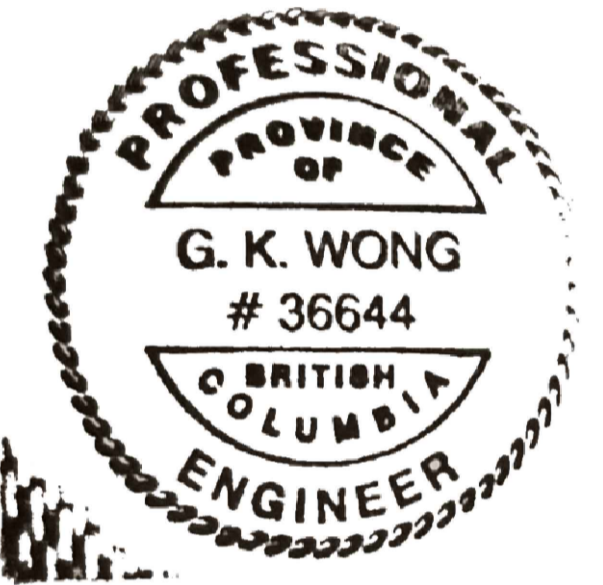


Mangat Environmental Solution Inc.



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2	ADDED GALLERY HEAT TRACE	20/09/20
1	ISSUED FOR TENDER	20/09/08
0	ISSUED FOR 75% REVIEW	19/08/19
Revision/	Description/Description	Date/Date

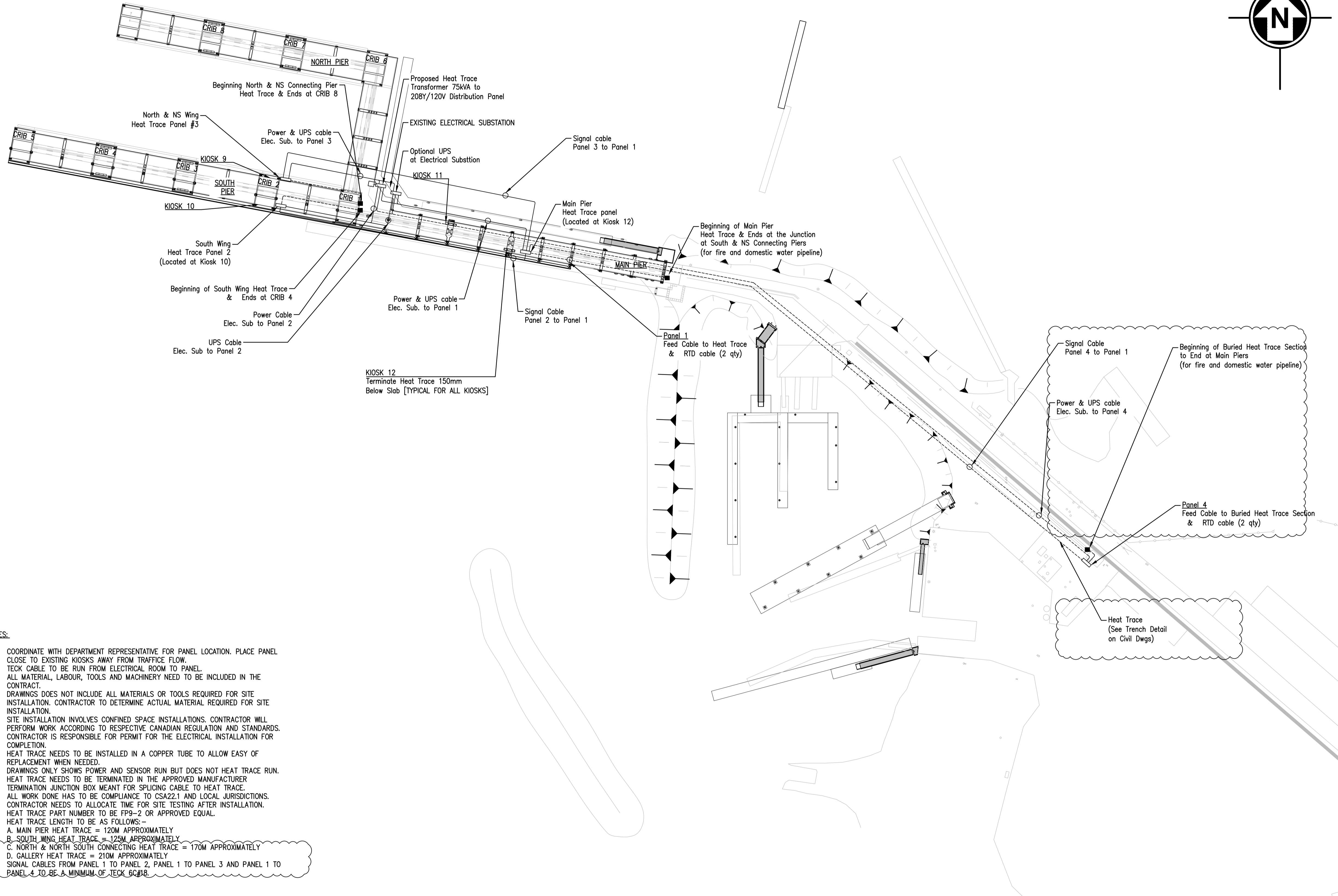
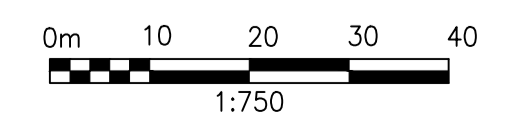
Client/client
FISHERIES AND OCEANS

Project title/Titre du projet
**INSTITUTE OF OCEAN SCIENCES (IOS)
MARINE FACILITY WATER
WATER UPGRADE**

Consultant Signature Only
-
Designed by/Concept par
GUAN WONG / SEPT 06, 2020
Drawn by/Dessiné par
GUAN WONG / SEPT 06, 2020
DFO Project Manager/Administrateur de Projets TPSOC
MICHAEL LIANG
Regional Manager, Architectural and Engineering Services
Gestionnaire régional, Services d'architecture et de génie, TPSOC

Drawing title/Titre du dessin
**SITE PLAN
PROPOSED HEAT TRACE PANEL
LOCATION**

Project No./No. du projet	Sheet/Fauille	Revision no./La Révision no.
DFO: F1700 - 195255	E-001 01 OF 01	2

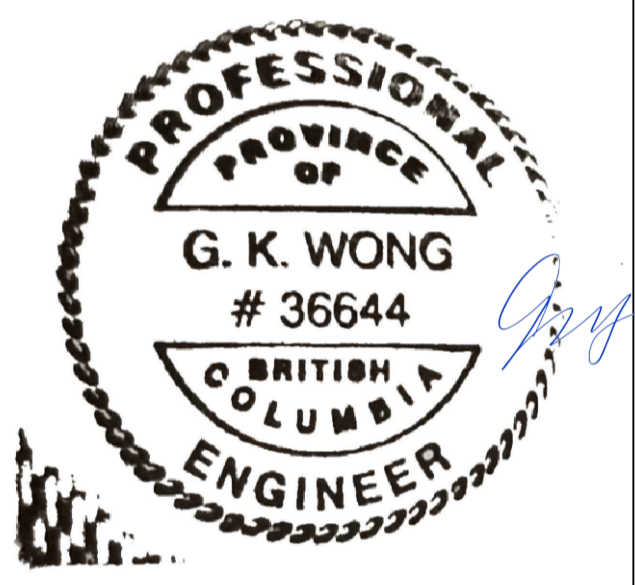


- NOTES:**
- COORDINATE WITH DEPARTMENT REPRESENTATIVE FOR PANEL LOCATION. PLACE PANEL CLOSE TO EXISTING KIOSKS AWAY FROM TRAFFICE FLOW.
 - TECK CABLE TO BE RUN FROM ELECTRICAL ROOM TO PANEL.
 - ALL MATERIAL, LABOUR, TOOLS AND MACHINERY NEED TO BE INCLUDED IN THE CONTRACT.
 - DRAWINGS DOES NOT INCLUDE ALL MATERIALS OR TOOLS REQUIRED FOR SITE INSTALLATION. CONTRACTOR TO DETERMINE ACTUAL MATERIAL REQUIRED FOR SITE INSTALLATION.
 - SITE INSTALLATION INVOLVES CONFINED SPACE INSTALLATIONS. CONTRACTOR WILL PERFORM WORK ACCORDING TO RESPECTIVE CANADIAN REGULATION AND STANDARDS. CONTRACTOR IS RESPONSIBLE FOR PERMIT FOR THE ELECTRICAL INSTALLATION FOR COMPLETION.
 - HEAT TRACE NEEDS TO BE INSTALLED IN A COPPER TUBE TO ALLOW EASY OF REPLACEMENT WHEN NEEDED.
 - DRAWINGS ONLY SHOWS POWER AND SENSOR RUN BUT DOES NOT HEAT TRACE RUN.
 - HEAT TRACE NEEDS TO BE TERMINATED IN THE APPROVED MANUFACTURER TERMINATION JUNCTION BOX MEANT FOR SPLICING CABLE TO HEAT TRACE.
 - ALL WORK DONE HAS TO BE COMPLIANCE TO CSA22.1 AND LOCAL JURISDICTIONS.
 - CONTRACTOR NEEDS TO ALLOCATE TIME FOR SITE TESTING AFTER INSTALLATION.
 - HEAT TRACE PART NUMBER TO BE FP9-2 OR APPROVED EQUAL.
 - HEAT TRACE LENGTH TO BE AS FOLLOWS: -
A. MAIN PIER HEAT TRACE = 120M APPROXIMATELY
B. SOUTH WING HEAT TRACE = 125M APPROXIMATELY
C. NORTH & NORTH SOUTH CONNECTING HEAT TRACE = 170M APPROXIMATELY
D. GALLERY HEAT TRACE = 210M APPROXIMATELY
 - SIGNAL CABLES FROM PANEL 1 TO PANEL 2, PANEL 1 TO PANEL 3 AND PANEL 1 TO PANEL 4 TO BE A MINIMUM OF TECK 6C#18.

