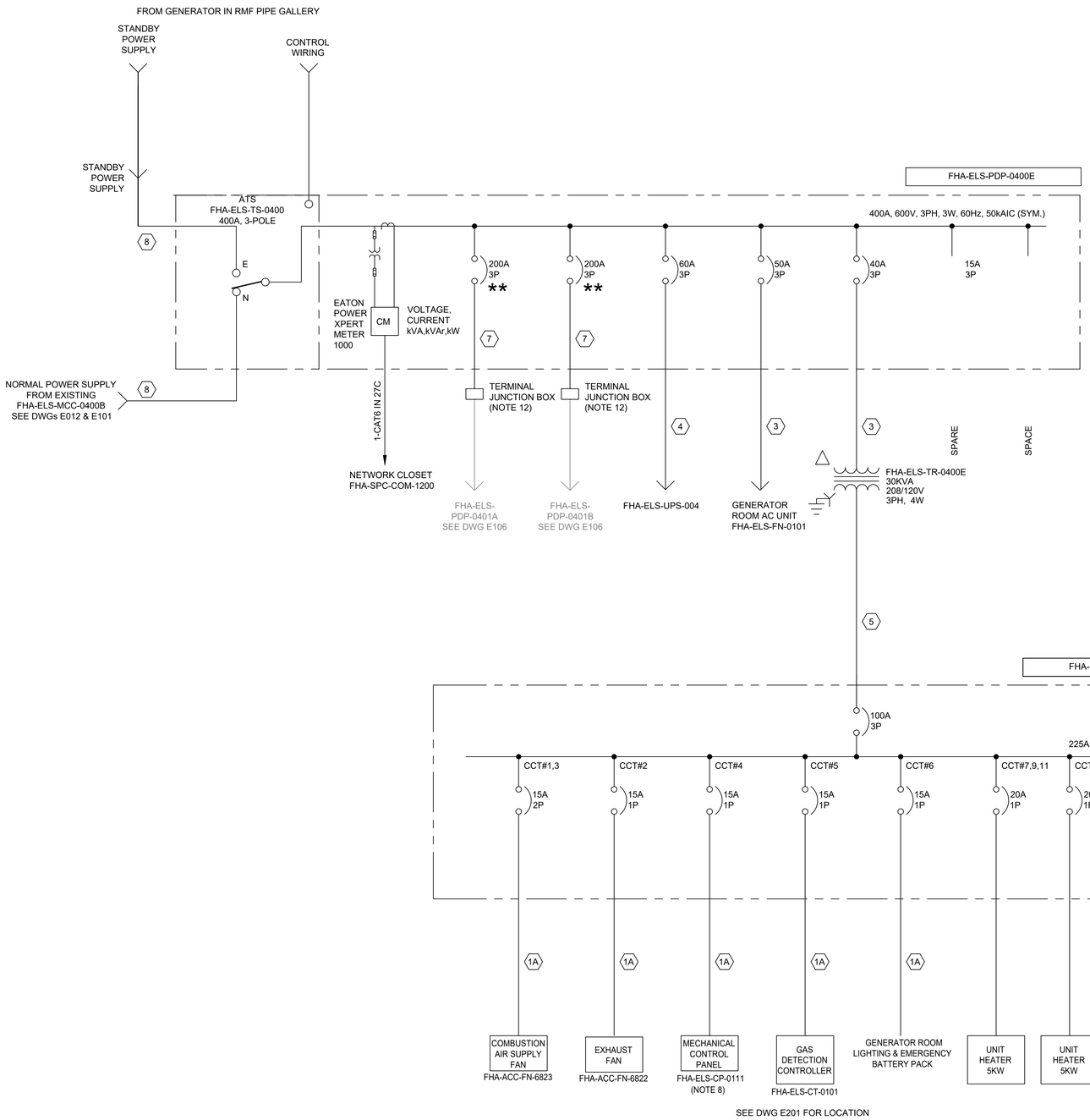
FHA-ELS-MCC-0400A/B ELEVATION LAYOUT - EXISTING AND MODIFICATIONS

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-42		E102
DATE:	2024-09-30						

Drawing: J:\W16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-42-E102.DWG
Layout Tab: E102
Date: 03/19/2025 Time: 12:33:59 PM

FEEDER AND CONDUIT SCHEDULE		
NUMBER	SIZE	RATING (A)
1	1-3C #12 AWG TECK90	20
1A	1-4C #12 AWG + #12GND - 21C	20
2	1-3C #10 AWG TECK90	30
3	1-3C #8 AWG TECK90	50
3A	1-4C #8 AWG + #10GND - 21C	50
4	1-3C #6 AWG TECK90	65
4A	1-3C #6 AWG + #8GND - 27C	65
5	1-4C #2 AWG + #6AWG - 35C	115
6	1-3C #2/0 AWG TECK90	175
7	1-3C #3/0 AWG TECK90	200
8	1-3C 400 MCM TECK90	335
9	1-3C 500 MCM TECK90	500



** CIRCUIT BREAKER's HANDLE OPERATING MECHANISM TO BE PADLOCKABLE IN THE 'OFF' POSITION.

NOTES:

1. 'S' DENOTES SHUNT TRIP.
2. ALL TAG NAMES SHOWN ON THE DRAWING HAVE A PREFIX OF "FHA-ELS" UNLESS OTHERWISE NOTED.
3. REFER TO DWG E015 FOR CONTROL WIRING.
4. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
5. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
6. REFER TO DWG E104 FOR NEW STANDBY PDP ELEVATION LAYOUT.
7. REFER TO DWGs E202 AND E203 FOR LOCATION DETAILS OF EACH NEW EQUIPMENT.
8. ONE (1) NEW LOAD BANK (ON WHEELS) TO BE PROVIDED FOR EACH GENERATOR AS SPECIFIED.
9. REFER TO DWG E106 FOR LOAD DISTRIBUTION.
10. AT EACH DISTRIBUTION POINT, CIRCUIT BREAKERS, FUSES AND SWITCHES SHALL BE MARKED, ADJACENT THERETO, IN A CONSPICUOUS AND LEGIBLE MANNER TO INDICATE CLEARLY WHICH INSTALLATION OR PORTION OF INSTALLATION THEY PROTECT OR CONTROL AND THE MAXIMUM RATING OF OVERCURRENT DEVICE THAT IS PERMITTED.
11. EACH NEW ATS AND PDP ASSEMBLY SHALL BE CERTIFIED FOR 50kA SHORT-CIRCUIT CURRENT RATING.
12. PROVIDE TERMINAL JUNCTION BOXES TO EXTEND EXISTING FHA-ELS-PDP-0401A/B FEEDER CABLES FROM ADJACENT EXISTING FHA-ELS-MCC-0400A/B VIA 250KCMIL CABLES. SEE DRAWING E101.

EXISTING
NEW

FHA-ELS-PDP-0400E SINGLE LINE DIAGRAM - NEW STANDBY BUS

TORONTO Water

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TORONTO, ONTARIO, M9W 0C9
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A	2025-03-18	ISSUED FOR TENDER	T.S.	

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ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
X. D. SHEN
100121127
MAR. 19, 2025
PROVINCE OF ONTARIO

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MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

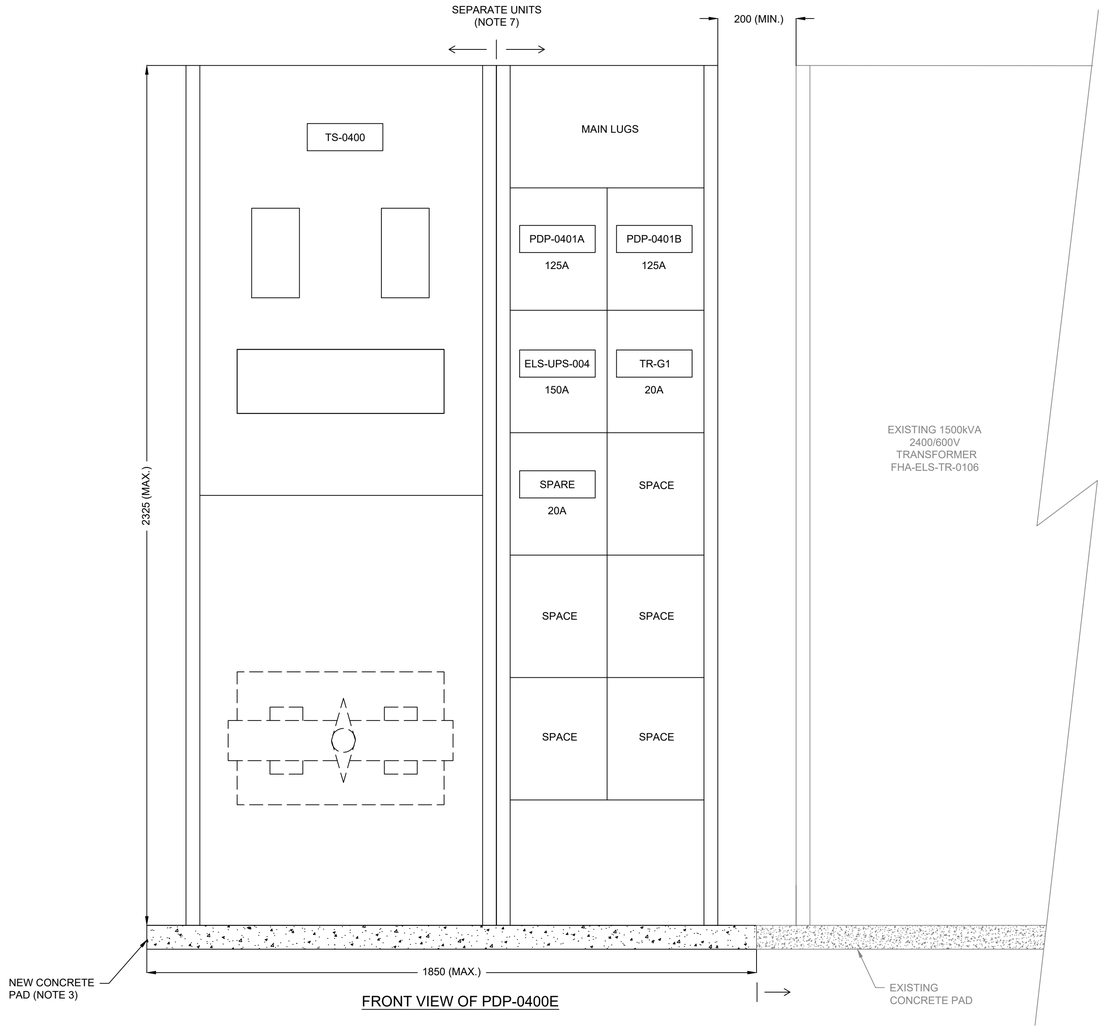
FHA-ELS-PDP-0400E SINGLE LINE DIAGRAM - NEW STANBY BUS

ELECTRICAL

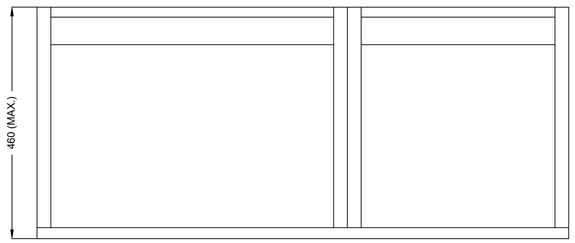
DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-43		E103
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-43-E103.DWG
Layout Tab: E103
Date: 03/19/2025 Time: 12:34:09 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



FRONT VIEW OF PDP-0400E



FLOOR VIEW OF PDP-0400E

NOTES:

1. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
2. THIS DRAWING IS INTENDED TO PROVIDE THE GENERAL SCHEMATIC, SIZE, AND LAYOUT OF PANELS. ACTUAL SIZE AND LAYOUT MAY VARY PER EQUIPMENT. CONTRACTOR SHALL SUBMIT ALL LAYOUTS FOR REVIEW.
3. PROVIDE CONCRETE HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
4. DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.
5. DIMENSIONS SHOWN ARE APPROXIMATE AND NOT TO BE EXCEEDED.
6. REFER TO DWG E202 FOR LOCATION DETAILS.
7. NEW ATS UNIT TO BE SEPARATE FROM NEW STANDBY PDP.

FHA-ELS-PDP-0400E ELEVATION LAYOUT

N.T.S.

EXISTING
NEW

TORONTO Water

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R.C. HARRIS WATER TREATMENT PLANT

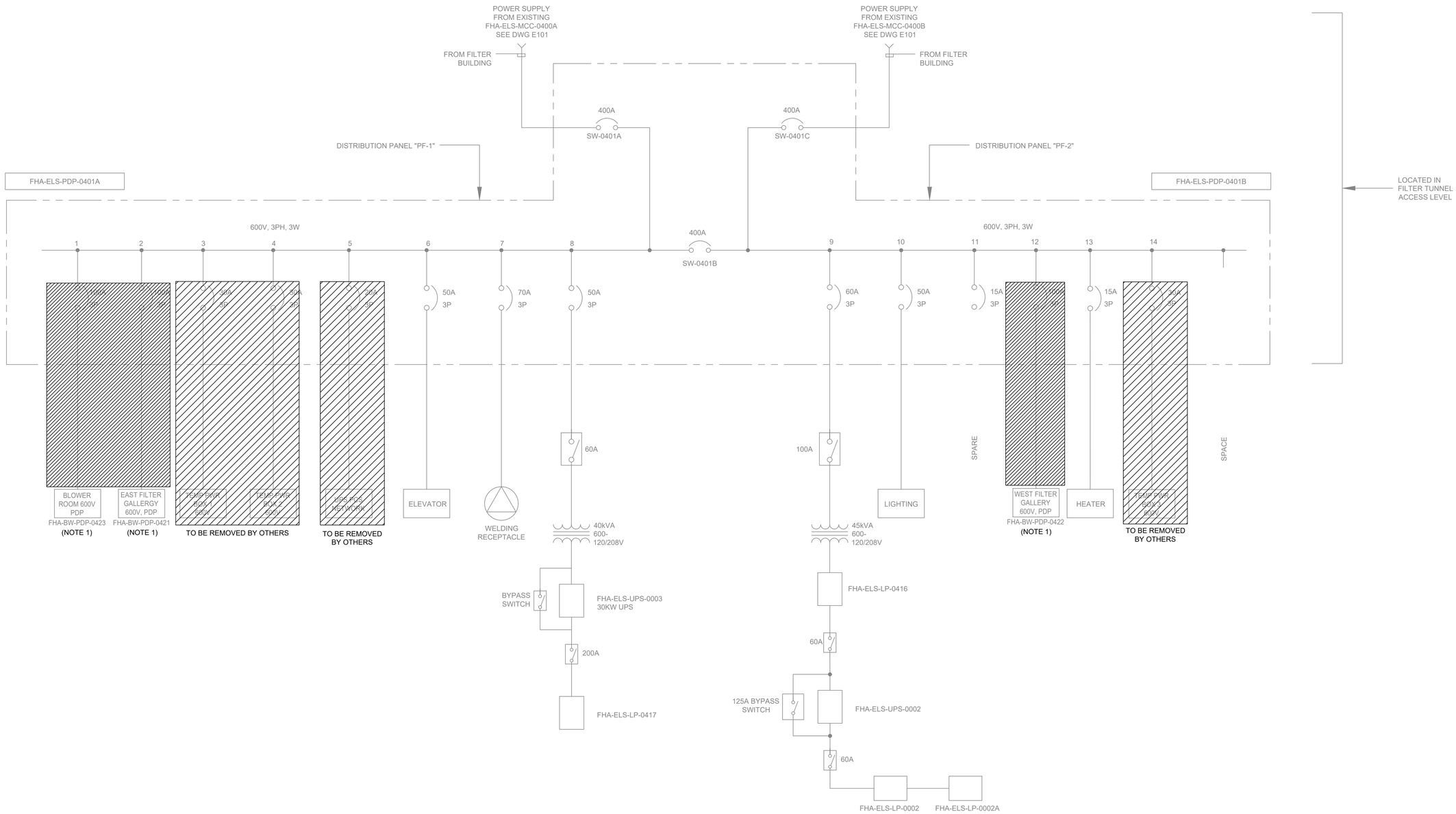
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

FHA-ELS-PDP-0400E ELEVATION LAYOUT

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-44		E104
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-44-E104.DWG
Layout Tab: E104
Date: 03/19/2025 Time: 12:34:19 PM



NOTES:

1. REFEED FROM FHA-ELS-PDP-0506. SEE DRAWING E108.
2. WHEN RELOCATING OR REMOVING EQUIPMENT, SHOULD ANY CIRCUITS BE ABANDONED,THE CONDUCTORS TO THESE CIRCUITS MUST BE REMOVED OR PROPERLY TERMINATED AS DETAILED IN RULE 2-130, RULE 12-114, RULE 12-3000 AND BULLETIN 12-25-*.

FHA-ELS-PDP-401A/B SINGLE LINE DIAGRAM - EXISTING

N.T.S.

EXISTING
NEW
REMOVAL

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INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

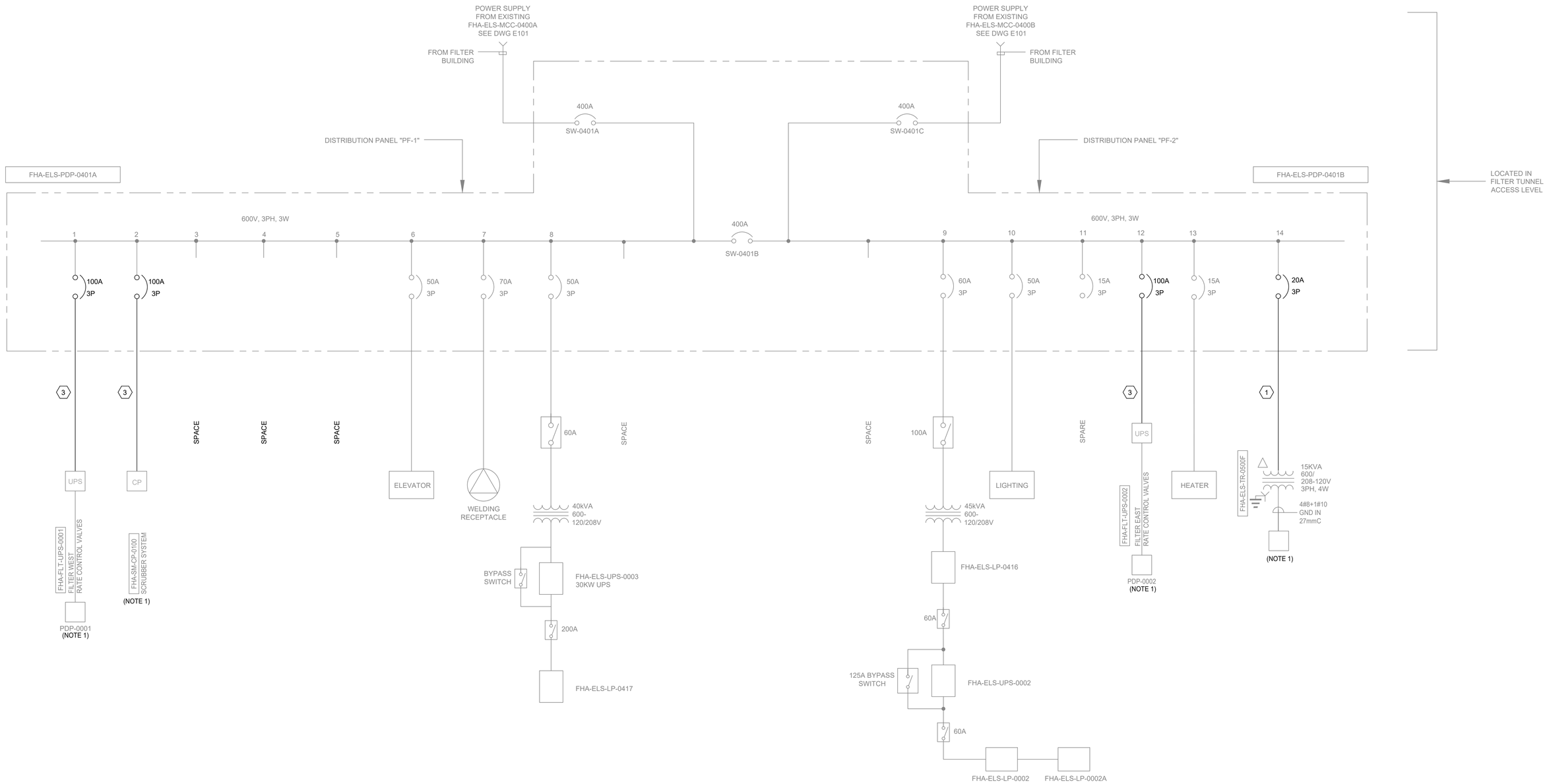
FHA-ELS-PDP-0401A/B SINGLE LINE DIAGRAM - EXISTING

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-45		E105
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-45-E105.DWG
Layout Tab: E105
Date: 03/19/2025 Time: 12:34:31 PM

FEEDER AND CONDUIT SCHEDULE		
NUMBER	SIZE	RATING (A)
1	1-4C #12 AWG TECK90	20
2	1-4C #6 AWG TECK90	65
3	1-4C #3 AWG TECK90	100



NOTES:

1. EXISTING EQUIPMENT FEEDER RELOCATED FROM MCC-0500. SEE DWG E111, E112.
2. WHEN RELOCATING OR REMOVING EQUIPMENT, SHOULD ANY CIRCUITS BE ABANDONED,THE CONDUCTORS TO THESE CIRCUITS MUST BE REMOVED OR PROPERLY TERMINATED.

FHA-ELS-PDP-401A/B SINGLE LINE DIAGRAM - MODIFICATIONS

N.T.S.

EXISTING
NEW
REMOVAL

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FHA-ELS-PDP-0401A/B SINGLE LINE DIAGRAM - MODIFICATIONS

ELECTRICAL

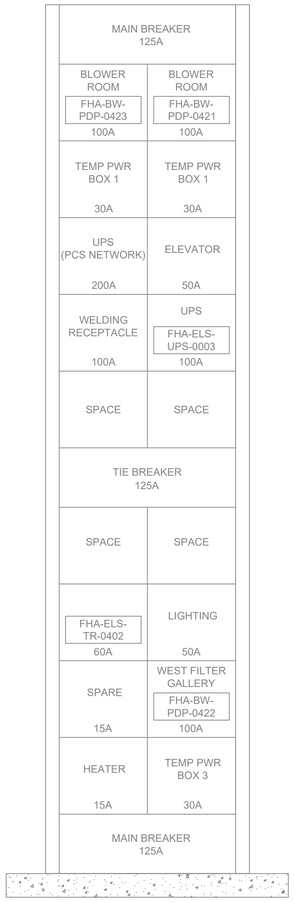
DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-46		E106
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-46-E106.DWG
Layout Tab: E106
Date: 03/19/2025 Time: 12:34:43 PM

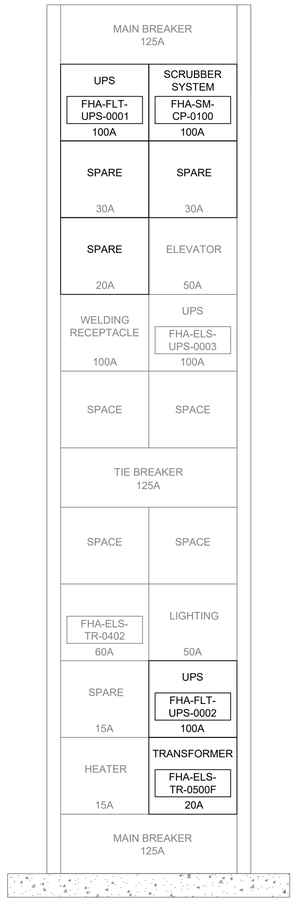
METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

NOTES:

1. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
2. THIS DRAWING IS INTENDED TO PROVIDE THE GENERAL SCHEMATIC, SIZE, AND LAYOUT OF PANELS. ACTUAL SIZE AND LAYOUT MAY VARY PER EQUIPMENT. CONTRACTOR SHALL SUBMIT ALL LAYOUTS FOR REVIEW.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.
4. DIMENSIONS SHOWN ARE APPROXIMATE AND NOT TO BE EXCEEDED.
5. REFER TO DWG E202 FOR LOCATION DETAILS.
6. NEW ATS UNIT TO BE SEPARATE FROM NEW STANDBY PDP.



EXISTING



MODIFICATIONS

FHA-ELS-PDP-0401A/B ELEVATION LAYOUT

N.T.S.

EXISTING
NEW

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100121127
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MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
FHA-ELS-PDP-0401A/B ELEVATION LAYOUT

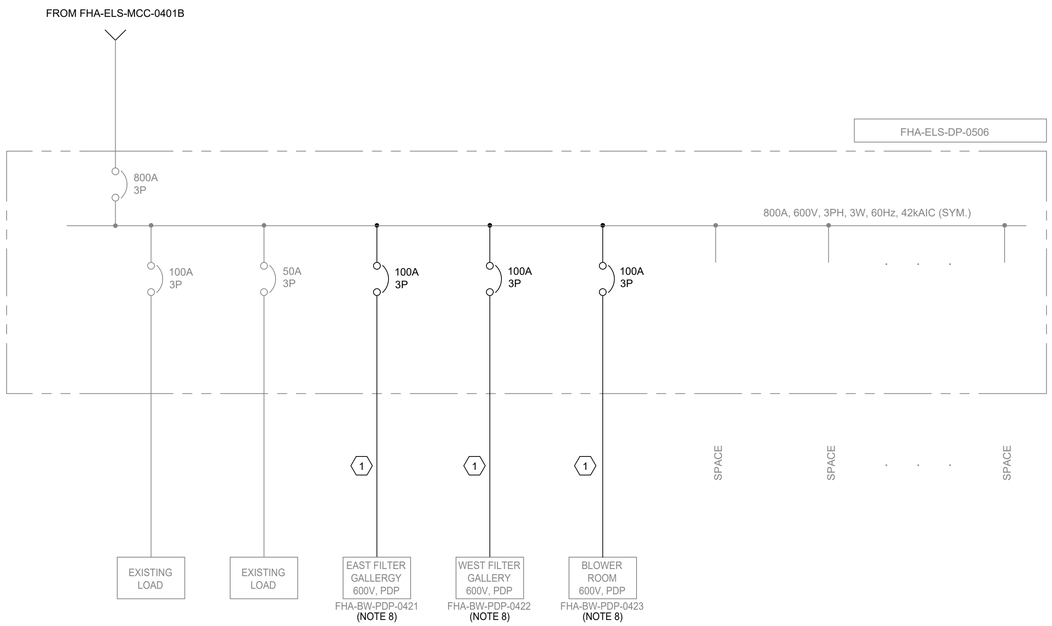
ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-47		E107
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-47-E107.DWG
Layout Tab: E107
Date: 03/19/2025 Time: 12:34:56 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED

FEEDER AND CONDUIT SCHEDULE		
NUMBER	SIZE	RATING (A)
1	1-4C #3 AWG TECK90	100



FHA-ELS-PDP-0506 SINGLE LINE DIAGRAM - MODIFICATIONS

N.T.S

NOTES:

1. ALL TAG NAMES SHOWN ON THE DRAWINGS HAVE A PREFIX OF "FHA". ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
2. REFER TO DWG E015 FOR CONTROL WIRING.
3. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
4. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
5. REFER TO DWGs E207 AND E208 FOR LOCATION DETAILS.
6. REFER TO DWG E144 FOR NEW STANDBY PDP ELEVATION LAYOUT.
7. AT EACH DISTRIBUTION POINT, CIRCUIT BREAKERS, FUSES AND SWITCHES SHALL BE MARKED, ADJACENT THERETO, IN A CONSPICUOUS AND LEGIBLE MANNER TO INDICATE CLEARLY WHICH INSTALLATION OR PORTION OF INSTALLATION THEY PROTECT OR CONTROL AND THE MAXIMUM RATING OF OVERCURRENT DEVICE THAT IS PERMITTED.
8. EXISTING EQUIPMENT FEED RELOCATED FROM PDP-0400A/B.

EXISTING
NEW
REMOVAL

TORONTO Water

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R.C. HARRIS WATER TREATMENT PLANT

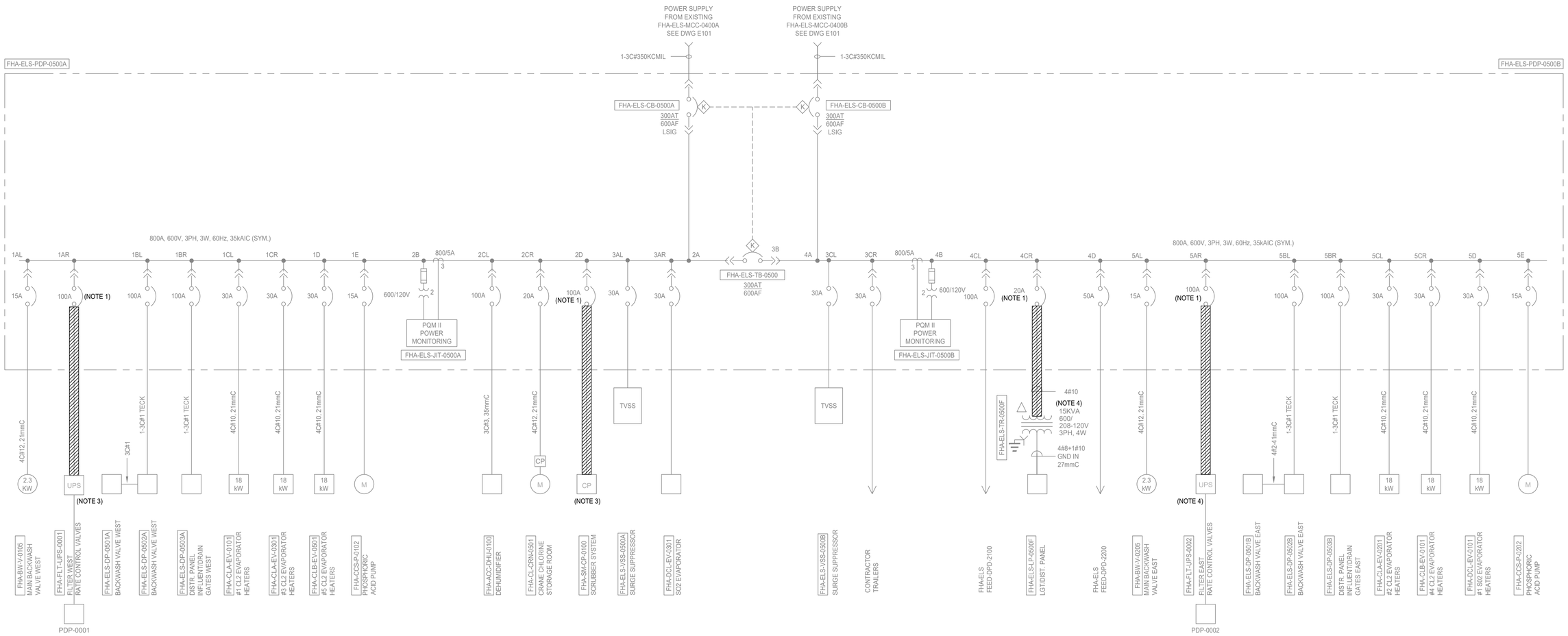
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

FHA-ELS-PDP-0506 SINGLE LINE DIAGRAM - MODIFICATIONS

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-48		E108
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-48-E108.DWG
Layout Tab: E108
Date: 03/19/2025 Time: 12:35:08 PM



NOTES:

1. MCC CUBICLES TO BE SPARE.
2. WHEN RELOCATING OR REMOVING EQUIPMENT, SHOULD ANY CIRCUITS BE ABANDONED,THE CONDUCTORS TO THESE CIRCUITS MUST BE REMOVED OR PROPERLY TERMINATED AS DETAILED IN RULE 2-130, RULE 12-114, RULE 12-3000 AND BULLETIN 12-25-*.
3. REFEED FROM FHA-ELS-PDP-0401A. SEE DRAWING E105.
4. REFEED FROM FHA-ELS-PDP-0401B. SEE DRAWING E105.

FHA-ELS-PDP-0500A/B SINGLE LINE DIAGRAM - MODIFICATIONS

N.T.S.

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

TORONTO Water

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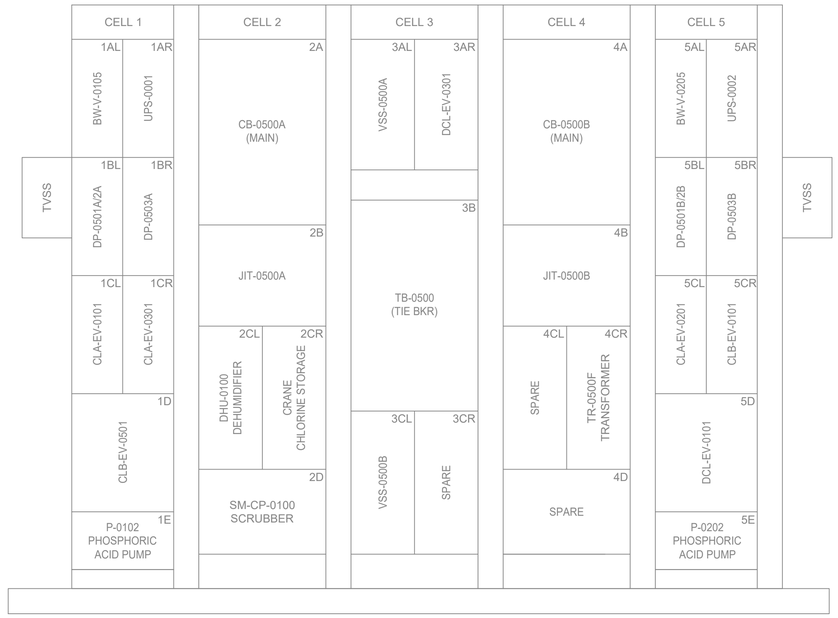
FHA-ELS-PDP-0500A/B SINGLE LINE DIAGRAM - MODIFICATIONS

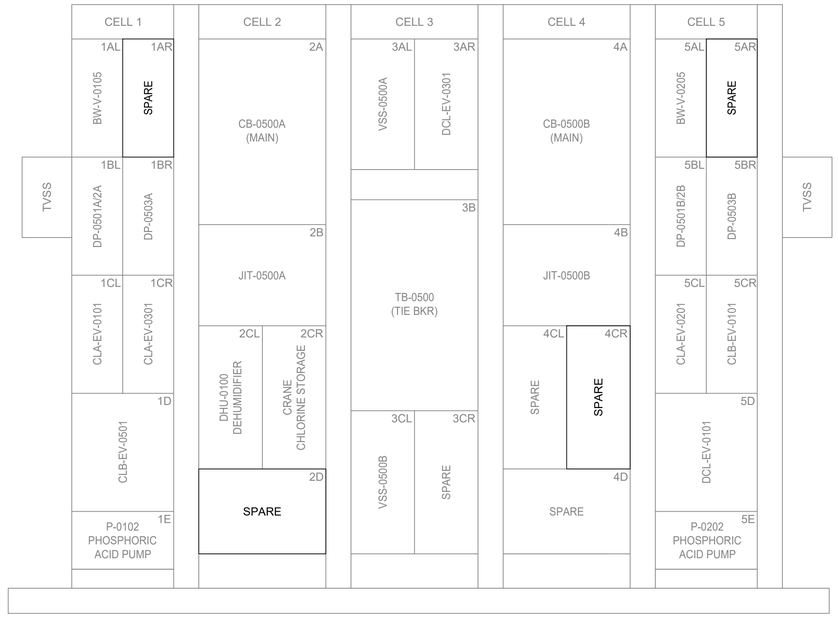
ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-49		E111
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-49-E111.DWG
Layout Tab: E111
Date: 03/19/2025 Time: 12:35:20 PM



EXISTING



MODIFICATIONS

ELECTRICAL CHARACTERISTICS:

600 VOLTS	HORIZONTAL BUS: 800A
3 PH	VERTICAL BUS: 800A
3 WIRE	SCCR: 35kAIC (SYM RMS.)
60 Hz	BUS BRACING: 42kAIC (SYM RMS.)
	ENCLOSURE TYPE: EEMAC 1A (GASKETED)

NOTES:

1. REFER TO DWG E203 FOR LOCATION DETAILS.
2. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.

FHA-ELS-PDP-0500A/B ELEVATION LAYOUT- EXISTING AND MODIFICATIONS

N.T.S.

EXISTING
NEW

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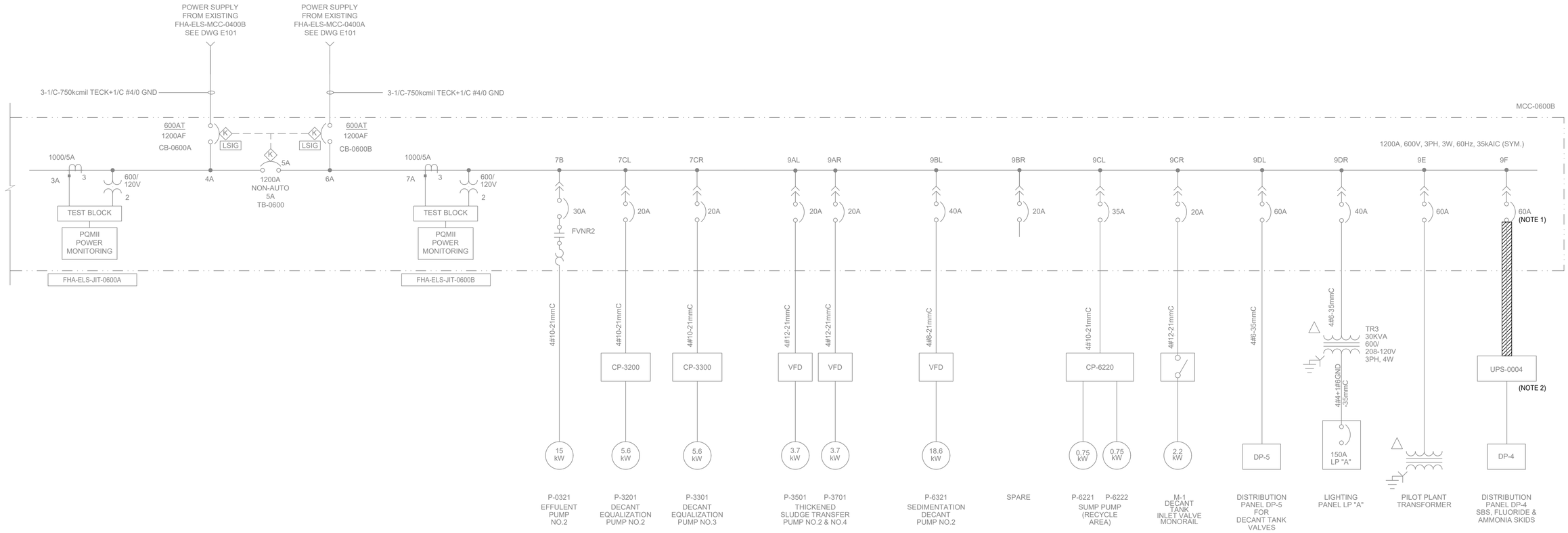
FHA-ELS-PDP-0500A/B ELEVATION LAYOUT- EXISTING AND MODIFICATIONS

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-50		E112
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-50-E112.DWG
Layout Tab: E112
Date: 03/19/2025 Time: 12:35:32 PM



NOTES:

1. MCC CUBICLE TO BE SPARE.
2. REFEED FROM FHA-ELS-PDP-0400E. SEE DWG E103.
3. WHEN RELOCATING OR REMOVING EQUIPMENT, SHOULD ANY CIRCUITS BE ABANDONED,THE CONDUCTORS TO THESE CIRCUITS MUST BE REMOVED OR PROPERLY TERMINATED AS DETAILED IN RULE 2-130, RULE 12-114, RULE 12-3000 AND BULLETIN 12-25-*.

FHA-ELS-MCC-0600A/B SINGLE LINE DIAGRAM - MODIFICATIONS

N.T.S

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

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A	2025-03-18	ISSUED FOR TENDER	T.S.	

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TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
X. D. SHEN
100121127
MAR. 19, 2025
PROVINCE OF ONTARIO

WILLIAM FERNANDES, P.ENG
DIRECTOR
WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

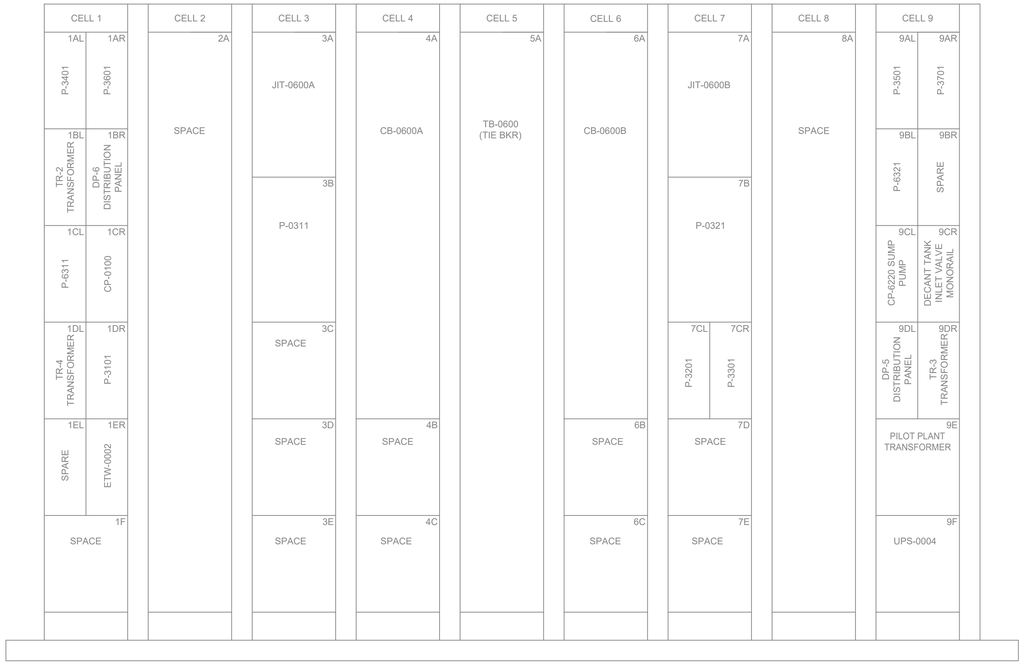
FHA-ELS-MCC-0600A/B SINGLE LINE DIAGRAM - MODIFICATIONS

ELECTRICAL

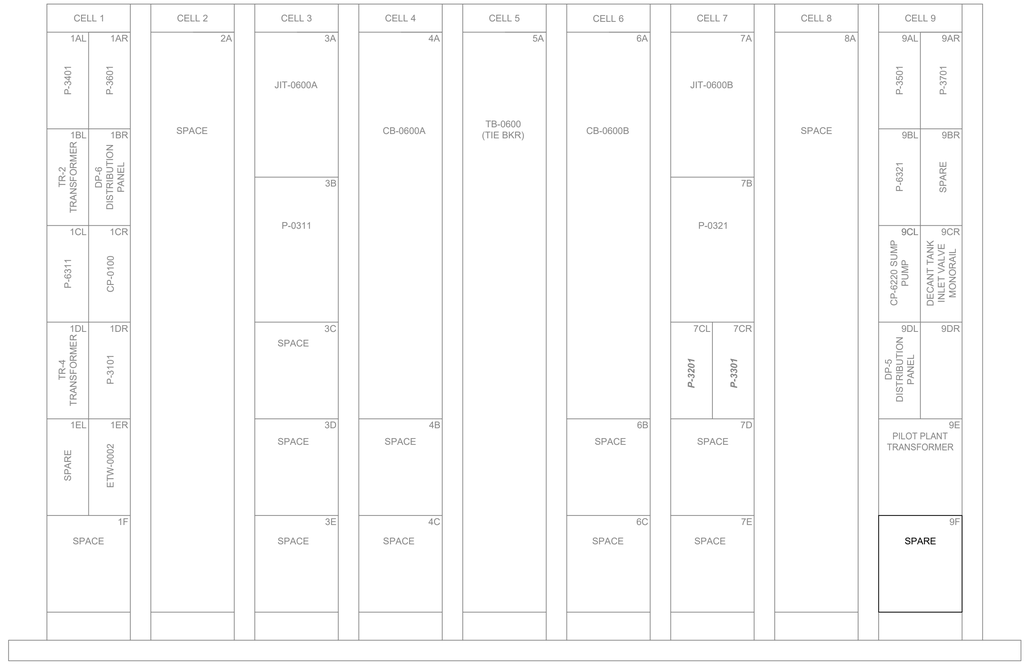
DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-51		E121
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-51-E121.DWG
Layout: Tab: E121
Date: 03/19/2025 Time: 12:35:44 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



EXISTING



MODIFICATIONS

ELECTRICAL CHARACTERISTICS:

600 VOLTS	VERTICAL BUS: CELL 4-6: 1200A
3 PH	CELL 1-3: 600A
3 WIRE	CELL 7-9: 600A
60 Hz	SCCR: 35kAIC (SYM RMS.)
HORIZONTAL BUS: 1200A	BUS BRACING: 42kAIC (SYM RMS.)
	ENCLOSURE TYPE: EEMAC 1A (GASKETED)

NOTES:

1. REFER TO DWG E202 FOR LOCATION DETAILS.
2. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.

FHA-ELS-MCC-0600A/B ELEVATION LAYOUT - EXISTING AND MODIFICATIONS

N.T.S.

EXISTING
NEW

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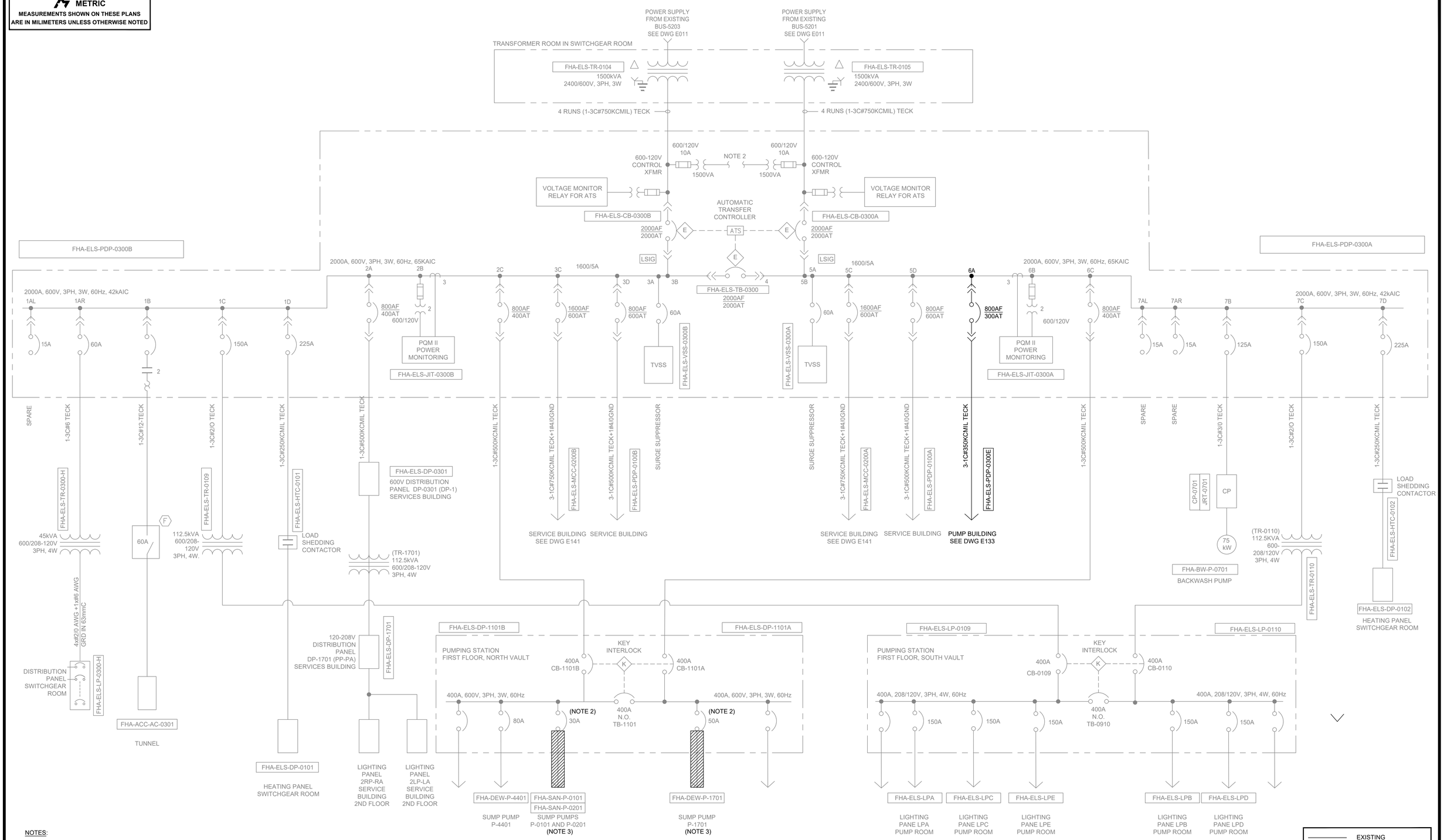
FHA-ELS-MCC-0600A/B ELEVATION LAYOUT - EXISTING AND MODIFICATIONS

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-52		E122
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-52-E122.DWG
Layout Tab: E122
Date: 03/19/2025 Time: 12:35:55 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



NOTES:

1. EXISTING CIRCUIT BREAKER TO BE REPLACED WITH A NEW 200A CIRCUIT BREAKER.
2. MCC CUBICLES TO BE SPARE
3. REFEED FROM FHS-ELS-0300E. SEE DRAWING E133.
4. WHEN RELOCATING OR REMOVING EQUIPMENT, SHOULD ANY CIRCUITS BE ABANDONED,THE CONDUCTORS TO THESE CIRCUITS MUST BE REMOVED OR PROPERLY TERMINATED.

FHA-ELS-PDP-0300 SINGLE LINE DIAGRAM - MODIFICATIONS

N.T.S.

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FHA-ELS-PDP-0300 SINGLE LINE DIAGRAM - MODIFICATIONS

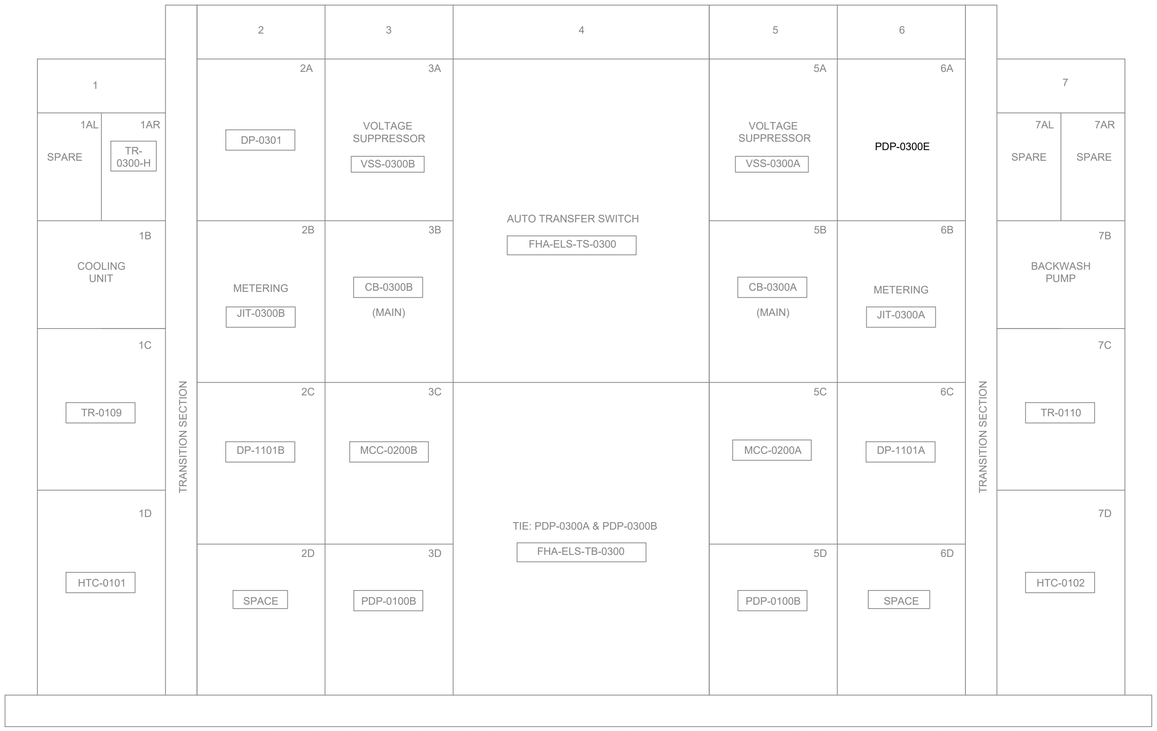
ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-53		E131
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-53-E131.DWG
Layout: E131
Date: 03/19/2025 Time: 12:36:07 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

EXISTING



MODIFICATIONS

ELECTRICAL CHARACTERISTICS:

600 V	MAIN BUS: 2000A
3 PH	SCCR: 42kAIC (SYM RMS.)
3 WIRE	BUS BRACING: 42kAIC (SYM RMS.)
60 Hz	ENCLOSURE TYPE: EEMAC 1A (GASKETED)

NOTES:

1. REFER TO DWG E205 FOR LOCATION DETAILS.
2. ALL TAG NAMES SHOWN ON THE DRAWINGS HAVE A PREFIX OF "FHA". ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

FHA-ELS-PDP-0300 ELEVATION LAYOUT - EXISTING AND MODIFICATIONS

SCALE: 1:10

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FHA-ELS-PDP-0300 ELEVATION LAYOUT - EXISTING AND MODIFICATIONS

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:10			DRAWING NUMBER:	2F-2017-08-54		E132
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-54-E132.DWG
Layout Tab: E132
Date: 03/19/2025 Time: 12:36:19 PM

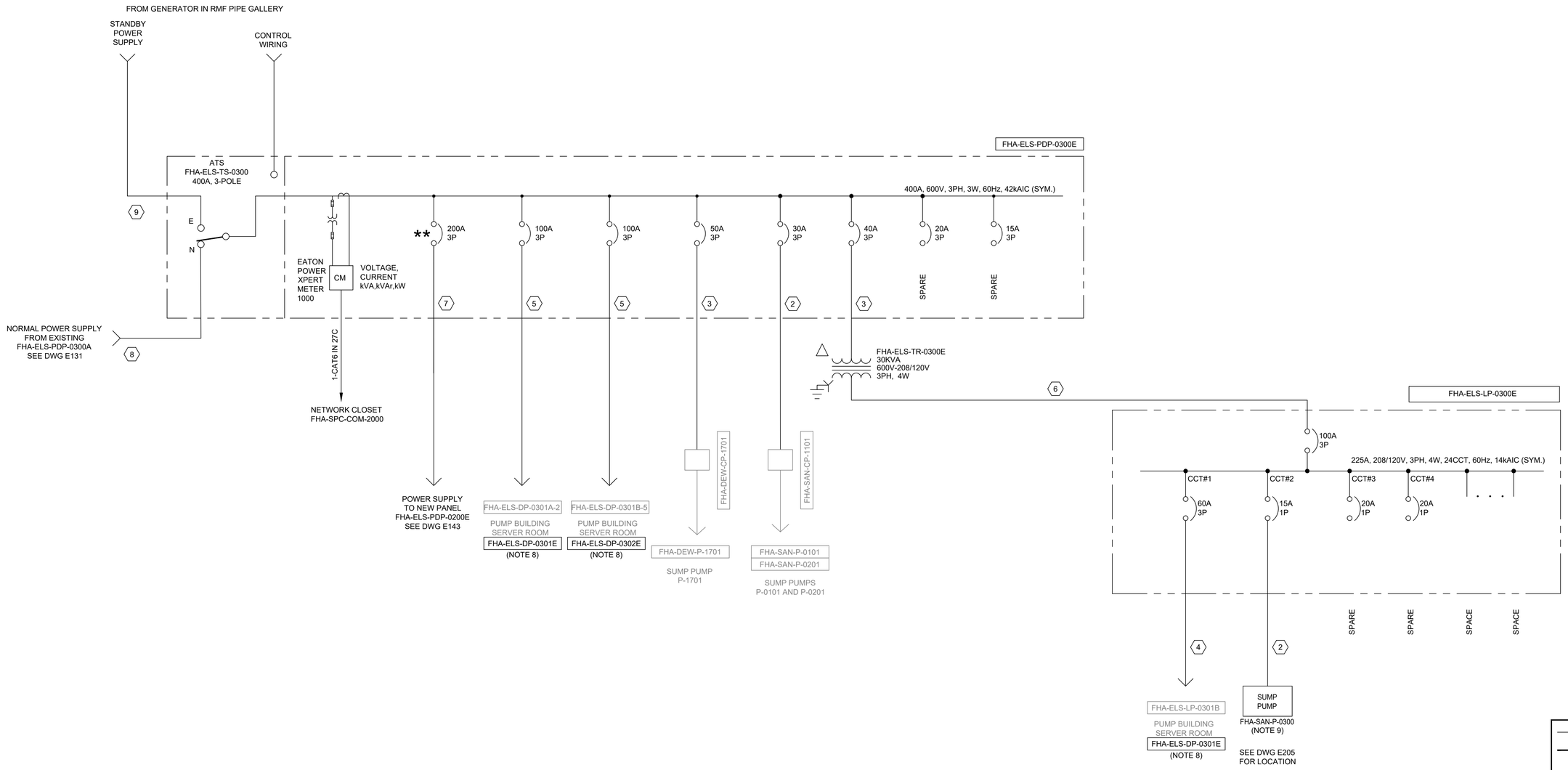
** CIRCUIT BREAKER's HANDLE OPERATING MECHANISM TO BE PADLOCKABLE IN THE 'OFF' POSITION.

NOTES:

1. 'S' DENOTES SHUNT TRIP.
2. ALL TAG NAMES SHOWN ON THE DRAWING HAVE A PREFIX OF "FHA-ELS" UNLESS OTHERWISE NOTED.
3. REFER TO DWG E015 FOR CONTROL WIRING.
4. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
5. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
6. REFER TO DWG E134 FOR NEW PDP ELEVATION LAYOUT.
7. AT EACH DISTRIBUTION POINT, CIRCUIT BREAKERS, FUSES AND SWITCHES SHALL BE MARKED, ADJACENT THERETO, IN A CONSPICUOUS AND LEGIBLE MANNER TO INDICATE CLEARLY WHICH INSTALLATION OR PORTION OF INSTALLATION THEY PROTECT OR CONTROL AND THE MAXIMUM RATING OF OVERCURRENT DEVICE THAT IS PERMITTED.
8. ADD NEW TAGS TO EXISTING PANELS.
9. PROVIDE 15A, 120V RECEPTACLE FOR PLUG-IN SUMP PUMP.

FEEDER AND CONDUIT SCHEDULE

NUMBER	SIZE	RATING (A)
1	1-3C #12 AWG TECK90	20
2	1-3C #10 AWG TECK90	30
3	1-3C #8 AWG TECK90	50
4	1-4C #6 AWG + #8GND - 27C	65
5	1-4C #3 AWG + #8 GND - 35C	100
6	1-4C #2 AWG + #6 GND - 35C	115
7	1-3C #3/0 AWG TECK90	200
8	1-3C 350 MCM TECK90	310
9	1-3C 500 MCM TECK90	500



FHA-ELS-PDP-0300E SINGLE LINE DIAGRAM - NEW STANDBY BUS

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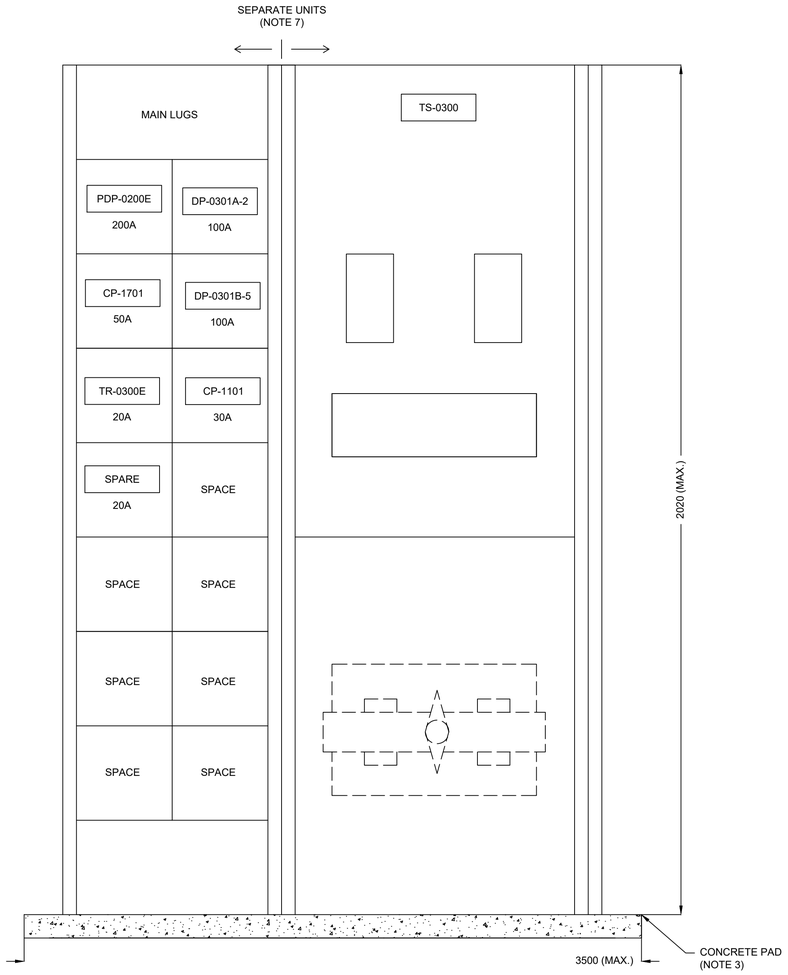
FHA-ELS-PDP-0300E SINGLE LINE DIAGRAM - NEW STANDBY BUS

ELECTRICAL

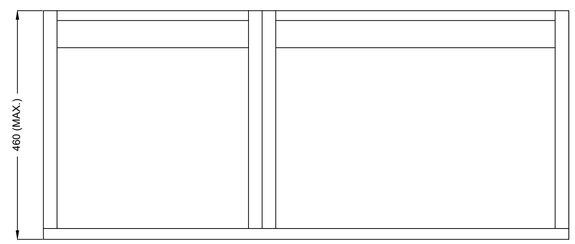
DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-55		E133
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-55-E133.DWG
Layout Tab: M133
Date: 03/19/2025 Time: 12:36:33 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



FRONT VIEW OF PDP-0300E



FLOOR VIEW OF PDP-0300E

NOTES:

1. ALL TAG NAMES SHOWN ON THE DRAWINGS HAVE A PREFIX OF "FHA". ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
2. THIS DRAWING IS INTENDED TO PROVIDE THE GENERAL SCHEMATIC, SIZE, AND LAYOUT OF PANELS. ACTUAL SIZE AND LAYOUT MAY VARY PER EQUIPMENT. CONTRACTOR SHALL SUBMIT ALL LAYOUTS FOR REVIEW.
3. PROVIDE CONCRETE HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
4. DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.
5. DIMENSIONS SHOWN ARE APPROXIMATE AND NOT TO BE EXCEEDED.
6. SEE DWG E205 FOR LOCATION DETAILS.
7. NEW ATS UNIT TO BE SEPARATE FROM NEW STANDBY PDP.

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

FHA-ELS-PDP-0300E ELEVATION LAYOUT - NEW

N.T.S.

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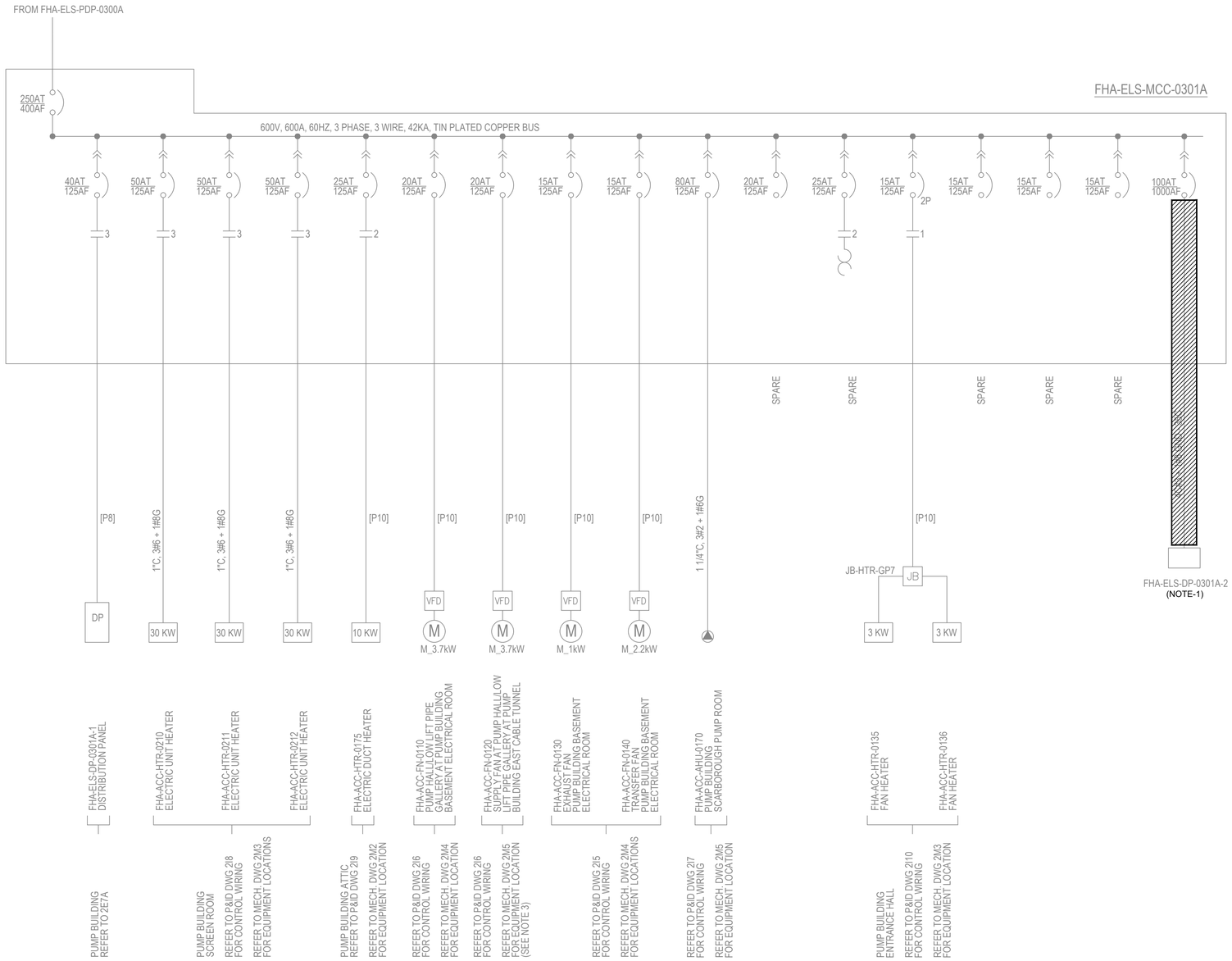
FHA-ELS-PDP-0300E ELEVATION LAYOUT - NEW

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-56		E134
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-56-E134.DWG
Layout Tab: E134
Date: 03/19/2025 Time: 12:36:44 PM



NOTES:

1. REFEED FROM FHA-ELS-PDP-0300E. SEE DRAWING E133.

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

FHA-ELS-MCC-0301A SINGLE LINE DIAGRAM

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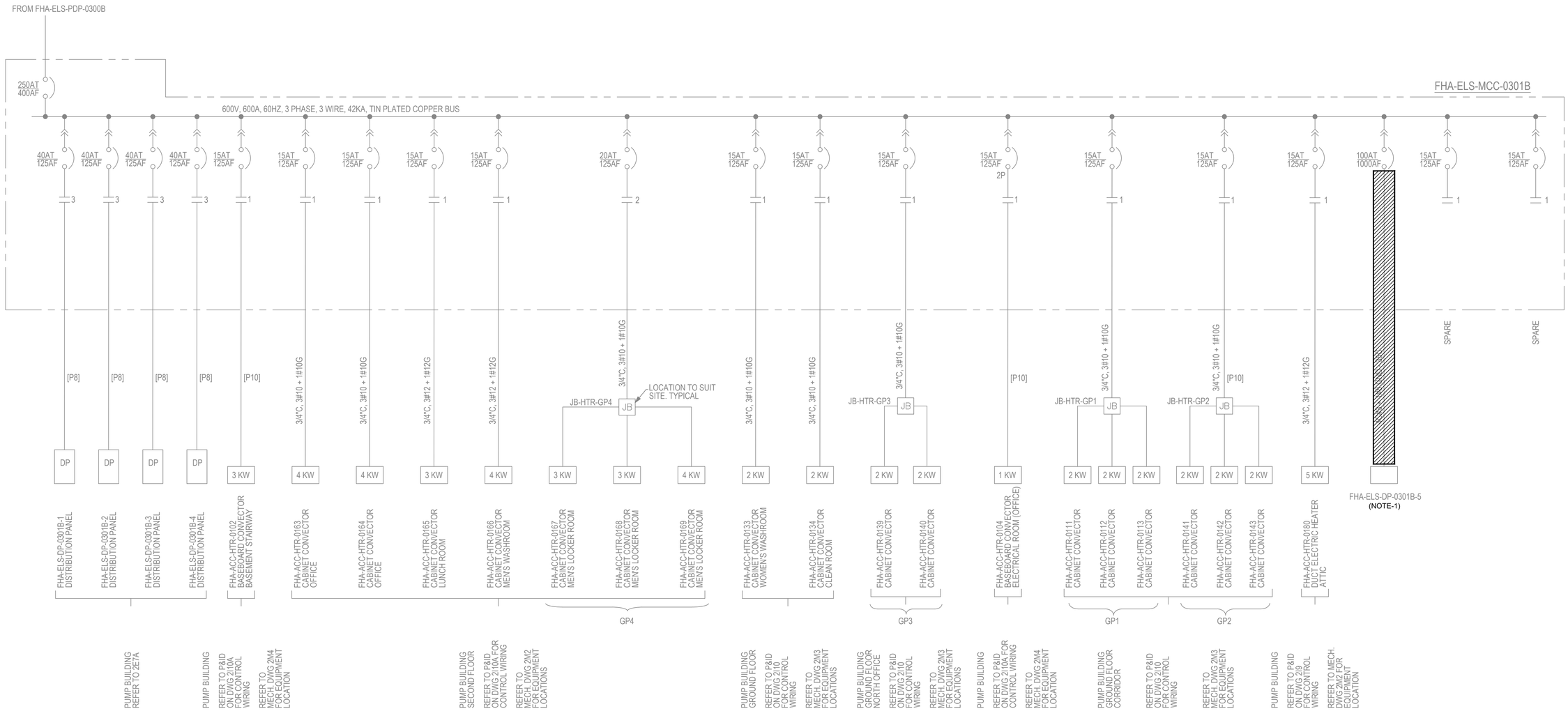
FHA-ELS-MCC-0301A SINGLE LINE DIAGRAM - EXISTING

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-57		E135
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-57-E135.DWG
Layout Tab: E135
Date: 03/19/2025 Time: 12:36:56 PM



NOTES:

1. REFEED FROM FHA-ELS-PDP-0300E. SEE DRAWING E133.

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

FHA-ELS-MCC-0301B SINGLE LINE DIAGRAM - EXISTING

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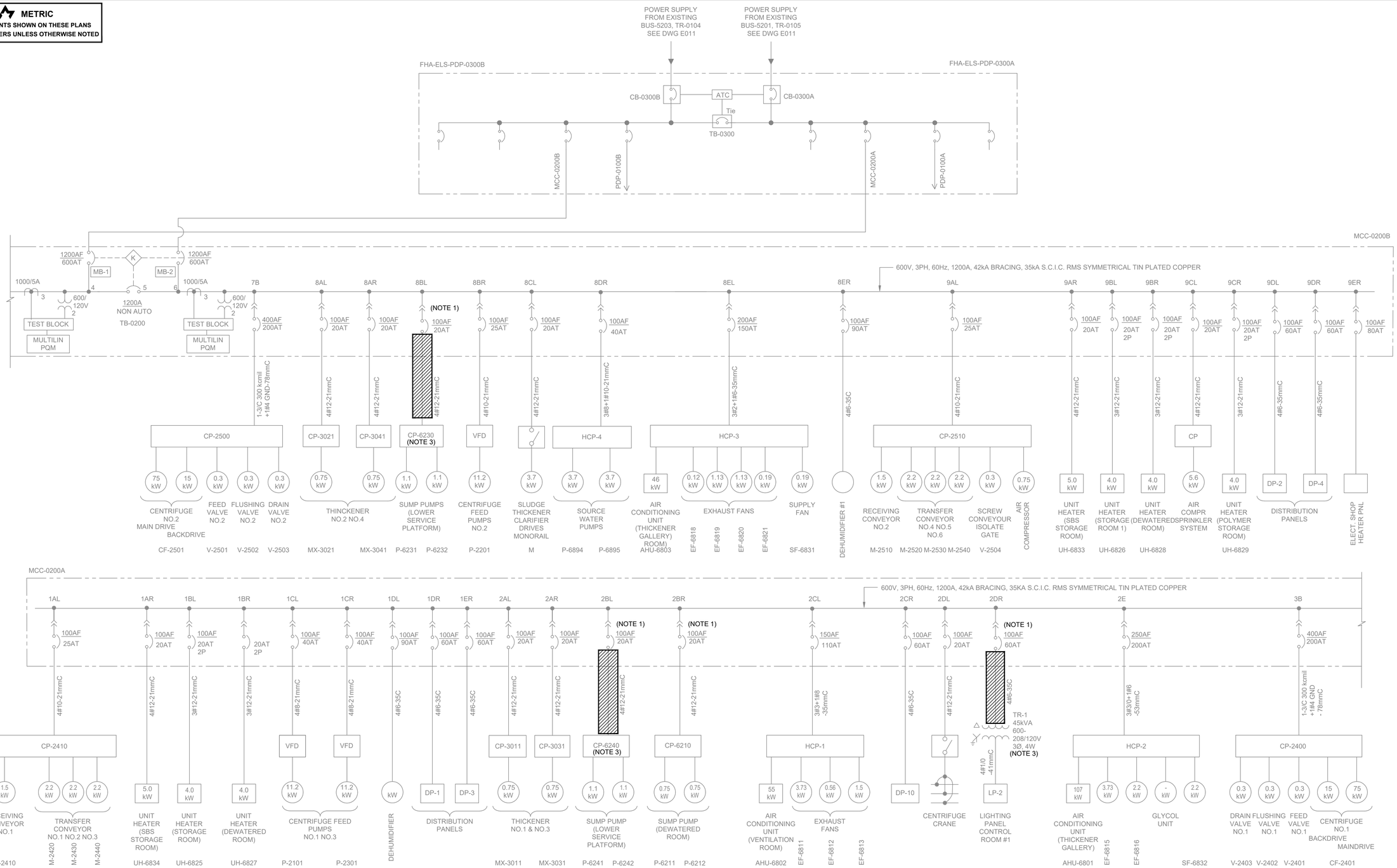
FHA-ELS-MCC-0301B SINGLE LINE DIAGRAM - EXISTING

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-58		E136
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-58-E136.DWG
Layout Tab: E136
Date: 03/19/2025 Time: 12:37:06 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



NOTES:

1. MCC CUBICLE TO BE SPARE.
2. WHEN RELOCATING OR REMOVING EQUIPMENT, SHOULD ANY CIRCUITS BE ABANDONED, THE CONDUCTORS TO THESE CIRCUITS MUST BE REMOVED OR PROPERLY TERMINATED AS DETAILED IN RULE 2-130, RULE 12-114, RULE 12-3000 AND BULLETIN 12-25-*.
3. REFEED FROM FHA-ELS-PDP-0200E. SEE DRAWING E143.

FHA-ELS-MCC-0200A/B SINGLE LINE DIAGRAM - MODIFICATIONS

N.T.S.

** CIRCUIT BREAKER's HANDLE OPERATING MECHANISM TO BE PADLOCKABLE IN THE 'OFF' POSITION.

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

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FHA-ELS-MCC-0200A/B SINGLE LINE DIAGRAM - MODIFICATIONS

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-59		E141
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-59-E141.DWG
Layout Tab: E141
Date: 03/19/2025 Time: 12:37:20 PM

METRIC
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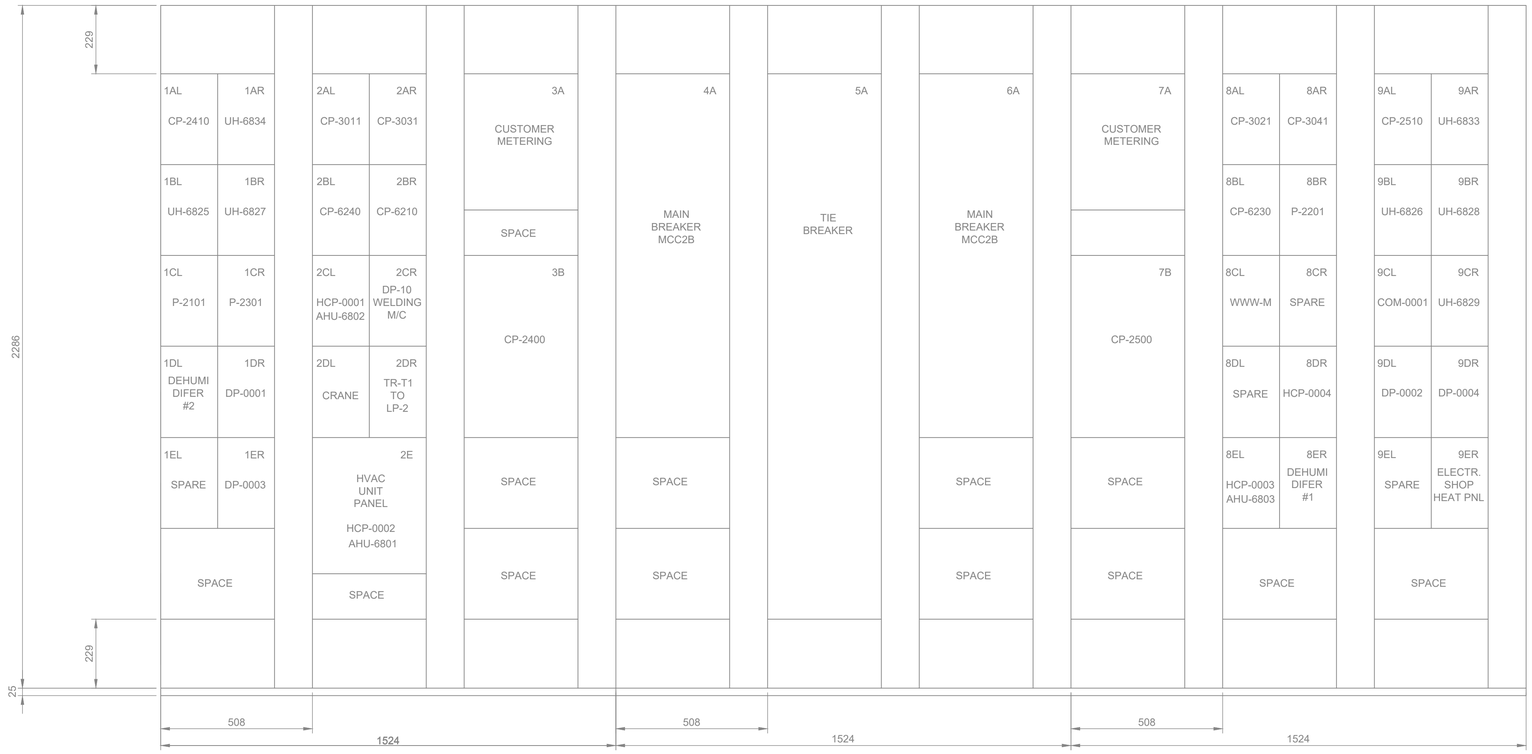
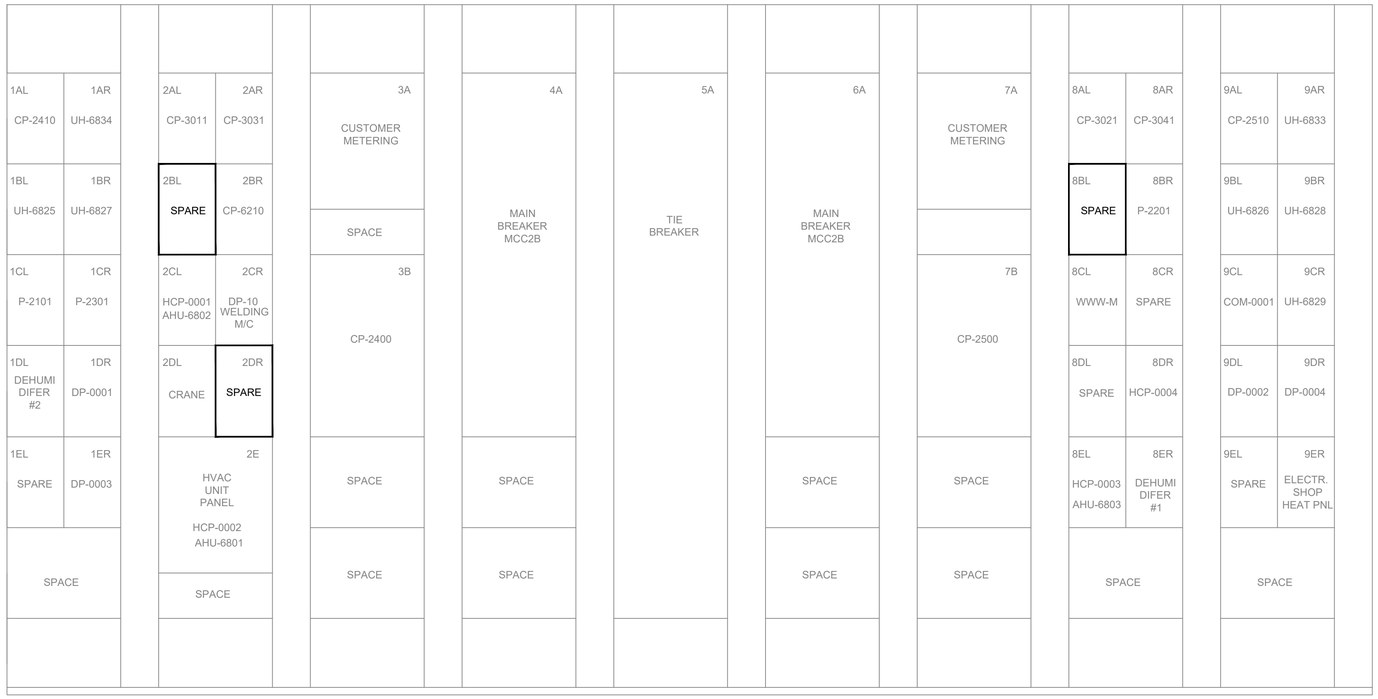


EXISTING



MODIFICATIONS

ELECTRICAL CHARACTERISTICS:

600 V	MAIN BUS: 1200A
3 PH	SCCR: 35kAIC (SYM RMS.)
3 WIRE	BUS BRACING: 42kAIC (SYM RMS.)
60 Hz	ENCLOSURE TYPE: EEMAC 1A

NOTES:

1. REFER TO DWG E207 FOR LOCATION DETAILS.
2. EXISTING CIRCUIT BREAKER TO BE SET TO 100A TRIP.
3. ALL TAG NAMES SHOWN ON THE DRAWINGS HAVE A PREFIX OF "FHA-WWW-". ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
4. DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.

FHA-ELS-MCC-0200A/B ELEVATION LAYOUT - EXISTING AND MODIFICATIONS

SCALE: 1:10

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

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A	2025-03-18	ISSUED FOR TENDER	T.S.	