LAST SAVE: 2020/10/06 - 9:40am
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 PWGSC - A1 - 841X594



Mangat Environmental Solution Inc.
2995, 140 Str. Surrey BC, V4P 2C3



Revision/Revision	Description/Description	Date/Date
5		
4		
3		
2	ADDED PANEL 4 INTERLOCK	20/09/29
1	ISSUED FOR TENDER	20/09/08
0	ISSUED FOR 75% REVIEW	19/08/19

Client/client: **FISHERIES AND OCEANS**

Project title/Titre du projet:

**INSTITUTE OF OCEAN SCIENCES (IOS)
MARINE FACILITY WATER
HEAT TRACE PANEL #01
PHASE 2**

Consultant Signature Only
-

Designed by/Concept par
GUAN WONG / SEPT 06, 2020

Drawn by/Dessiné par
GUAN WONG / SEPT 06, 2020

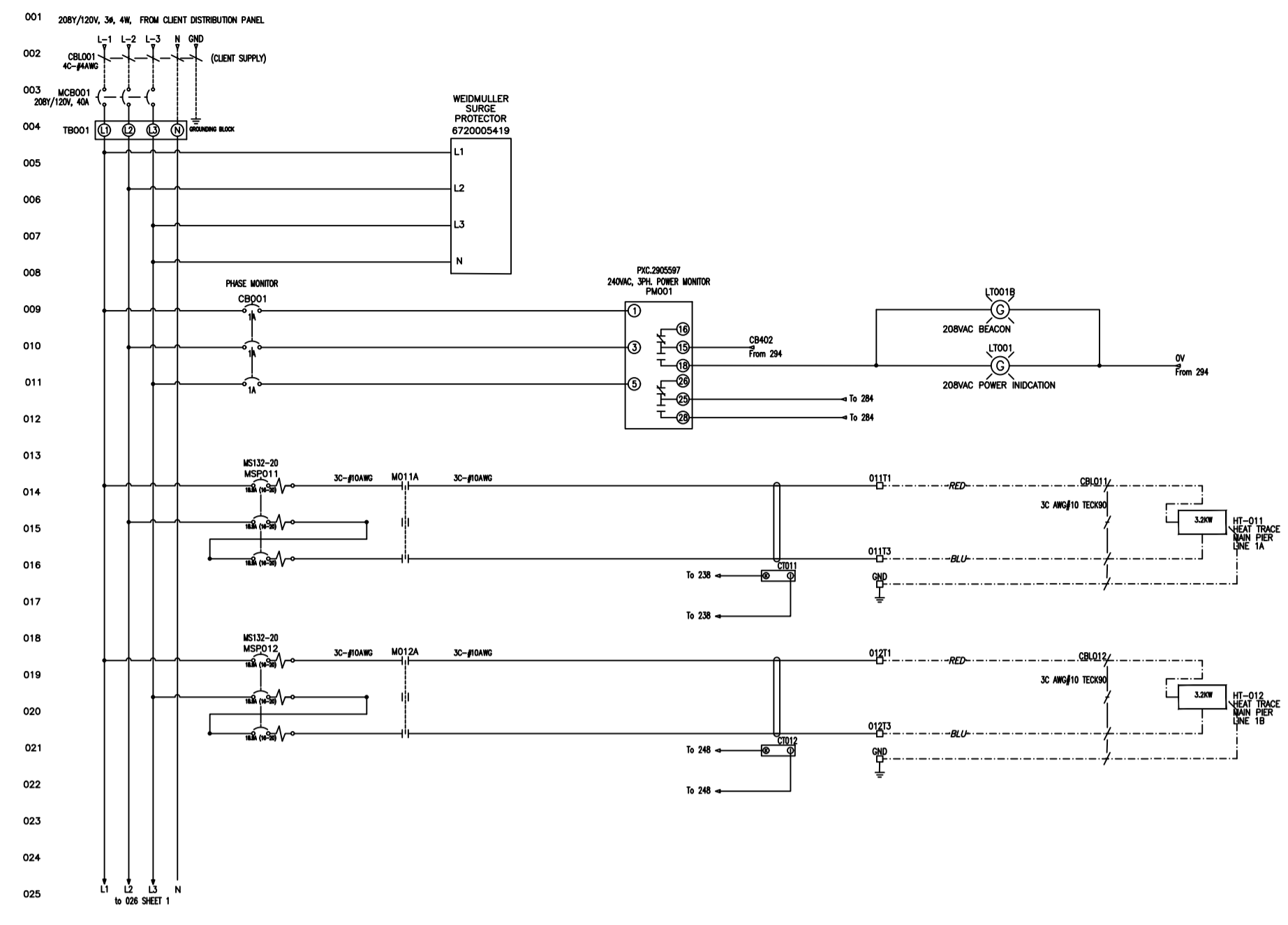
DFO Project Manager/Administrateur de Projets TPSCG
MICHAEL LIANG

Regional Manager, Architectural and Engineering Services
Gestionnaire régionale, Services d'architecture et de génie, TPSCG

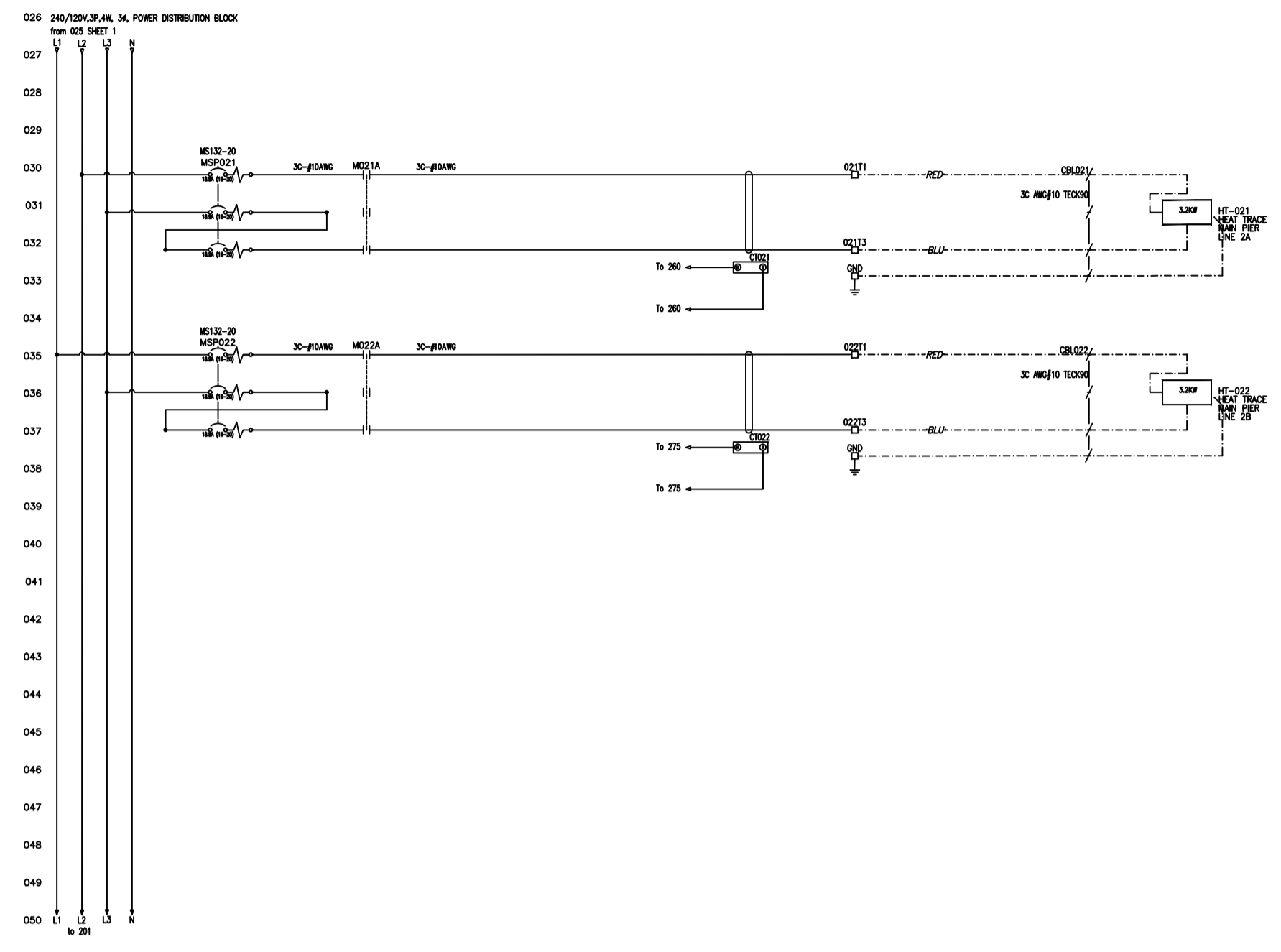
Drawing title/Titre du dessin

**MAIN PIER HEAT TRACE SCHEMATICS
PROPOSED UPGRADES**

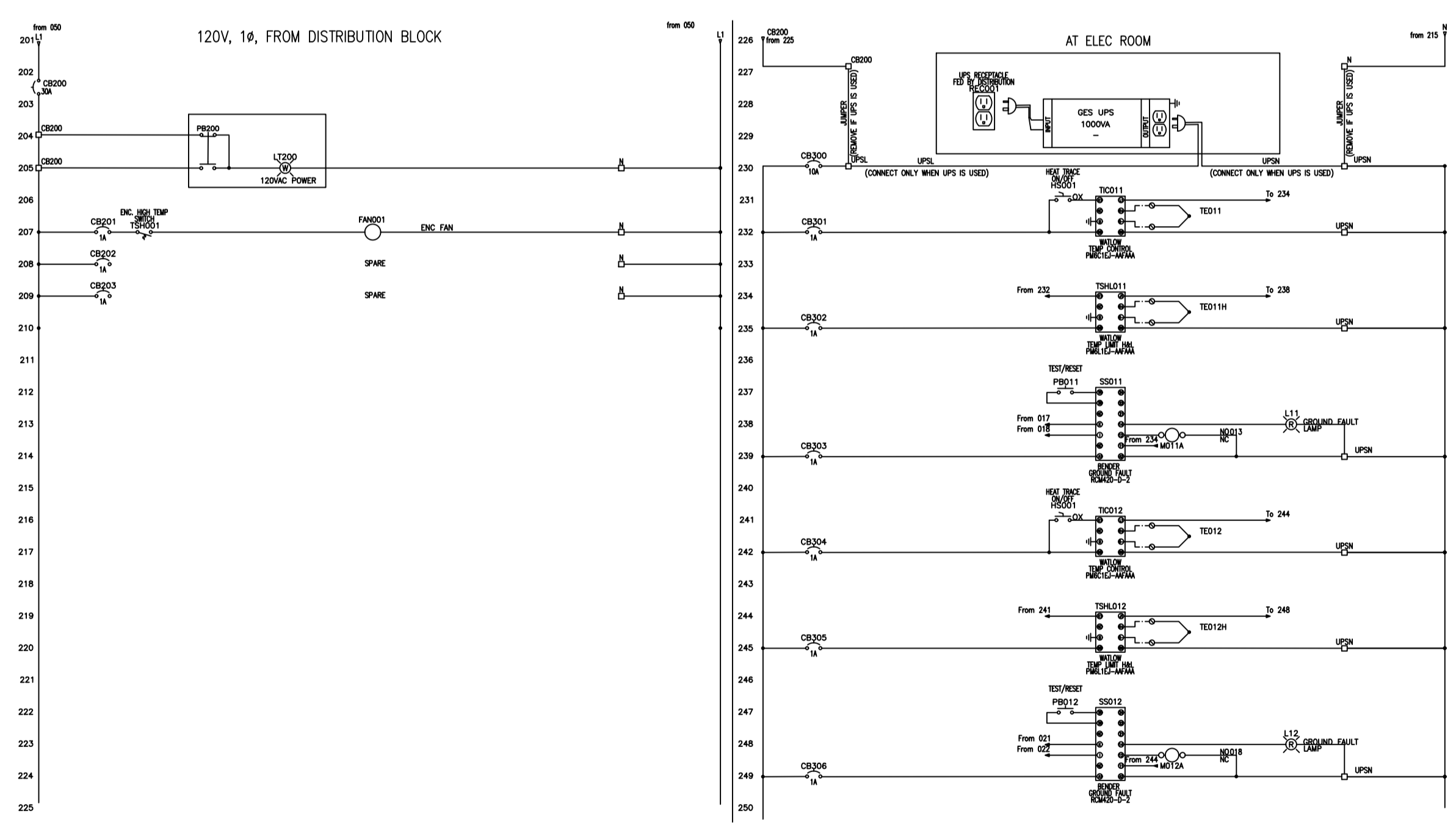
Project No./No. du projet DFO: F1700 - 195247	Sheet/Fauille E-002 01 OF 02	Revision no./La Révision no. 2
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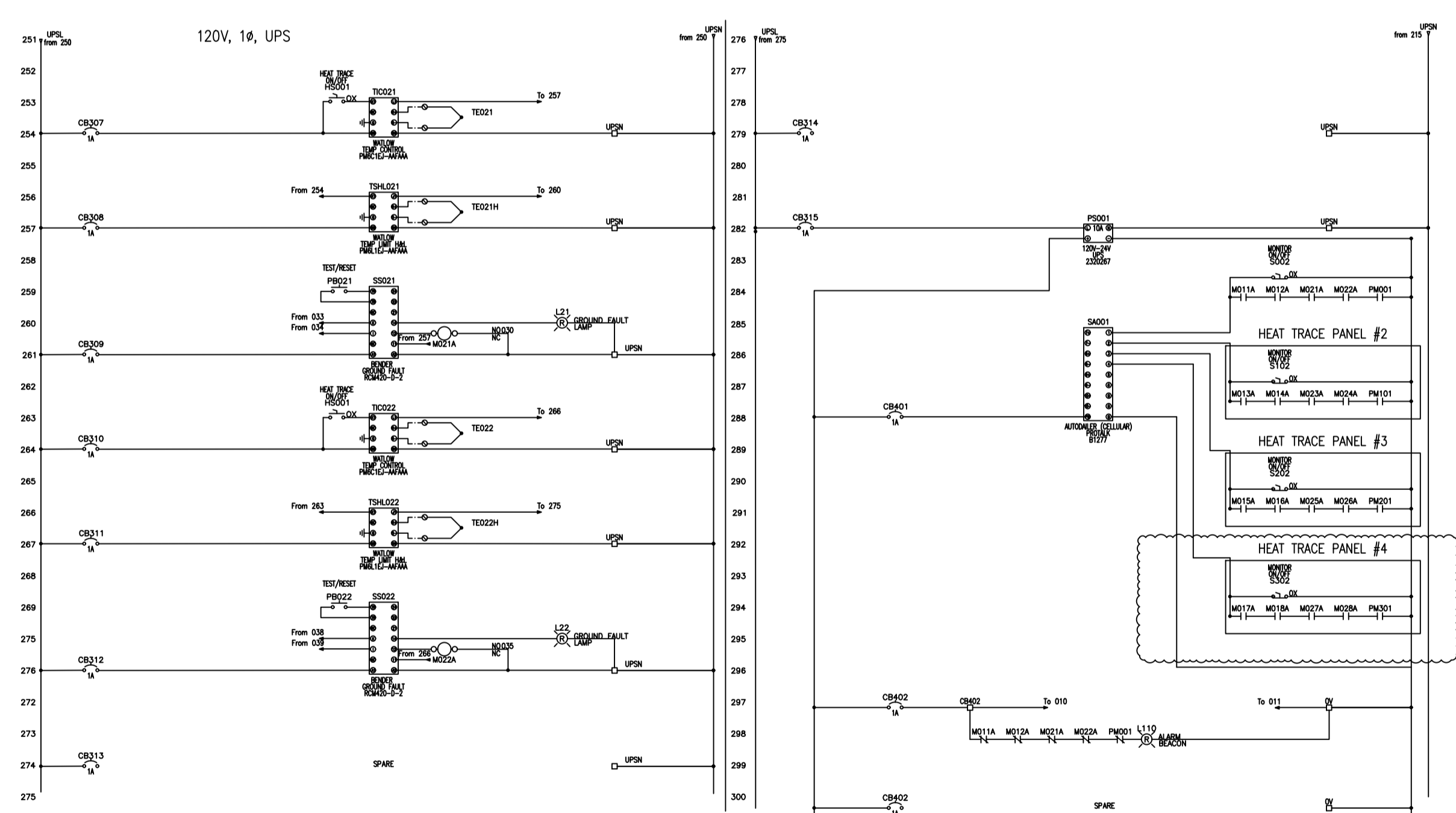
DETAIL 1 208Y/120V POWER



DETAIL 2 208Y/120V POWER

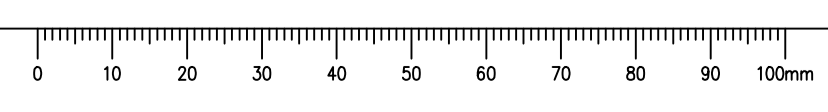
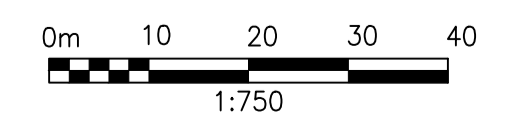


DETAIL 3 120V CONTROL



DETAIL 4 120V & 24V CONTROL

- NOTES:
- ALL PANEL NEEDS TO BE CERTIFIED TO CSA22.2 OR SPE1000.
 - ALL PANEL NEEDS TO BE FUNCTIONAL TEST AND SET UP PRIOR TO SHIPPING.
 - ALL WIRE AND TERMINALS MUST BE CLEARLY LABEL AND FERRULE CRIMPED.
 - COORDINATE WITH OWNER FOR ALL WORK REQUIRED PRIOR TO SHIPPING TO SITE.
 - ALL WORKS TO BE COMPLETED PER CAPITAL REGIONAL DISTRICT STANDARDS UNLESS NOTED OTHERWISE.
 - ALL DIMENSIONS ARE FOR REFERENCE ONLY. CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD.
 - SITE WORK PERFORMED NEEDS TO SPE1000 CERTIFIED AND CONFORMED TO CSA22.1.
 - QUOTATION FOR SITE WORK NEEDS TO INCLUDE ALL MATERIAL, MACHINERY, TOOLS, PERMIT AND LABOUR COST.



LAST SAVE: 2020/10/05 - 9:25pm
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 2995, 140 Str. Surrey BC, V4P 2C3



5		
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2	ADDED PANEL 4 INTERLOCK	20/09/29
1	ISSUED FOR TENDER	20/09/08
0	ISSUED FOR 75% REVIEW	19/08/19
Revision/Revision	Description/Description	Date/Date

Client/client

FISHERIES AND OCEANS

Project title/Titre du projet

**INSTITUTE OF OCEAN SCIENCES (IOS)
 MARINE FACILITY WATER
 HEAT TRACE PANEL #01
 PHASE 2**

Consultant Signature Only

Designed by/Concept par
 GUAN WONG / SEPT 06, 2020

Drawn by/Dessiné par
 GUAN WONG / SEPT 06, 2020

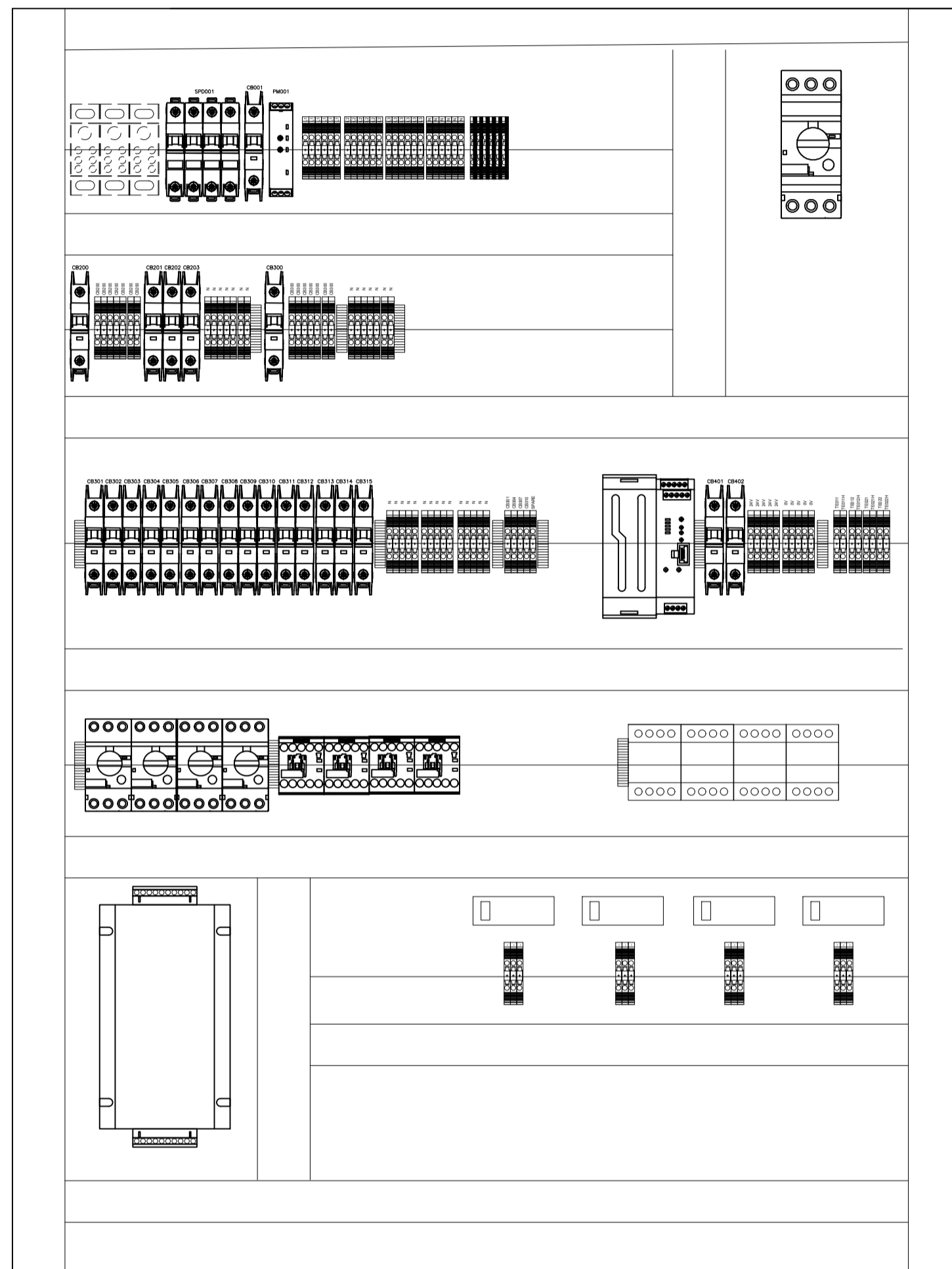
DFO Project Manager/Administrateur de Projets TPSC
 MICHAEL LIANG

Regional Manager, Architectural and Engineering Services
 Gestionnaire régionale, Services d'architecture et de génie, TPSC