TORONTO

TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
X. D. SHEN
100121127
MAR. 19, 2025
PROVINCE OF ONTARIO

WILLIAM FERNANDES, P.ENG
DIRECTOR
WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

FHA-ELS-MCC-0200A/B ELEVATION LAYOUT - EXISTING AND MODIFICATIONS

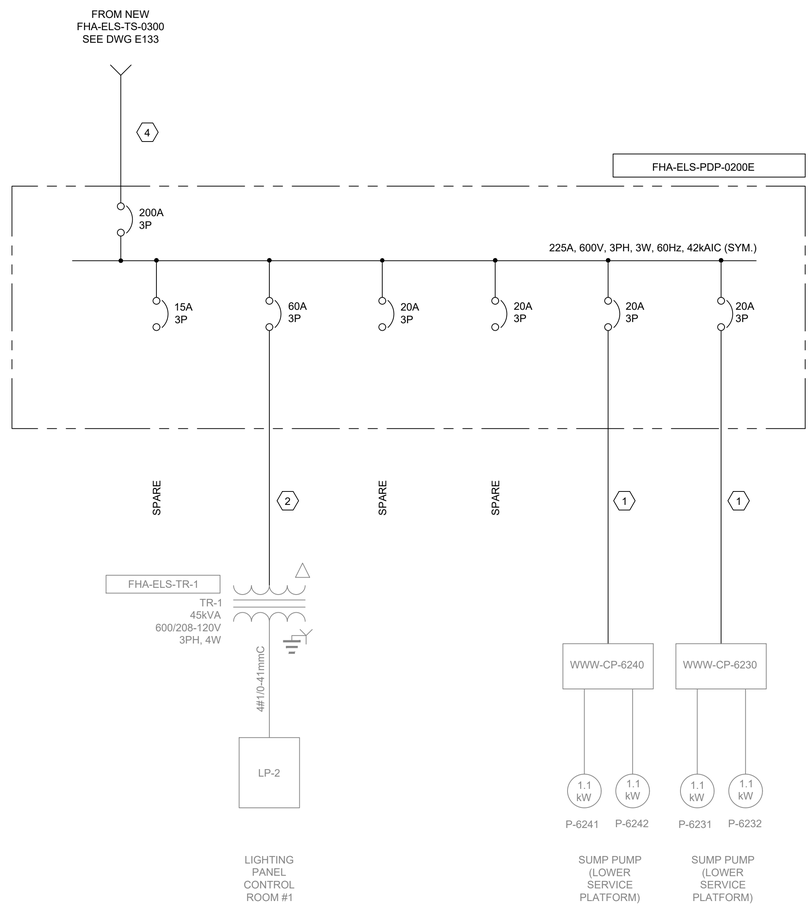
ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:10			DRAWING NUMBER:	2F-2017-08-60		E142
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-60-E142.DWG
Layout: Tab: E142
Date: 03/19/2025 Time: 12:37:32 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED

FEEDER AND CONDUIT SCHEDULE		
NUMBER	SIZE	RATING (A)
1	1-3C #10 AWG TECK90	35
2	1-3C #6 AWG TECK90	65



NOTES:

1. ALL TAG NAMES SHOWN ON THE DRAWINGS HAVE A PREFIX OF "FHA". ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
2. REFER TO DWG E015 FOR CONTROL WIRING.
3. ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
4. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
5. REFER TO DWGs E207 AND E208 FOR LOCATION DETAILS.
6. REFER TO DWG E144 FOR NEW STANDBY PDP ELEVATION LAYOUT.
7. AT EACH DISTRIBUTION POINT, CIRCUIT BREAKERS, FUSES AND SWITCHES SHALL BE MARKED, ADJACENT THERETO, IN A CONSPICUOUS AND LEGIBLE MANNER TO INDICATE CLEARLY WHICH INSTALLATION OR PORTION OF INSTALLATION THEY PROTECT OR CONTROL AND THE MAXIMUM RATING OF OVERCURRENT DEVICE THAT IS PERMITTED.

FHA-ELS-PDP-0200E SINGLE LINE DIAGRAM - NEW STANDBY BUS

N.T.S

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

TORONTO Water

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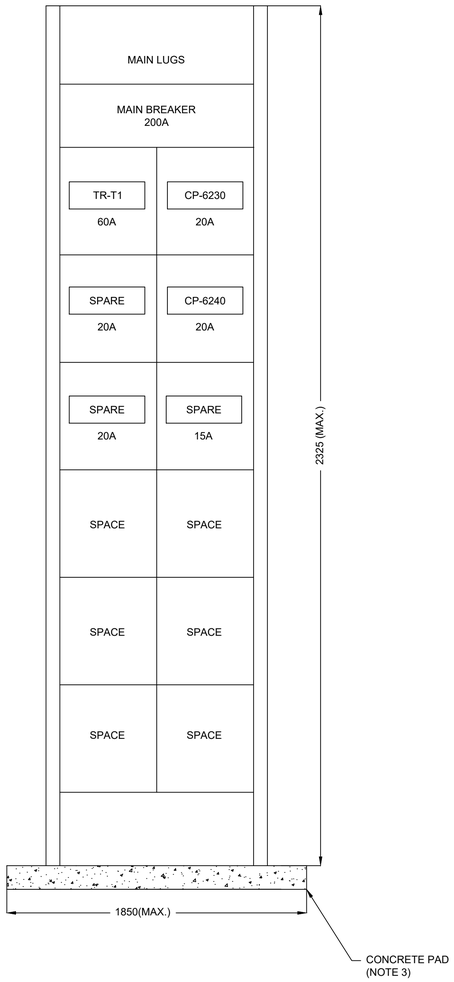
FHA-ELS-PDP-0200E SINGLE LINE DIAGRAM - NEW STANDBY BUS

ELECTRICAL

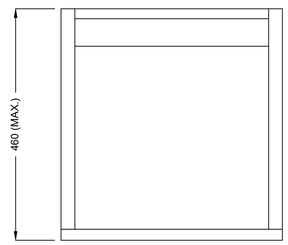
DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-61		E143
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-61-E143.DWG
Layout Tab: E143
Date: 03/19/2025 Time: 12:37:45 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED



FRONT VIEW OF PDP-0200E



FLOOR VIEW OF PDP-0200E

NOTES:

1. ALL TAG NAMES SHOWN ON THE DRAWINGS HAVE A PREFIX OF "FHA". ALL CONDUCTORS, EQUIPMENT, AND FIELD CONNECTIONS SHALL BE TAGGED AND IDENTIFIED AS PER CITY REQUIREMENTS.
2. THIS DRAWING IS INTENDED TO PROVIDE THE GENERAL SCHEMATIC, SIZE, AND LAYOUT OF PANELS. ACTUAL SIZE AND LAYOUT MAY VARY PER EQUIPMENT. CONTRACTOR SHALL SUBMIT ALL LAYOUTS FOR REVIEW.
3. PROVIDE CONCRETE HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
4. DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.
5. DIMENSIONS SHOWN ARE APPROXIMATE AND NOT TO BE EXCEEDED.
6. REFER TO DWGs E207 AND E208 FOR LOCATION DETAILS.

FHA-ELS-PDP-0200E ELEVATION LAYOUT - NEW

N.T.S.

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

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INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
FHA-ELS-PDP-0200E ELEVATION LAYOUT - NEW

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-62		E144
DATE:	2024-09-30						

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Layout: E144
Date: 03/19/2025 Time: 12:37:57 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

EXISTING LIGHTING PANEL LP 'F'

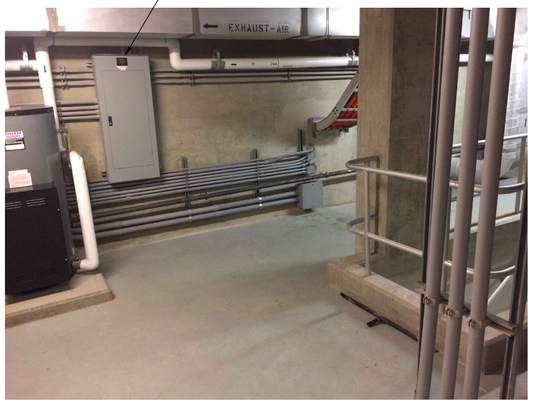


PHOTO 1

PROPOSED LOCATION FOR OVERHEAD CABLE ROUTING INSIDE RMF PIPE GALLERY

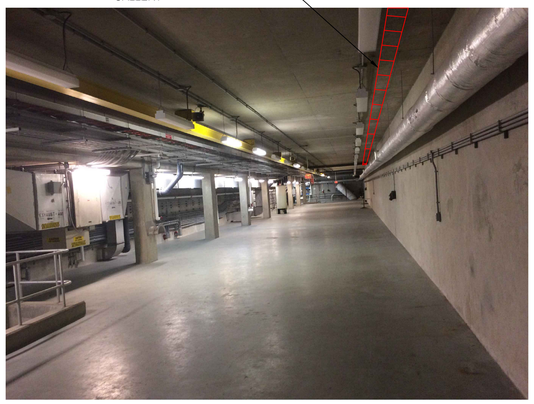
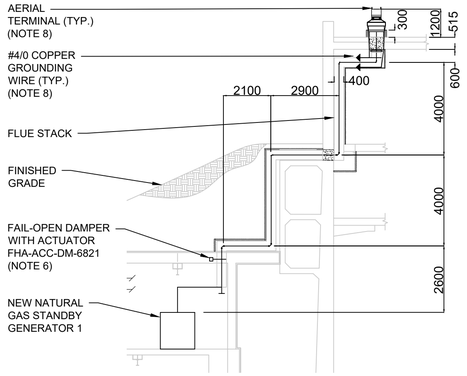


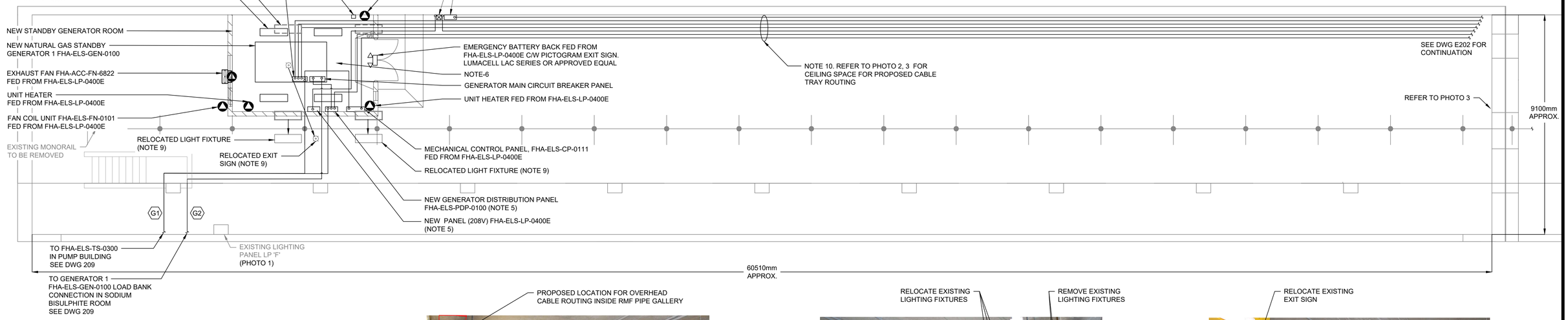
PHOTO 2



PIPE GALLERY & FILTER BUILDING ELEVATION - CHIMNEY GROUNDING FOR NEW NATURAL GAS STANDBY GENERATOR 1 - FHA-ELS-GEN-0100

CABLE ROUTING TABLE

#	FED FROM	TO	LOCATION	REFERENCE
G1	FHA-ELS-TS-0300	GENERATOR 1 FHA-ELS-GEN-0100	FROM PUMPING STATION TO RMF PIPE GALLERY	DWG E201, E205, E207, E209
G2	GENERATOR 1 FHA-ELS-GEN-0100	GENERATOR 1 LOAD CONNECTION BOX	FROM RMF PIPE GALLERY TO SODIUM BISULPHITE ROOM	DWG E201, E209



NOTES:

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE STRUCTURAL AND MECHANICAL DRAWINGS.
2. PROVIDE NEW AND COMPLETE OVERHEAD CABLE TRAY SYSTEM FOR ALL NEW POWER AND CONTROL CABLES/WIRING TO INTERCONNECT EQUIPMENT. USE OF EXISTING CABLE TRAYS WILL ONLY BE ACCEPTED IF SUFFICIENT SPACE IS AVAILABLE AND THE RESULTING FILL AREA DOES NOT EXCEED THE OESC CODE REQUIREMENTS.
3. PROVIDE SEPARATE CABLE TRAYS OR ACCEPTABLE BARRIER FOR CONDUCTORS OF 600VAC POWER, ELECTRICAL LIGHTING, 120VAC CONTROL AND SIGNAL WIRING.
4. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
5. NEW PANEL TO BE MOUNTED ON THE WALL INSIDE THE NEW ROOM FOR NEW STANDBY GENERATOR 1. SEE DRAWING E103 FOR CIRCUIT ASSIGNMENT.
6. REFER TO MECHANICAL DRAWINGS FOR LOCATION OF ALL CONTROL AND MECHANICAL EQUIPMENT.
7. REFER TO DWG E202 FOR LOCATION DETAILS OF EXISTING REMOTE PROCESSING UNIT FHA-SPC-RPU-2022.
8. THE CHIMNEY SHALL BE ELECTRICALLY GROUNDED. CONTRACTOR TO PROVIDE TWO (2) AERIAL TERMINALS AT THE TOP OF THE CHIMNEY AND TWO (2) CONNECTING POINTS FOR #4/0 COPPER GROUNDING WIRES. GROUNDING WIRES (APPROX. 250m) TO BE EXTENDED TO THE GROUND BAR ON THE WALL LOCATED IN RMF MCC ROOM.
9. RELOCATE EXISTING FIXTURE TO NEW LOCATION AS SHOWN. EXTEND CONDUIT AND WIRING AS REQUIRED.
10. RUN TECK CABLES IN NEW CABLE TRAY. SUPPORT NEW CONTROL/SCADA CONDUITS BELOW THE CABLE TRAY. REFER TO DWG E015 FOR DETAILS.

PROPOSED LOCATION FOR OVERHEAD CABLE ROUTING INSIDE RMF PIPE GALLERY

PHOTO 3

RELOCATE EXISTING LIGHTING FIXTURES

REMOVE EXISTING LIGHTING FIXTURES

PHOTO 4

RELOCATE EXISTING EXIT SIGN

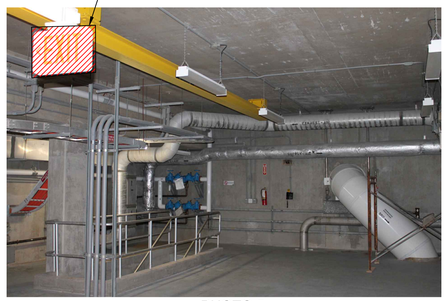


PHOTO 5

EXISTING
NEW

ELECTRICAL FLOOR PLAN - RMF PIPE GALLERY (EL. 88.00)

N.T.S.

TORONTO Water

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ELECTRICAL FLOOR PLAN - RMF PIPE GALLERY (EL. 88.00)

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-63		E201
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-63-E201.DWG
Layout: E201
Date: 03/19/2025 Time: 02:55:05 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

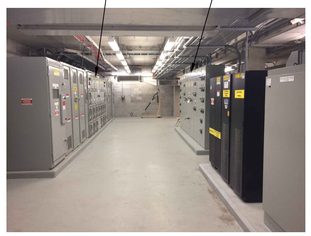


PHOTO 1
SCALE: N.T.S.

PHOTO 2
SCALE: N.T.S.

PHOTO 3
SCALE: N.T.S.

PHOTO 4
SCALE: N.T.S.

PHOTO 5
SCALE: N.T.S.

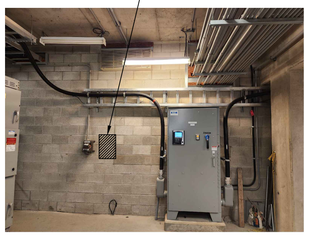


PHOTO 6
SCALE: N.T.S.

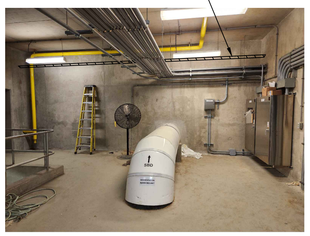
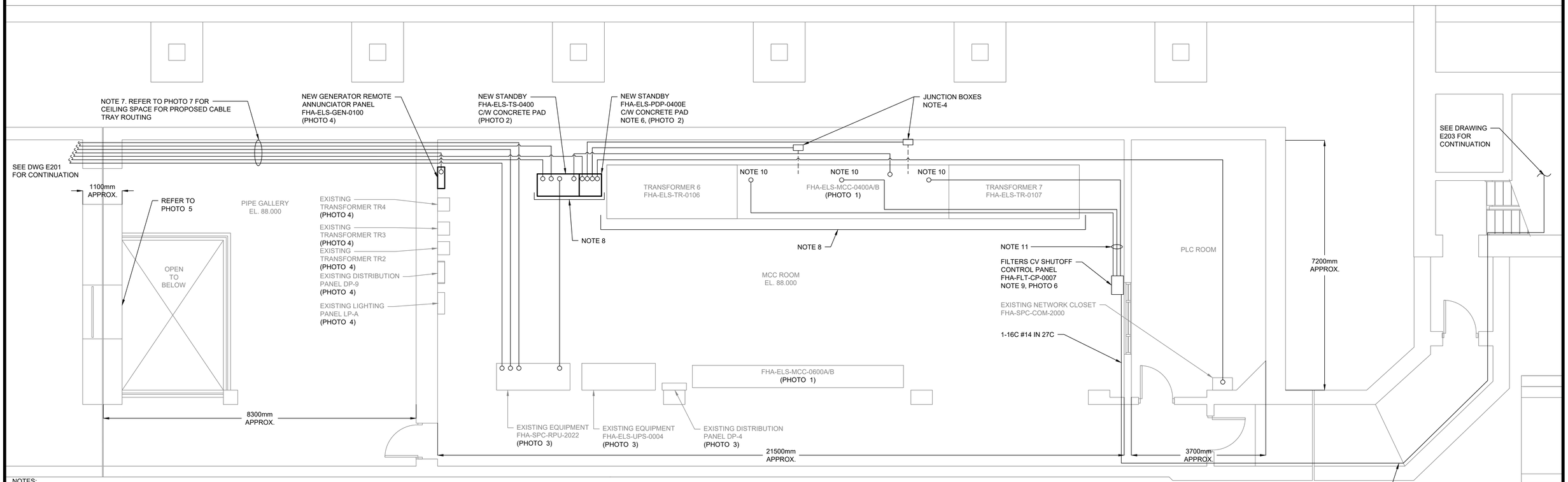


PHOTO 7
SCALE: N.T.S.



NOTES:

1. PROVIDE NEW AND COMPLETE OVERHEAD CABLE TRAY SYSTEM FOR ALL NEW POWER AND CONTROL CABLES/WIRING TO INTERCONNECT EQUIPMENT WHERE INDICATED. USE OF EXISTING CABLE TRAYS WILL ONLY BE ACCEPTED IF SUFFICIENT SPACE IS AVAILABLE AND THE RESULTING FILL AREA DOES NOT EXCEED THE OESC CODE REQUIREMENTS.
2. PROVIDE SEPARATE CABLE TRAYS OR ACCEPTABLE BARRIER FOR CONDUCTORS OF 600VAC POWER, ELECTRICAL LIGHTING, 120VAC CONTROL AND SIGNAL WIRING.
3. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
4. DISCONNECT EXISTING FEEDERS FOR PDP-0401A/B FROM MCC-0400A/B AND EXTEND TO NEW PDP-0400E.
5. CONTRACTOR TO COORDINATE WITH CITY OF TORONTO FOR THE EXACT INSTALLATION LOCATION OF THE EQUIPMENT.
6. PROVIDE CONDUIT AND DATA WIRING BETWEEN POWER METER INSIDE FHA-ELS-PDP-0400E AND EXISTING NETWORK CLOSET FHA-SPC-COM-2000.
7. RUN TECK CABLES IN CABLE TRAY, SUPPORT CONDUITS BELOW THE CABLE TRAY.
8. PROVIDE 2' WIDE ELECTRICAL INSULATION MAT COVERING THE FULL LENGTH OF THE EQUIPMENT.
9. REFER TO E016 FOR WIRING & CONNECTION DETAILS.
10. INSTALL TECK CABLES TO THE UNDERSIDE OF THE EXISTING CABLE TRAY.
11. PROVIDE SUPPORT FOR TECK CABLES ON WALL.

ELECTRICAL FLOOR PLAN - RMF MCC ROOM (EL. 88.00)

N.T.S.

EXISTING
NEW

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ELECTRICAL FLOOR PLAN - RMF MCC ROOM (EL. 88.00)

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-64		E202
DATE:	2024-09-30						

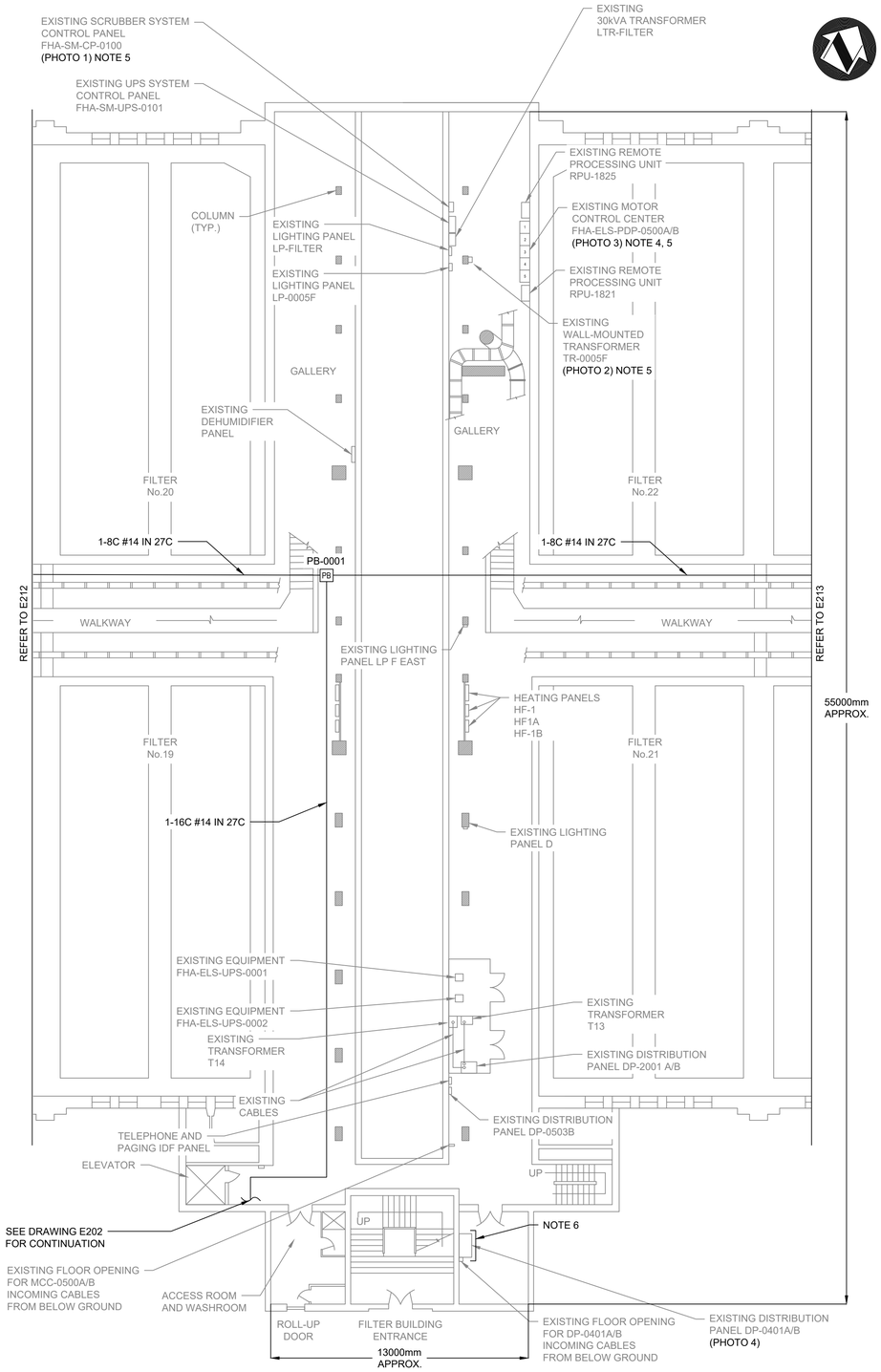
Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-64-E202.DWG
Layout Tab: E202
Date: 03/19/2025 Time: 12:38:46 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED

PHOTO 1
SCALE: N.T.S.

EXISTING SCRUBBER PANEL

PHOTO 2
SCALE: N.T.S.



ELECTRICAL FLOOR PLAN - LOWER FILTER PIPE GALLERY (EL. 94.06)
N.T.S.

EXISTING MOTOR CONTROL CENTER FHA-ELS-PDP-0500A/B

PHOTO 3
SCALE: N.T.S.

EXISTING DISTRIBUTION PANEL DP-0401A/B

PHOTO 4
SCALE: N.T.S.

NOTES:

1. PROVIDE NEW AND COMPLETE OVERHEAD CABLE TRAY SYSTEM FOR ALL NEW POWER AND CONTROL CABLES/WIRING TO INTERCONNECT EQUIPMENT WHERE INDICATED. USE OF EXISTING CABLE TRAYS WILL ONLY BE ACCEPTED IF SUFFICIENT SPACE IS AVAILABLE AND THE RESULTING FILL AREA DOES NOT EXCEED THE OESC CODE REQUIREMENTS.
2. PROVIDE SEPARATE CABLE TRAYS OR ACCEPTABLE BARRIER FOR CONDUCTORS OF 600VAC POWER, ELECTRICAL LIGHTING, 120VAC CONTROL WIRING AND SIGNAL WIRING.
3. UNLESS OTHERWISE INDICATED ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
4. DISCONNECT EXISTING FEEDERS FOR FHA-FLT-UPS-0001 AND 0002. RELOCATE FEEDERS TO PDP-0401A/B.
5. DISCONNECT EXISTING FEEDERS FOR EXISTING SCRUBBER CONTROL PANEL FHA-SM-CP-0100 AND EXISTING TRANSFORMER FHA-ELS-TR-0500F. EXTEND FEEDERS TO PDP-0401A/B.
8. PROVIDE 2' WIDE ELECTRICAL INSULATION MAT COVERING THE FULL LENGTH OF THE EQUIPMENT.

EXISTING
NEW

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ELECTRICAL FLOOR PLAN - LOWER FILTER PIPE GALLERY (EL. 94.06)

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-65		E203
DATE:	2024-09-30						

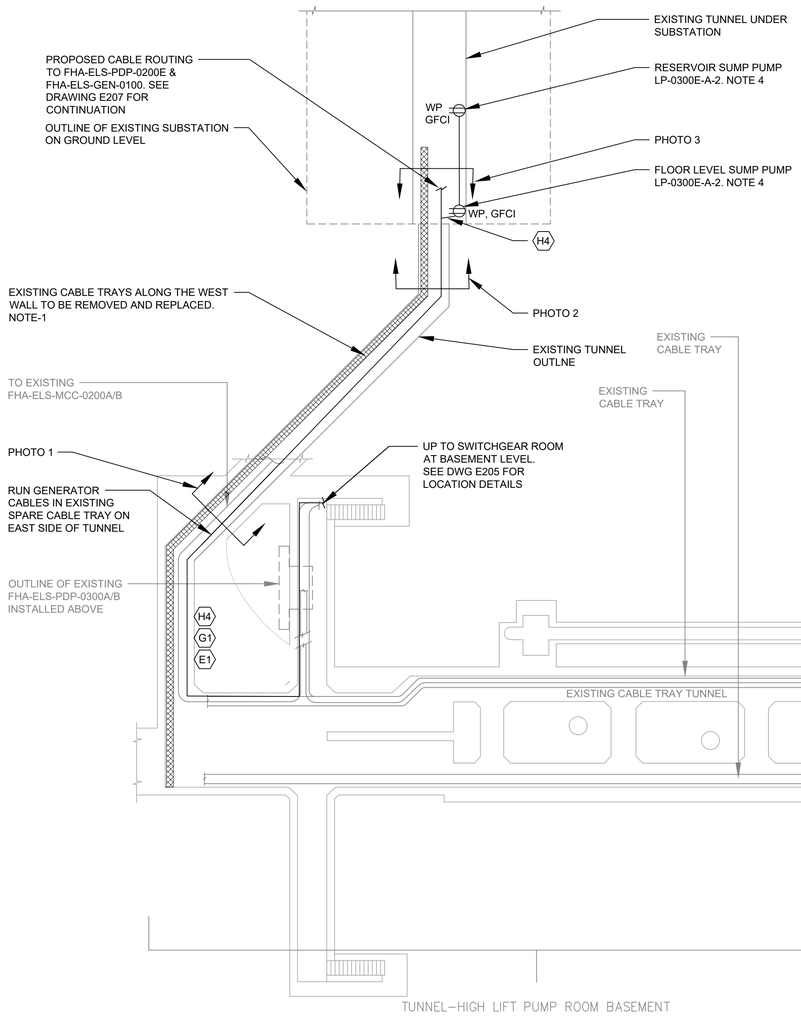
Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-65-E203.DWG
Layout: E203
Date: 03/19/2025 Time: 12:39:01 PM

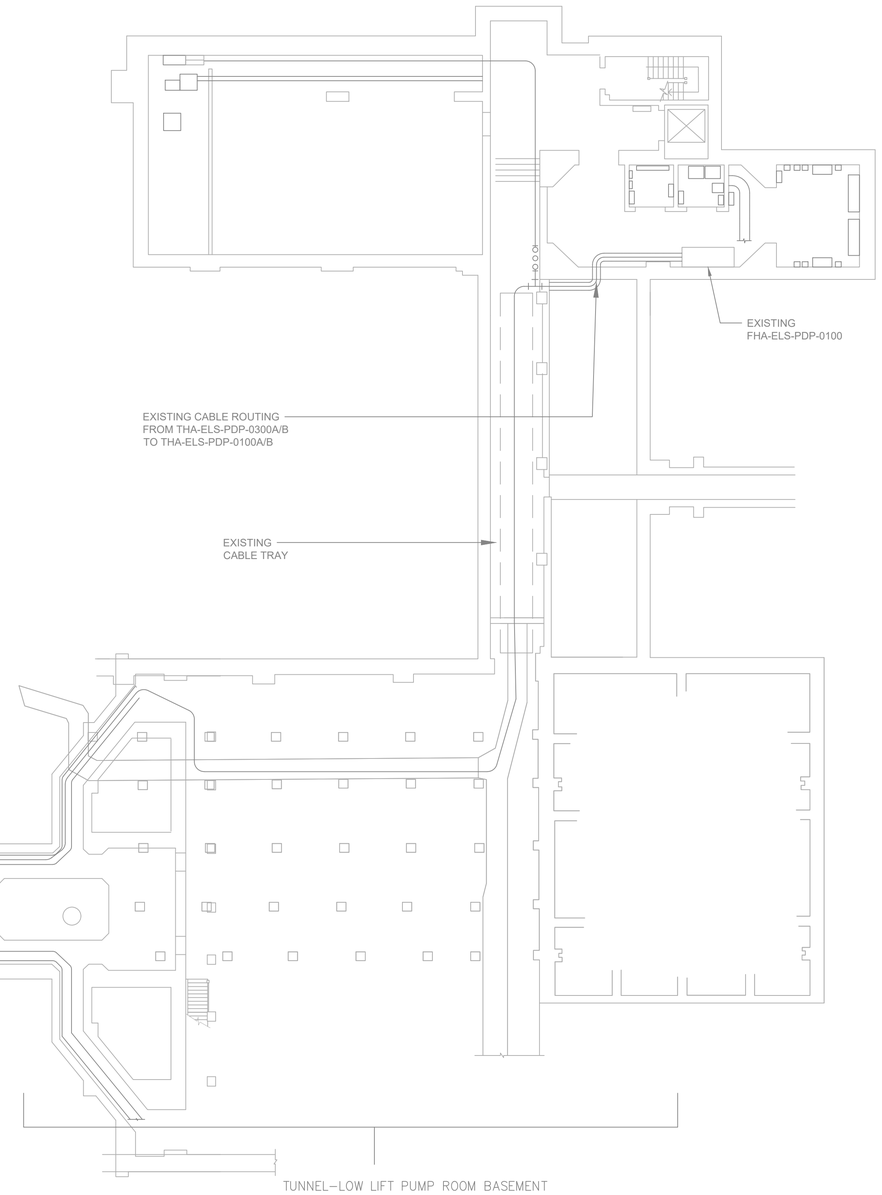
METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

CABLE ROUTING TABLE

#	FED FROM	TO	LOCATION	REFERENCE
E1	FHA-ELS-PDP-0300E	FHA-ELS-PDP-0200E	FROM PUMPING STATION TO RMF BUILDING	DWG E205, E207, E208
G1	GENERATOR 1 FHA-ELS-GEN-0100	FHA-ELS-TS-0300	FROM RMF PIPE GALLERY TO SWITHGEAR ROOM PUMP BUILDING	DWG E201, E205, E207, E209
H4	FHA-ELS-PDP-0300E	SUMP PUMP FHA-SAN-P-0300E	SWITCHGEAR ROOM PUMPING STATION TO TUNNEL UNDER SUBSTATION IN RMF BLDG	DWG E205





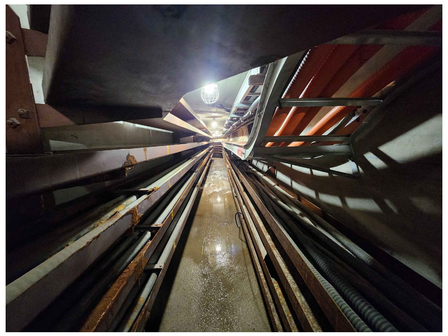


PHOTO 1

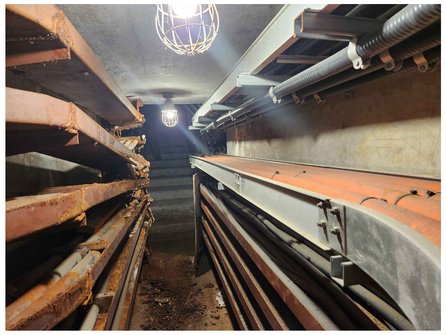


PHOTO 2

PHOTO 3

NOTES:

1. REPLACE THE ENTIRE LENGTH OF EXISTING DETERIORATED CABLE TRAYS (5 LAYERS) C/W SUPPORTS ALONG THE WEST WALL OF THE TUNNEL BETWEEN RMF BUILDING AND PUMP BULDING WITH NEW 12"x4" ALUMINUM LADDER CABLE TRAY. CLEAN THE SALT CRYSTALS FROM REST OF THE CABLE. RE-INSTALL HV CABLES IN NEW CABLE TRAYS. DISPOSE OF OLD CABLE TRAYS AND SUPPORTS. CONTRACTOR TO SITE VERIFY.
2. PROVIDE NEW AND COMPLETE WALL MOUNTED CABLE TRAY SYSTEM FOR ALL NEW POWER AND CONTROL CABLE AND WIRING AS REQUIRED TO INTERCONNECT EQUIPMENT, UNLESS OTHERWISE NOTED. USE OF EXISTING CABLE TRAYS WILL ONLY BE ACCEPTED IF SUFFICIENT SPACE IS AVAILABLE AND THE RESULTING FILL AREA DOES NOT EXCEED THE OESC CODE REQUIREMENTS. MAXIMUM ALLOWABLE FILL AREA NOT TO BE EXCEEDED.
3. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL CABLES ARE TO BE TECK90.
4. COORDINATE LOCATION ON SITE WITH SUMP PUMP TRADE.

ELECTRICAL FLOOR PLAN - PUMPING STATION TUNNEL TO SERVICE BUILDING

SCALE: 1:150

TORONTO Water

ARCADIS
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TORONTO, ONTARIO, M9W 0C9
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NO.	DATE	REVISIONS	INITIAL	SIGNED
A	2025-03-18	ISSUED FOR TENDER	T.S.	

TORONTO

TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
X. D. SHEN
100121127
MAR. 19, 2025
PROVINCE OF ONTARIO

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WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

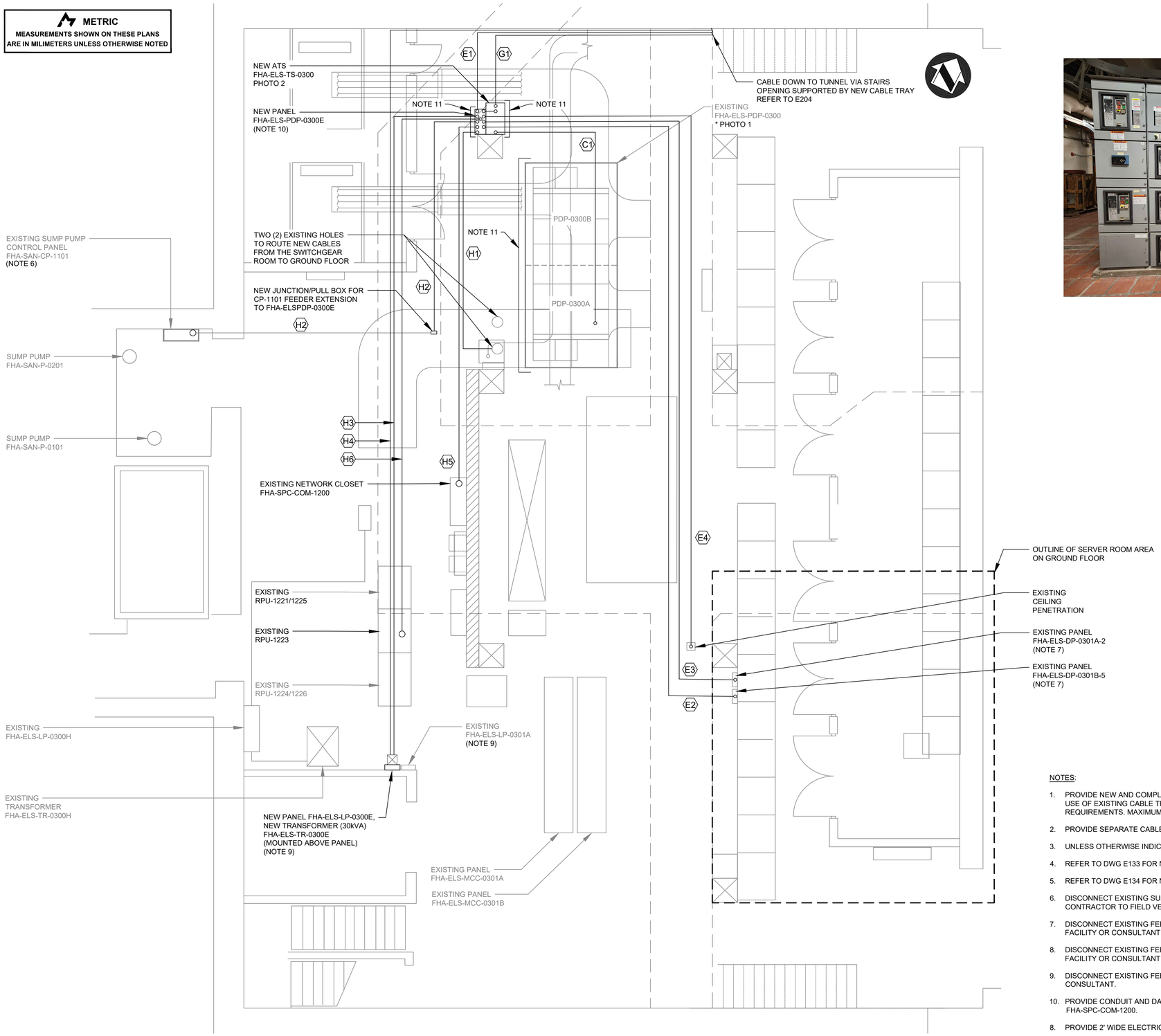
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
ELECTRICAL FLOOR PLAN - PUMPING STATION TUNNEL TO SERVICE BUILDING

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:150			DRAWING NUMBER:	2F-2017-08-66		E204
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-66-E204.DWG
Layout Tab: E204 Time: 12:39:25 PM
Date: 03/19/2025

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED



ELECTRICAL FLOOR PLAN - SWITCHGEAR ROOM PUMPING STATION BASEMENT
1:50

PHOTO 1

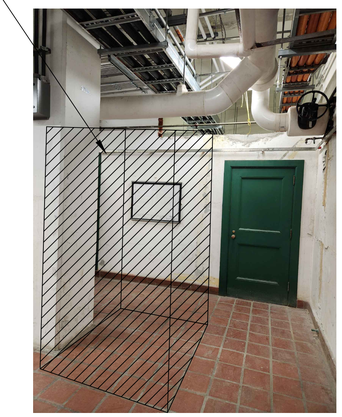


PHOTO 2

CABLE ROUTING TABLE

#	FED FROM	TO	LOCATION	REFERENCE
C1	FHA-ELS-PDP-0300B	FHA-ELS-TS-0300	SWITCHGEAR ROOM PUMPING STATION	DWG E205
E1	FHA-ELS-PDP-0300E	FHA-ELS-PDP-0200E	FROM PUMPING STATION TO RMF BUILDING	DWG E205, E207, E208
E2	FHA-ELS-PDP-0300E	FHA-ELS-PDP-0301A-2	SWITCHGEAR ROOM PUMPING STATION	DWG E205
E3	FHA-ELS-PDP-0300E	FHA-ELS-PDP-0301B-5	SWITCHGEAR ROOM PUMPING STATION	DWG E205
E4	FHA-ELS-PDP-0300E	FHA-ELS-LP-0301B	FROM SWITCHGEAR ROOM PUMPING STATION TO SERVER ROOM	DWG E205, E206
G1	GENERATOR 1 FHA-ELS-GEN-0100	FHA-ELS-TS-0300	FROM RMF PIPE GALLERY TO SWITHGEAR ROOM PUMP BUILDING	DWG E201, E205, E207, E209
H1	FHA-ELS-PDP-0300E	SUMP PUMP CONTROL PANEL FHA-DEW-CP-1701	SWITCHGEAR ROOM PUMPING STATION	DWG E205, E206
H2	FHA-ELS-PDP-0300E	SUMP PUMP CONTROL PANEL FHA-SAN-CP-1101	SWITCHGEAR ROOM PUMPING STATION	DWG E205
H3	FHA-ELS-PDP-0300E	TRANSFORMER FHA-ELS-TR-0300E	SWITCHGEAR ROOM PUMPING STATION	DWG E204, E205
H4	FHA-ELS-LP-0300E	SUMP PUMP FHA-SAN-P-0300E	SWITCHGEAR ROOM PUMPING STATION TO TUNNEL UNDER SUBSTATION IN RMF BLDG	DWG E205
H5	FHA-ELS-PDP-0300E	NETWORK CLOSET FHA-SPC-COM-1200	SWITCHGEAR ROOM PUMPING STATION	DWG E205
H6	FHA-ELS-TS-0300E	RPU PANEL RPU-1223	SWITCHGEAR ROOM PUMPING STATION	DWG E205

NOTES:

1. PROVIDE NEW AND COMPLETE OVERHEAD CABLE TRAY SYSTEM FOR ALL NEW POWER AND CONTROL CABLE AND WIRING AS REQUIRED TO INTERCONNECT EQUIPMENT. USE OF EXISTING CABLE TRAYS WILL ONLY BE ACCEPTED IF SUFFICIENT SPACE IS AVAILABLE AND THE RESULTING FILL AREA DOES NOT EXCEED THE OESC CODE REQUIREMENTS. MAXIMUM ALLOWABLE FILL AREA NOT TO BE EXCEEDED.
2. PROVIDE SEPARATE CABLE TRAYS OR ACCEPTABLE BARRIER FOR CONDUCTORS OF 600VAC POWER, ELECTRICAL LIGHTING, 120VAC CONTROL AND SIGNAL WIRING.
3. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
4. REFER TO DWG E133 FOR NEW STANDBY FHA-ELS-PDP-0300E SINGLE LINE DIAGRAM AND CABLE SCHEDULE.
5. REFER TO DWG E134 FOR NEW STANDBY PDP ELEVATION LAYOUT.
6. DISCONNECT EXISTING SUMP PUMP CONTROL PANEL CP-1101 FROM DP-1101B (LOCATED ON GROUND FLOOR). EXTEND EXISTING FEEDER TO FHA-ELS-PDP-0300E. CONTRACTOR TO FIELD VERIFY EXISTING SUMP PUMP CONTROL PANEL LOCATIONS.
7. DISCONNECT EXISTING FEEDER FOR FHA-ELS DP-0301A-2 FROM MCC-FLS-MCC-0301A AND RECONNECT TO FHA-ELS-PDP-0300E. COORDINATE SWITCH WITH THE FACILITY OR CONSULTANT.
8. DISCONNECT EXISTING FEEDER FOR FHA-ELS DP-0301B-5 FROM MCC-FLS-MCC-0301B AND RECONNECT TO FHA-ELS-PDP-0300E. COORDINATE SWITCH WITH THE FACILITY OR CONSULTANT.
9. DISCONNECT EXISTING FEEDER FOR FHA-ELS-LP-0301B FROM FHA-ELS-LP-0301A AND RECONNECT TO FHA-ELS-LP-0300E-A. COORDINATE SWITCH WITH THE FACILITY OR CONSULTANT.
10. PROVIDE CONDUIT AND DATA WIRING BETWEEN POWER METER INSIDE FHA-ELS-PDP-0300E AND EXISTING NETWORK CLOSET FHA-SPC-COM-1200.