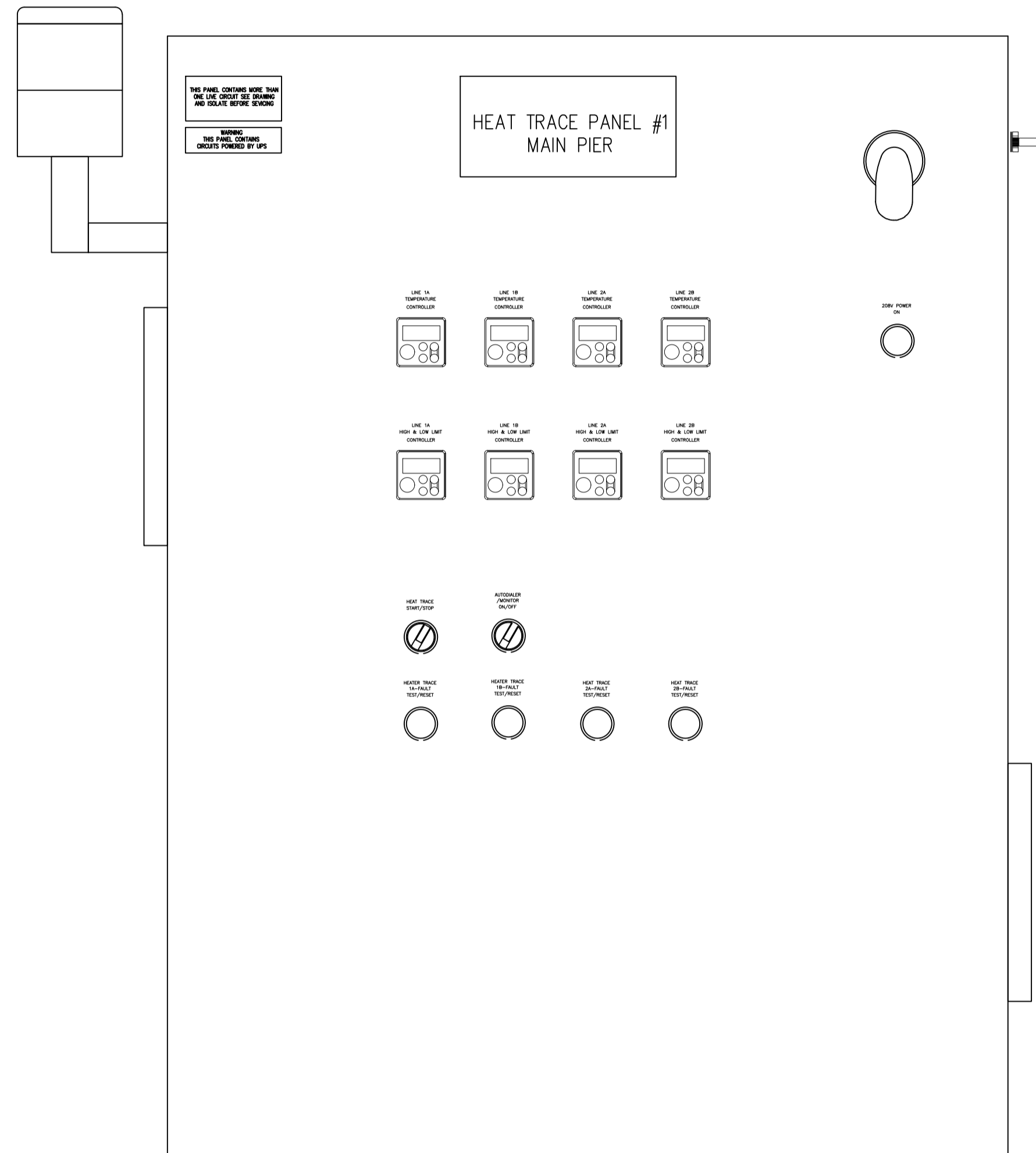
Drawing title/Titre du dessin

**MAIN PIER PANEL LAYOUT
 PROPOSED UPGRADES**

Project No./No. du projet DFO: F1700 - 195247	Sheet/Feuille E-002 02 OF 02	Revision no./La Révision no. 2
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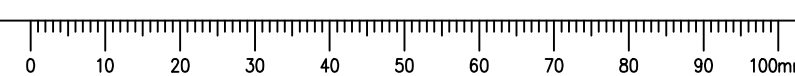
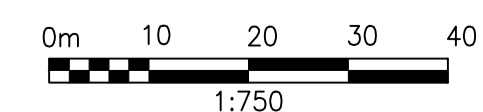
HEAT TRACE PANEL#1 (INTERNAL)
 (36X48X16) SS



HEAT TRACE PANEL#1 (FRONT)
 (36X48X16) SS

NOTES:

1. ALL PANEL NEEDS TO BE CERTIFIED TO CSA22.2 OR SPE1000.
2. ALL PANEL NEEDS TO BE FUNCTIONAL TEST AND SET UP PRIOR TO SHIPPING.
3. ALL WIRE AND TERMINALS MUST BE CLEARLY LABEL AND FERRULE CRIMPED.
4. COORDINATE WITH OWNER FOR ALL WORK REQUIRED PRIOR TO SHIPPING TO SITE.
5. ALL WORKS TO BE COMPLETED PER CAPITAL REGIONAL DISTRICT STANDARDS UNLESS NOTED OTHERWISE.
6. ALL DIMENSIONS ARE FOR REFERENCE ONLY. CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD.
7. SITE WORK PERFORMED NEEDS TO SPE1000 CERTIFIED AND CONFORMED TO CSA22.1.
8. QUOTATION FOR SITE WORK NEEDS TO INCLUDE ALL MATERIAL, MACHINERY, TOOLS, PERMIT AND LABOUR COST.





Mangat Environmental Solution Inc.
2995, 140 Str. Surrey BC, V4P 2C3



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2	REVISED ISSUED FOR TENDER	20/10/06
1	ISSUED FOR TENDER	20/09/06
0	ISSUED FOR 75% REVIEW	19/08/19

Client/client
FISHERIES AND OCEANS

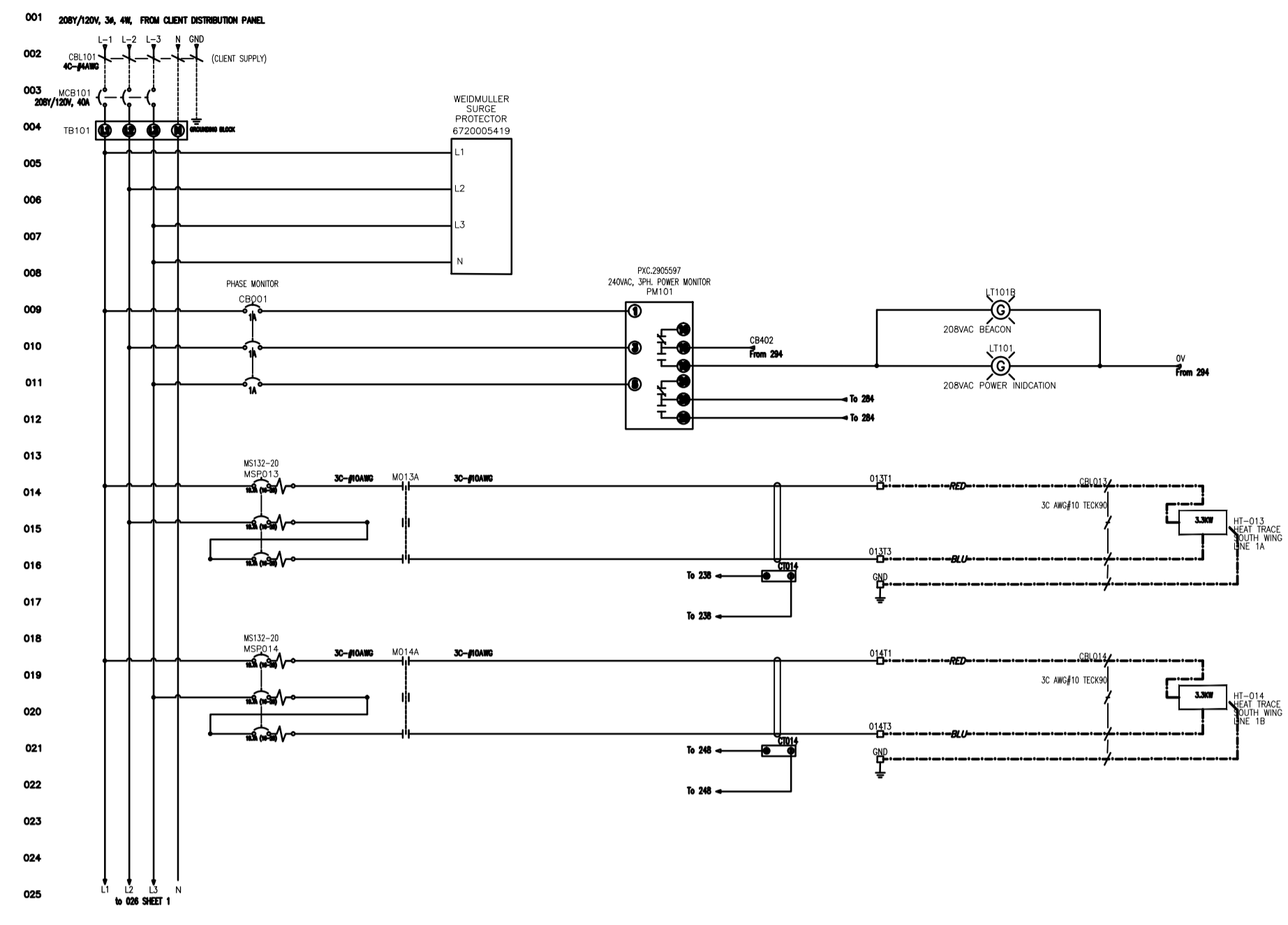
Project title/Titre du projet
**INSTITUTE OF OCEAN SCIENCES (IOS)
MARINE FACILITY WATER
HEAT TRACE PANEL #02
PHASE 2**

Consultant Signature Only
-
Designed by/Concept par
GUAN WONG / SEPT 06, 2020
Drawn by/Dessiné par
GUAN WONG / SEPT 06, 2020
DFO Project Manager/Administrateur de Projets TFSOC
MICHAEL LIANG

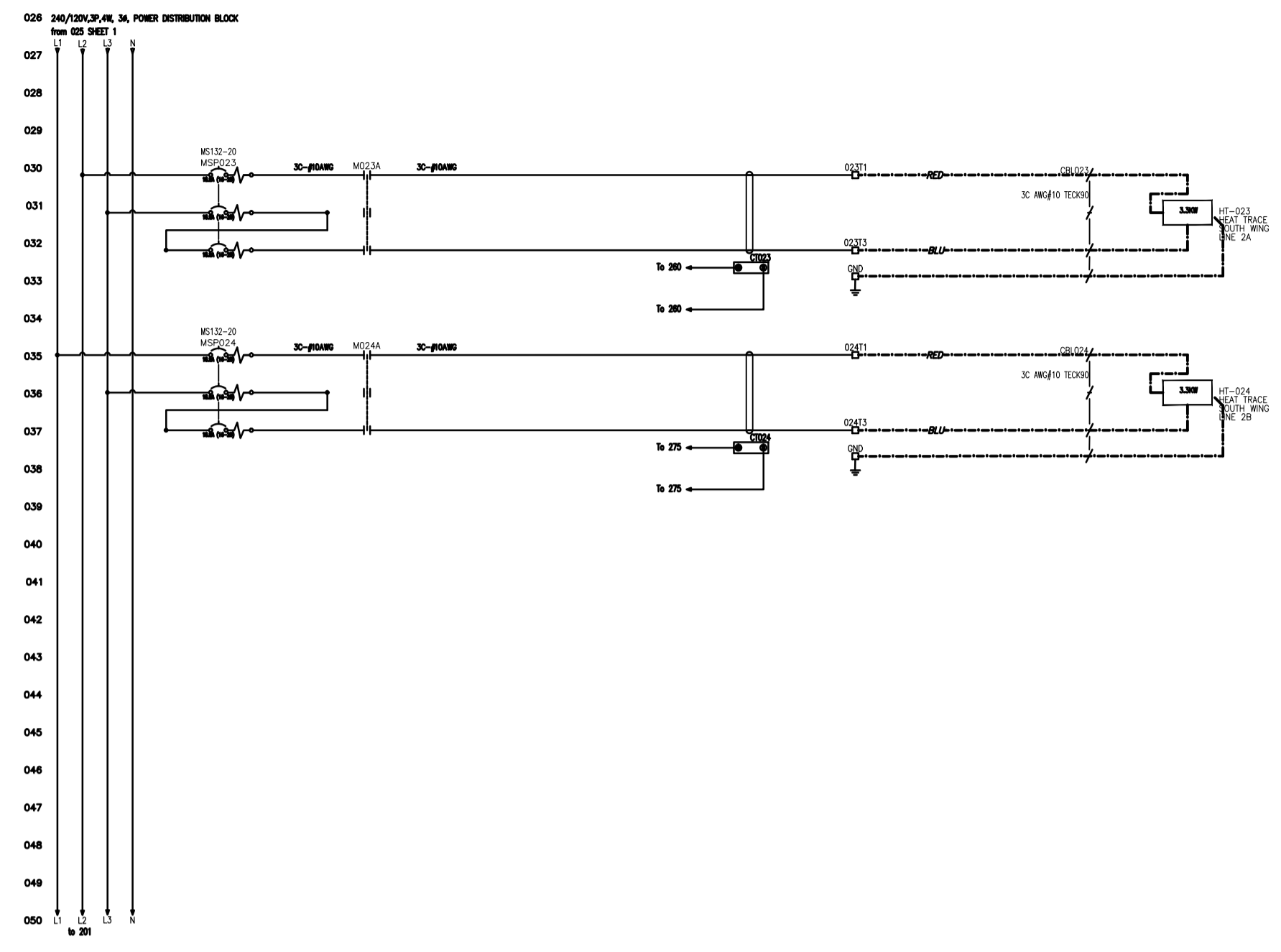
Regional Manager, Architectural and Engineering Services
Gestionnaire régional, Services d'architectural et de génie, TFSOC