8. PROVIDE 2' WIDE ELECTRICAL INSULATION MAT COVERING THE FULL LENGTH OF THE EQUIPMENT.

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

TORONTO Water

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INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

ELECTRICAL FLOOR PLAN - PUMPING STATION BASEMENT LEVEL SWITCHGEAR ROOM

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:50			DRAWING NUMBER:	2F-2017-08-67		E205
DATE:	2024-09-30						

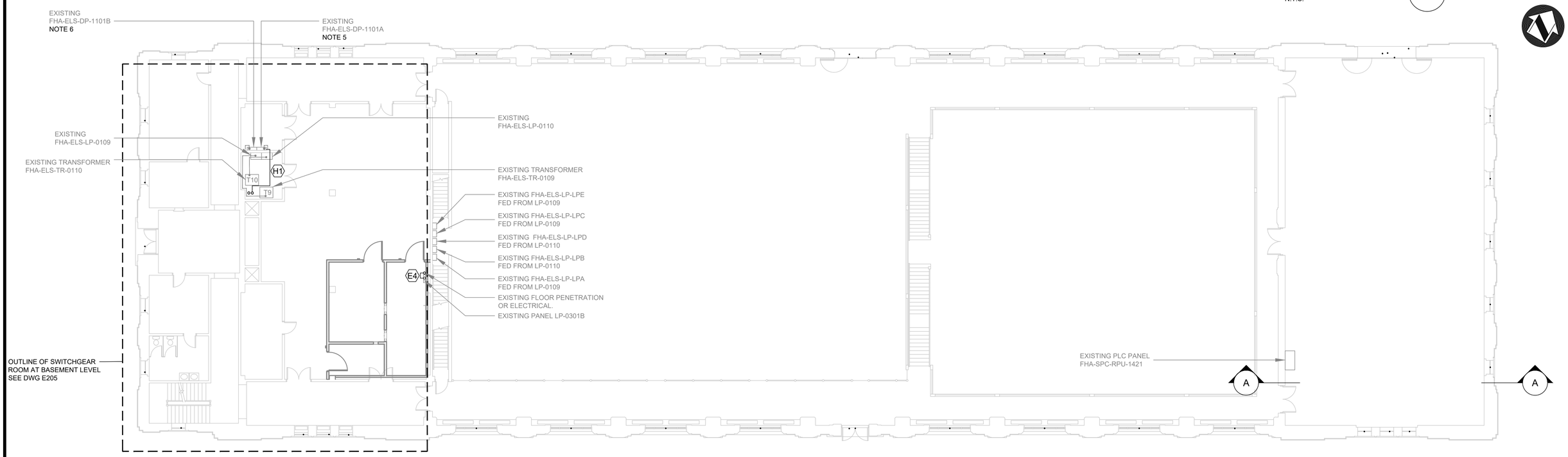
Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-67-E205.DWG
Layout Tab: E205
Date: 03/19/2025 Time: 12:39:50 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED

EXISTING SUMP PUMP
CONTROL PANEL
FHA-DEW-CP-1701
(NOTE 6)
*PHOTO 1

EXISTING SUMP PUMP
CONTROL PANEL
FHA-DEW-CP-4401
(NOTE 6)
*PHOTO 1

CROSS SECTION DETAIL
N.T.S.
A



NOTES:

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE STRUCTURAL AND MECHANICAL DRAWINGS.
2. PROVIDE NEW AND COMPLETE OVERHEAD CABLE TRAY SYSTEM FOR ALL NEW POWER AND CONTROL CABLE AND WIRING AS REQUIRED TO INTERCONNECT EQUIPMENT WHERE INDICATED. USE OF EXISTING CABLE TRAYS WILL ONLY BE ACCEPTED IF SUFFICIENT SPACE IS AVAILABLE AND THE RESULTING FILL AREA DOES NOT EXCEED THE OESC CODE REQUIREMENTS. MAXIMUM ALLOWABLE FILL AREA NOT TO BE EXCEEDED.
3. PROVIDE SEPARATE CABLE TRAYS OR ACCEPTABLE BARRIER FOR CONDUCTORS OF 600VAC POWER, ELECTRICAL LIGHTING, 120VAC CONTROL AND SIGNAL WIRING.
4. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
5. DISCONNECT EXISTING FEEDER FOR CP-1701 AND EXTEND FEEDER TO PDP-0300E (LOCATED IN THE BASEMENT SWITCHGEAR ROOM) VIA NEAREST EXISTING FLOOR PENETRATION.
6. DISCONNECT EXISTING SUMP PUMP CONTROL PANEL CP-1101 (LOCATED IN BASEMENT LEVEL) FROM FHA-ELS-DP-1101B . EXTEND EXISTING FEEDER TO FHA-ELS-PDP-0300E.

CABLE ROUTING TABLE

#	FED FROM	TO	LOCATION	REFERENCE
E4	FHA-ELS-PDP-0300E	FHA-ELS-LP-0301B	FROM SWITCHGEAR ROOM PUMPING STATION TO SERVER ROOM	DWG E205, E206
H1	FHA-ELS-PDP-0300E	SUMP PUMP CONTROL PANEL FHA-DEW-CP-1701	SWITCHGEAR ROOM PUMPING STATION	DWG E205, E206

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

ELECTRICAL FLOOR PLAN - PUMPING STATION GROUND LEVEL (EL. 78.64)

1:125

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ELECTRICAL FLOOR PLAN - PUMPING STATION GROUND LEVEL (EL. 78.64)

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:125			DRAWING NUMBER:	2F-2017-08-68		E206
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-68-E206.DWG
Layout Tab: M206
Date: 03/19/2025 Time: 12:40:27 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

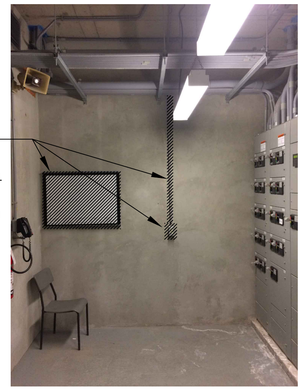
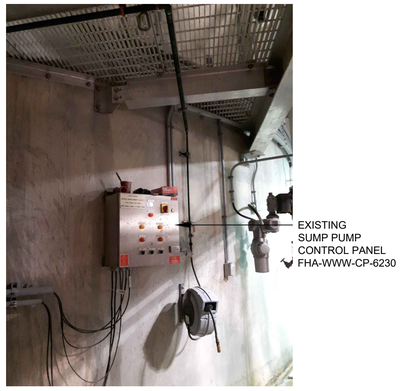


PHOTO 2

PHOTO 3



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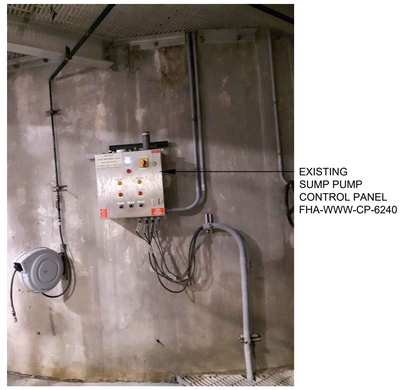


PHOTO 5

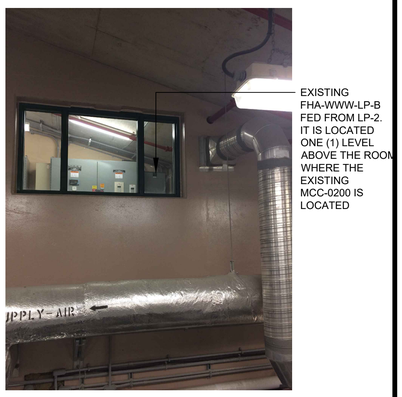
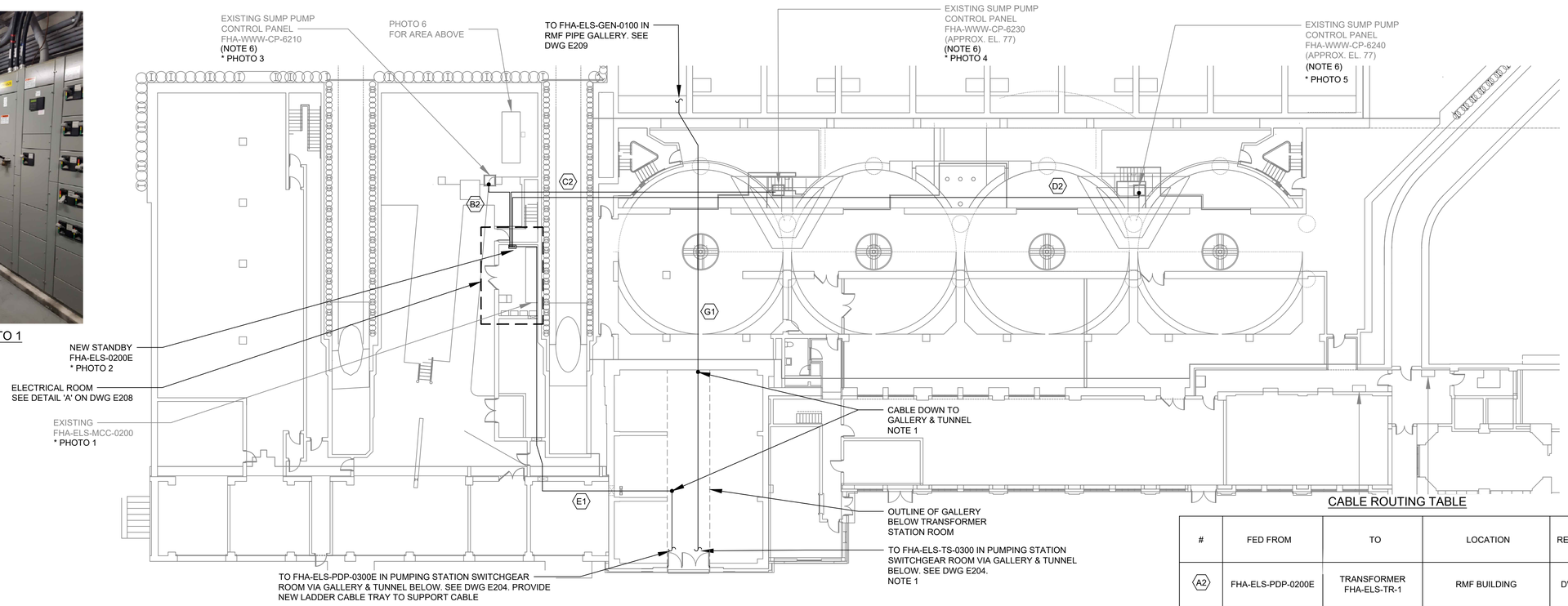


PHOTO 6

PHOTO 1



ELECTRICAL FLOOR PLAN - RMF & SERVICE BUILDING (EL. 83.00)

1:200

NOTES:

1. PROVIDE NEW AND COMPLETE OVERHEAD CABLE TRAY SYSTEM FOR ALL NEW POWER AND CONTROL CABLE AND WIRING AS REQUIRED TO INTERCONNECT EQUIPMENT. USE OF EXISTING CABLE TRAYS WILL ONLY BE ACCEPTED IF SUFFICIENT SPACE IS AVAILABLE AND THE RESULTING FILL AREA DOES NOT EXCEED THE OESC CODE REQUIREMENTS. MAXIMUM ALLOWABLE FILL AREA NOT TO BE EXCEEDED.
2. PROVIDE SEPARATE CABLE TRAYS OR ACCEPTABLE BARRIER FOR CONDUCTORS OF 600VAC POWER, ELECTRICAL LIGHTING, 120VAC CONTROL AND SIGNAL WIRING.
3. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
4. REFER TO DWG E143 FOR NEW STANDBY FHA-ELS-PDP-0200E SINGLE LINE DIAGRAM AND CABLE SCHEDULE.
5. REFER TO DWG E144 FOR NEW STANDBY PDP ELEVATION LAYOUT.
6. CONTRACTOR TO FIELD VERIFY EXISTING SUMP PUMP CONTROL PANEL LOCATIONS.
7. FLOOR/WALL TO BE CORE-DRILLED TO MAKE NEW HOLES TO RUN NEW CABLES. VNEW CABLES TO BE SUPPORTED AND PROTECTED PROPERLY.
8. SUITABLE CORING LOCATION TO BE IDENTIFIED PRIOR TO DRILLING TO PREVENT ANY INTERFERENCE WITH EXISTING EQUIPMENT, PIPES AND CONDUITS IN THE SWITCHGEAR ROOM.
9. ALL HOLES TO BE PATCHED AND FILLED. THEY SHALL BE RESTORED TO THE SAME FLOOR CONDITION AS PRIOR TO DRILLING.

CABLE ROUTING TABLE

#	FED FROM	TO	LOCATION	REFERENCE
A2	FHA-ELS-PDP-0200E	TRANSFORMER FHA-ELS-TR-1	RMF BUILDING	DWG E208
B2	FHA-ELS-PDP-0200E	SUMP PUMP CONTROL PANEL FHA-WWW-CP-6210	RMF BUILDING (NOTE 6)	DWG E208
C2	FHA-ELS-PDP-0200E	SUMP PUMP CONTROL PANEL FHA-WWW-CP-6230	RMF & SERVICE BUILDING (NOTE 6)	DWG E207
D2	FHA-ELS-PDP-0200E	SUMP PUMP CONTROL PANEL FHA-WWW-CP-6240	RMF & SERVICE BUILDING (NOTE 6)	DWG E207
E1	FHA-ELS-PDP-0300E	FHA-ELS-PDP-0200E	FROM PUMPING STATION TO RMF BUILDING	DWG E205, E207, E208
G1	GENERATOR 1 FHA-ELS-GEN-0100	FHA-ELS-TS-0300	FROM RMF PIPE GALLERY TO SWITHGEAR ROOM PUMP BUILDING	DWG E201, E205, E207, E209

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

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INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
ELECTRICAL FLOOR PLAN - RMF & SERVICE BUILDING

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:200			DRAWING NUMBER:	2F-2017-08-69		E207
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-69-E207.DWG
Layout Tab: E207
Date: 03/19/2025 Time: 12:40:47 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS
ARE IN MILIMETERS UNLESS OTHERWISE NOTED

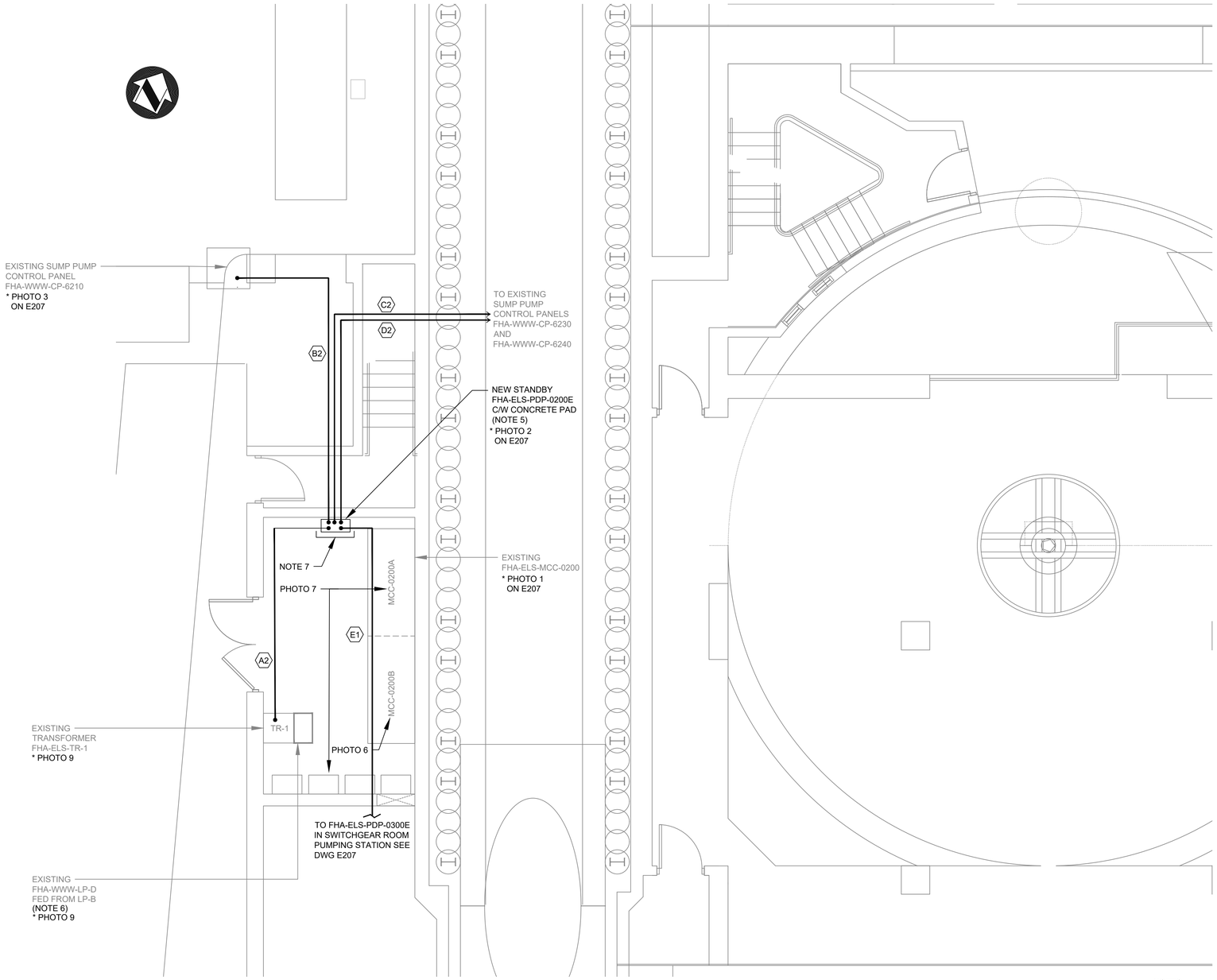

PHOTO 7

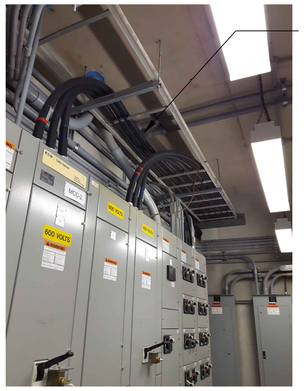

PHOTO 8

PHOTO 9

CABLE ROUTING TABLE

#	FED FROM	TO	LOCATION	REFERENCE
A2	FHA-ELS-PDP-0200E	TRANSFORMER FHA-ELS-TR-1	RMF BUILDING	DWG E208
B2	FHA-ELS-PDP-0200E	SUMP PUMP CONTROL PANEL FHA-WWW-CP-6210	RMF BUILDING (NOTE 6)	DWG E208
C2	FHA-ELS-PDP-0200E	SUMP PUMP CONTROL PANEL FHA-WWW-CP-6230	RMF & SERVICE BUILDING (NOTE 6)	DWG E207
D2	FHA-ELS-PDP-0200E	SUMP PUMP CONTROL PANEL FHA-WWW-CP-6240	RMF & SERVICE BUILDING (NOTE 6)	DWG E207
E1	FHA-ELS-PDP-0300E	FHA-ELS-PDP-0200E	FROM PUMPING STATION TO RMF BUILDING	DWG E205, E207, E208

NOTES:

1. PROVIDE NEW AND COMPLETE OVERHEAD CABLE TRAY SYSTEM FOR ALL NEW POWER AND CONTROL CABLE AND WIRING AS REQUIRED TO INTERCONNECT EQUIPMENT. USE OF EXISTING CABLE TRAYS WILL ONLY BE ACCEPTED IF SUFFICIENT SPACE IS AVAILABLE AND THE RESULTING FILL AREA DOES NOT EXCEED THE OESC CODE REQUIREMENTS. MAXIMUM ALLOWABLE FILL AREA NOT TO BE EXCEEDED.
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4. REFER TO DWG E143 FOR NEW STANDBY FHA-ELS-PDP-0200E SINGLE LINE DIAGRAM AND CABLE SCHEDULE.
5. REFER TO DWG E144 FOR NEW STANDBY PDP ELEVATION LAYOUT.
6. REFER TO PHOTO 6 ON DWG E207.
8. PROVIDE 2' WIDE ELECTRICAL INSULATION MAT COVERING THE FULL LENGTH OF THE EQUIPMENT.

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

ELECTRICAL FLOOR PLAN - DETAIL 'A' - RMF & SERVICE BUILDING (EL. 83.00)
1:50

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ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:50			DRAWING NUMBER:	2F-2017-08-70		E208
DATE:	2024-09-30						

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Layout Tab: E208
Date: 03/19/2025 Time: 12:41:01 PM

METRIC
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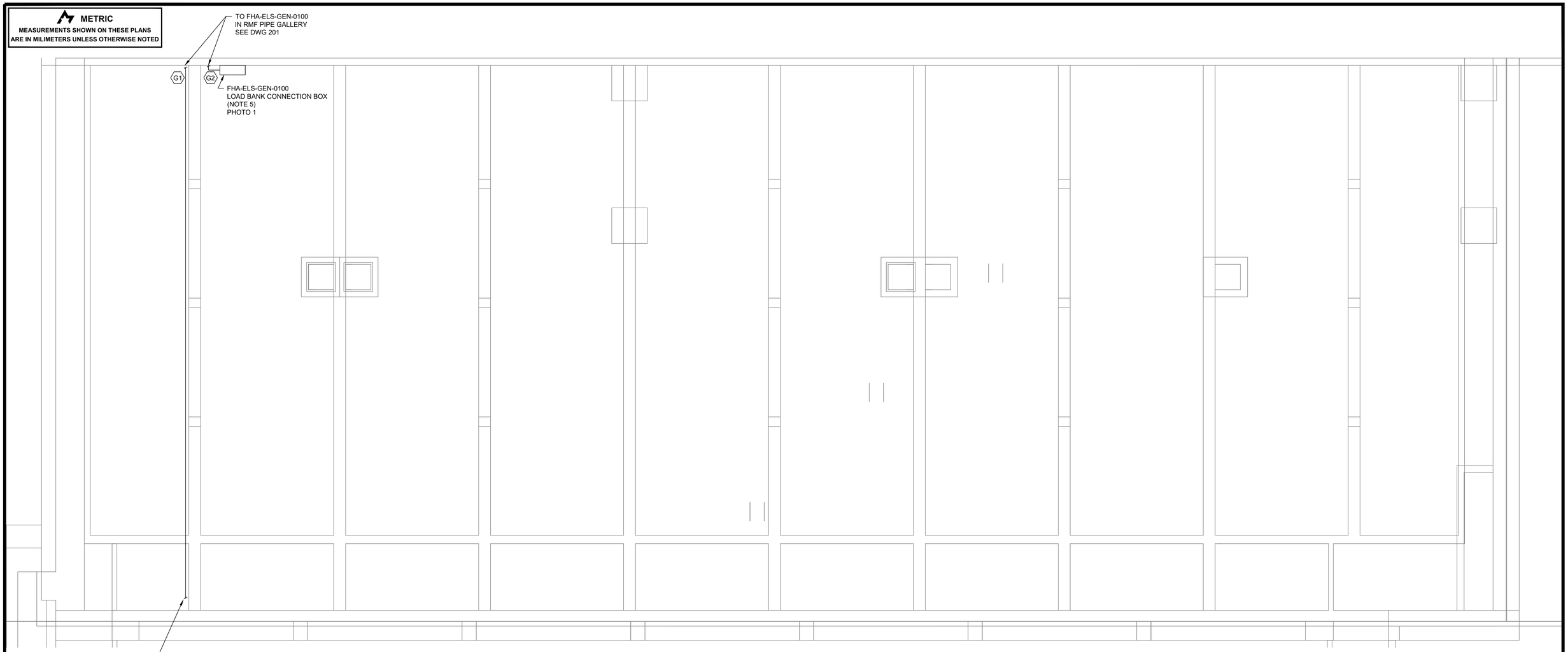

NOTES:

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3. PROVIDE SEPARATE CABLE TRAYS OR ACCEPTABLE BARRIER FOR CONDUCTORS OF 600VAC POWER, ELECTRICAL LIGHTING, 120VAC CONTROL AND SIGNAL WIRING.
4. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE TO BE COPPER AND ALL POWER CABLES ARE TO BE TECK90.
5. LOAD BANK CONNECTION ENCLOSURE TO BE c/w 400A, 600V, 3-POLE RATED DISCONNECT SWITCH WITH 300A FUSES AND POSI-LOK CONNECTORS. PROVIDE A SEPARATE ENCLOSURE FOR POSI-LOK CONNECTIONS AND A FRONT HINGED DOOR. IN ADDITION, CONTRACTOR TO PROVIDE THREE (3) ADDITIONAL SPARE FUSES.
7. WALL TO BE CORE-DRILLED TO MAKE NEW HOLES TO RUN NEW CABLES. NEW CABLES COMING INSIDE TO BE SUPPORTED AND PROTECTED PROPERLY.
8. SUITABLE CORING LOCATION TO BE IDENTIFIED PRIOR TO DRILLING TO PREVENT ANY INTERFERENCE WITH EXISTING EQUIPMENT, PIPES AND CONDUITS IN THE SWITCHGEAR ROOM.
9. ALL HOLES TO BE PATCHED AND FILLED. THEY SHALL BE RESTORED TO THE SAME FLOOR CONDITION AS PRIOR TO DRILLING.

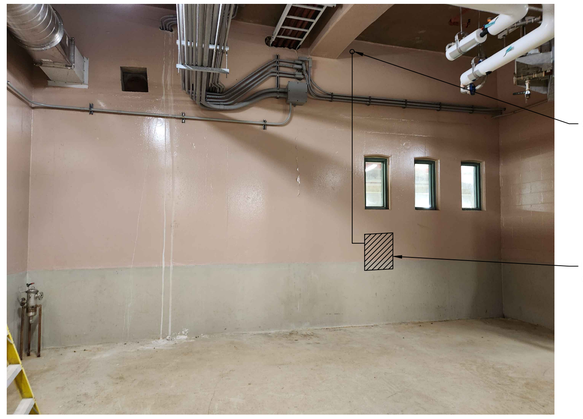


PHOTO 1

CABLE ROUTING TABLE

#	FED FROM	TO	LOCATION	REFERENCE
G1	GENERATOR 1 FHA-ELS-GEN-0100	FHA-ELS-TS-0300	FROM RMF PIPE GALLERY TO SWITHGEAR ROOM PUMP BUILDING	DWG E201, E205, E207
G2	GENERATOR 1 FHA-ELS-GEN-0100	GENERATOR 1 LOAD CONNECTION BOX	FROM RMF PIPE GALLERY TO SODIUM BISULPHITE ROOM	DWG E201

EXISTING
NEW

ELECTRICAL FLOOR PLAN - CHEMICALS ROOM. PIPE GALLERY

N.T.S.

TORONTO Water

ARCADIS
100-175 GALAXY BOULEVARD
TORONTO, ONTARIO, M9W 0C9
TEL 416 679 1930 FAX 416 675 4620
www.arcadis.com

NO.	DATE	REVISIONS	INITIAL	SIGNED
A	2025-03-18	ISSUED FOR TENDER	T.S.	

TORONTO

TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
X. D. SHEN
100121127
MAR. 19, 2025
PROVINCE OF ONTARIO

WILLIAM FERNANDES, P.ENG
DIRECTOR
WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

ELECTRICAL FLOOR PLAN - CHEMICALS ROOM, PIPE GALLERY

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-71		E209
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-71-E209.DWG
Layout Tab: E209
Date: 03/19/2025 Time: 12:41:16 PM

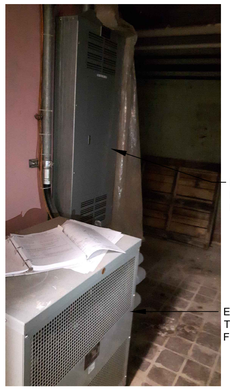


PHOTO 1

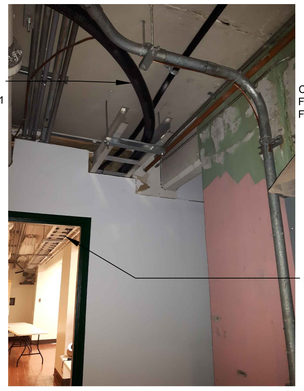


PHOTO 2

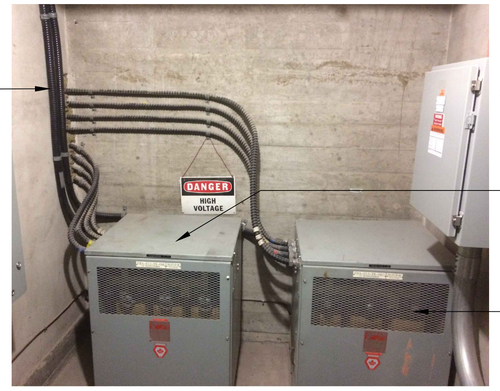


PHOTO 3

PHOTO 4

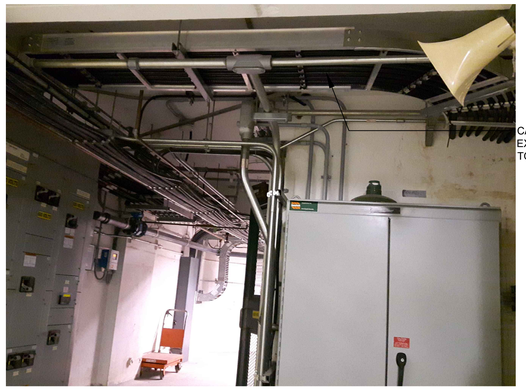
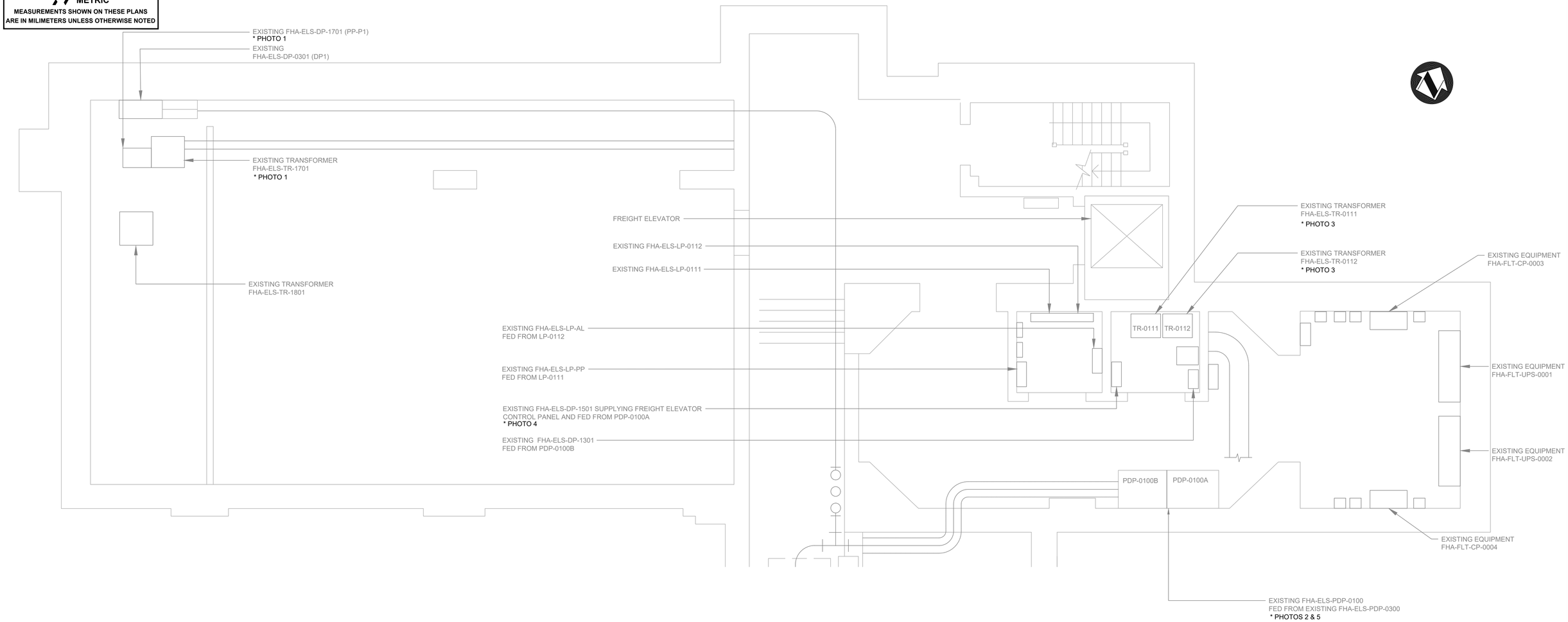


PHOTO 5

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



ELECTRICAL FLOOR PLAN - SERVICE BUILDING BASEMENT (EL.75.59)

SCALE: 1:50

EXISTING
NEW
REMOVAL, TO BE REPLACED WITH NEW CABLES & INSTALLED COMPLETE

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A	2025-03-18	ISSUED FOR TENDER	T.S.	

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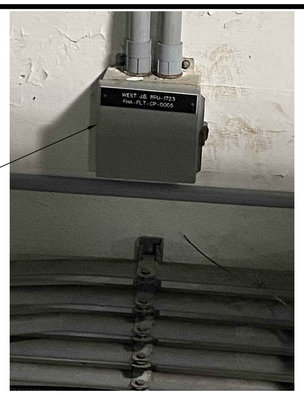
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
ELECTRICAL FLOOR PLAN - SERVICE BUILDING BASEMENT

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	1:50			DRAWING NUMBER:	2F-2017-08-72		E211
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-72-E211.DWG
Layout Tab: M211
Date: 03/19/2025 Time: 12:41:35 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



EXISTING CONTROL PANEL FHA-FLT-CP-0005

PHOTO 1
SCALE: N.T.S.

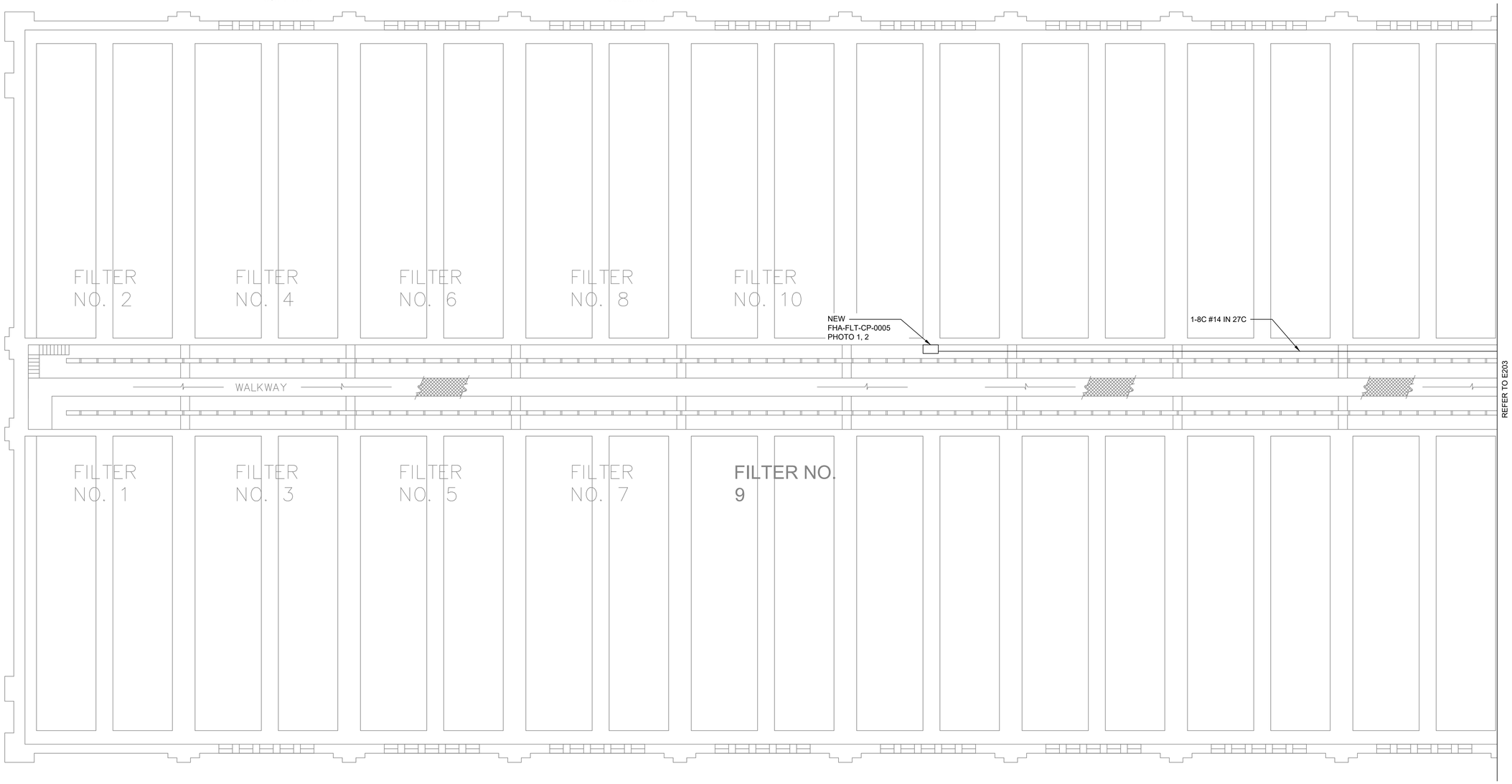
EXISTING CONTROL PANEL FHA-FLT-CP-0005. RENAME PANEL TO FHA-FLT-JB-0005. PROVIDE TERMINALS AND EXTEND WIRING C/W CONDUITS TO NEW FHA-FLT-CP-0006 LOCATION.

NEW CONTROL PANEL FHA-FLT-CP-0005. REFER TO I&C DRAWING I106 FOR DETAILS

PHOTO 2
SCALE: N.T.S.

NOTE:

1. PROVIDE 1-2C #14 FROM NEW FHA-FLT-CP-0005 TO EXISTING FHA-FLT-UPS-0001 VIA EXISTING JUNCTION BOX FHA-FLT-JB-0005. REUSE EXISTING CONDUITS BETWEEN EXISTING UPS-0001 AND JB-0005.



EXISTING
NEW

ELECTRICAL FLOOR PLAN - WEST LOWER FILTER PIPE GALLERY (EL. 94.06)
N.T.S.

TORONTO Water

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100-175 GALAXY BOULEVARD
TORONTO, ONTARIO, M9W 0C9
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MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
ELECTRICAL FLOOR PLAN - LOWER FILTER PIPE GALLERY - WEST (EL. 94.06)

ELECTRICAL

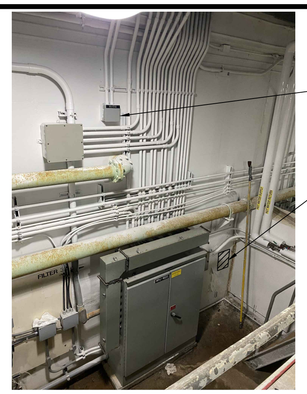
DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-73		E212
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-73-E212.DWG
Layout Tab: E212
Date: 03/19/2025 Time: 12:41:48 PM

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

EXISTING CONTROL PANEL
FHA-FLT-CP-0006

PHOTO 1
SCALE: N.T.S.



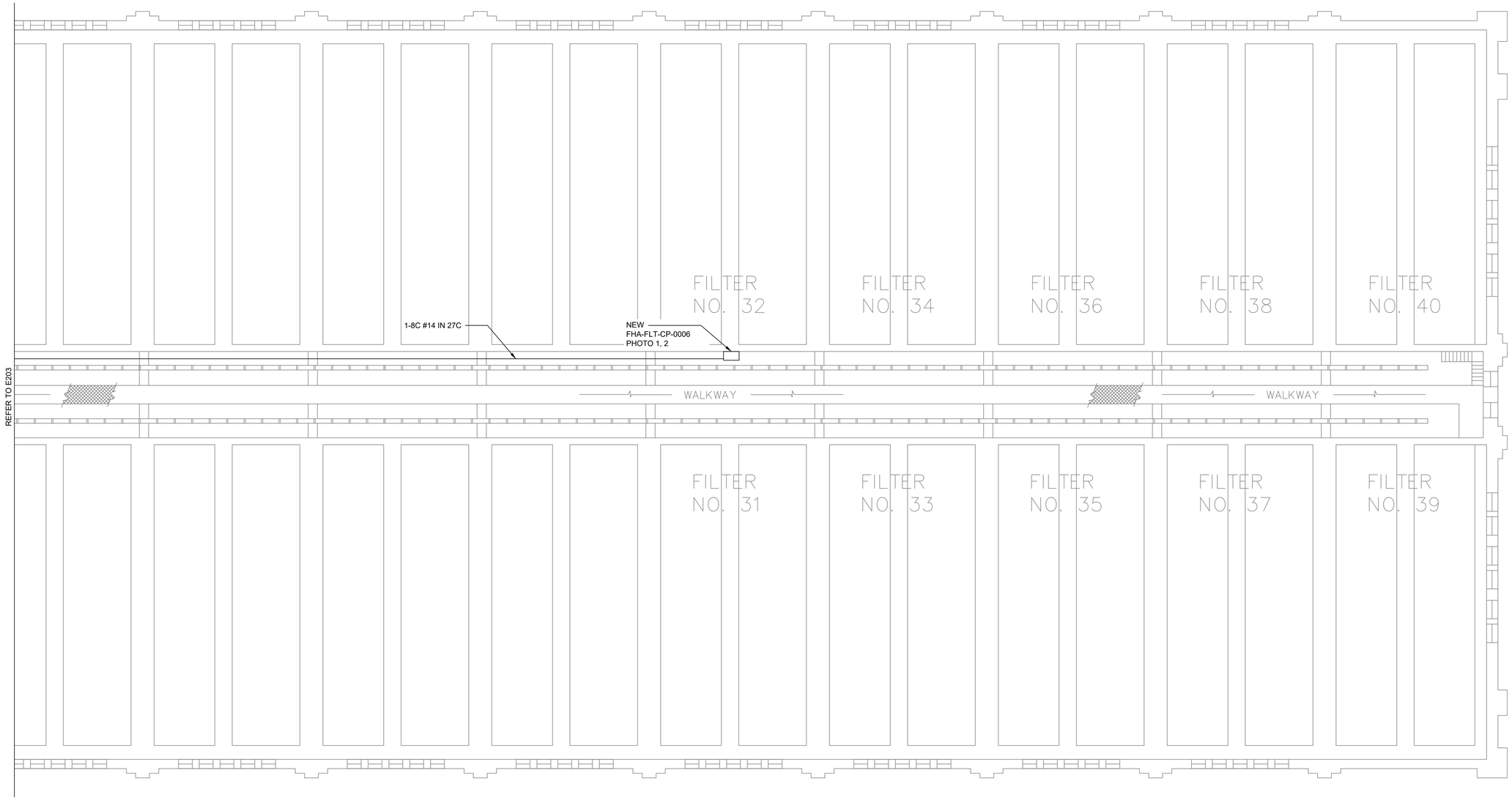
EXISTING CONTROL PANEL
FHA-FLT-CP-0006. RENAME PANEL
TO FHA-FLT-JB-0006. PROVIDE
TERMINALS AND EXTEND WIRING
C/W CONDUITS TO NEW
FHA-FLT-CP-0006 LOCATION.

NEW CONTROL PANEL
FHA-FLT-CP-0006. REFER TO I&C
DRAWING I107 FOR DETAILS

PHOTO 2
SCALE: N.T.S.

NOTE:

1. PROVIDE 1-2C #14 FROM NEW FHA-FLT-CP-0006 TO EXISTING FHA-FLT-UPS-0002 VIA EXISTING JUNCTION BOX FHA-FLT-JB-0006. REUSE EXISTING CONDUITS BETWEEN EXISTING UPS-0002 AND JB-0006.



EXISTING
NEW

ELECTRICAL FLOOR PLAN - EAST LOWER FILTER PIPE GALLERY (EL. 94.06)
N.T.S.

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\6 ELEC\2F-2017-08-74-E213.DWG
Layout Tab: E213
Date: 03/19/2025 Time: 12:42:00 PM

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NO.	DATE	REVISIONS	INITIAL	SIGNED

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X. D. SHEN
100121127
MAR. 19, 2025
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WILLIAM FERNANDES, P.ENG	SIMON HOPTON, P. ENG.
DIRECTOR WATER TREATMENT AND SUPPLY	DIRECTOR DESIGN & CONSTRUCTION MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

ELECTRICAL FLOOR PLAN - LOWER FILTER PIPE GALLERY - EAST (EL. 94.06)

ELECTRICAL

DESIGN:	SC	DRAFTING:	SC	CHECK:	TS	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-74		E213
DATE:	2024-09-30						

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

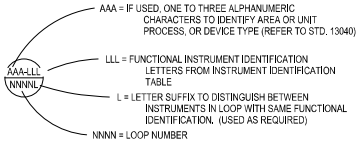
INSTRUMENT IDENTIFICATION TABLE

ISA-S5.1-1984

LETTER	FIRST LETTER: MEASURED OR INITIATING VARIABLE	FIRST LETTER: MODIFIER	SUCCEEDING LETTERS: READOUT OR PASSIVE FUNCTION	SUCCEEDING LETTERS: OUTPUT FUNCTION	SUCCEEDING LETTERS: MODIFIER
A	ANALYSIS (2)		ALARM		
B	BURNER, COMBUSTION			CLOSE, STOP, DECREASE (1)	
C				CONTROL	
D	DENSITY	DIFFERENTIAL		OPEN, START, INCREASE (1)	
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			FAIL (1)
G			GLASS, VIEWING DEVICE		
H	HAND				HIGH (OPENED)
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW (CLOSED)
M	MOTOR, MOTION (1)	MOMENTARY		MOTOR (1)	MIDDLE OR INTERMEDIATE
N					ON OR OPERATE (1)
O			ORIFICE, RESTRICTION		OVERLOAD (1)
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION	PUMP (1)	
Q	QUANTITY (2)	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTI-VARIABLE (2)		MULTI-FUNCTION (2)	MULTIFUNCTION (2)	MULTI-FUNCTION (2)
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED (2)		UNCLASSIFIED (2)	UNCLASSIFIED (2)	UNCLASSIFIED (2)
Y	EVENT, STATE, PRESENCE			RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION			DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

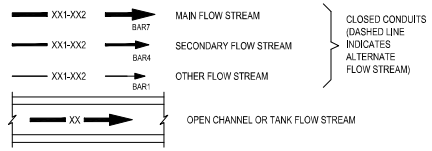
(1) USER'S CHOICE
(2) WHEN USED, SYMBOL OR SIGNAL LINE IS ANNOTATED.

INSTRUMENT & FUNCTION TAGGING

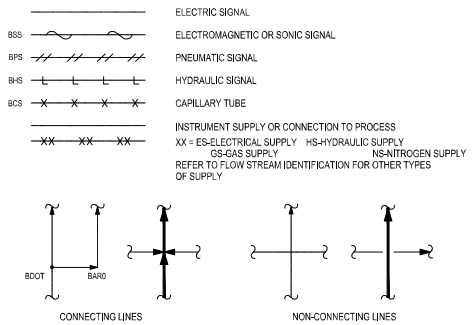


EQUIPMENT TAGGING

FLOW STREAM & INSTRUMENT LINE SYMBOLS

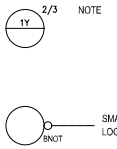


NOTE: XX1 - PIPE DIAMETER IN MM
XX2 - FLOW STREAM



EXPLANATORY NOTATIONS

SIGNAL CONVERTERS

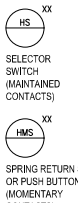


NOTE 1: PROCESS OR INITIATING VARIABLE

2/3:
A = ANALOG
B = BINARY
D = DIGITAL
E = VOLTAGE
F = FREQUENCY
H = HYDRAULIC
I = CURRENT
M = MOTOR
O = ELECTROMAGNETIC, SONIC
P = PNEUMATIC
PF = PULSE FREQUENCY
PD = PULSE DURATION
R = RESISTANCE

SMALL CIRCLE SIGNIFIES LOGICAL INVERSION OF SIGNAL

HAND SWITCHES



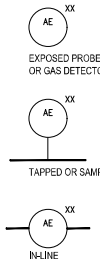
SELECTOR SWITCH (MAINTAINED CONTACTS)

SPRING RETURN SWITCH OR PUSH BUTTONS (MOMENTARY CONTACTS)

NOTE XX:
A/M = AUTO/MANUAL
C/M = COMPUTER/MANUAL
C/A/M = COMPUTER/AUTO/MANUAL
C/L = COMPUTER/LOCAL
F/R = FORWARD/REVERSE
F/O/R = FORWARD/OFF/REVERSE
F/S = FAST/SLOW
F/O/S = FAST/OFF/SLOW
H/O/A = HAND/OFF/AUTO
L/R = LOCAL/REMOTE
LOS = LOCKOUT STOP
M/F/S = MODULATE FASTER/SLOWER
MO/C = MODULATE OPEN/CLOSE
O/C = OPEN/CLOSE
O/O = ON/OFF
O/S/C = OPEN/STOP/CLOSE
S/S = START/STOP
O/A/O = ON/AUTO/OFF
N/M = NORMAL/MANUAL
E/S = EMERGENCY/STOP
N = NORMAL
O = OPEN
S = STOP
C = CLOSE
L = LOCAL

1. "A", WHEN ADDED TO NOTATION, INDICATES AUTO. EXAMPLE: H-OA = HAND/OFF/AUTO
2. "R", WHEN ADDED TO NOTATION, INDICATES REMOTE. EXAMPLE: H-OR = HAND/OFF/REMOTE

ANALYSIS INSTRUMENTS



EXPOSED PROBE OR GAS DETECTOR

TAPPED OR SAMPLED

IN-LINE

NOTE XX:
ALR = ALUMINUM RESIDUAL
COL = COLOR
CDG = CARBON DIOXIDE GAS
CG = COMBUSTIBLE GAS
CH4 = METHANE
CLG = CHLORINE GAS
CLR = CHLORINE RESIDUAL
COG = CARBON MONOXIDE GAS
DO = DISSOLVED OXYGEN
FA = FREE AMMONIA
FHS = FLUORIDE
HC = HYDROCARBONS
HUM = HUMIDITY
H2S = HYDROGEN SULFIDE
MHO = CONDUCTIVITY
NOG = NITRIC OXIDE GAS
NH4 = AMMONIA
N2G = NITROGEN GAS
OG = OXYGEN GAS
ORP = OXIDATION REDUCTION POT.
OUR = OXYGEN UPTAKE RATE
OZG = OZONE GAS
PC = PARTICLE COUNTER
PH = pH
SD = SOLIDS DENSITY
SO2 = SULPHUR DIOXIDE GAS
SS = SUSPENDED SOLIDS
TMP = TEMPERATURE
TOC = TOTAL ORGANIC CARBON
TRB = TURBIDITY
WT = WEIGHT

MISCELLANEOUS

BRT = BEARING TEMPERATURE

FLOW STREAM IDENTIFICATION *

- AM — AQUA AMMONIA
- AHP — AIR, HIGH PRESSURE PROCESS
- AIS — AIR, INSTRUMENT SUPPLY
- ALM — ALUM
- ALP — AIR, LOW PRESSURE PROCESS
- ASH — ASH
- ATM — ATMOSPHERE
- BCA — BURNER COMBUSTION AIR
- BFE — BIO-FILTER EFFLUENT
- BFR — BIO-FILTER RECYCLE
- BLS — BLENDED SLUDGE
- BR — BRINE
- BRS — BRINE SLUDGE
- BRSP — BRINE, SPENT
- BYP — BYPASS
- CAU — CAUSTIC
- CC — CENTRIFUGE CAKE
- CDG — CARBON DIOXIDE GAS
- CDL — CARBON DIOXIDE LIQUID
- CEN — CENTRATE
- CGA — CARBON GRANULATED ACTIVATED
- CH — CHEMICAL
- CKE — CAKE
- CLG — CHLORINE GAS
- CLL — CHLORINE LIQUID
- CLS — CHLORINE SOLUTION
- CON — CONDENSATE
- CPA — CARBON POWDERED ACTIVATED
- CS — CLARIFIED SLUDGE
- CSL — CARBON SLURRY
- CWR — COOLING WATER RETURN
- CWS — COOLING WATER SUPPLY
- DCL — DECANT LIQUOR
- DCT — DECANT
- DG — DIGESTER GAS
- DR — DECANT RESIDUE
- DRN — DRAIN
- DS — DIGESTED SLUDGE
- DTR — DECANT TANK RESIDUE
- DTS — DECANT TANK SUPERNATANT
- DWS — DEWATERED SLUDGE
- EFF — EFFLUENT
- EMA — EMISSION AIR
- EXG — EXHAUST GAS
- FA — FRESH AIR
- FC — FERRIC CHLORIDE
- FCPL — PICKLE LIQUOR
- FES — FERROUS SULFATE
- FG — FLUE GAS
- FHS — FLUORIDE
- FIW — FINISHED WATER
- FLE — FILTER EFFLUENT(FILTERED WATER)
- FLT — FILTRATE
- FLR — FLOTRATE
- FLW — FILTER WASH WATER
- FOA — FOUL AIR
- FOAR — FOUL AIR RETURN
- FOR — FUEL OIL RETURN
- FOS — FUEL OIL SUPPLY
- FRR — FILTER RIPPENING/RECYCLE
- FSC — FERROUS CHLORIDE
- FWD — FILTER TO WASTE
- GR — GRIT
- GRS — GREASE
- HC — HYPOCHLORITE
- HG — HYDROGEN GAS
- HL — LIQUID HYDROGEN
- HPC — HIGH PRESSURE CONDENSATE
- HPS — HIGH PRESSURE STEAM
- HTS — HEAT TREATED SLUDGE
- HWR — HEATING WATER RETURN
- HWS — HEATING WATER SUPPLY
- INF — INFLUENT
- IW — IRRIGATION WATER
- LM — LIME, DRY
- LMS — LIME SLURRY
- LMSD — LIME SLUDGE
- LO — LUBRICATION OIL
- LPC — LOW PRESSURE CONDENSATE
- LPS — LOW PRESSURE STEAM
- MG — METHANE GAS
- ML — MIXED LIQOUR
- MXS — MIXED SLUDGE
- NAH — SODIUM HYDROXIDE
- NG — NATURAL GAS
- NIG — NITROGEN GAS
- OF — OVERFLPW
- OG — OXYGEN GAS
- OL — LIQUID OXYGEN
- OZN — OZONE
- PD — PROCESS DRAIN
- PG — PROPANE GAS
- PHA — PHOSPHORIC ACID
- PRE — PRIMARY EFFLUENT
- PRI — PRIMARY INFLUENT
- PRS — PRIMARY SLUDGE
- PYD — POLYMER DRY
- PYL — POLYMER LIQUID
- PYS — POLYMER SOLUTION
- RAS — RETURN ACTIVATED SLUDGE
- RAW — RAW WATER
- RCY — RECYCLE
- RI — RESIDUE INFLUENT
- RSE — RAW SEWAGE
- SLG — SLUDGE
- SA — SODA ASH
- SAS — SODA ASH SOLUTION
- SBS — SODIUM BISULPHITE
- SBD — SEDIMENTATION BASIN DECANT
- SCA — SHAFT COOLING AIR
- SCNAR — SHAFT COOLING AIR NOT RETURN
- SCAR — SHAFT COOLING AIR RETURN
- SCR — SCREEN
- SCM — SCUM
- SDG — SULFUR DIOXIDE GAS
- SDL — SULFUR DIOXIDE LIQUID
- SDR — SANITARY DRAIN
- SDS — SULFUR DIOXIDE SOLUTION
- SE — SECONDARY EFFLUENT
- SES — SETTLED SOLIDS
- SEW — SETTLED WATER
- SHS — SETTLED HEATED SLUDGE
- SL — SLURRY
- SMP — SAMPLE
- SPD — SUMP PUMP DISCHARGE
- SSL — SECONDARY SLUDGE
- STM — STEAM
- STR — STRAINER
- STW — STORM WATER
- SUB — SUB NATANT
- SUP — SUPERNATANT
- SW — SEAL WATER
- SWW — SCREEN WASTEWATER SLUDGE
- TAS — THICKENED ACTIVATED SLUDGE
- TBS — THICKENER BOTTOM SLUDGE
- TO — THICKENER OVERFLOW
- TPS — THICKENED PRIMARY SLUDGE
- TR — THICKENER RECYCLE
- TS — THICKENED SLUDGE
- TSR — TREVELLING SCREEN RESIDUE
- TSUP — THICKENER SUPERNATANT
- TUF — THICKENED UNDER FLOW
- UD — UNDER DRAIN
- UNW — UN-WATERING LINE
- VAC — VACUUM
- VT — VENT
- WAW — WASH WATER
- WAS — WASTE ACTIVATED SLUDGE
- WBW — WATER, BACK WASH
- WCL — WATER, CHLORINATED PLANT EFFLUENT
- WD — WATER, DISTILLED
- WDO — WATER, DEOZONATED
- WHF — HOT WATER FLUSHING
- WML — WASTE MIXED LIQOUR
- WO — WATER, OZONATED
- WP — WATER, POTABLE
- WPS — WATER, PLANT SERVICES
- WN — WATER, NON-POTABLE
- WSE — WATER, SCREENED EFFLUENT
- WW — WELL WATER
- WWW — WATER, WASTE WATER

*IDENTIFICATION MAY BE FOLLOWED BY A NUMBER TO DIFFERENTIATE AMONG SIMILAR FLOW STREAMS. FOR EXAMPLE, CH1 & CH2 WOULD REPRESENT TWO DIFFERENT CHEMICAL FLOW STREAMS.

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 MCC\2F-2017-08-75_I001 LEGEND 1.DWG
Layout Tab: I001
Date: 03/21/2025 Time: 02:16:49 PM

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Toronto — TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER — J.A. Glastin-Clay — 100079715 — PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.
DIRECTOR,
WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

LEGEND SHEET - 1

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-75		I001
DATE:	2024-09-30						

PRIMARY ELEMENT SYMBOLS

FLOW

- M — ELECTROMAGNETIC
- ULTRASONIC IN-LINE
- ULTRASONIC CLAMP-ON OR DOPPLER
- VENTURI
- ORIFICE PLATE
- PROPELLER OR TURBINE
- VORTEX
- TARGET
- PITOT TUBE
- FI — ROTAMETER
- E — AVERAGING PITOT TUBE
- FLUME
- WEIR
- FLOW NOZZLE
- C — ELECTROMAGNETIC CORIORILIS TYPE

LEVEL

- BUBBLE TUBE
- LT — ULTRASONIC
- CAPACITANCE
- ELECTRODES (WITH HOLDER)
- FLOAT
- OPTICAL

TEMPERATURE

- TE — TEMPERATURE ELEMENT WITH WELL
- TE — TEMPERATURE ELEMENT SURFACE MOUNT

MISCELLANEOUS SYMBOLS

- DIAPHRAGM SEAL
- ANNULAR DIAPHRAGM
- RUPTURE DISK (PRESSURE RELIEF)
- RUPTURE DISK (VACUUM RELIEF)
- VENT TO ATMOSPHERE
- AIR GAP
- DD NNN — DEVICE INTERFACE
- SIPHON BREAKER
- BLIND FLANGE
- EXPANSION COUPLING
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- UNION
- VICTAULIC COUPLING
- AS — SELF CONTAINED AIR SUPPLY
- X P — PURGE SET NOTE X: W=WATER A=AIR
- FLOW STRAIGHTENER
- T — TRAP
- X — EQUIPMENT CONNECTION WITH ELECTRICAL INTERLOCK
- X G — SIGHT GLASS NOTE X: F=FLOW L=LEVEL
- PRESSURE GAUGE
- Y TYPE STRAINER
- PULSATING DAMPER
- SCRUBBER

NOTE X: F=FLUSHING WATER
L=LUBE OIL
S=SEAL WATER

VALVE & GATE SYMBOLS

- BUTTERFLY VALVE
- CHECK VALVE
- GATE OR GENERAL IN-LINE VALVE
- GLOBE VALVE
- ROTARY VALVE
- THREE WAY VALVE (ARROW IF SHOWN INDICATES FAIL OPEN PATH)
- TELESCOPING VALVE
- DAMPER OR LOUVER
- SLUICE GATE
- PREFABRICATED SLIDE GATE
- FLAP VALVE
- CONE VALVE
- BALL VALVE
- PLUG VALVE
- KNIFE GATE
- NEEDLE VALVE
- MUD VALVE
- BACK FLOW PREVENTER
- PINCH VALVE
- ANGLE VALVE
- FOUR WAY VALVE
- DIAPHRAGM VALVE
- BALANCING VALVE

VALVE & REGULATOR SYMBOLS

- PRESSURE REDUCING REGULATOR WITH HAND WHEEL
- PRESSURE REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP
- S — PRESSURE REDUCING VALVE WITH SOLENOID SHUTOFF
- DIFFERENTIAL PRESSURE REDUCING REGULATOR WITH INTERNAL AND EXTERNAL PRESSURE TAPS
- BACK PRESSURE REGULATOR, SELF-CONTAINED
- BACK PRESSURE REGULATOR WITH EXTERNAL PRESSURE TAP
- PRESSURE REDUCING REGULATOR, SELF-CONTAINED
- PRESSURE RELIEF OR SAFETY VALVE
- PRESSURE RELIEF OR SAFETY VALVE
- VACUUM RELIEF VALVE
- PRESSURE AND VACUUM RELIEF VALVE
- TEMPERATURE REGULATOR SELF-OPERATED
- AIR VENT

INSTRUMENT & FUNCTION SYMBOLS

- FIELD MOUNTED
- PILOT LIGHT
- FACE OF PANEL MOUNTED
- INTERIOR OF PANEL MOUNTED
- PANEL PILOT LIGHT
- MOTOR CONTROL CENTER MOUNTED
- INTERIOR OF MCC MOUNTED
- MCC PILOT LIGHT
- I — INTERLOCK LOGIC
- R — RESET
- A — AND LOGIC
- OR — OR LOGIC
- XX HS — FIELD SWITCH
- XX HS — PANEL MOUNTED SWITCH
- XX HS — MCC MOUNTED SWITCH
- EXAMPLE OF INSTRUMENTS SHARING COMMON HOUSING

INPUTS & OUTPUTS TO SHARED OR PROGRAMMABLE LOGIC CONTROLLER

- YY AI — ANALOG INPUT
- YY AO — ANALOG OUTPUT
- YY PI — PULSE INPUT
- YY X PO — PULSE OUTPUT X: BLANK = TIME DURATION (PULSE WIDTH) F = PULSE TRAIN T = TRIAC
- YY DI — DIGITAL INPUT
- YY X DO — DIGITAL OUTPUT X: BLANK = MAINTAINED (ELECTRICALLY HELD) M = MOMENTARY L = LATCHED (MAGNETICALLY OR MECHANICALLY HELD)

NOTE:
YY: MEASURED VARIABLE OR OUTPUT FUNCTION FROM INSTRUMENT IDENTIFICATION TABLE
YN: ON DIGITAL INPUT INDICATES COMPUTER/HAND SWITCH STATUS

ACTUATOR SYMBOLS

- XX — CYLINDER
- PRESSURE OR VACUUM RELIEF SPRING OR WEIGHT LOADED
- M XX — MOTOR
- E/P — ELECTROPNEUMATIC
- H/M — HYDRAMOTOR
- E/H — ELECTROHYDRAULIC
- MANUAL (SHOWN ONLY FOR HAND OPERATED VALVES EQUIPPED WITH POSITION MONITORING INSTRUMENTS)
- S XX — SOLENOID
- XX — DIAPHRAGM (SPRING OPPOSED)
- XX — DIAPHRAGM (PRESSURE BALANCED)

NOTE: ON LOSS OF PRIMARY POWER (PNEUMATIC OR ELECTRICAL)
XX: FO = FAIL OPEN
FC = FAIL CLOSED
FI = FAIL TO INTERMEDIATE POSITION
BLANK = FAIL TO LAST POSITION

Toronto Water

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TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER J.A. Glaskin-Clay 100079716 Expiry: 31.12.2025 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.
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SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

LEGEND SHEET - 2

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-76		I002
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-76_I002 LEGEND 2.DWG
Layout Tab: I002
Date: 03/21/2025 Time: 02:21:00 PM

EQUIPMENT SYMBOLS

- CENTRIFUGAL PUMP (DRY PIT) BE29
- GENERAL PUMP
- PROPORTIONING PUMP (PD) BE2
- ROTARY PUMP (PD) BE3
- CENTRIFUGAL PUMP (WET PIT) BE4
- SUBMERSIBLE SUMP PUMP SUBM.SP.
- VERTICAL PUMP VERT.PUMP
- VERTICAL TURBINE PUMP VERT.TURB.
- SCREW PUMP BE5
- COMPRESSOR BE17
- TURBINE BE6
- CENTRIFUGAL BLOWER BE8
- RECIPROCATING COMPRESSOR (PD) BE9
- ROTARY COMPRESSOR (PD) BE10
- MOTOR BE16
- HEAT EXCHANGER BE7
- AGITATOR OR MIXER BE12
- EJECTOR BE13

NOTE XX : CS = CONSTANT SPEED
2S = TWO SPEED
VS = VARIABLE SPEED

PD : POSITIVE DISPLACEMENT

EQUIPMENT SYMBOLS

- BAR SCREEN BE18
- GRINDER BE19
- STRAINER BE20
- SCREW CONVEYOR WITH DUAL DISCHARGE (*) BE21
- SCREW CONVEYOR (*) BE22
- CLASSIFIER BE23
- TWO WAY SCREW CONVEYOR (*) BE24
- CONVEYOR (*) BE27
- CYCLONE BE25
- CENTRIFUGE BE26
- HEAT EXCHANGER (FINNED) BE28
- TRAVELING BRIDGE (*) BE30

MISCELLANEOUS SYMBOLS

- TEST OPENING, PLUGGED OR CAPPED BZV13
- FLEXIBLE METAL HOSE CONNECTOR BM25
- BURNER FLAME SCANNER AS PRIMARY TEMPERATURE ELEMENT BM26
- FLAME PROVING ROD AS PRIMARY TEMPERATURE ELEMENT BM27
- DRIP CAP BM28
- GAS FILTER BM29
- FLAME CHECK (FLASH-BACK ARRESTER) BM30
- HIGH ENERGY IGNITION BM31
- GAS CARBURETOR BM32
- FILTER BM33
- TEST BURNER BM34
- NOZZLE MIXING CONCENTRIC RING BURNER BM35
- SILENCER SIL-1
- LIQUID DIFFUSER LD-1
- AIR DIFFUSER AD-2
- CAP/PLUG CAP
- FLEXIBLE TUBING FLEX
- PANT GATE DIVERTER LEG PANT GATE
- LUBRICATION RING LUBRIT. RING
- HEAT TRACING (*) HEAT TRACING

NOTE:
SYMBOLS SHOWN WITH A SINGLE ASTERISK (*) CAN BE EXTENDED HORIZONTALLY IF NEEDED.

PROCESS VENTILATION

- MOTORIZED DAMPER (**) HV1
- BACK DRAFT DAMPER (**) HV2
- FIRE DAMPER (**) HV3
- LOUVER (**) HV4
- CENTRIFUGAL FAN HV5
- AXIAL FAN HV6
- UNIT HEATER
- CONVECTION/BASEBOARD OR GENERAL HEATER
- A/C UNIT

NOTE:
SYMBOLS SHOWN WITH A DOUBLE ASTERISK (**) CAN BE EXTENDED VERTICALLY IF NEEDED.

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED

GENERAL NOTES

1. THIS IS A GENERAL P & ID SYMBOL SHEET. SOME SYMBOLS OR NOTATIONS MAY NOT BE USED ON THIS PROJECT.
2. MOTOR CONTROL (MC) & VARIABLE SPEED DRIVE (VSD) PANELS ARE SHOWN WITH FACE OF PANEL MOUNTED INSTRUMENTS & EXTERNAL INTERFACE SIGNALS ONLY.
3. A CONTROL PANEL (CP) PACKAGED WITH MECHANICAL EQUIPMENT OR A SYSTEM IS SHOWN WITH FACE OF PANEL MOUNTED INSTRUMENTS & EXTERNAL INTERFACE SIGNALS SIMILAR TO MC & VSD PANELS.
4. CONTROL PANELS (CP) OTHER THAN THOSE PREVIOUSLY DE-SCRIBED ARE SHOWN WITH FACE & INTERIOR OF PANEL MOUNTED INSTRUMENTS.
5. SEE ELECTRICAL DRAWINGS FOR MC & VSD LOCATIONS WITHIN THE MCC.
6. EXISTING PIPING, EQUIPMENT & INSTRUMENTS ARE SHOWN LIGHT-LINED, SCREENED OR DOTTED.

(AB-1C)	OLD TAG NUMBERS
ABC-1234	PCS INSTALLED TAG NUMBER
ABC-1234*	PCS ASSIGNED TAG NUMBER
	ITEMS TO BE REMOVED AND DISCONNECTED

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TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER J.A. Glassin-Clay 100079715 Apr 21, 2025 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.
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SIMON HOPTON, P. ENG.
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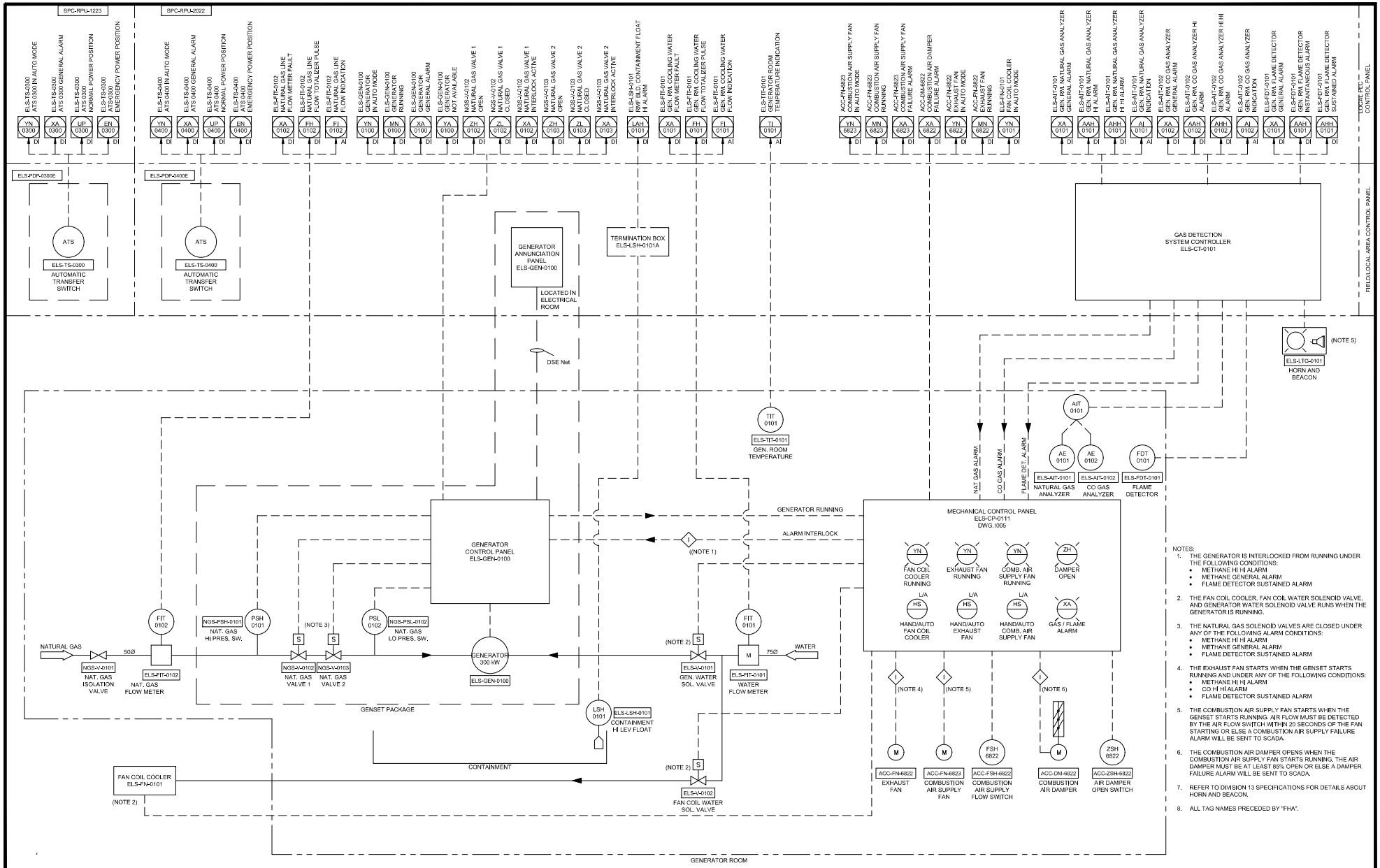
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
LEGEND SHEET - 3

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-77		I003
DATE:	2024-09-30						

Drawing: J:\MI16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-77_I003 LEGEND 3.DWG
Layout Tab: I003
Date: 03/21/2025 Time: 02:21:54 PM



NOTES:

1. THE GENERATOR IS INTERLOCKED FROM RUNNING UNDER THE FOLLOWING CONDITIONS:
   - METHANE HI HI ALARM
   - METHANE GENERAL ALARM
   - FLAME DETECTOR SUSTAINED ALARM
2. THE FAN COIL COOLER, FAN COIL WATER SOLENOID VALVE, AND GENERATOR WATER SOLENOID VALVE RUNS WHEN THE GENERATOR IS RUNNING.
3. THE NATURAL GAS SOLENOID VALVES ARE CLOSED UNDER ANY OF THE FOLLOWING ALARM CONDITIONS:
   - METHANE HI HI ALARM
   - METHANE GENERAL ALARM
   - FLAME DETECTOR SUSTAINED ALARM
4. THE EXHAUST FAN STARTS WHEN THE GENSET STARTS RUNNING AND UNDER ANY OF THE FOLLOWING CONDITIONS:
   - METHANE HI HI ALARM
   - CO HI HI ALARM
   - FLAME DETECTOR SUSTAINED ALARM
5. THE COMBUSTION AIR SUPPLY FAN STARTS WHEN THE GENSET STARTS RUNNING. AIR FLOW MUST BE DETECTED BY THE AIR FLOW SWITCH WITHIN 20 SECONDS OF THE FAN STARTING OR ELSE A COMBUSTION AIR SUPPLY FAILURE ALARM WILL BE SENT TO SCADA.
6. THE COMBUSTION AIR DAMPER OPENS WHEN THE COMBUSTION AIR SUPPLY FAN STARTS RUNNING. THE AIR DAMPER MUST BE AT LEAST 85% OPEN OR ELSE A DAMPER FAILURE ALARM WILL BE SENT TO SCADA.
7. REFER TO DIVISION 13 SPECIFICATIONS FOR DETAILS ABOUT HORN AND BEACON.
8. ALL TAG NAMES PRECEDED BY "FHA".

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-78_I004 P&ID.DWG
Layout Tab: I004
Date: 03/21/2025 Time: 02:24:31 PM

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TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER J.A. Glassin-Clay 100079715 Mar 31, 2025 PROVINCE OF ONTARIO

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MAJOR INFRASTRUCTURE

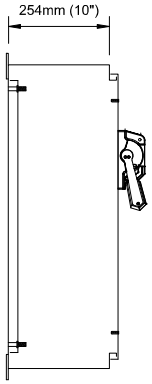
R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

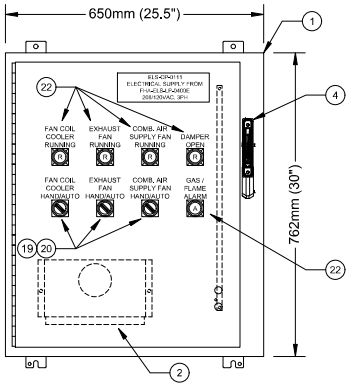
PROCESS AND INSTRUMENTATION DIAGRAM

INSTRUMENTATION

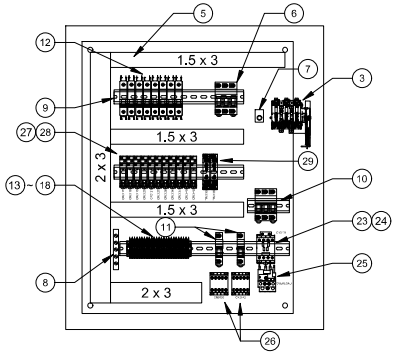
DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-78		I004
DATE:	2024-09-30						



LEFT SIDE VIEW



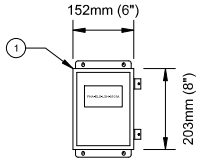
MECHANICAL CONTROL PANEL
FHA-ELS-CP-0111



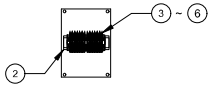
INTERIOR BACKPLATE

TYPICAL BILL OF MATERIALS

ITEM	PROCESS/TAG	EQUIPMENT	MANUFACTURER	PART #	DESCRIPTION	QTY
1	FHA-ELS-CP-0111	ENCLOSURE	RALSTON	N4-DD727224	760x650x254 (30x25.5x10), WALL MOUNT ENCLOSURE, DISC SWITCH, NEMA 12	1
2		ENCLOSURE	HAMMOND	PKT12125	12"x12" SHEET POCKET	1
3		DISCONNECT SWITCH	ALLEN BRADLEY	1494U-D30	3 POLE, 30A	1
4		DISCONNECT SWITCH	ALLEN BRADLEY	1494U 30A-200A	DISCONNECT SWITCH HANDLE	1
5		ENCLOSURE SUNDRIES	PANDUIT OR EQUIVALENT		WIRE DUCT, 2"x3", 1.5"x3", GRAY, AS SHOWN IN PANEL LAYOUT	AS REQ.
6		FUSE BLOCK	ALLEN BRADLEY	1492-FB3J30	3 POLE, CLASS J FUSE, 30A, LED INDICATOR	1
7		GROUND LUG	ILSCO	SLU-125	COPPER, 1 - 0/6 AWG	1
8		GROUND BAR	ILSCO	N-174	COPPER, CUT TO SIZE	1
9		DIN RAIL	PHOENIX CONTACT	801733	35mm	AS REQ.
10		FUSE BLOCK	ALLEN BRADLEY	P1492-FB3C30-L	3 POLE, 30A, CLASS CC, LED INDICATOR	1
11		FUSE BLOCK	ALLEN BRADLEY	P1492-FB1C30-L	1 POLE, 30A, CLASS CC, LED INDICATOR	2
12		CIRCUIT BREAKER	ALLEN BRADLEY	1489-M C1**0	1 POLE, **(AMP RATING)	8
13		TERMINAL BLOCK	PHOENIX CONTACT	3044102	GREY TERMINAL M4/6	AS REQ.
14		TERMINAL BLOCK	PHOENIX CONTACT	3044128	GREEN GROUND TERMINALS	AS REQ.
15		TERMINAL BLOCK	PHOENIX CONTACT	3022276	END STOPS	AS REQ.
16		TERMINAL BLOCK	PHOENIX CONTACT	3047167	GREY SEPARATOR END SECTION	AS REQ.
17		TERMINAL BLOCK	PHOENIX CONTACT	3030271	10 POSITION PLUG IN BRIDGE	AS REQ.
18		TERMINAL BLOCK	PHOENIX CONTACT	1051003	TERMINAL MARKING STRIP	AS REQ.
19		2-POSITION SELECTOR SWITCH	ALLEN BRADLEY	800T-H2A	30.5mm 3-POSITION MAINTAINED SELECTOR SWITCH, STANDARD KNOB, 1N.O. / 1N.C.	3
20		800T AUX CONTACT BLOCK	ALLEN BRADLEY	800T-XA1	AUXILIARY CONTACT BLOCK, 1N.O. / 1N.C.	3
21		PILOT LIGHT W. PUSH TO TEST	ALLEN BRADLEY	800T-QTE2A	30.5mm, AMBER LED, 12-130V AC/DC, PUSH-TO-TEST	1
22		PILOT LIGHT W. PUSH TO TEST	ALLEN BRADLEY	800T-QTE2R	30.5mm, RED LED, 12-130V AC/DC, PUSH-TO-TEST	4
23		CONTACTOR	ALLEN BRADLEY	100-C16D10	120VAC, 3 POLE, 1N.O. AUX	1
24		100C AUX CONTACT BLOCK	ALLEN BRADLEY	100-FA22	2N.O. / 2 N.C.	1
25		OVERLOAD RELAY	ALLEN BRADLEY	193-T1AC12	MCS BIMETALLIC, 9.0A-12.5A	1
26		CONTACTOR	ALLEN BRADLEY	100-K12D10	120VAC, 3 POLE, 1N.O. AUX	2
27		RELAY	OMRON	G2R-2-SN120VAC(S)	120VAC, DPDT, 10A, LED INDICATOR, REQUIRES CONNECTING SOCKET	11
28		RELAY BASE FOR OMRON G2R-2	OMRON	P2RF-08-E	2-POLE RELAY SOCKET, SCREW TERMINAL, FOR G2R-2** DPDT	11
29		TIMER	PHOENIX CONTACT	2905813	120VAC, 50ms - 1hr	2



CONTAINMENT LEVEL SWITCH TERMINATION BOX
FHA-ELS-LSH-0101A



INTERIOR BACKPLATE

TYPICAL BILL OF MATERIALS

ITEM	PROCESS/TAG	EQUIPMENT	MANUFACTURER	PART #	DESCRIPTION	QTY
1	FHA-ELS-LSH-0101A	ENCLOSURE	RALSTON	IBOH-080606	203x152x152 (8x6x6), WALL MOUNT, NEMA 12	1
2		DIN RAIL	PHOENIX CONTACT	801733	35mm	1
3		TERMINAL BLOCK	PHOENIX CONTACT	3044102	GREY TERMINAL M4/6	AS REQ.
4		TERMINAL BLOCK	PHOENIX CONTACT	3044128	GREEN GROUND TERMINALS	AS REQ.
5		TERMINAL BLOCK	PHOENIX CONTACT	3022276	END STOPS	AS REQ.
6		TERMINAL BLOCK	PHOENIX CONTACT	3047167	GREY SEPARATOR END SECTION	AS REQ.

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-79_I005 MECHANICAL CONTROL PANEL LAYOUT.DWG
Layout Tab: I005
Date: 03/21/2025 Time: 02:19:14 PM

Toronto Water

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A	2025-03-18	ISSUED FOR TENDER	C.H.	