Drawing title/Titre du dessin
**SOUTH WING HEAT TRACE SCHEMATICS
PROPOSED UPGRADES**

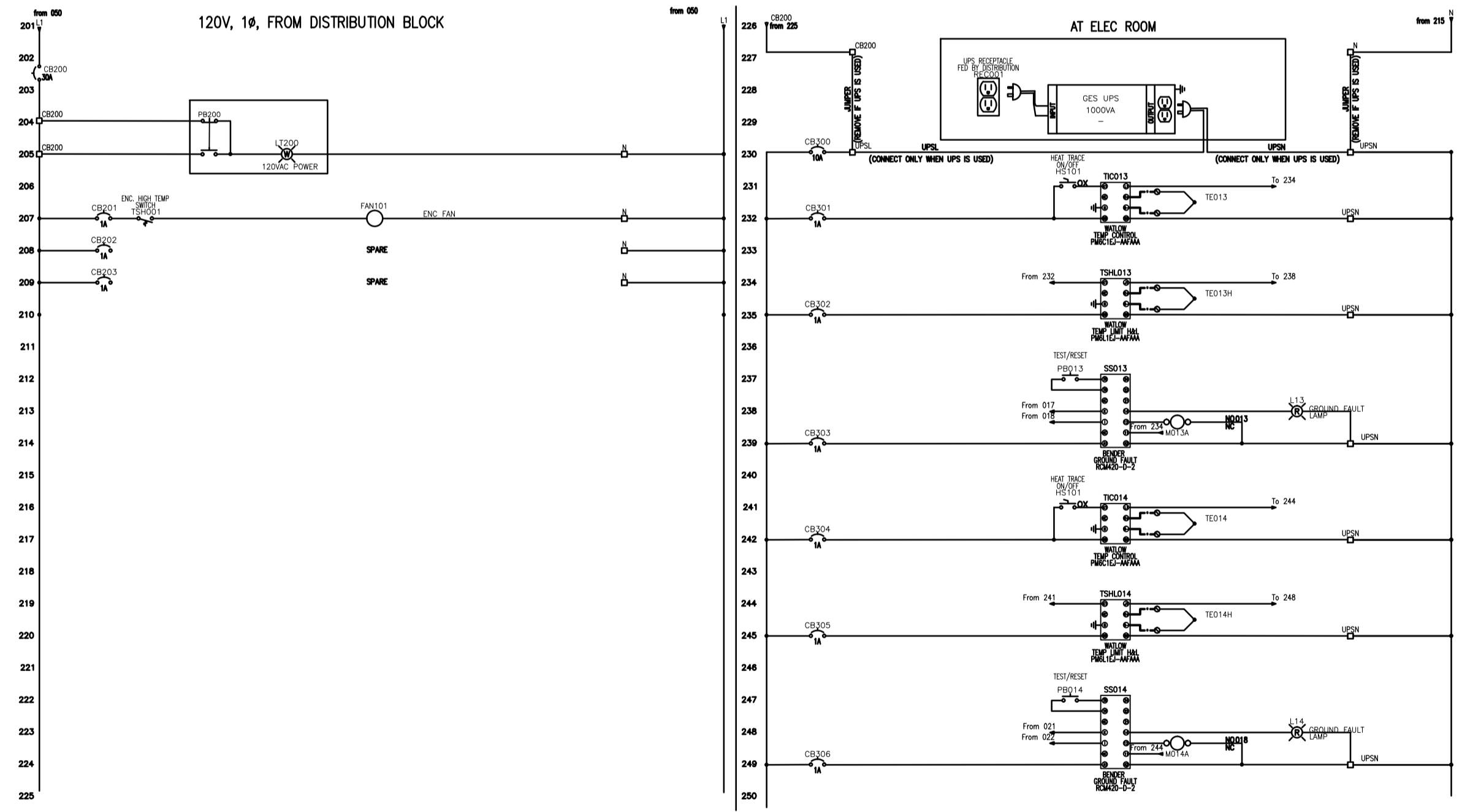
Project No./No. du projet DFO: F1700 - 195247	Sheet/Fauille E-003 01 OF 02	Revision no./La Révision no. 2
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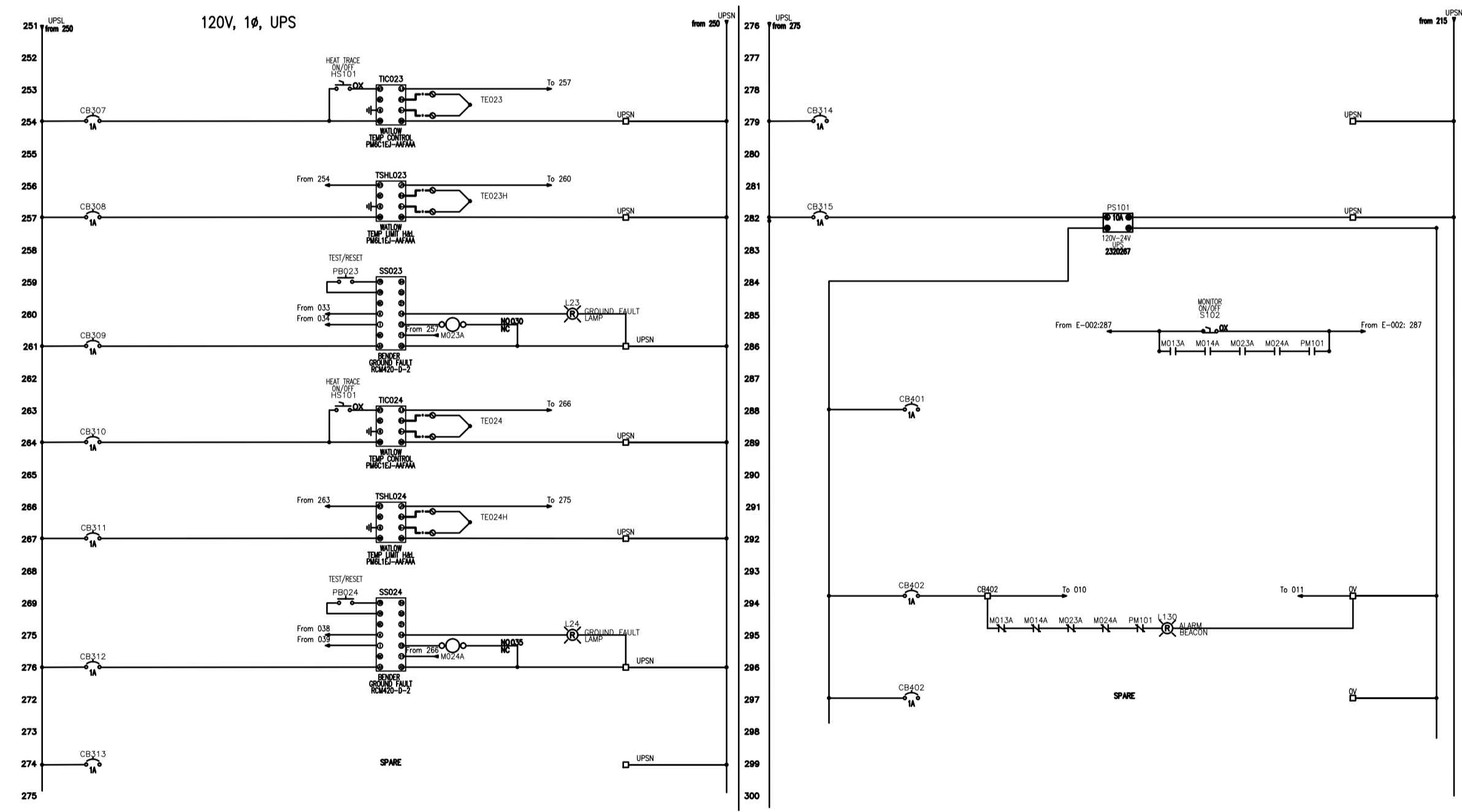
DETAIL 1 208Y/120V POWER



DETAIL 2 208Y/120V POWER

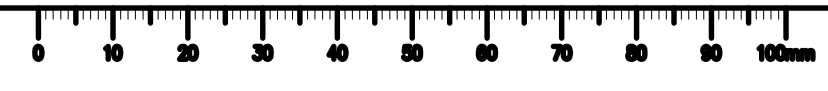
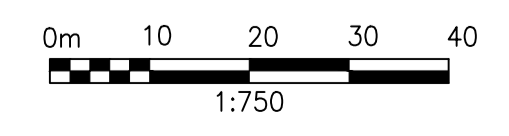


DETAIL 3 120V CONTROL



DETAIL 4 120V & 24V CONTROL

- NOTES:
1. ALL PANEL NEEDS TO BE CERTIFIED TO CSA22.2 OR SPE1000.
 2. ALL PANEL NEEDS TO BE FUNCTIONAL TEST AND SET UP PRIOR TO SHIPPING.
 3. ALL WIRE AND TERMINALS MUST BE CLEARLY LABEL AND FERRULE CRIMPED.
 4. COORDINATE WITH OWNER FOR ALL WORK REQUIRED PRIOR TO SHIPPING TO SITE.
 5. ALL WORKS TO BE COMPLETED PER CAPITAL REGIONAL DISTRICT STANDARDS UNLESS NOTED OTHERWISE.
 6. ALL DIMENSIONS ARE FOR REFERENCE ONLY. CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD.
 7. SITE WORK PERFORMED NEEDS TO SPE1000 CERTIFIED AND CONFORMED TO CSA22.1.
 8. QUOTATION FOR SITE WORK NEEDS TO INCLUDE ALL MATERIAL, MACHINERY, TOOLS, PERMIT AND LABOUR COST.