Toronto

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ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
J.A. Glastin-Clay
100079715
Mar 31, 2025
PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.
DIRECTOR,
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SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

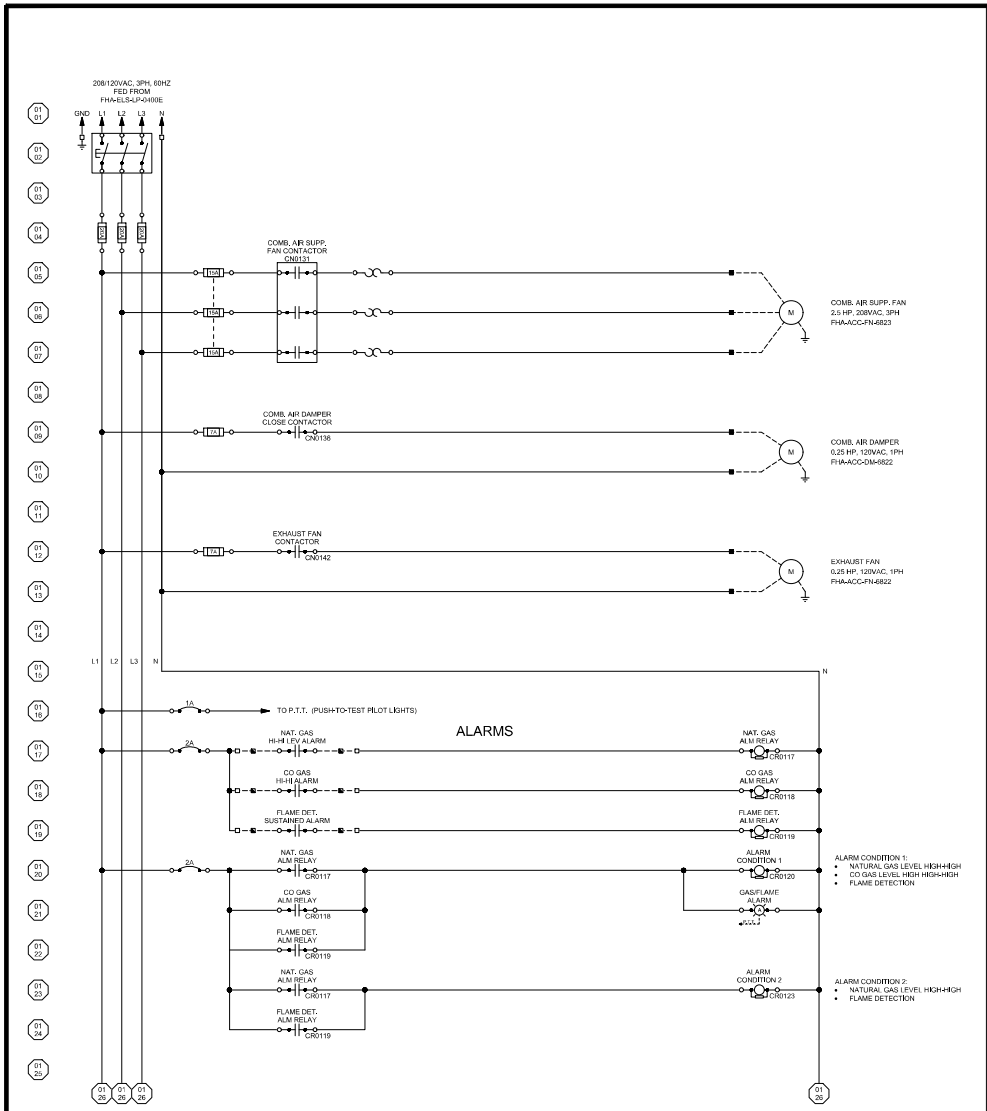
R.C. HARRIS WATER TREATMENT PLANT

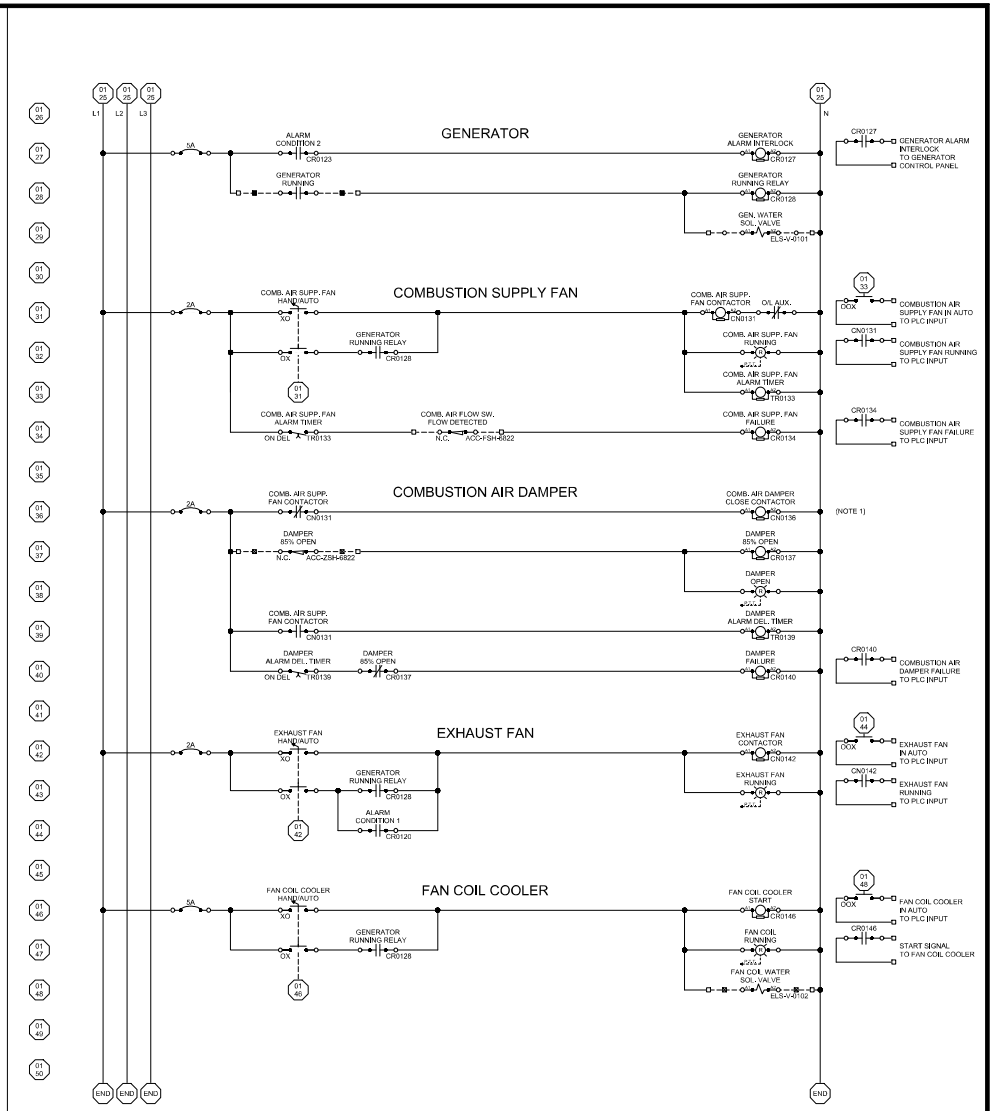
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

MECHANICAL CONTROL PANEL LAYOUT

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-79		I005
DATE:	2024-09-30						





NOTES:
1. AIR DAMPER IS SPRING OPENED AND ENERGIZED TO CLOSE

- TERMINAL BLOCK IN MECHANICAL CONTROL PANEL
- TERMINAL BLOCK IN GENERATOR CONTROL PANEL
- TERMINAL BLOCK IN GAS DETECT SYSTEM CONTROLLER
- TERMINAL BLOCK IN FIELD
- FIELD WIRING
- EXTERNAL DEVICE/CONNECTION

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 MCC\2F-2017-08-80_I006 MECHANICAL PANEL POWER DISTRIBUTION.DWG
Layout Tab: I006
Date: 03/21/2025 Time: 02:22:51 PM

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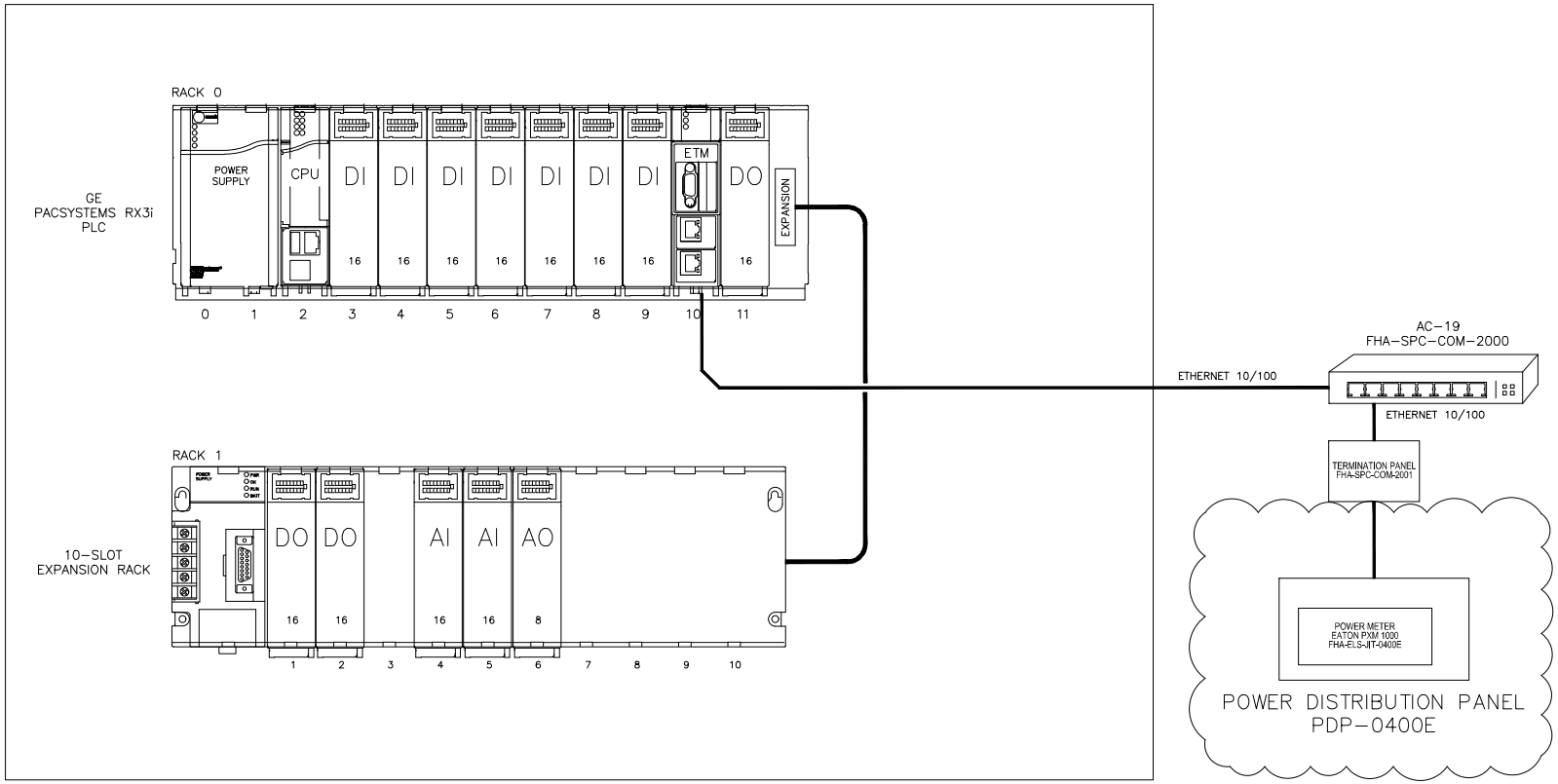
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
MECHANICAL CONTROL PANEL WIRING

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-80		I006
DATE:	2024-09-30						



CORROSION CONTROL PANEL FHA-SPC-RPU-2022

NOTES:

1. THIS DRAWING IS BASED ON EXISTING RECORD DRAWINGS. DETAILS AS DEPICTED MAY NOT BE AN ACCURATE REPRESENTATION OF EXISTING CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND SUPPLY AND CONFIGURE ALL COMPONENTS TO PROVIDE A FUNCTIONAL SYSTEM THAT MEETS THE DESIGN INTENTION OF THIS DRAWING.
2. THE CONTRACTOR IS RESPONSIBLE FOR SUPPLYING AND INSTALLING ALL INTERCONNECTING CABLES, INCLUDING ETHERNET CABLES, PATCH CABLES, AS WELL AS THE NECESSARY CONNECTORS TO ENSURE A FULLY FUNCTIONAL COMMUNICATION LINK EXISTS BETWEEN THE NEW POWER MONITOR AND THE FHA-SPC-RPU-2022 SYSTEM.
3. CONTRACTOR TO FIELD VERIFY EXISTING TERMINATION PANEL AND NETWORK CLOSETS AND IDENTIFY SPARE PORT FOR CONNECTING THE POWER METER.
4. CONTRACTOR SHALL PERFORM NETWORK CABLING TESTS AND SUBMIT RESULTS TO ENGINEER/CITY.

LEGEND:

NEW

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MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

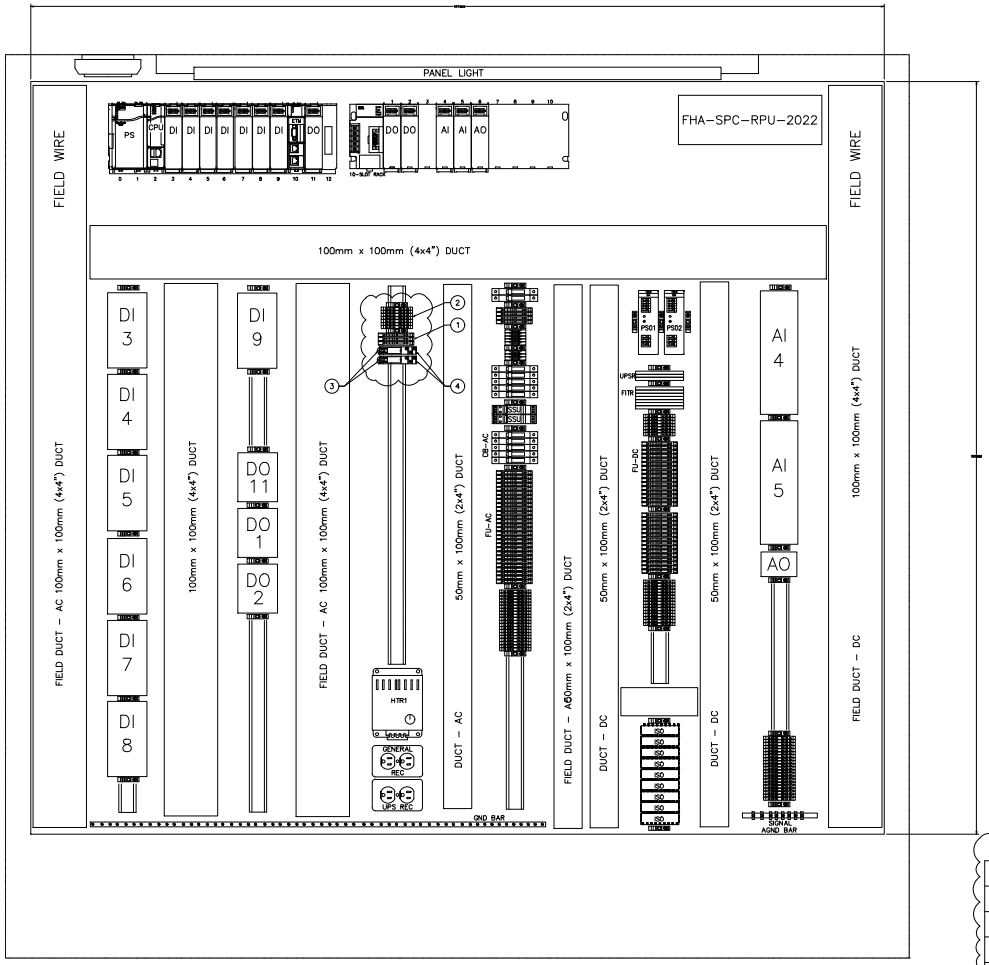
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-2022 PLC RACK LAYOUT

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-81		I007
DATE:	2024-09-30						

Drawing: J:\MI16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-81_I007 RPU 2022 PLC RACK LAYOUT.DWG
Layout Tab: I007
Date: 03/21/2025 Time: 02:22:23 PM



EXISTING FHA-SPC-RPU-2022 BACKPANEL LAYOUT

BILL OF MATERIALS

ITEM	PART NUMBER	MANUFACTURER	DESCRIPTION	QUANTITY
1	1492-H5/1492-H4	ALLEN-BRADLEY	FUSED TERMINAL BLOCK WITH FUSE BLOWN INDICATOR	AS REQ.
2	WDU4	WEIDMULLER	NON-FUSED TERMINAL BLOCKS	AS REQ.
3	G2R-1-SND24VDC	OMRON	24VDC SPST RELAY	2
4	P2RF-05-E	OMRON	RELAY BASE SOCKET	2

NOTES:
1. THIS DRAWING IS BASED ON EXISTING RECORD DRAWINGS. DETAILS AS DEPICTED MAY NOT BE AN ACCURATE REPRESENTATION OF EXISTING CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND SUPPLY AND CONFIGURE ALL COMPONENTS TO PROVIDE A FUNCTIONAL SYSTEM THAT MEETS THE DESIGN INTENTION OF THIS DRAWING.

LEGEND:

NEW

Drawing: J:\M16-0273 TOR_JHARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-82_I008 RPU 2022 PANEL LAYOUT.DWG
Layout Tab: I008
Date: 03/21/2025 Time: 02:18:16 PM

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LICENSED PROFESSIONAL ENGINEER
J.A. Glasin-Clay
100079715
Apr 30, 2025
PROVINCE OF ONTARIO

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SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

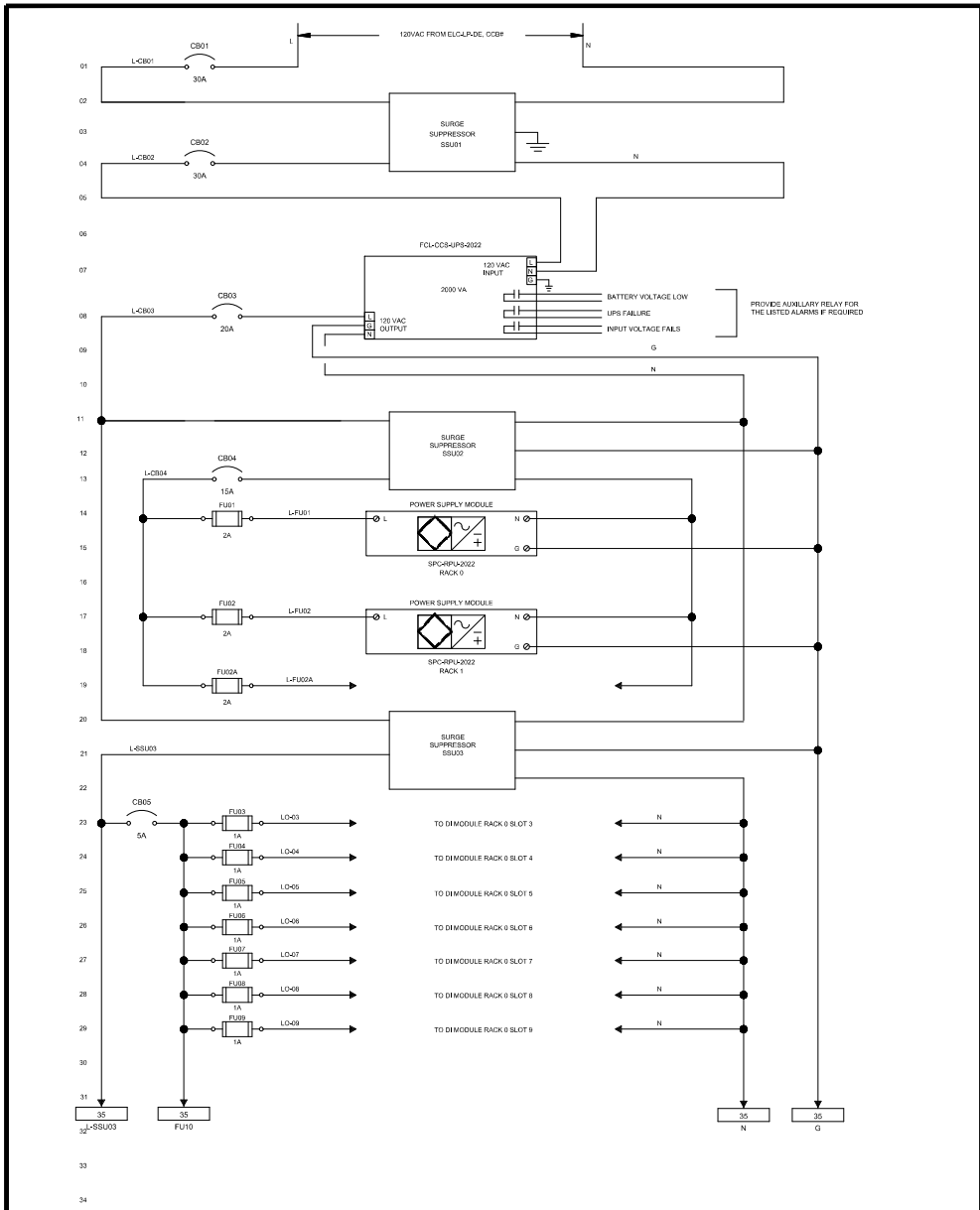
R.C. HARRIS WATER TREATMENT PLANT

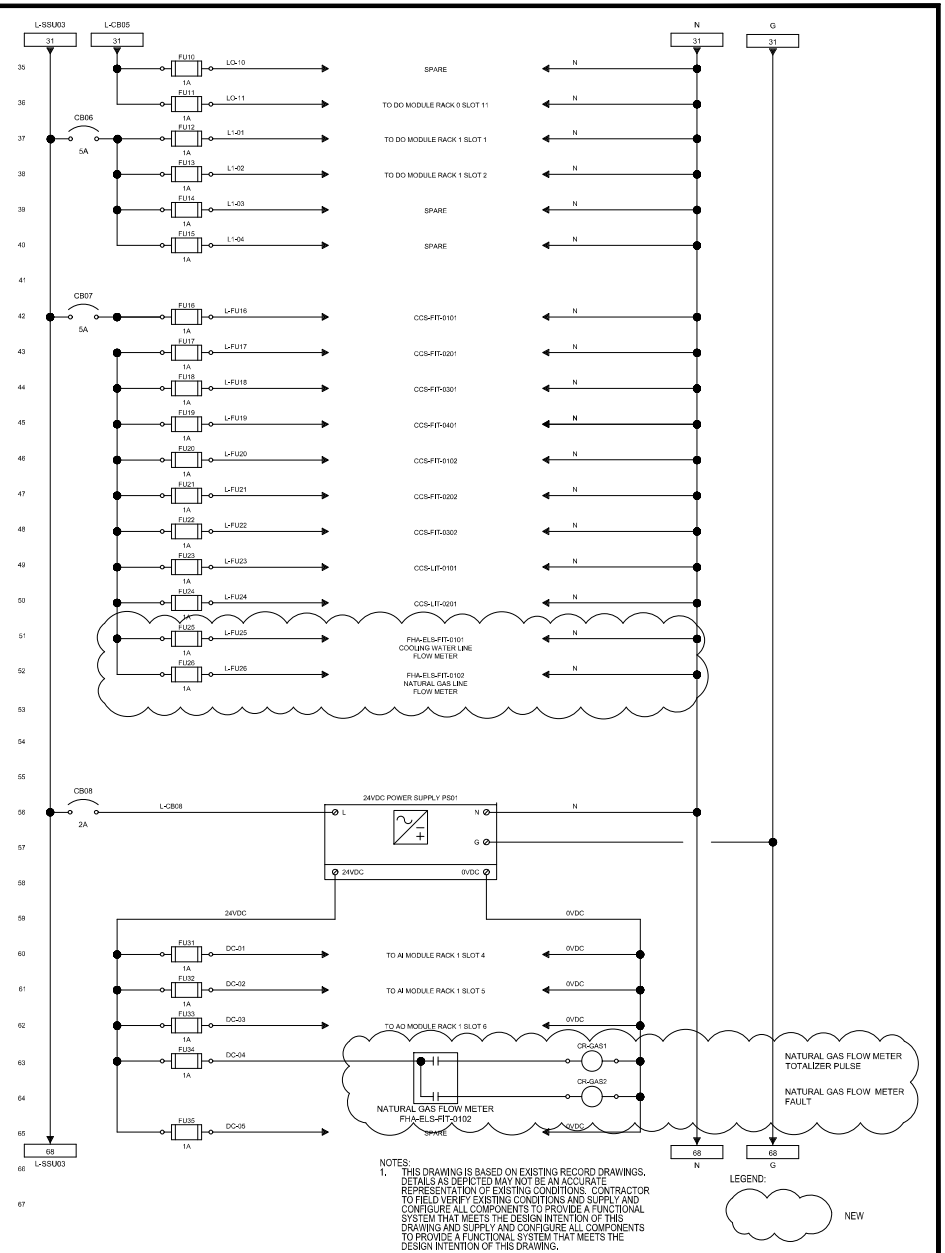
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-2022 PLC PANEL LAYOUT

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-82		I008
DATE:	2024-09-30						





NOTES:
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SIMON HOPTON, P. ENG.
DIRECTOR
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MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

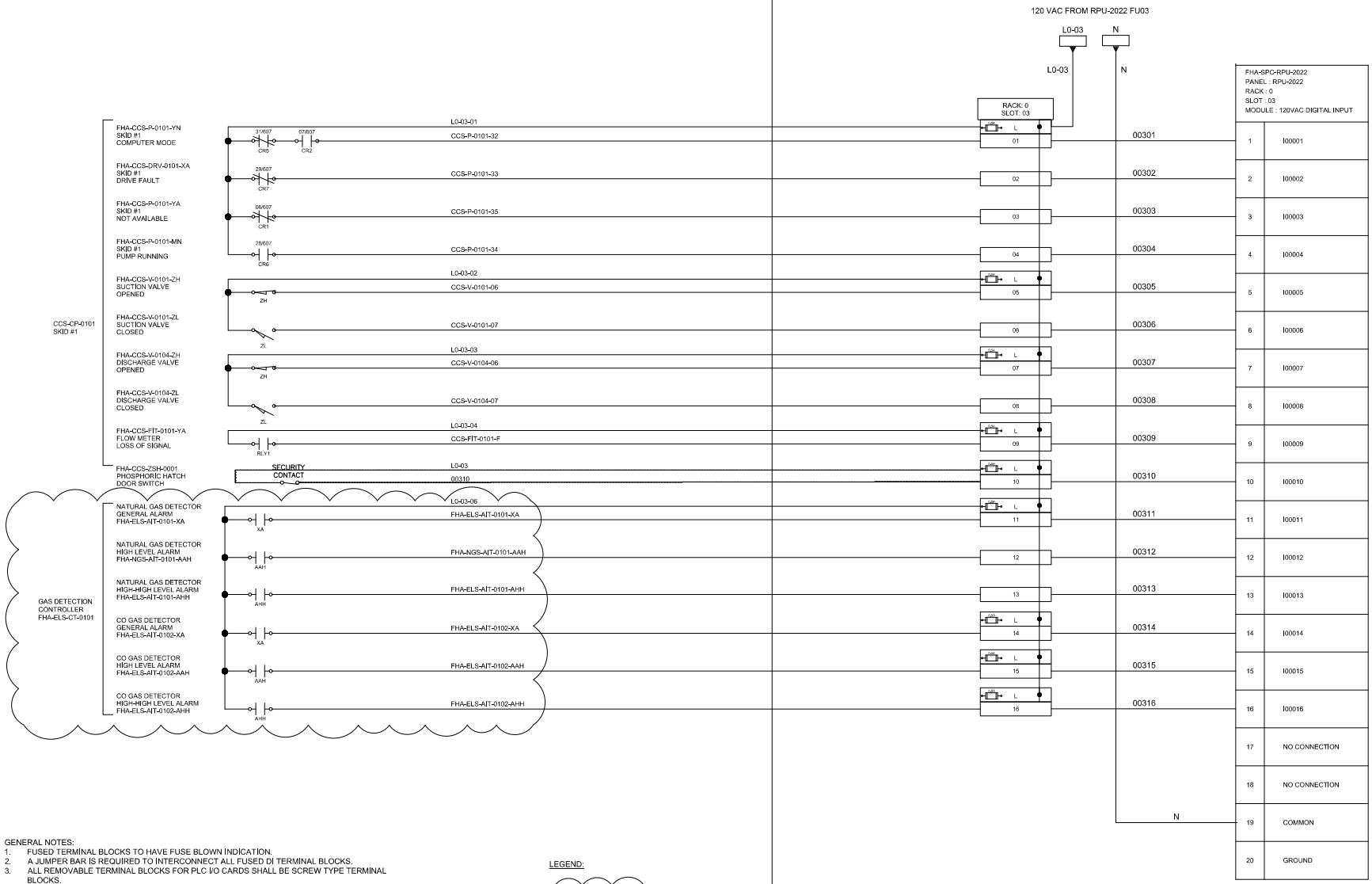
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-2022-PANEL POWER DISTRIBUTION 1

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-83		I009
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-83_I009 RPU 2022 POWER DIST.DWG
Layout Tab: I009
Date: 03/21/2025 Time: 02:25:28 PM



GENERAL NOTES:

1. FUSED TERMINAL BLOCKS TO HAVE FUSE BLOWN INDICATION.
2. A JUMPER BAR IS REQUIRED TO INTERCONNECT ALL FUSED DI TERMINAL BLOCKS.
3. ALL REMOVABLE TERMINAL BLOCKS FOR PLC I/O CARDS SHALL BE SCREW TYPE TERMINAL BLOCKS.
4. THIS DRAWING IS BASED ON EXISTING RECORD DRAWINGS. DETAILS AS DEPICTED MAY NOT BE AN ACCURATE REPRESENTATION OF EXISTING CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND SUPPLY AND CONFIGURE ALL COMPONENTS TO PROVIDE A FUNCTIONAL SYSTEM THAT MEETS THE DESIGN INTENTION OF THIS DRAWING.
5. CONTRACTOR TO FIELD VERIFY EXISTING SPARE I/O FOR THE CONNECTION OF THE NEW INPUTS.

LEGEND:

NEW

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Mar 31, 2025
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R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-2022 RACK 0 SLOT 03 WIRING DIAGRAM

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-84		I010
DATE:	2024-09-30						

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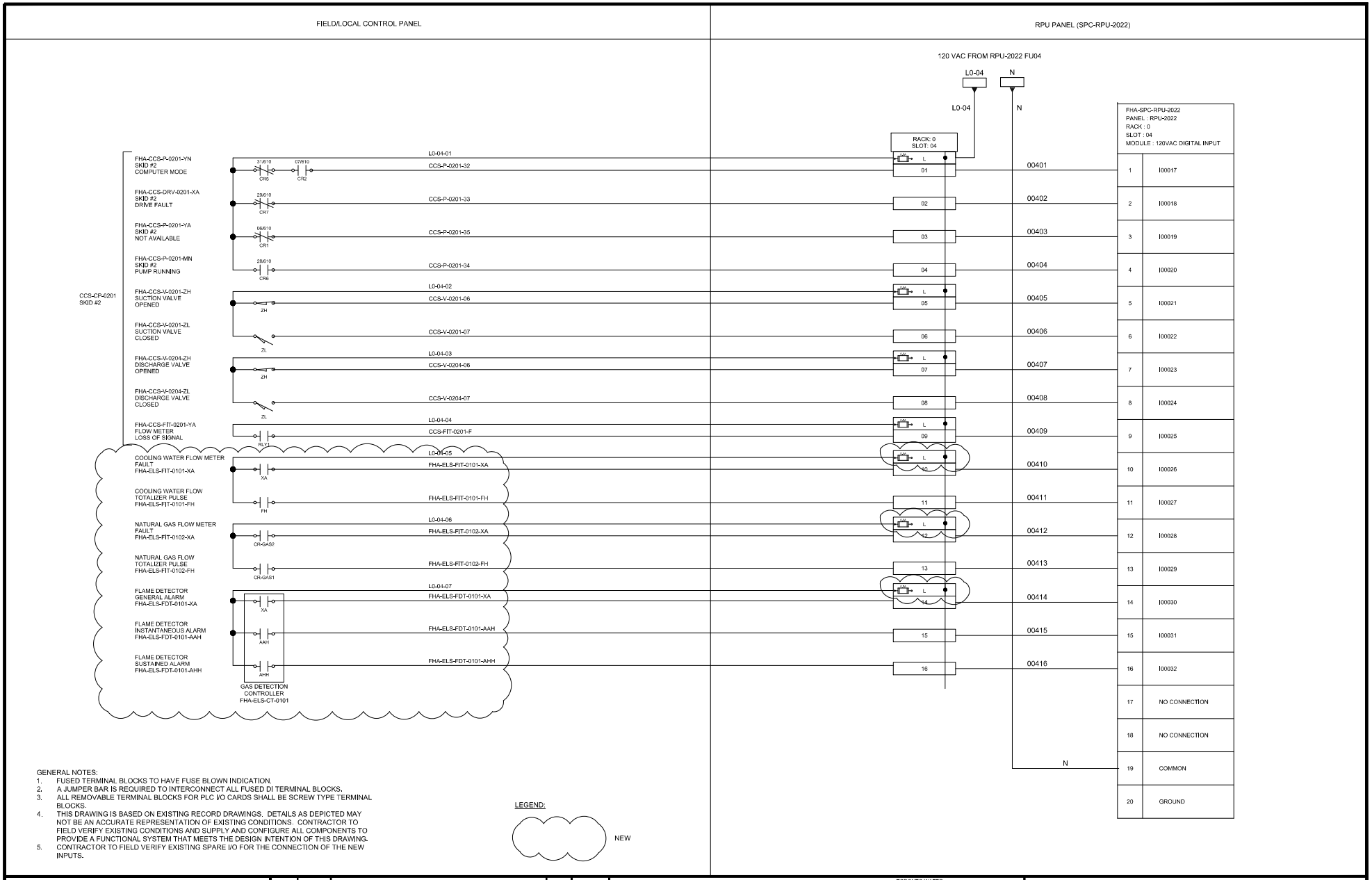

GENERAL NOTES:

1. FUSED TERMINAL BLOCKS TO HAVE FUSE BLOWN INDICATION.
2. A JUMPER BAR IS REQUIRED TO INTERCONNECT ALL FUSED DI TERMINAL BLOCKS.
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4. THIS DRAWING IS BASED ON EXISTING RECORD DRAWINGS. DETAILS AS DEPICTED MAY NOT BE AN ACCURATE REPRESENTATION OF EXISTING CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND SUPPLY AND CONFIGURE ALL COMPONENTS TO PROVIDE A FUNCTIONAL SYSTEM THAT MEETS THE DESIGN INTENTION OF THIS DRAWING.
5. CONTRACTOR TO FIELD VERIFY EXISTING SPARE I/O FOR THE CONNECTION OF THE NEW INPUTS.

LEGEND:

NEW

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-85_I011 RPU 2022 RC54.DWG
Layout Tab: I011
Date: 03/21/2025 Time: 02:19:41 PM

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LICENSED PROFESSIONAL ENGINEER
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Oct 31, 2025
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SIMON HOPTON, P. ENG.
DIRECTOR
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MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

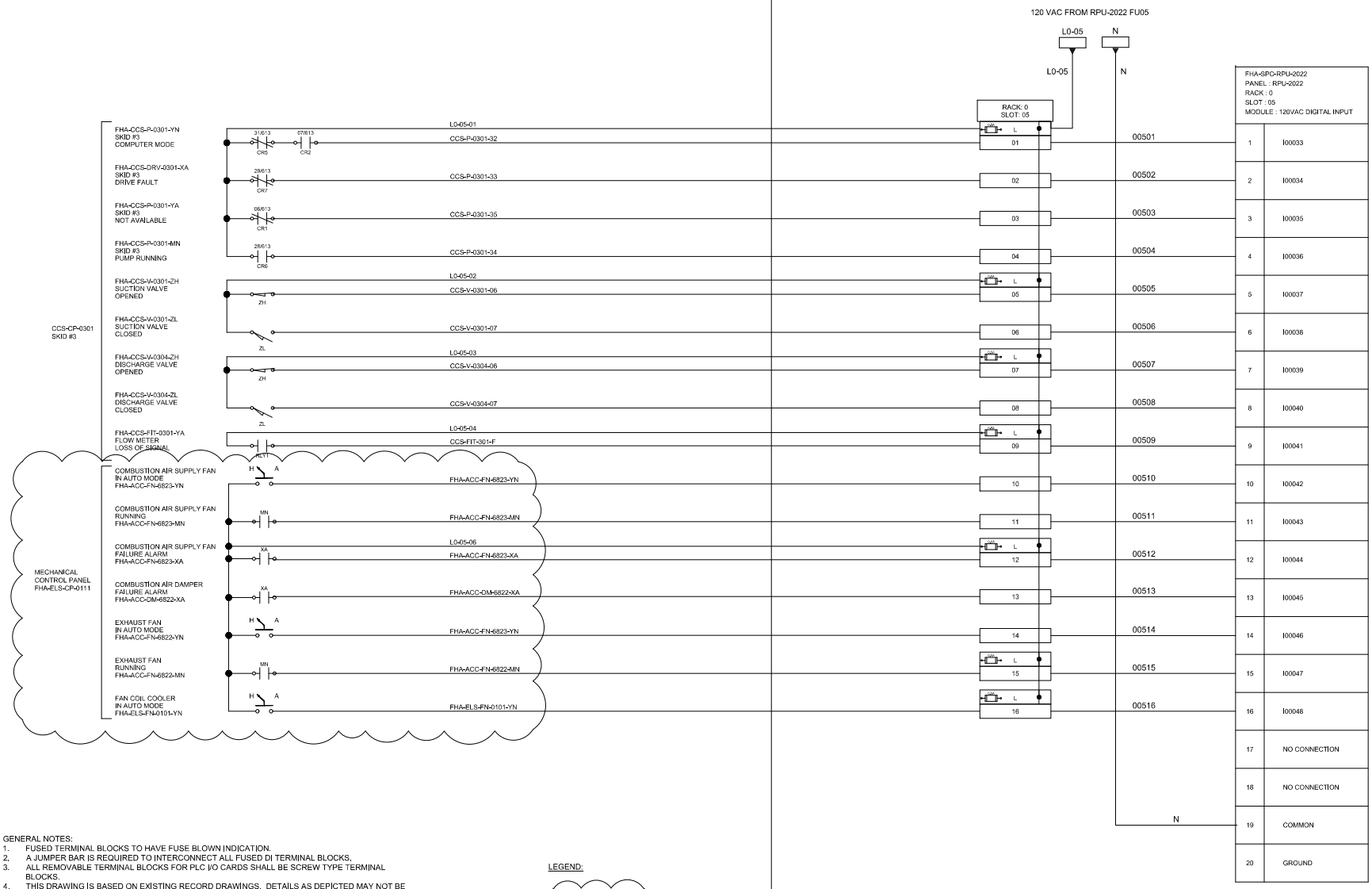
SPC-RPU-2022 RACK 0 SLOT 04 WIRING DIAGRAM

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-85		I011
DATE:	2024-09-30						

FIELD/LOCAL CONTROL PANEL

RPU PANEL (SPC-RPU-2022)



GENERAL NOTES:

1. FUSED TERMINAL BLOCKS TO HAVE FUSE BLOWN INDICATION.
2. A JUMPER BAR IS REQUIRED TO INTERCONNECT ALL FUSED DI TERMINAL BLOCKS.
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LEGEND:

NEW

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MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-2022 RACK 0 SLOT 05 WIRING DIAGRAM

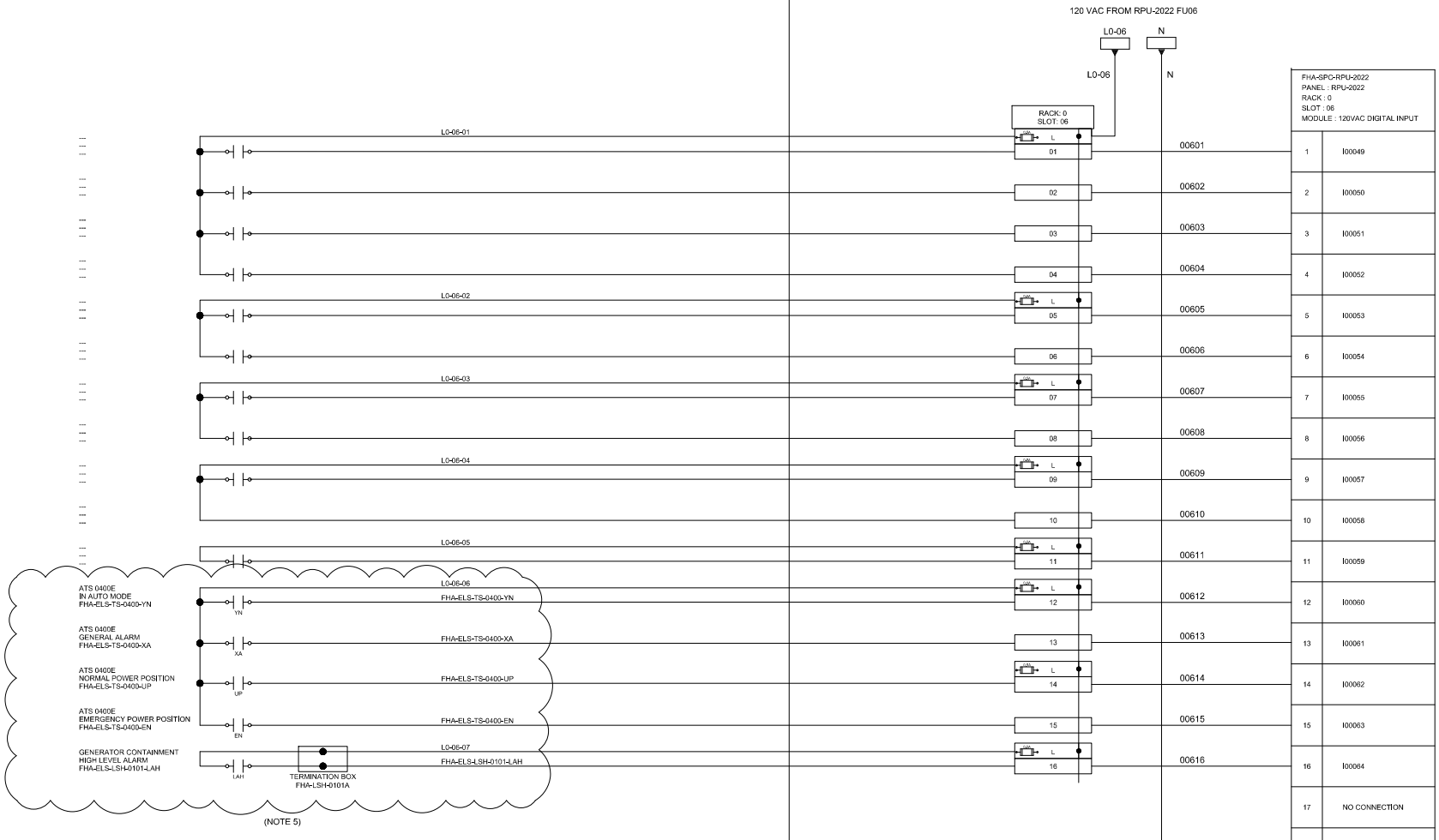
INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-86		I012
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-86_I012 RPU 2022 R055.DWG
Layout Tab: I012
Date: 03/21/2025 Time: 02:23:18 PM

FIELD/LOCAL CONTROL PANEL

RPU PANEL (SPC-RPU-2022)



GENERAL NOTES:

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2. A JUMPER BAR IS REQUIRED TO INTERCONNECT ALL FUSED DI TERMINAL BLOCKS.
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LEGEND:

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R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-2022 RACK 0 SLOT 06 WIRING DIAGRAM

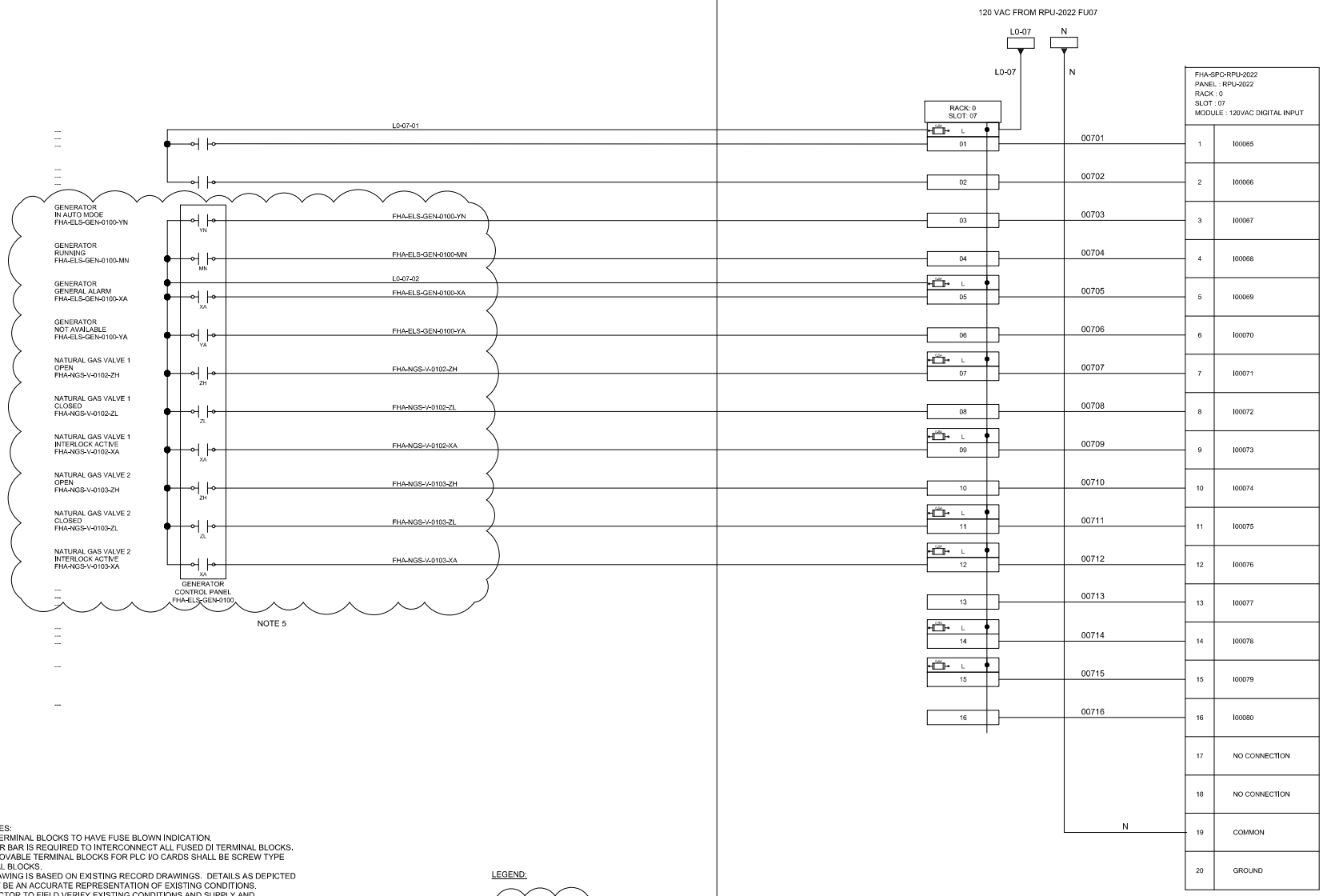
INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-87		I013
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-87_I013 RPU 2022 R056.DWG
Layout Tab: I013
Date: 03/21/2025 Time: 02:26:17 PM

FIELD/LOCAL CONTROL PANEL

RPU PANEL (SPC-RPU-2022)



GENERAL NOTES:

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5. CONTRACTOR TO FIELD VERIFY EXISTING SPARE I/O FOR THE CONNECTION OF THE NEW INPUTS.