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PWGSC - A1 - 841X594



Mangat Environmental Solution Inc.
2995, 140 Str. Surrey BC, V4P 2C3



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2	INTERLOCK CHANGE	20/10/06
1	ISSUED FOR TENDER	20/09/06
0	ISSUED FOR 75% REVIEW	19/08/19

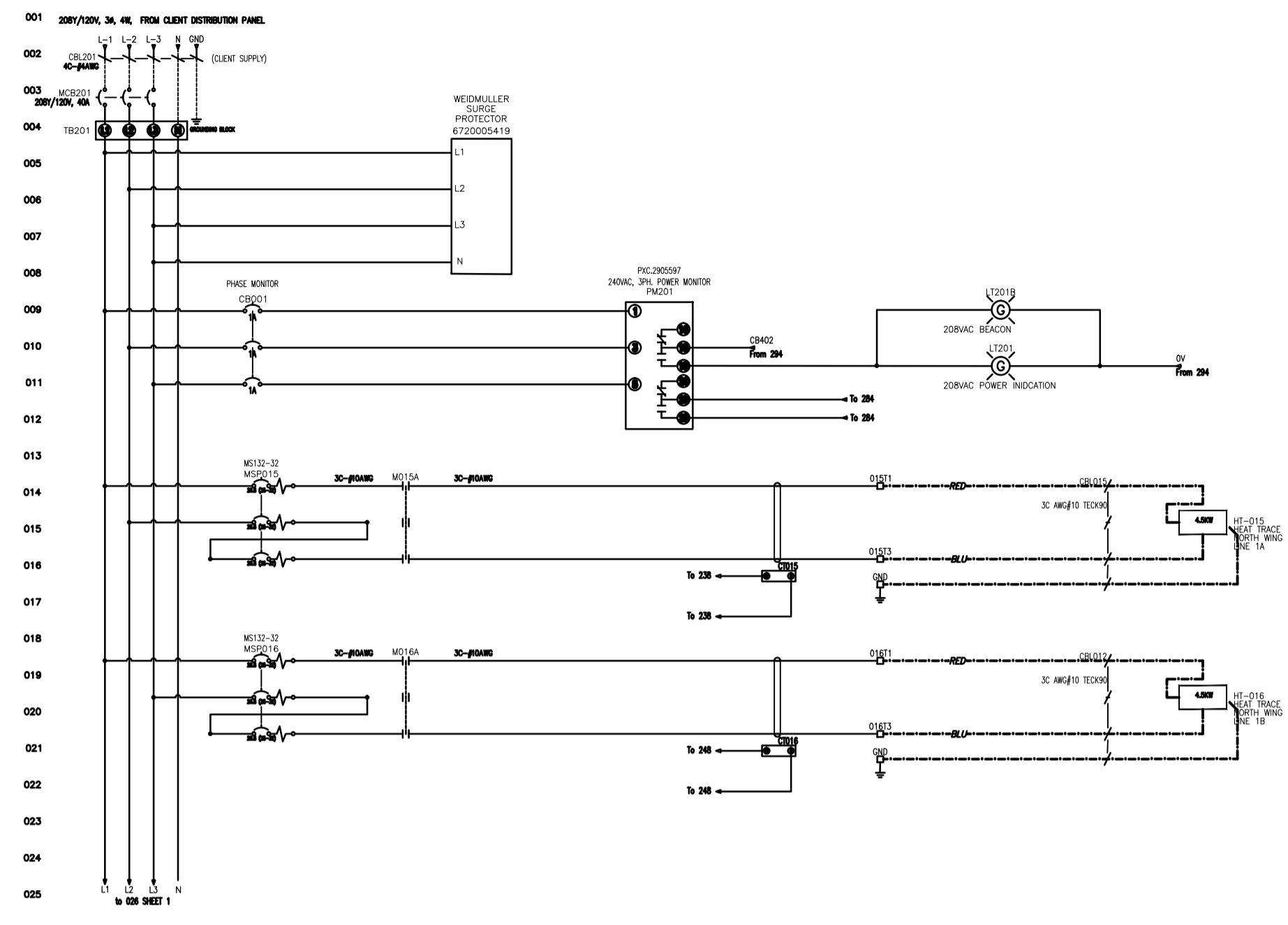
Client/client
FISHERIES AND OCEANS

Project title/Titre du projet
**INSTITUTE OF OCEAN SCIENCES (IOS)
MARINE FACILITY WATER
HEAT TRACE PANEL #03
PHASE 2**

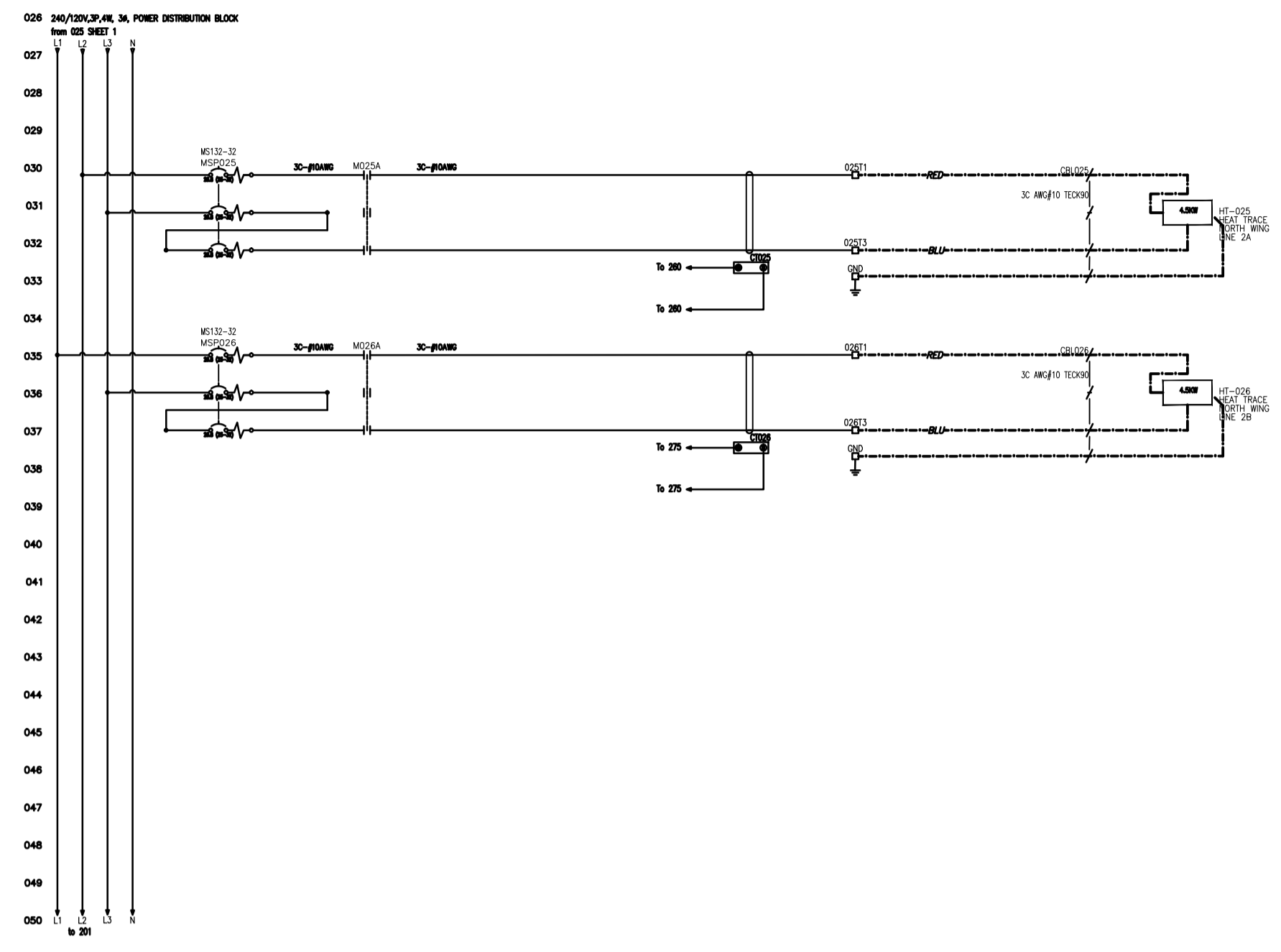
Consultant Signature Only
-
Designed by/Concept par
GUAN WONG / SEPT 06, 2020
Drawn by/Dessiné par
GUAN WONG / SEPT 06, 2020
DFO Project Manager/Administrateur de Projets TFSOC
MICHAEL LIANG
Regional Manager, Architectural and Engineering Services
Gestionnaire régional, Services d'architectural et de génie, TFSOC
-

Drawing title/Titre du dessin
**NORTH & NS HEAT TRACE SCHEMATICS
PROPOSED UPGRADES**

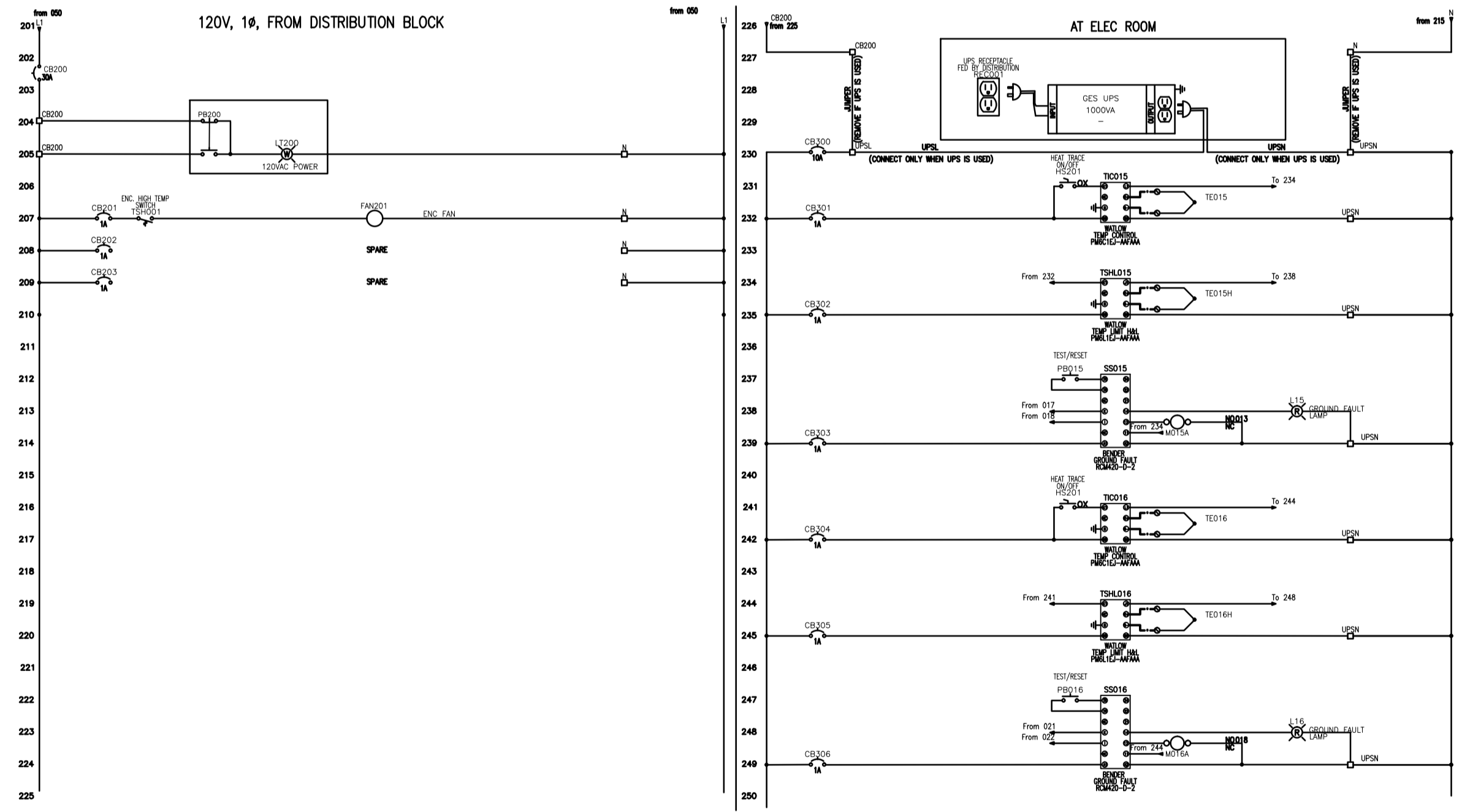
Project No./No. du projet DFO: F1700 - 195247	Sheet/Fauille E-004 01 OF 02	Revision no./La Révision no. 2
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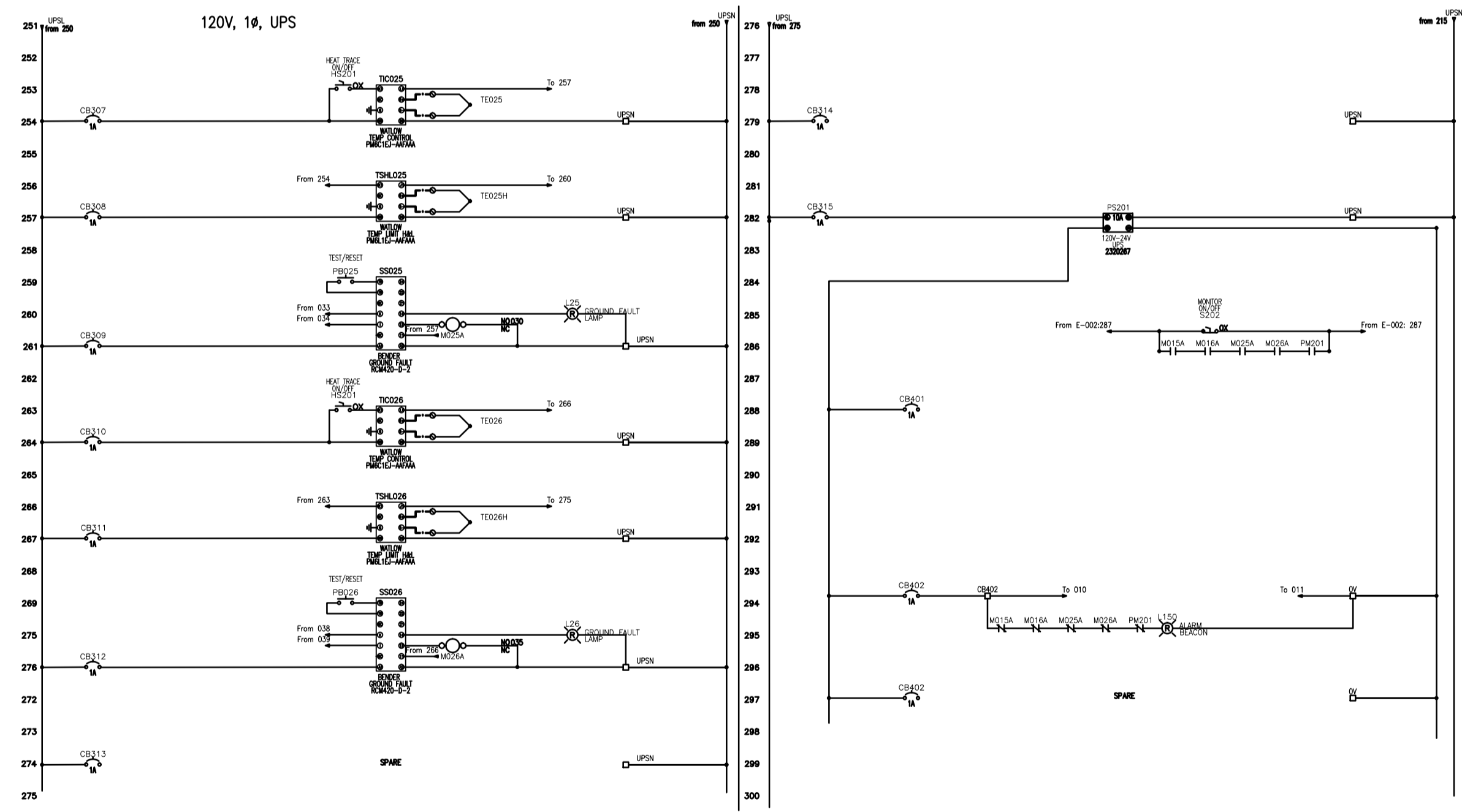
DETAIL 1 208Y/120V POWER



DETAIL 2 208Y/120V POWER

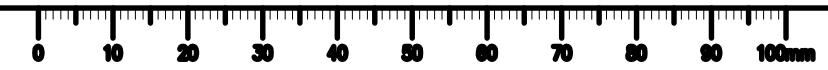
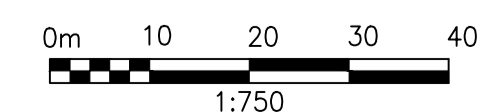


DETAIL 3 120V CONTROL



DETAIL 4 120V & 24V CONTROL

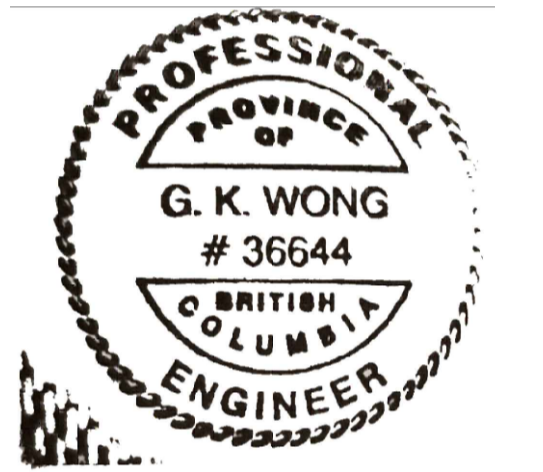
- NOTES:
1. ALL PANEL NEEDS TO BE CERTIFIED TO CSA22.2 OR SPE1000.
 2. ALL PANEL NEEDS TO BE FUNCTIONAL TEST AND SET UP PRIOR TO SHIPPING.
 3. ALL WIRE AND TERMINALS MUST BE CLEARLY LABEL AND FERRULE CRIMPED.
 4. COORDINATE WITH OWNER FOR ALL WORK REQUIRED PRIOR TO SHIPPING TO SITE.
 5. ALL WORKS TO BE COMPLETED PER CAPITAL REGIONAL DISTRICT STANDARDS UNLESS NOTED OTHERWISE.
 6. ALL DIMENSIONS ARE FOR REFERENCE ONLY. CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD.
 7. SITE WORK PERFORMED NEEDS TO SPE1000 CERTIFIED AND CONFORMED TO CSA22.1.
 8. QUOTATION FOR SITE WORK NEEDS TO INCLUDE ALL MATERIAL, MACHINERY, TOOLS, PERMIT AND LABOUR COST.



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Mangat Environmental Solution Inc.
2995, 140 Str. Surrey BC, V4P 2C3



Revision/Revision	Description/Description	Date/Date
5		
4		
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2		
1	ISSUED FOR TENDER	20/09/06
0	ISSUED FOR 75% REVIEW	19/08/19

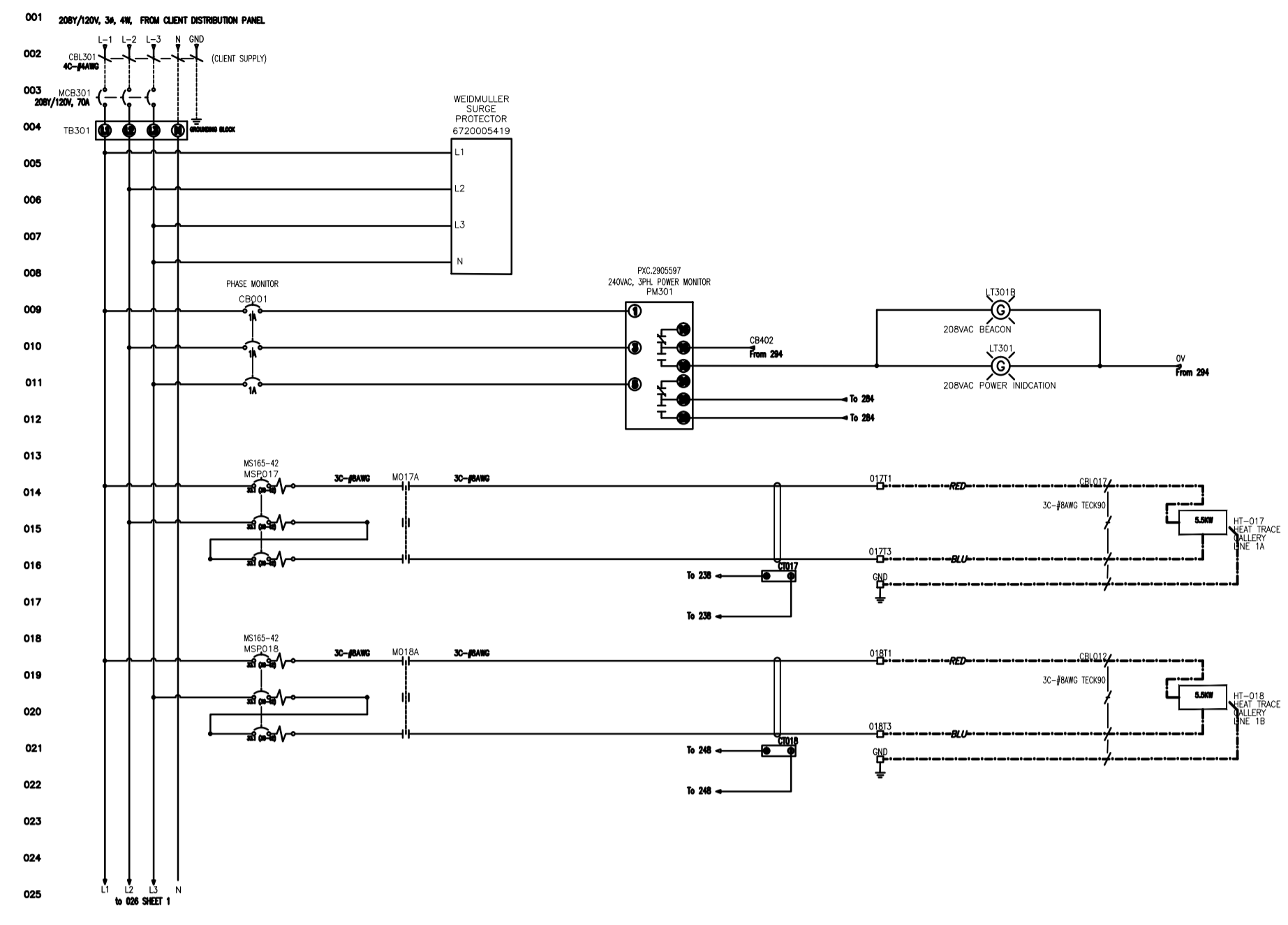
Client/client
FISHERIES AND OCEANS

Project title/Titre du projet
**INSTITUTE OF OCEAN SCIENCES (IOS)
MARINE FACILITY WATER
HEAT TRACE PANEL #04
PHASE 2**