LEGEND:

NEW

Drawing: J:\MHE-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-88_I014 RPU 2022 R057.DWG
Layout Tab: I014
Date: 03/21/2025 Time: 02:20:35 PM

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ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER J.A. Glaskin-Clay 100079715 Mar 31, 2025 PROVINCE OF ONTARIO

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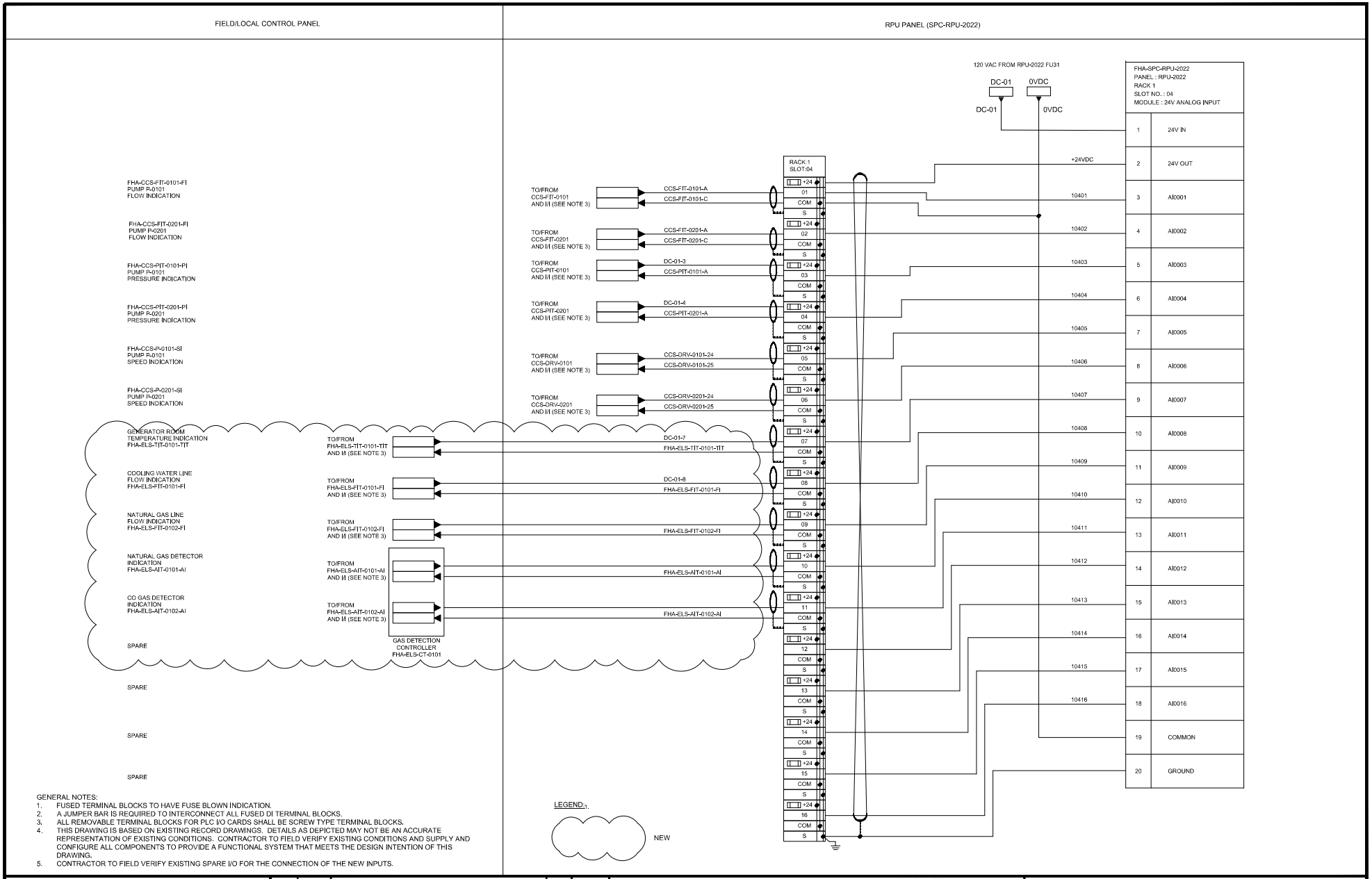
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-2022 RACK 0 SLOT 07 WIRING DIAGRAM

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-88		I014
DATE:	2024-09-30						



GENERAL NOTES:

1. FUSED TERMINAL BLOCKS TO HAVE FUSE BLOWN INDICATION.
2. A JUMPER BAR IS REQUIRED TO INTERCONNECT ALL FUSED DI TERMINAL BLOCKS.
3. ALL REMOVABLE TERMINAL BLOCKS FOR PLC I/O CARDS SHALL BE SCREW TYPE TERMINAL BLOCKS.
4. THIS DRAWING IS BASED ON EXISTING RECORD DRAWINGS. DETAILS AS DEPICTED MAY NOT BE AN ACCURATE REPRESENTATION OF EXISTING CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND SUPPLY AND CONFIGURE ALL COMPONENTS TO PROVIDE A FUNCTIONAL SYSTEM THAT MEETS THE DESIGN INTENTION OF THIS DRAWING.
5. CONTRACTOR TO FIELD VERIFY EXISTING SPARE I/O FOR THE CONNECTION OF THE NEW INPUTS.

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-89_I015 RPU 2022 R154.DWG
Layout Tab: I015
Date: 03/21/2025 Time: 02:18:45 PM

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A	2025-03-18	ISSUED FOR TENDER	C.H.	

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ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
J.A. Glastin-Clay
100079715
Mar 21, 2025
PROVINCE OF ONTARIO

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SIMON HOPTON, P. ENG.
DIRECTOR
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MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

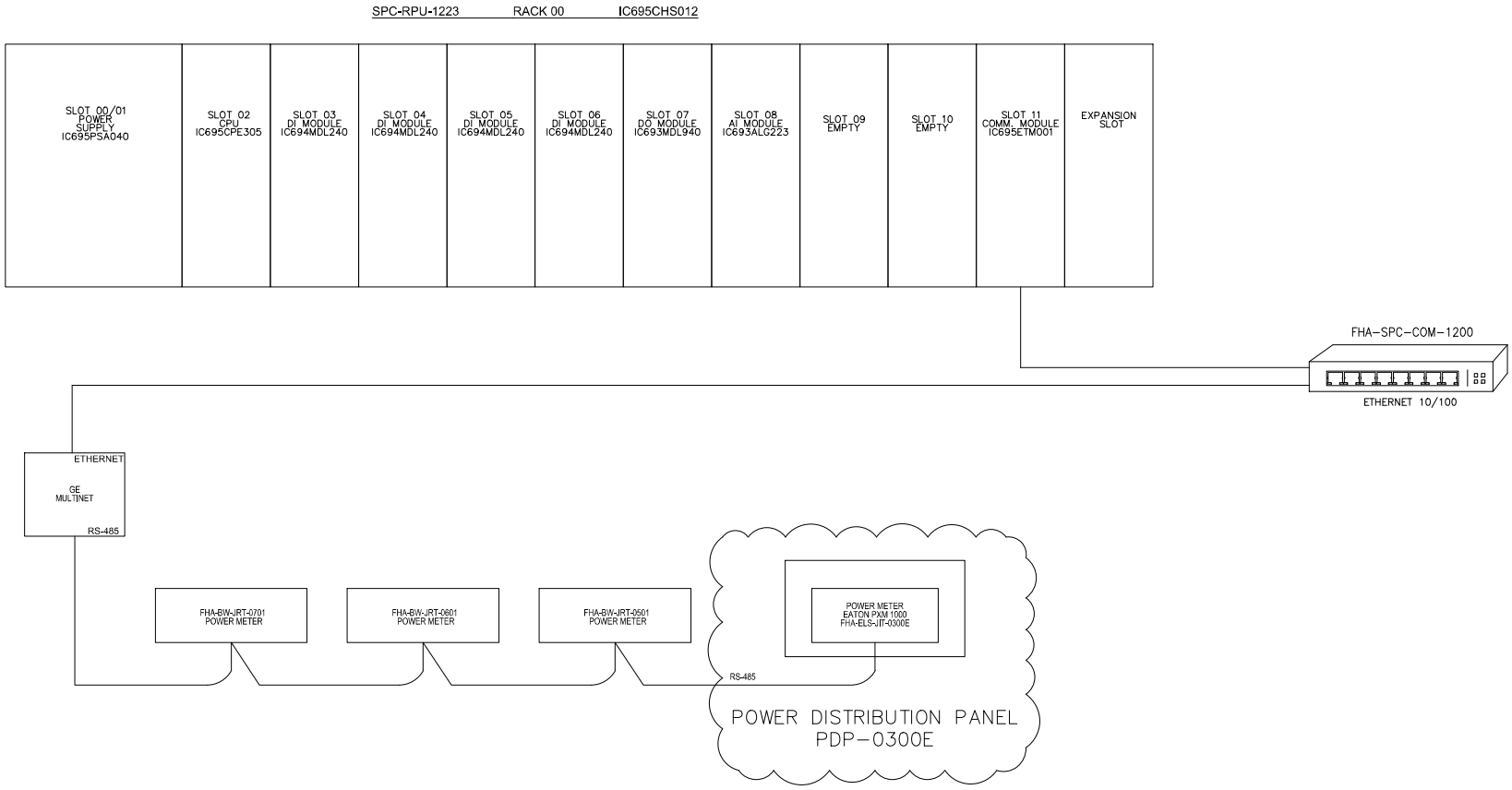
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-2022 RACK 1 SLOT 04 WIRING DIAGRAM

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-89		I015
DATE:	2024-09-30						

METRIC
MEASUREMENTS SHOWN ON THESE PLANS ARE IN MILIMETERS UNLESS OTHERWISE NOTED



NOTES:

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2. THE CONTRACTOR IS RESPONSIBLE FOR SUPPLYING AND INSTALLING ALL INTERCONNECTING CABLES, INCLUDING SERIAL COMMS CABLES, PATCH CABLES, AS WELL AS THE NECESSARY CONNECTORS TO ENSURE A FULLY FUNCTIONAL COMMUNICATION LINK EXISTS BETWEEN THE NEW POWER MONITOR AND THE FHA-SPC-RPU-1223 SYSTEM.
3. THE CONTRACTOR SHALL PERFORM END TO END TESTING OF THE POWER MONITOR TO THE PLC TO VERIFY RS-485 COMMUNICATION LINKS ARE FUNCTIONAL.

LEGEND:

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R.C. HARRIS WATER TREATMENT PLANT

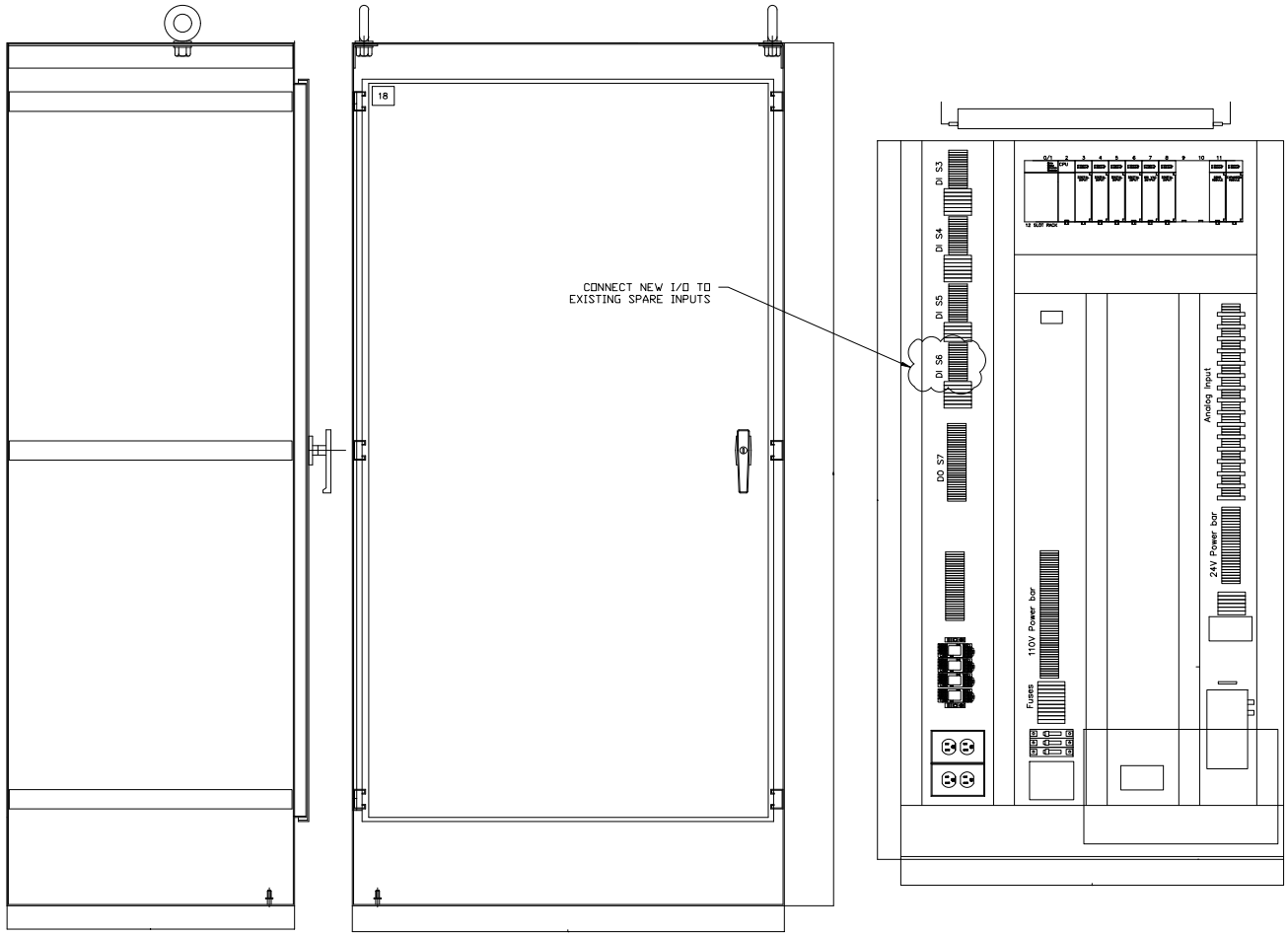
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-1223 - PLC RACK LAYOUT

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-90		I016
DATE:	2024-09-30						

Drawing: J:\MH6-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-90_I016 RPU 1223 PLC RACK LAYOUT.DWG
Layout Tab: I016
Date: 03/21/2025 Time: 02:20:08 PM



SIDE VIEW

PLC CONTROL PANEL
FHA–SPC–RPU–1223

FRONT VIEW

MOUNTING PLATE

GENERAL NOTES:
1. THIS DRAWING IS BASED ON EXISTING RECORD DRAWINGS. DETAILS AS DEPICTED MAY NOT BE AN ACCURATE REPRESENTATION OF EXISTING CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND SUPPLY AND CONFIGURE ALL COMPONENTS TO PROVIDE A FUNCTIONAL SYSTEM THAT MEETS THE DESIGN INTENTION OF THIS DRAWING.
2. CONTRACTOR TO FIELD VERIFY EXISTING SPARE I/O FOR THE CONNECTION OF THE NEW INPUTS.

LEGEND:

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R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-1223 PLC PANEL LAYOUT

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-91		I017
DATE:	2024-09-30						

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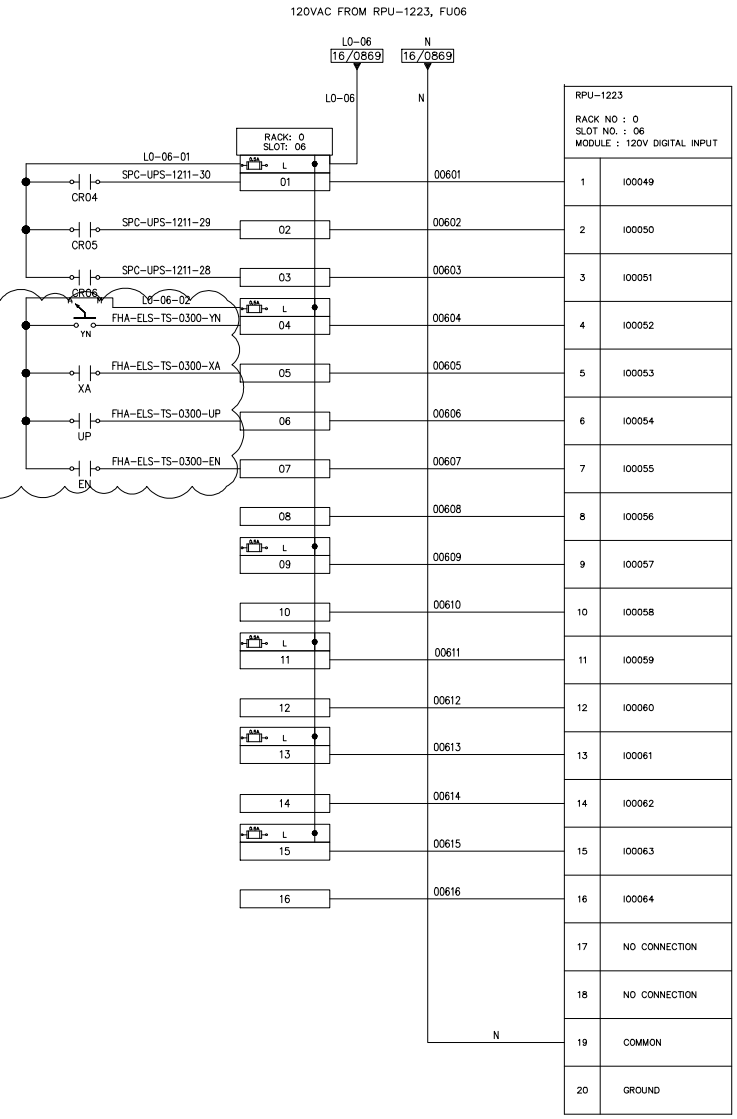
Layout Tab: I017
Date: 03/21/2025 Time: 02:21:27 PM

FIELD/MCC/AREA CONTROL PANEL/CONTROL STATION

WORKSTATION CPU-1211

- FHA-SPC-UPS-1211-EA WORKSTATION CPU-1211 POWER FAILURE
- FHA-SPC-UPS-1211-EAL WORKSTATION CPU-1211 UPS LOW BATTERY
- FHA-SPC-UPS-1211-XA WORKSTATION CPU-1211 UPS FAILURE
- ATS 0300 AUTO MODE FHA-ELS-TS-0300-YN
- ATS 0300 GENERAL ALARM FHA-ELS-TS-0300-XA
- ATS 0300 NORMAL POWER POSITION FHA-ELS-TS-0300-UP
- ATS 0300 EMERGENCY POWER POSITION FHA-ELS-TS-0300-EN
- SPARE
- SPARE
- SPARE
- SPARE
- SPARE
- SPARE
- SPARE
- SPARE
- SPARE

PLC PANEL (SPC-RPU-1223)



GENERAL NOTES:

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5. CONTRACTOR TO FIELD VERIFY EXISTING SPARE I/O FOR THE CONNECTION OF THE NEW INPUTS.

LEGEND:

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MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

SPC-RPU-1223 RACK 0 SLOT 06 WIRING DIAGRAM

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-92		I018
DATE:	2024-09-30						

Drawing: J:\MHE-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-92_I018 RPU 1223 RCSS.DWG
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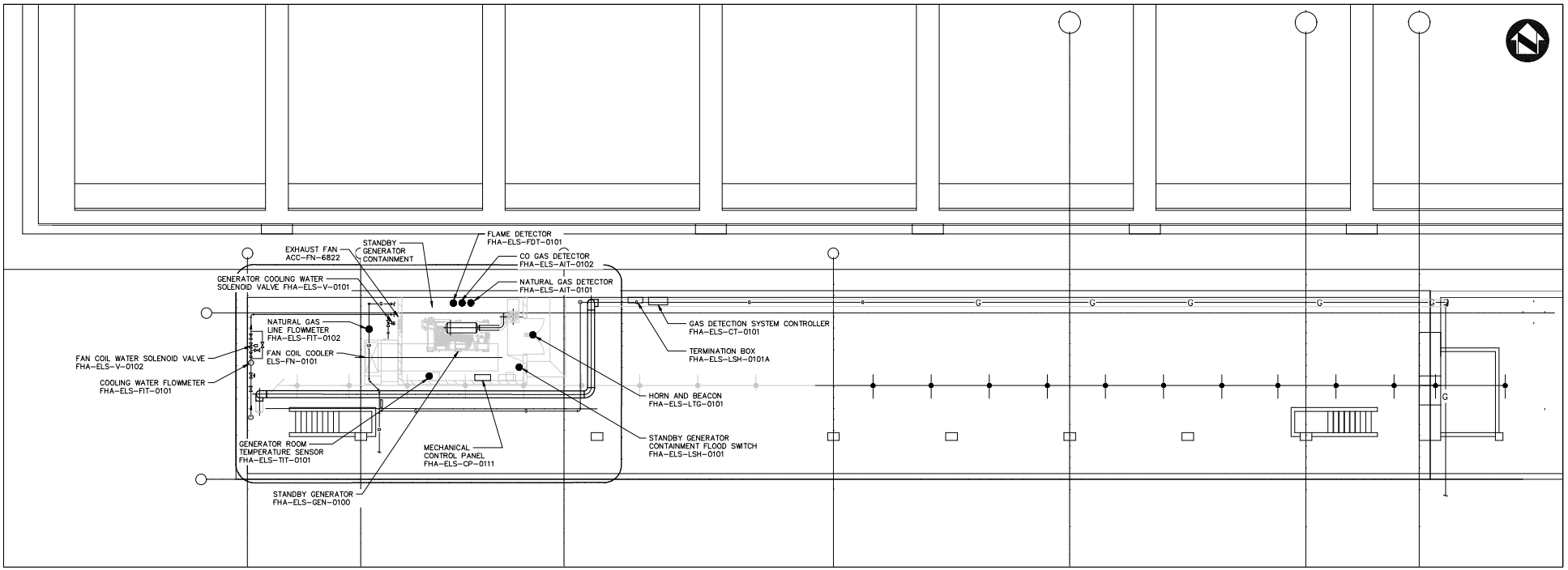

FLOOR PLAN - RMF BUILDING PIPE GALLERY

NOTES:

1. REFER TO E202 FOR LOCATION DETAILS OF FHA-SPC-RPU-2022 AND FHA-ELS-TS-0400.
2. REFER TO E205 FOR LOCATION DETAILS OF FHA-SPC-RPU-1223 AND FHA-ELS-TS-0300.
3. REFER TO M201A FOR LOCATION DETAILS OF:
   - ACC-FN-6823 COMBUSTION AIR SUPPLY FAN
   - ACC-FS-6822 COMBUSTION AIR SUPPLY FLOW SWITCH
   - ACC-DM-6822 COMBUSTION AIR DAMPER
   - ACC-ZSH-6822 AIR DAMPER OPEN SWITCH

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-93-I019 FLOOR PLAN.DWG
Layout Tab: I019
Date: 03/21/2025 Time: 02:24:04 PM

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R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

INSTRUMENTATION FLOOR PLAN

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-93		I019
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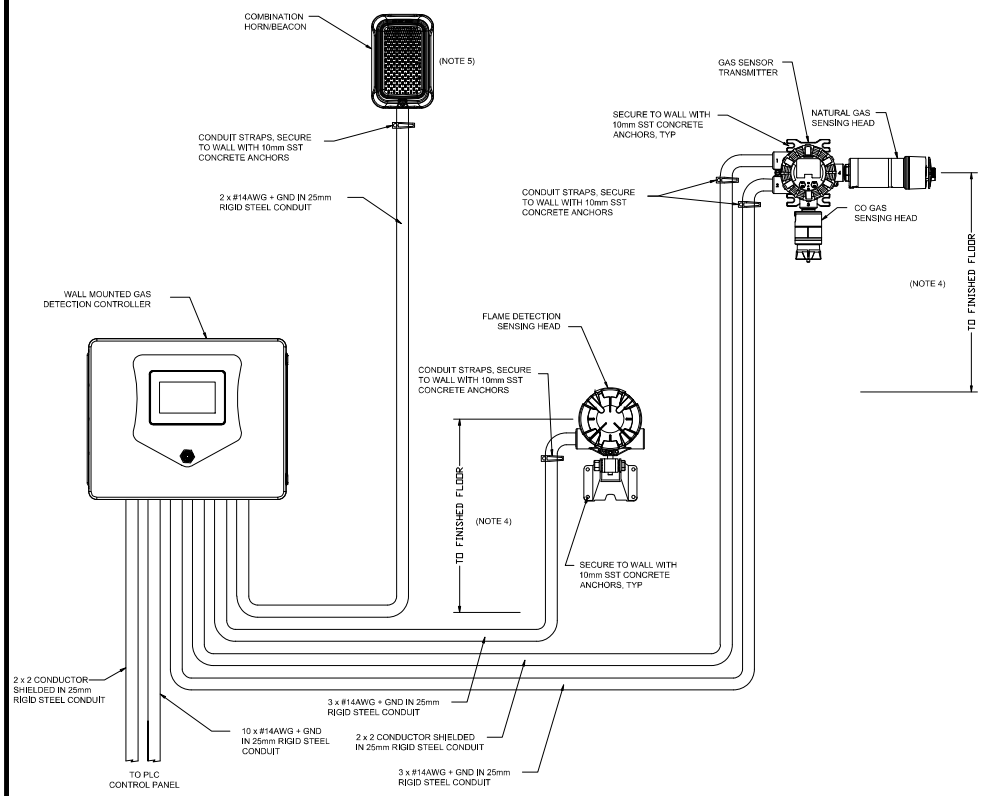
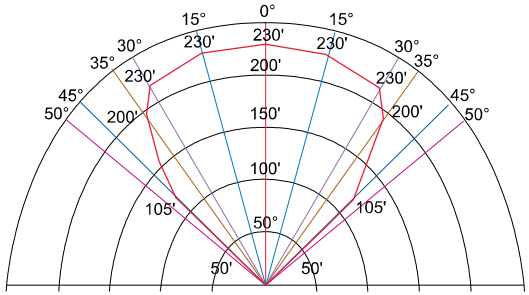


FLAME DETECTION AND GAS DETECTOR



NOTES:
1. 1 SQ. FT. N-HEPTANE FIRE USING HIGH SENSITIVITY. THIS IS A NOMINAL VALUE AND DIFFERENT RESULTS MAY ARISE DEPENDING ON THE SOURCE OF EACH FIRE.
2. MAXIMUM FIELD OF VIEW IS THE ANGLE AT WHICH THE DETECTOR CAN DETECT FLAME AT 50% OF MAXIMUM SPECIFIED RANGE.

FLAME DETECTOR MAXIMUM FIELD OF VIEW

NOTES:

1. INSTALL SENSOR/TRANSMITTER AND DETECTOR IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS.
2. SENSOR/TRANSMITTER LOCATED IN AREA TO BE MONITORED. GAS DETECTION CONTROLLER TO BE INSTALLED REMOTELY.
3. THE MANUFACTURER MOUNTING BRACKET IS TO BE USED FOR INSTALLATION.
4. REFER TO MANUFACTURER'S RECOMMENDATION FOR MOUNTING DISTANCE.
5. INSTALL HORN/BEACON ABOVE THE DOOR ON THE OUTSIDE OF THE GENERATOR ROOM.
6. PIPE NIPPLES SHALL BE SCHEDULE 80, MAXIMUM 30mm FROM PROCESS PIPE OR PIPE LAGGING.
7. CONDUIT (AND CABLE) ENTRY CONNECTION TO THE INSTRUMENT SHALL BE 1000mm (3ft.) FLEXIBLE, THE BALANCE IN RIGID CONDUIT.

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LICENSED PROFESSIONAL ENGINEER J.A. Glassin-Clay 100079715 Apr 21, 2025 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.
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SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
INSTALLATION DETAILS - 1

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-94		I020
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-94_I020 INSTALLATION DETAILS 1.DWG
Layout Tab: I020
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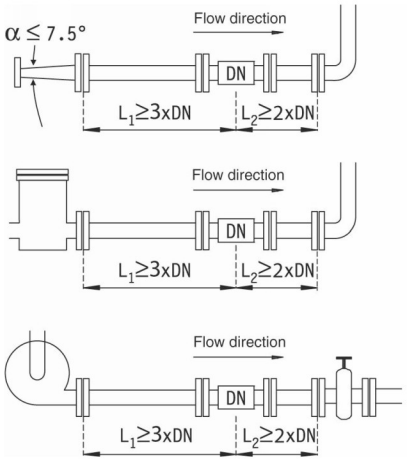
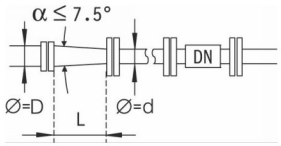


THE FLOW SENSOR MUST BE MOUNTED IN A LOCATION WHICH IS FREE FROM INTERFERING ELEMENTS LIKE VALVES, TS, BENDS, PUMPS, ETC. THE FLOW SENSOR MUST BE MOUNTED IN A STRAIGHT PIPE AT A DISTANCE FROM INTERFERING ELEMENTS OF MINIMUM 3 x DN UPSTREAM AND MINIMUM 2 x DN DOWNSTREAM.

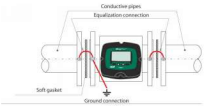


IF IT BECOMES NECESSARY TO USE REDUCERS, THE INNER ANGLE MUST NOT EXCEED 7,5°. THE MINIMUM LENGTH TO KEEP THE ANGLE BELOW 7,5° CAN BE CHECKED BY MEANS OF THE FORMULA BELOW:

L = (D - D) X 7.63

WHERE D IS THE LARGE DIAMETER AND D THE SMALL DIAMETER OF THE REDUCER.

FLANGE CONNECTIONS MUST BE ASSEMBLED CONCENTRICALLY ON BOTH THE UPSTREAM AND THE DOWNSTREAM SIDE. MEASURING ACCURACY WILL BE AFFECTED BY TURBULENCE IN THE LIQUID FROM POORLY MADE CONNECTIONS.

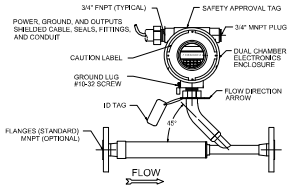


THE FLOW SENSOR MUST BE CONNECTED TO AN EFFECTIVE GROUND CONNECTION, AND THE WIRE DIMENSION MUST BE AT LEAST 1.5 MM2.

MAGNETIC FLOWMETER INSTALLATION DETAIL

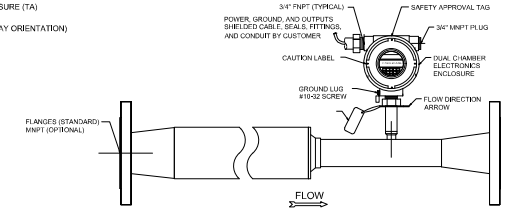
DIRECTLY ATTACHED ELECTRONICS ENCLOSURE (TA)

(SHOWN WITH DISPLAY IN STANDARD DISPLAY ORIENTATION)

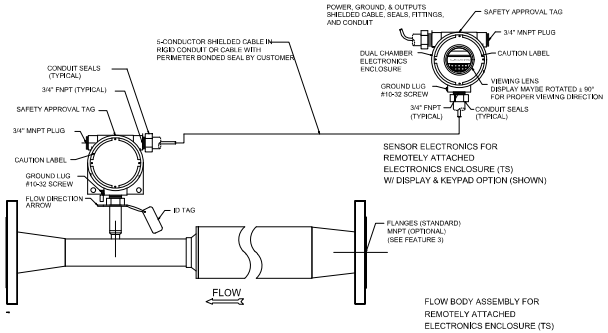


DIRECTLY ATTACHED ELECTRONICS ENCLOSURE (TA)

(SHOWN WITH DISPLAY IN STANDARD DISPLAY ORIENTATION)



REMOTE ELECTRONICS ENCLOSURE



THERMAL MASS FLOWMETER INSTALLATION DETAIL

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\2F-2017-08-95_I021 INSTALLATION DETAILS 2.DWG
Layout Tab: I021
Date: 03/21/2025 Time: 02:17:16 PM

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A	2025-03-18	ISSUED FOR TENDER	C.H.	

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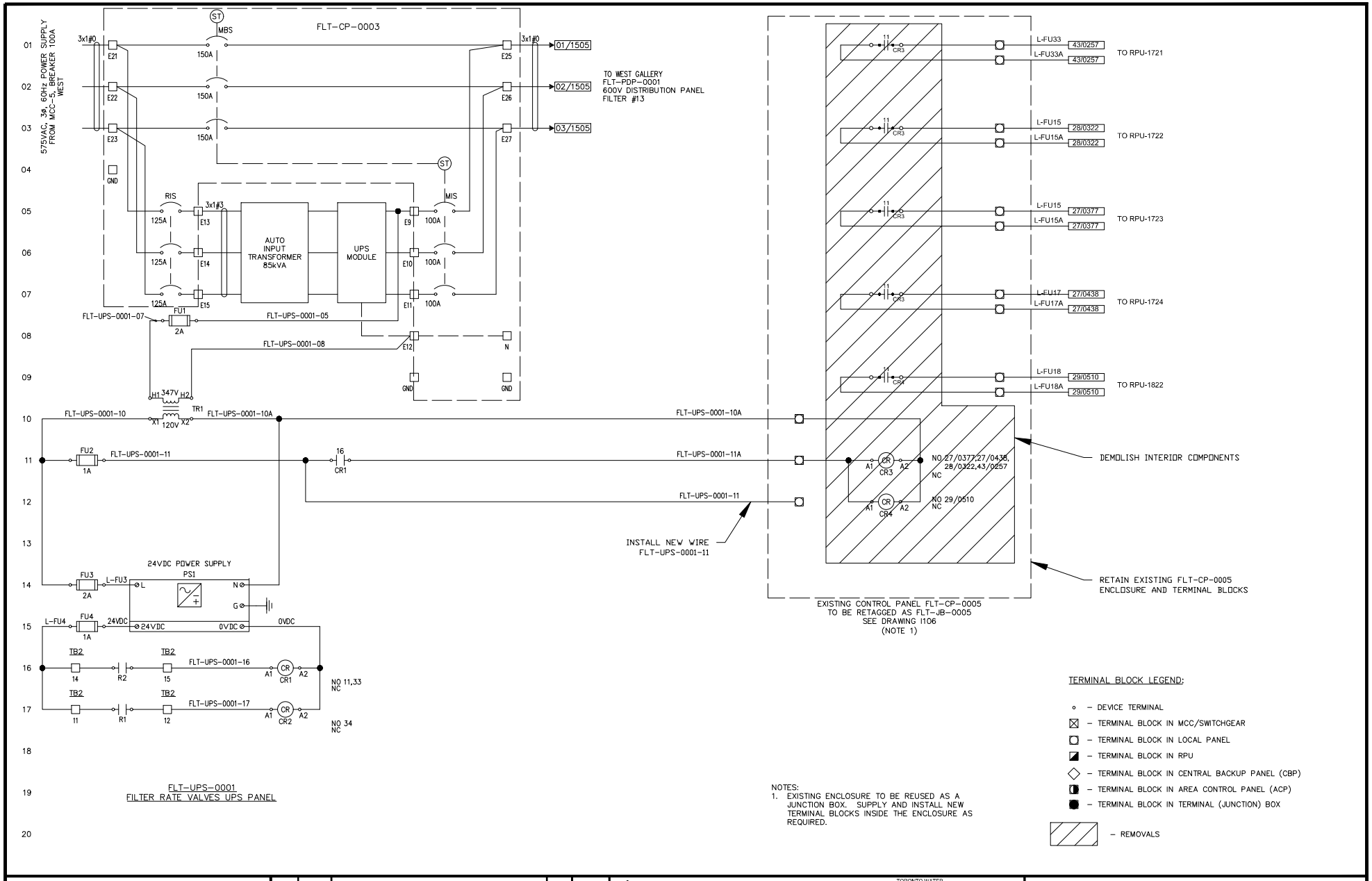
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
INSTALLATION DETAILS - 2

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-95		I021
DATE:	2024-09-30						



FLT-UPS-0001
FILTER RATE VALVES UPS PANEL

NOTES:
1. EXISTING ENCLOSURE TO BE REUSED AS A JUNCTION BOX. SUPPLY AND INSTALL NEW TERMINAL BLOCKS INSIDE THE ENCLOSURE AS REQUIRED.

TERMINAL BLOCK LEGEND:

- ∘ – DEVICE TERMINAL
- ⊠ – TERMINAL BLOCK IN MCC/SWITCHGEAR
- ▢ – TERMINAL BLOCK IN LOCAL PANEL
- ◪ – TERMINAL BLOCK IN RPU
- ◇ – TERMINAL BLOCK IN CENTRAL BACKUP PANEL (CBP)
- ◑ – TERMINAL BLOCK IN AREA CONTROL PANEL (ACP)
- ● – TERMINAL BLOCK IN TERMINAL (JUNCTION) BOX
- ▨ – REMOVALS

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LICENSED PROFESSIONAL ENGINEER J.A. Glaskin-Clay 100079715 for 30, 2025 PROVINCE OF ONTARIO

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SIMON HOPTON, P. ENG.
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MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

FLT-UPS-0001 POWER FAILURE WIRING DIAGRAM

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-96		I101
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\FILTER CV SHUTDOWN\2F-2017-08-96_I101 UPS-0001.DWG
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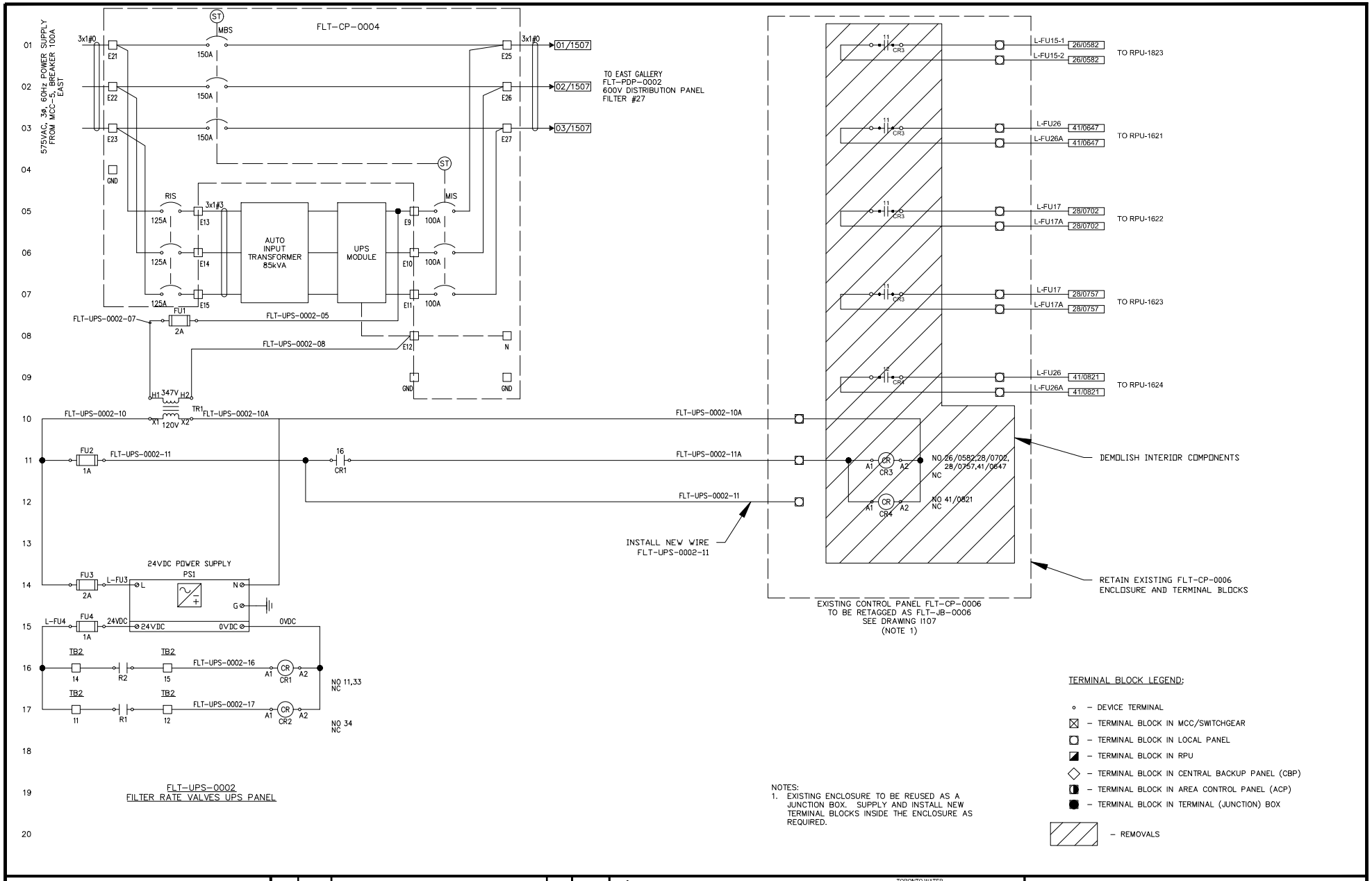

NOTES:
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A	2025-03-18	ISSUED FOR TENDER	C.H.	

TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER J.A. Glaskin-Clay 100079715 Mar 31, 2025 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.
DIRECTOR,
WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT

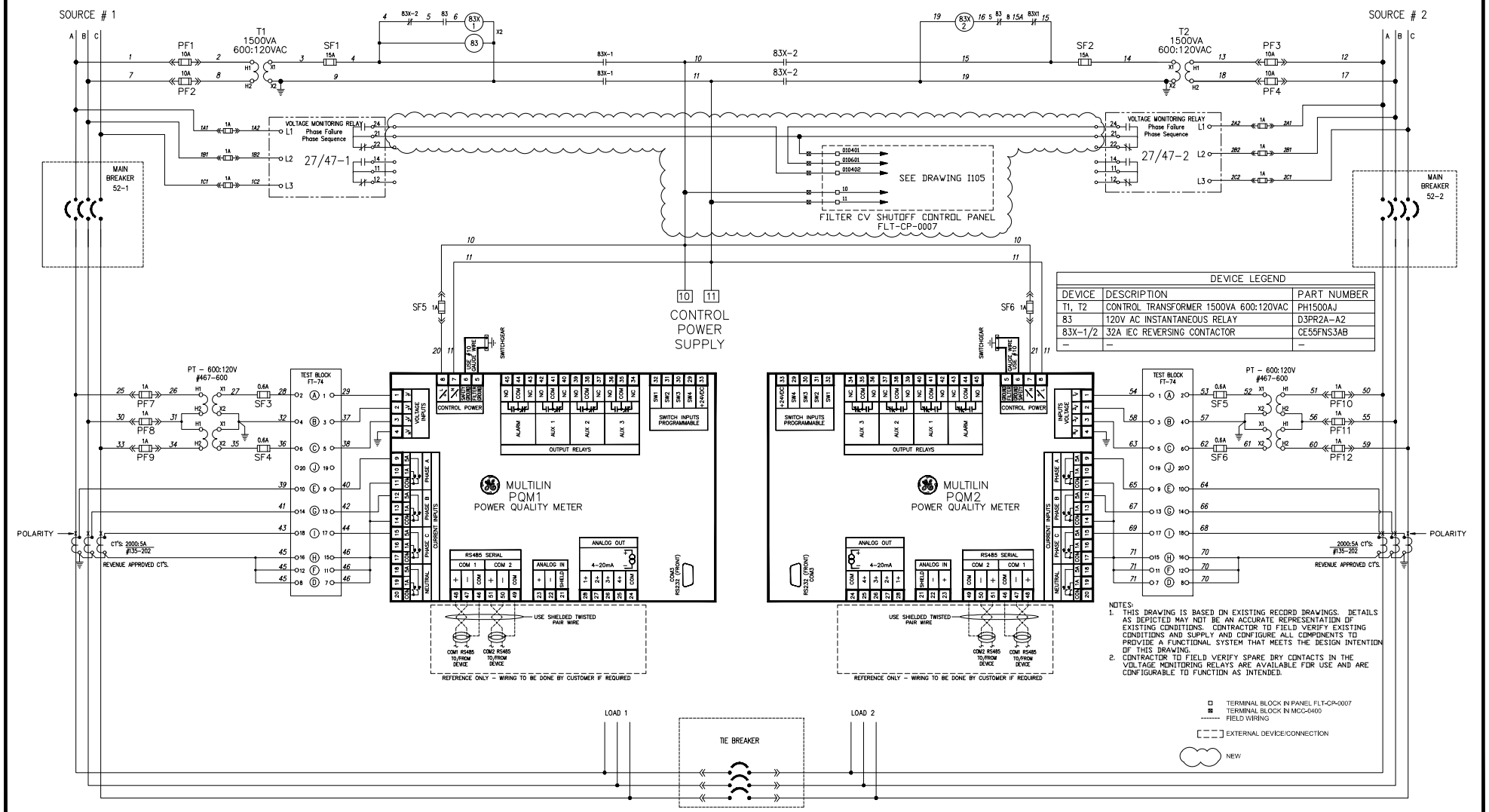
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

FLT-UPS-0002 POWER FAILURE WIRING DIAGRAM

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-97		I102
DATE:	2024-09-30						

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 MCC\FILTER CV SHUTDOWN\2F-2017-08-97_I102 UPS-0002.DWG
Layout Tab: I102
Date: 03/21/2025 Time: 02:34:52 PM



DEVICE LEGEND		
DEVICE	DESCRIPTION	PART NUMBER
T1, T2	CONTROL TRANSFORMER 1500VA 600:120VAC	PH1500AJ
83	120V AC INSTANTANEOUS RELAY	D3PR2A-A2
83X-1/2	32A IEC REVERSING CONTACTOR	CE55FNS3AB
–	–	–

NOTES:
1. THIS DRAWING IS BASED ON EXISTING RECORD DRAWINGS. DETAILS AS DEPICTED MAY NOT BE AN ACCURATE REPRESENTATION OF EXISTING CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND SUPPLY AND CONFIGURE ALL COMPONENTS TO PROVIDE A FUNCTIONAL SYSTEM THAT MEETS THE DESIGN INTENTION OF THIS DRAWING.
2. CONTRACTOR TO FIELD VERIFY SPARE DRY CONTACTS IN THE VOLTAGE MONITORING RELAYS ARE AVAILABLE FOR USE AND ARE CONFIGURABLE TO FUNCTION AS INTENDED.

TERMINAL BLOCK IN PANEL FLT-CP-0007
TERMINAL BLOCK IN MCC-0400
FIELD WIRING
EXTERNAL DEVICE/CONNECTION
NEW

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 MCC\FILTER CV SHUTDOWN\2F-2017-08-98_I103 MCC-0400 WIRING DETAIL.DWG
Layout Tab: I103
Date: 03/21/2025 Time: 02:35:58 PM

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LICENSED PROFESSIONAL ENGINEER
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R.C. HARRIS WATER TREATMENT PLANT

INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

MCC-0400 WIRING DETAIL

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-98		I103
DATE:	2024-09-30						

NOTES:
1. THIS DRAWING IS BASED ON EXISTING RECORD DRAWINGS. DETAILS AS DEPICTED MAY NOT BE AN ACCURATE REPRESENTATION OF EXISTING CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND SUPPLY AND CONFIGURE ALL COMPONENTS TO PROVIDE A FUNCTIONAL SYSTEM THAT MEETS THE DESIGN INTENTION OF THIS DRAWING.
2. CONTRACTOR TO FIELD VERIFY EXISTING SPARE CONTACTS FOR TIE-52T RELAY ARE AVAILABLE FOR USE. SUPPLY AND INSTALL EXPANSION RELAY/AUX. CONTACTS AS REQUIRED.

TERMINAL BLOCK IN PANEL FLT-CP-0007
TERMINAL BLOCK IN MCC-0400
FIELD WIRING
EXTERNAL DEVICE/CONNECTION
NEW

NORMAL CONDITION
1. MAIN BREAKERS (52-1, 52-2) ARE CLOSED
2. TIE BREAKER (52-T) IS OPEN

INTERLOCKING
1. MAIN AND TIE BREAKERS ARE ELECTRICALLY INTERLOCKED TO PREVENT PARALLELING OF SOURCES AT ALL TIMES.

2. CLOSING OF MAIN AND TIE BREAKERS VIA SELECTOR WITCH IS PERMITTED ONLY WHEN THE AUTO/OFF/MANUAL SELECTOR SWITCH (43-1) IS IN THE MANUAL OR OFF POSITION.

3. TRIPPING OF MAIN AND TIE BREAKERS VIA SELECTOR SWITCH IS PERMITTED UNDER ALL CIRCUMSTANCES.

LOCKOUT
1. OVERCURRENT TRIP SWITCHES (OTS) ON MAIN AND TIE BREAKERS ARE INCORPORATED IN THE CONTROL SCHEME TO PREVENT CLOSURE OF TIE & FAULTED MAIN BREAKER AFTER A FAULT. THE FAULT MUST BE CLEARED AND THE CORRESPONDING BREAKER MANUALLY RESET TO RETURN TO NORMAL OPERATION.

4. ONLY TWO BREAKERS CAN BE CLOSED AT ONE TIME WHEN SELECTOR SWITCH (43-1) IS EITHER IN AUTO, OFF OR MANUAL POSITION AND BKRS ARE IN FULLY CONNECTED POSITION. **INTERLOCKING IS DEFEATED WHEN BREAKERS ARE IN TEST POSITION. SELECTOR SWITCH (43-1) MUST BE IN OFF POSITION WHEN TESTING THE BREAKERS.**

INITIAL START-UP
1. VERIFY SELECTOR SWITCH (43-1) IS IN "MANUAL" POSITION.

2. VERIFY ALL 3 BREAKERS ARE IN THE FULLY CONNECTED POSITION IN THEIR RESPECTIVE CELLS.

3. TURN SELECTOR SWITCH (43-M1/2) TO CLOSE POSITION.
-MAIN BREAKERS CLOSES.

4. PLACE SELECTOR SWITCH (43-1) IN THE "AUTO" POSITION.

SEQUENCE OF AUTOMATIC OPERATION
A. LOSS OF UTILITY POWER AT EITHER MAIN
1. DEVICE 47 DETECTS LOSS OF NORMAL VOLTAGE (BUILT IN TIME DELAY SET TO MINIMUM).
2. DEVICE 62-1/2 TIMES OUT FOR 5s(ADJUSTABLE 0.0s – 10sec.)
3. MAIN BREAKER OPENS
4. DEVICE 62-3/4 TIMES OUT FOR 1s(ADJUSTABLE 0.5s – 10s)
5. TIE BREAKER CLOSES

B. POWER RESTORED AT EITHER MAIN
1. DEVICE 47 DETECTS NORMAL VOLTAGE (AUTOMATICALLY RESETS CONTACT)
2. DEVICE 62-5/6 TIMES OUT FOR 5min. (ADJUSTABLE 0min – 10min)
3. TIE BREAKER OPENS
4. DEVICE 62-3/4 TIMES OUT FOR 1s(ADJUSTABLE 0.5s – 10s)
5. MAIN BREAKER CLOSES

C. LOSS OF UTILITY POWER AT BOTH MAINS.
1. NO ACTIVITY UNTIL AT LEAST ONE SOURCE IS AVAILABLE.

MANUAL MODE SEQUENCE
1. PLACE SELECTOR SWITCH (43-1) IN "MANUAL" POSITION.

2. USING SELECTOR SWITCH(43-M1/M2/T) IN EACH MAIN BREAKERS WILL ALLOW MANUAL TRANSFER CONTROL OF THE ASSOCIATED BREAKER. OPERATION OF THE BREAKER SELECTOR SWITCH IN TRIP POSITION WILL TRIP THE ASSOCIATED BREAKER.

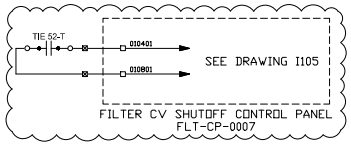
3. OPERATION OF MAIN BREAKERS SELECTOR SWITCH (43-M1/M2) IN CLOSE POSITION WILL TRIP THE TIE BREAKER. TIE BREAKER CANNOT BE CLOSED UNLESS ONE OF THE MAIN BREAKERS IS OPEN. ONLY TWO BREAKERS CAN BE CLOSED AT ANY GIVEN TIME.

4. MAIN BREAKER WILL CLOSE ONLY IF SOURCE POWER IS AVAILABLE.

5. SELECTOR SWITCH (43-1) MAY BE RETURNED TO "AUTO" TO REACT TO NEXT POWER FAILURE.

LEGEND:
- OTC OVERCURRENT TRIP SWITCH (BELL ALARM)
- TOC TRUCK OPERATED CELL SWITCH
- 120V AC COIL
- 120V AC PILOT LIGHT
- FUSE
- MOT SPRING CHARGE OPERATOR
- SR SPRING RELEASE (CLOSE)
- 27/47 VOLTAGE MONITORING RELAY-D65VMLS600-B1
- TC TRIP COIL
- VENDOR WIRING
- FIELD WIRING
- TERMINAL BLOCK

DEVICE LEGEND		
DEVICE	DESCRIPTION	PART NUMBER
43-1	AUTO/OFF/MANUAL SELECTOR SWITCH – 3 POS. SELECTOR SWITCH	LVDAJ8404
43-M1/T/M2	CLOSE/OFF/OPEN SELECTOR SWITCH – 3 POS. MOMENTARY	10250T3043
62-1,62-2	OMRON OFF-DELAY (3s-10min) 120V AC RELAY – 8 PIN (H3CR)	3A16882H01
62-1,62-2	RELAY SOCKET – 8 PIN	D3PA2-A2
62-3,62-4	OMRON ON-DELAY (0.5-60s) 120V AC RELAY – 8 PIN (H3CR)	LVDAJ7617
62-3,62-4	RELAY SOCKET – 11 PIN	D3PA3-A2
62-5,62-6	OMRON ON-DELAY (2min-120min) 120V AC RELAY – 8 PIN (H3CR)	LVDAJ7617
62-5,62-6	RELAY SOCKET – 11 PIN	D3PA3-A2
62-1,62-2	RELAY SOCKET – 8 PIN	D3PA2-A2
LIGHTS	120V AC PUSH-TO-TEST TRANSFORMER TYPE PILOT LIGHTS	10250T221N
G	GREEN PILOT LIGHT LENS	10250T022
R	RED PILOT LIGHT LENS	10250T021
CR-1,CR-2, CR-7	CONTROL RELAY 120VAC / 8 PIN SOCKET	D3PR2A / D3PA2-A2
CR-4,CR-5,CR-6	CONTROL RELAY 120VAC / 11 PIN SOCKET	D3PR3A / D3PA3-A2



DEVICE 43-1
AUTO/MANUAL SELECTOR SWITCH

CONTACT	AUTO	OFF	MAN
1 –|– 2	X		
3 –|– 2			X
5 –|– 6	X		
7 –|– 6			X
25–|– 18	X		
27–|– 18			X
17–|– 20	X		
19–|– 20			X
9 –|– 10	X		
11–|– 10			X
23–|– 24	X		
21–|– 24			X
13–|– 14	X		

"X" = CONTACT CLOSED

DEVICE (43-M1) MOMENTARY
CLOSE/OFF/TRIP SELECTOR SWITCH

CONTACT	CLOSE	OFF	TRIP
1 –|– 2	X		
3 –|– 4			X
5 –|– 6	X		
7 –|– 8			X
9 –|– 10	X		
11–|– 12			X

"X" = CONTACT CLOSED

DEVICE (43-M2) MOMENTARY
CLOSE/OFF/TRIP SELECTOR SWITCH

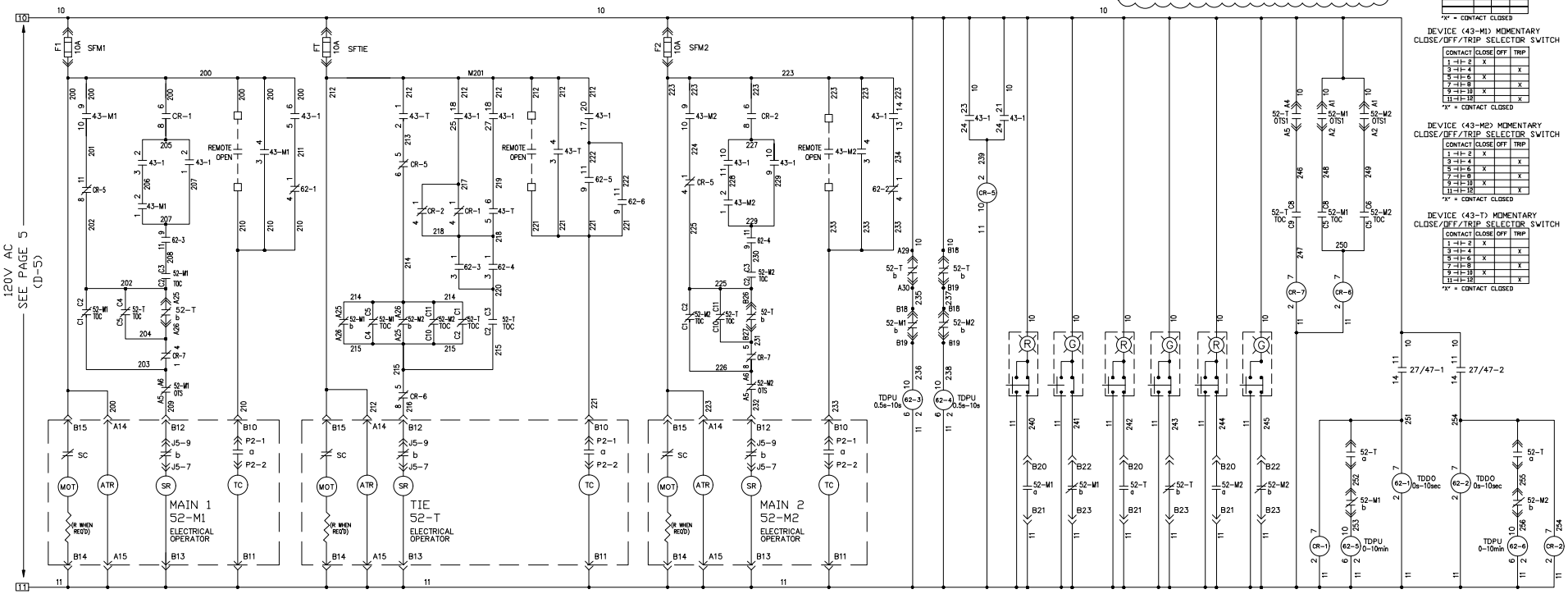
CONTACT	CLOSE	OFF	TRIP
1 –|– 2	X		
3 –|– 4			X
5 –|– 6	X		
7 –|– 8			X
9 –|– 10	X		
11–|– 12			X

"X" = CONTACT CLOSED

DEVICE (43-T) MOMENTARY
CLOSE/OFF/TRIP SELECTOR SWITCH

CONTACT	CLOSE	OFF	TRIP
1 –|– 2	X		
3 –|– 4			X
5 –|– 6	X		
7 –|– 8			X
9 –|– 10	X		
11–|– 12			X

"X" = CONTACT CLOSED



Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 MCC\FILTER CV SHUTDOWN\2F-2017-08-99_I104 TIE BREAKER.DWG
Layout Tab: I104
Date: 03/21/2025 Time: 02:36:16 PM

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TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER J.A. Glaskin-Clay 100079715 PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.
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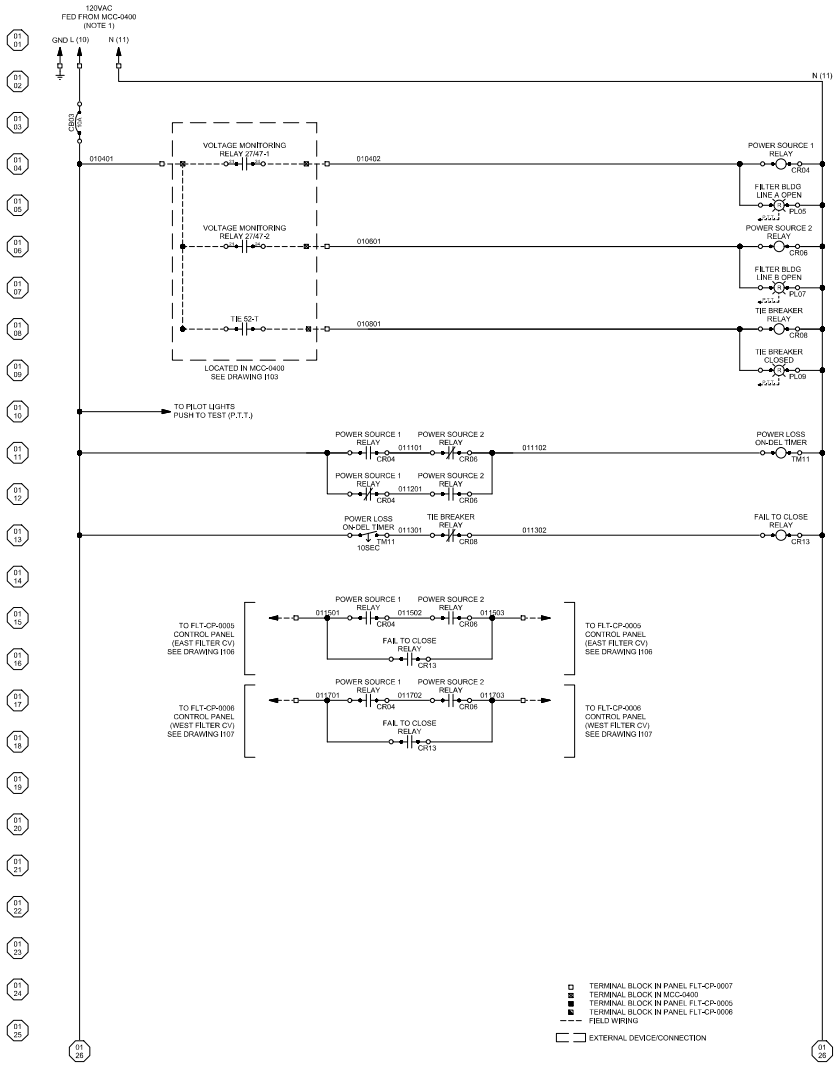
SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

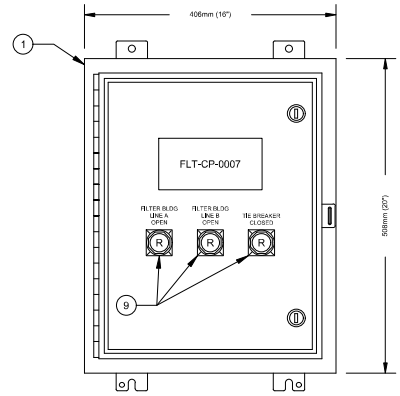
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
TIE BREAKER WIRING

INSTRUMENTATION

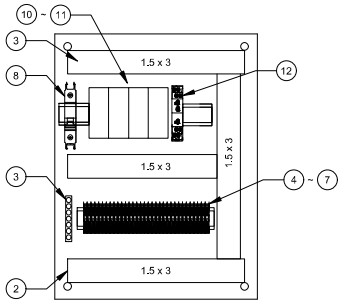
DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-99		I104
DATE:	2024-09-30						



NOTE:
1. 120 VAC FED FROM CONTROL POWER SUPPLY IN MCC-0400, SEE DRAWING I103
2. REFER TO DRAWING E202 FOR DETAILS ON THE LOCATION OF THE FILTER CV SHUTOFF CONTROL PANEL FLT-CP-0007



FLT-CP-0007 FILTER CV SHUTOFF CONTROL PANEL



INTERIOR BACKPLATE

FILTER CV SHUTOFF CONTROL PANEL - BILL OF MATERIALS

ITEM	EQUIPMENT	MANUFACTURER	PART #	DESCRIPTION	QTY
1	ENCLOSURE	RALSTON	N12-201608	508x406x203 (20x16x8), WALL MOUNTED/SINGLE DOOR NEMA 12	1
2	ENCLOSURE SUNDRIES	PANDUIT OR EQUIVALENT		WIRE DUCT, 6"x4", 4"x4", 3"x4", 2"x4", 4"x3", 3"x3", 2"x3", GRAY, AS SHOWN IN PANEL LAYOUT	AR
3	GROUND BAR	ILSCO	N-174	COPPER, CUT TO SIZE	1
4	TERMINAL BLOCK	PHOENIX CONTACT	3044102	GREY TERMINAL M4/6	AR
5	TERMINAL BLOCK	PHOENIX CONTACT	3022276	END STOPS	AR
6	TERMINAL BLOCK	PHOENIX CONTACT	3047167	GREY SEPARATOR END SECTION	AR
7	TERMINAL BLOCK	PHOENIX CONTACT	1051003	TERMINAL MARKING STRIP	AR
8	CIRCUIT BREAKER 1 POLE, 10A	SCHNEIDER ELECTRIC	M9F42110	MULTI 9 C60BP, 1P, 10A, C CURVE	1
9	PILOT LIGHT W. PUSH TO TEST	ALLEN BRADLEY	800T-QH12K	30.5mm, RED LED, 12-130V AC/DC, PUSH-TO-TEST	3
10	RELAY	OMRON	MY4N-CR	120VAC, 4-POLE WITH INDICATOR	4
11	RELAY BASE FOR OMRON MY4N-CR	OMRON	PYF214T	4-POLE RELAY SOCKET, SCREW TERMINAL, FOR MY4N-CR	4
12	TIMER RELAY	PHOENIX CONTACT	2905813	ETD-BL-1T-230, ADJUSTABLE TIME RANGE OF 50MS - 1H	1

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 MCC\FILTER CV SHUTDOWN\2F-2017-08-100_I105 FILTER CV SHUTOFF PANEL.DWG
Layout Tab: I105
Date: 03/21/2025 Time: 02:33:48 PM

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TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
J.A. Glaskin-Clay
100079715
Mar 30, 2025
PROVINCE OF ONTARIO

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SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

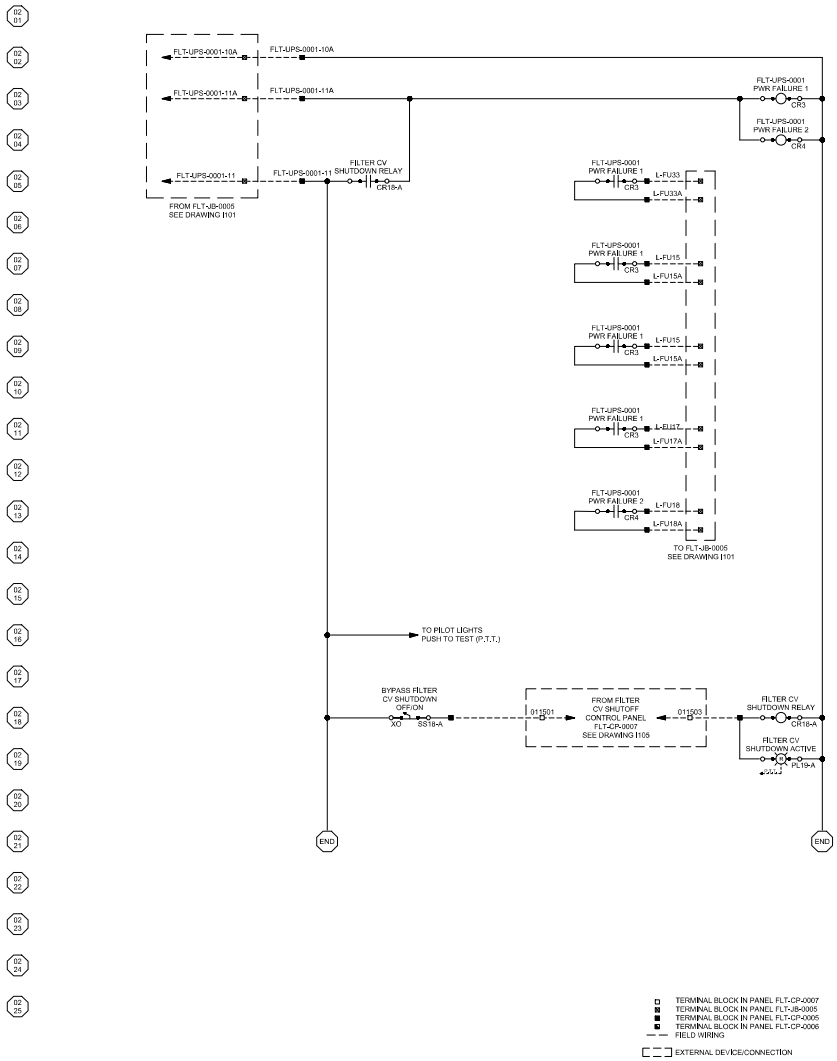
R.C. HARRIS WATER TREATMENT PLANT

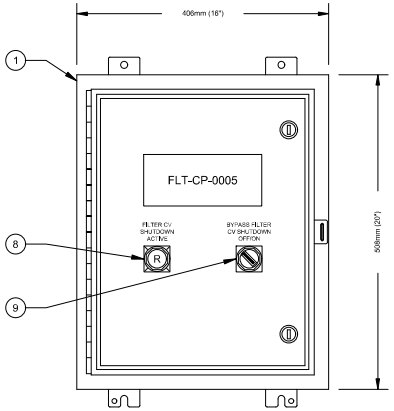
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS

FILTER CV SHUTOFF CONTROL PANEL LAYOUT AND WIRING

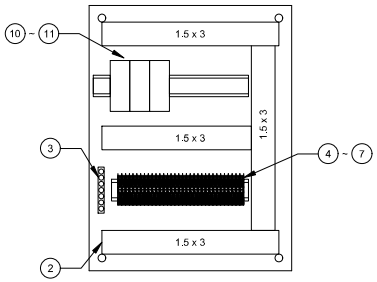
INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	T.S.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-100		I105
DATE:	2024-09-30						





NEW FLT-CP-0005 PANEL



INTERIOR BACKPLATE

FLT-CP-0005 - BILL OF MATERIALS

ITEM	EQUIPMENT	MANUFACTURER	PART #	DESCRIPTION	QTY
1	ENCLOSURE	RALSTON	N12-201608	508x406x203 (20x16x8), WALL MOUNTED/SINGLE DOOR NEMA 12	1
2	ENCLOSURE SUNDRIES	PANDUIT OR EQUIVALENT		WIRE DUCT, 6"x4", 4"x4", 3"x4", 2"x4", 4"x3", 3"x3", 2"x3", GRAY, AS SHOWN IN PANEL LAYOUT	AR
3	GROUND BAR	ILSCO	N-174	COPPER, CUT TO SIZE	1
4	TERMINAL BLOCK	PHOENIX CONTACT	3041102	GREY TERMINAL M4/6	AR
5	TERMINAL BLOCK	PHOENIX CONTACT	3022276	END STOPS	AR
6	TERMINAL BLOCK	PHOENIX CONTACT	3047167	GREY SEPARATOR END SECTION	AR
7	TERMINAL BLOCK	PHOENIX CONTACT	1051003	TERMINAL MARKING STRIP	AR
8	PILOT LIGHT W. PUSH TO TEST	ALLEN BRADLEY	800T-QTE2R	30.5mm, RED LED, 12-130V AC/DC, PUSH-TO-TEST	1
9	2-POSITION SELECTOR SWITCH	ALLEN BRADLEY	800T-H2A	30.5mm 2-POSITION MAINTAINED SELECTOR SWITCH, STANDARD KNOB, 1N.O. / 1N.C.	1
10	RELAY	OMRON	MY4N-CR	120VAC, 4-POLE WITH INDICATOR	3
11	RELAY BASE FOR OMRON MY4N-CR	OMRON	PYFZ14T	4-POLE RELAY SOCKET, SCREW TERMINAL, FOR MY4N-CR	3
12					

NOTES:
1. REFER TO DRAWING E212 FOR DETAILS ON THE LOCATION OF THE NEW FILTER CV PANEL FLT-CP-0005

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 I&C\FILTER CV SHUTDOWN\2F-2017-08-101_I106 FLT-CP-0005.DWG
Layout Tab: I106
Date: 03/21/2025 Time: 02:34:06 PM

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Apr 30, 2025
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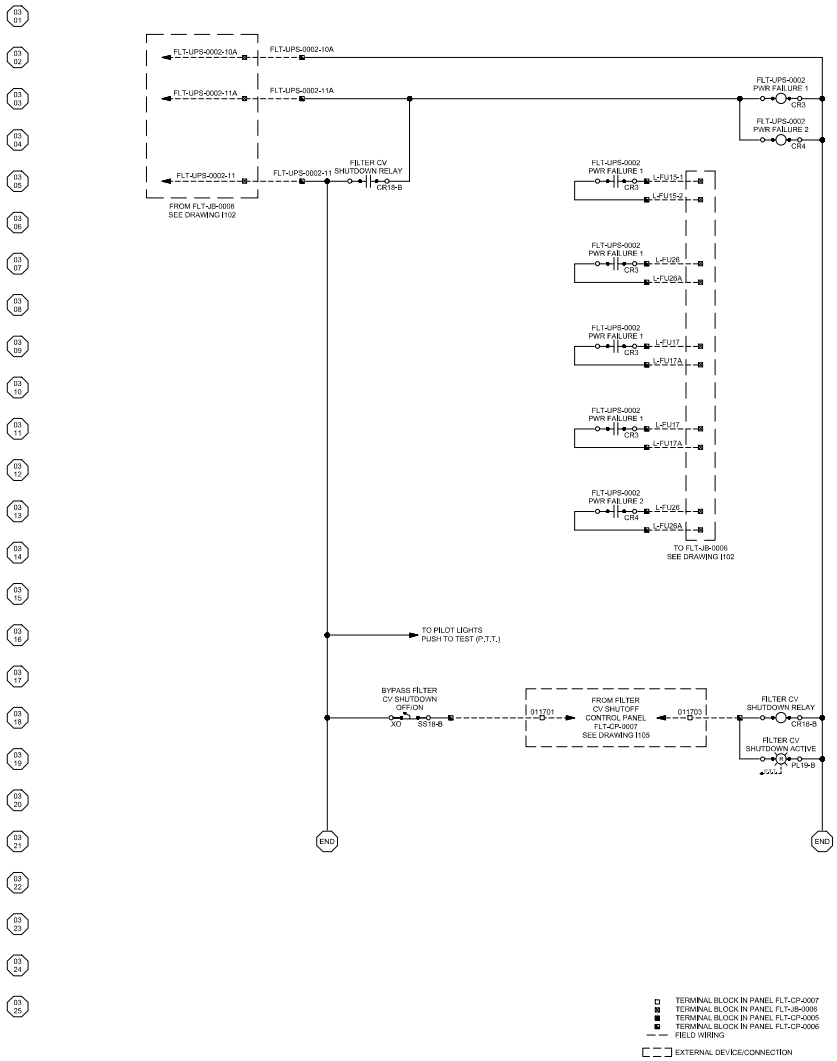
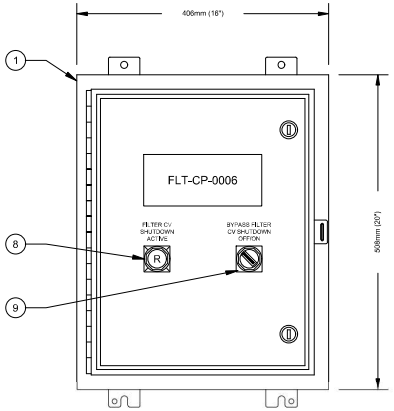
R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
FLT-CP-0005 CONTROL PANEL

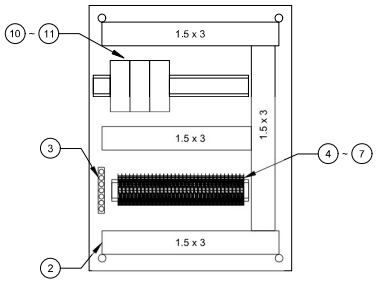
INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-101		I106
DATE:	2024-09-30						





NEW FLT-CP-0006 PANEL



INTERIOR BACKPLATE

FLT-CP-0006 - BILL OF MATERIALS

ITEM	EQUIPMENT	MANUFACTURER	PART #	DESCRIPTION	QTY
1	ENCLOSURE	RALSTON	N12-201608	508x406x203 (20x16x8), WALL MOUNTED/SINGLE DOOR NEMA 12	1
2	ENCLOSURE SUNDRIES	PANDUIT OR EQUIVALENT		WIRE DUCT, 6"x4", 4"x4", 3"x4", 2"x4", 4"x3", 3"x3", 2"x3", GRAY, AS SHOWN IN PANEL LAYOUT	AR
3	GROUND BAR	ILSCO	N-174	COPPER, CUT TO SIZE	1
4	TERMINAL BLOCK	PHOENIX CONTACT	3044102	GREY TERMINAL M4/6	AR
5	TERMINAL BLOCK	PHOENIX CONTACT	3022276	END STOPS	AR
6	TERMINAL BLOCK	PHOENIX CONTACT	3047167	GREY SEPARATOR END SECTION	AR
7	TERMINAL BLOCK	PHOENIX CONTACT	1051003	TERMINAL MARKING STRIP	AR
8	PILOT LIGHT W. PUSH TO TEST	ALLEN BRADLEY	800T-QTE2R	30.5mm, RED LED, 12-130V AC/DC, PUSH-TO-TEST	1
9	2-POSITION SELECTOR SWITCH	ALLEN BRADLEY	800T-H2A	30.5mm 2-POSITION MAINTAINED SELECTOR SWITCH, STANDARD KNOB, 1N.O. / 1N.C.	1
10	RELAY	OMRON	MY4N-CR	120VAC, 4-POLE WITH INDICATOR	3
11	RELAY BASE FOR OMRON MY4N-CR	OMRON	PYFZ14T	4-POLE RELAY SOCKET, SCREW TERMINAL, FOR MY4N-CR	3
12					

NOTES:
1. REFER TO DRAWING E213 FOR DETAILS ON THE LOCATION OF THE NEW FILTER CV PANEL FLT-CP-0006

Drawing: J:\M16-0273 TOR_HARRISWTP-STANDBYGENERATOR\500_CAD\401-CAD\1-SS OR BU\SHEET\7 M&C\FILTER CV SHUTDOWN\2F-2017-08-102_I107 FLT-CP-0006.DWG
Layout Tab: I107
Date: 03/24/2025 Time: 04:08:28 PM

TORONTO Water

ARCADIS
100-175 GALAXY BOULEVARD
TORONTO, ONTARIO, M9W 0C9
TEL 416 679 1930 FAX 416 675 4620
www.arcadis.com

NO.	DATE	REVISIONS	INITIAL	SIGNED
A	2025-03-18	ISSUED FOR TENDER	C.H.	

TORONTO WATER
ENGINEERING AND CONSTRUCTION SERVICES

LICENSED PROFESSIONAL ENGINEER
J.A. Glaskin-Clay
100079715
Mar 30, 2025
PROVINCE OF ONTARIO

WILLIAM FERNANDES, P. ENG.
DIRECTOR,
WATER TREATMENT AND SUPPLY

SIMON HOPTON, P. ENG.
DIRECTOR
DESIGN & CONSTRUCTION
MAJOR INFRASTRUCTURE

R.C. HARRIS WATER TREATMENT PLANT
INSTALLATION OF A STANDBY GENERATOR FOR CRITICAL LOADS
FLT-CP-0006 CONTROL PANEL

INSTRUMENTATION

DESIGN:	M.D.	DRAFTING:	M.D.	CHECK:	J.G.C.	CONTRACT No.	25ECS-MI-03HA
SCALE:	N.T.S.			DRAWING NUMBER:	2F-2017-08-102		I107
DATE:	2024-09-30						