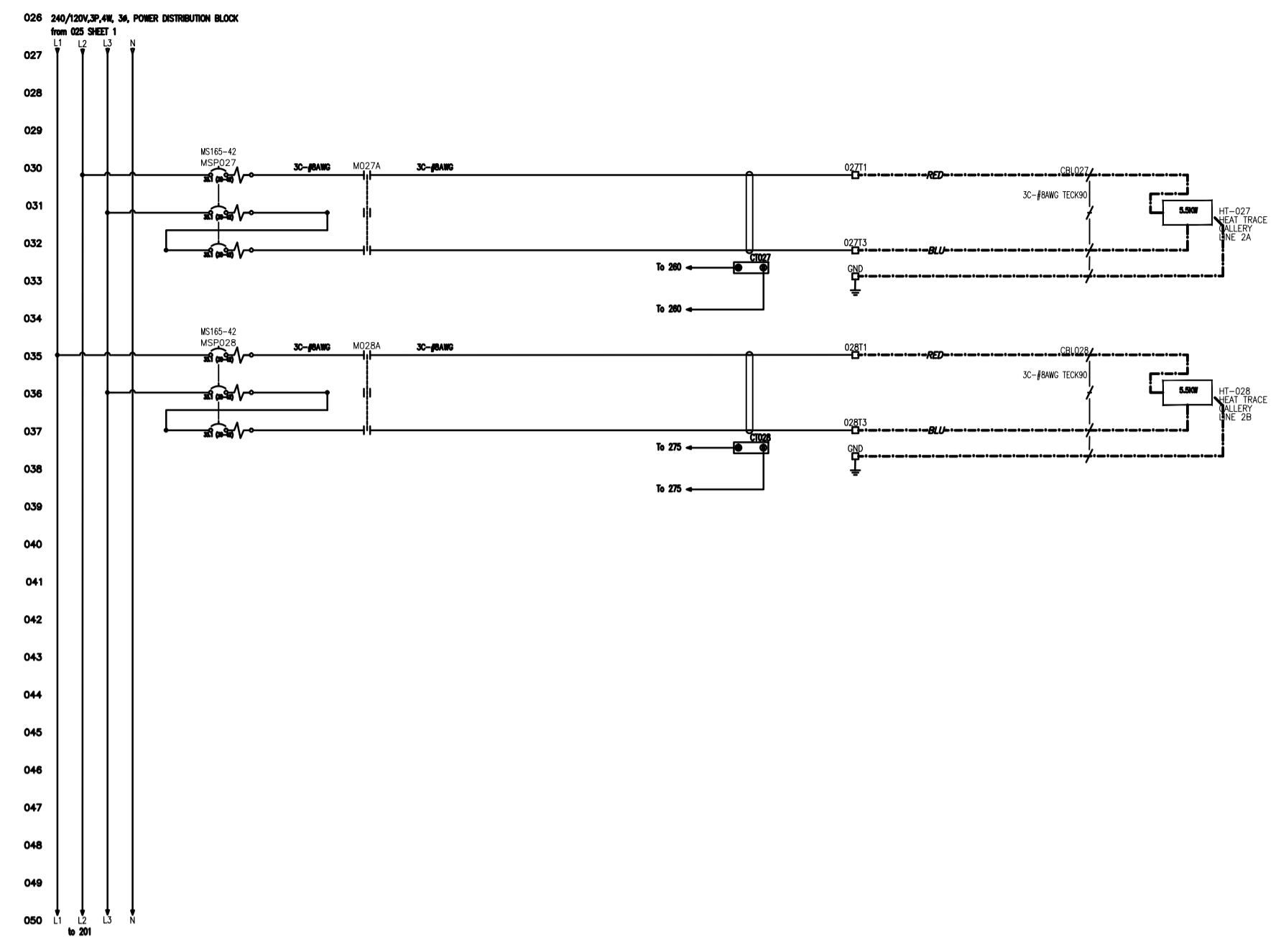
Consultant Signature Only
-
Designed by/Concept par
GUAN WONG / SEPT 06, 2020
Drawn by/Dessiné par
GUAN WONG / SEPT 06, 2020
DFO Project Manager/Administrateur de Projets TPSC
MICHAEL LIANG
Regional Manager, Architectural and Engineering Services
Gestionnaire régional, Services d'architectural et de génie, TPSC

Drawing title/Titre du dessin
**BURIED PIPES HEAT TRACE SCHEMATICS
PROPOSED UPGRADES**

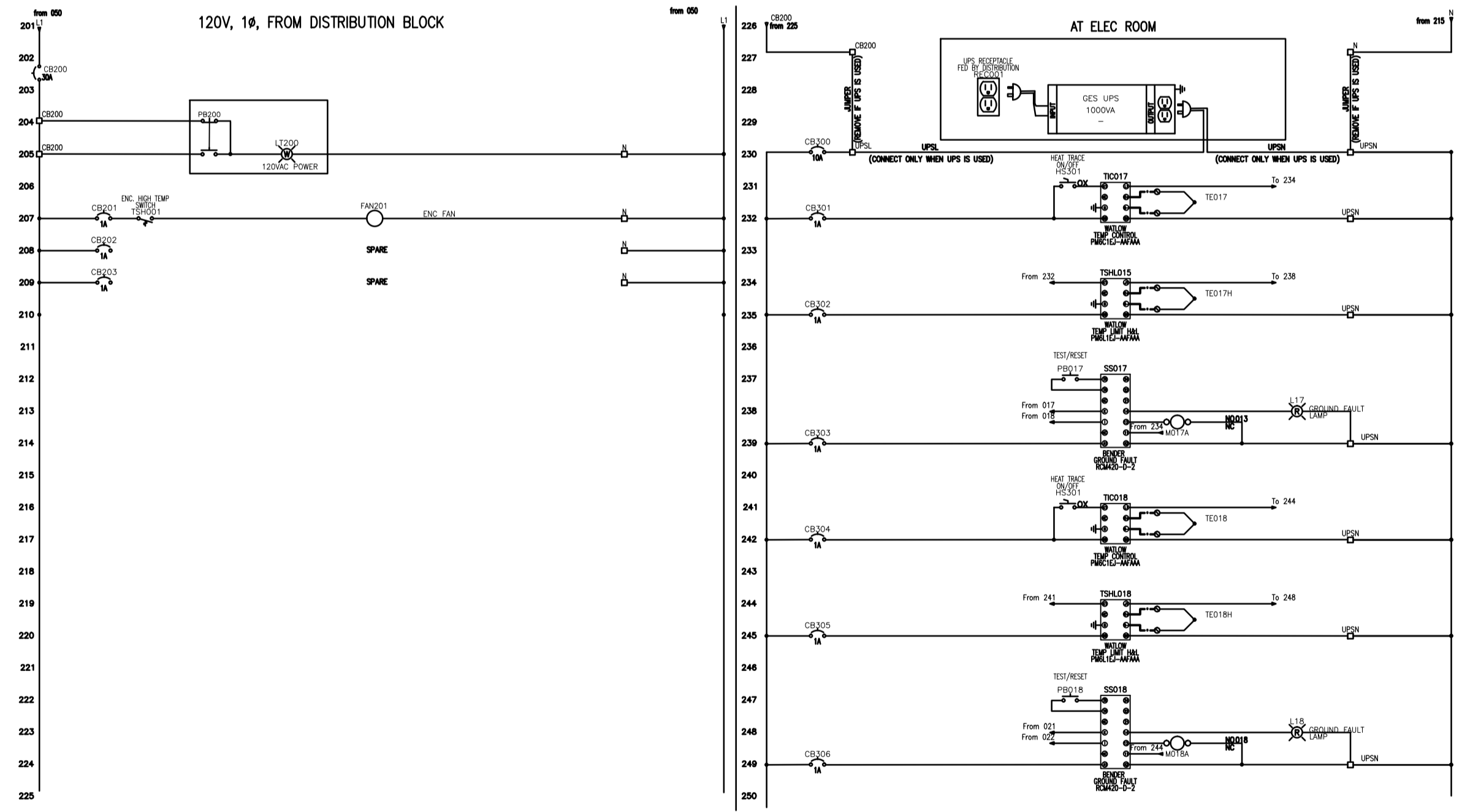
Project No./No. du projet	Sheet/Fauille	Revision no./La Révision no.
DFO: F1700 - 195247	E-005 01 OF 02	1



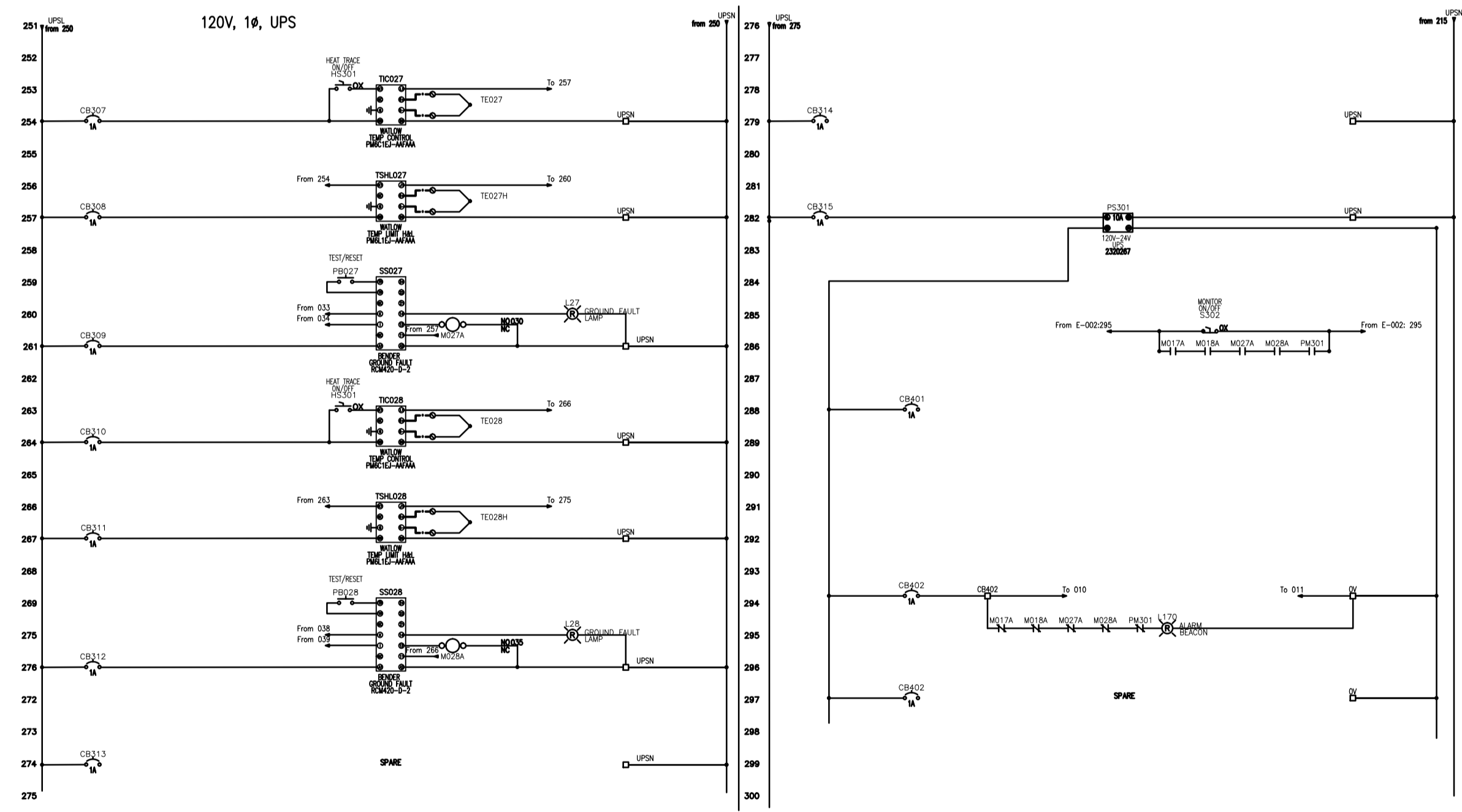
DETAIL 1 208Y/120V POWER



DETAIL 2 208Y/120V POWER

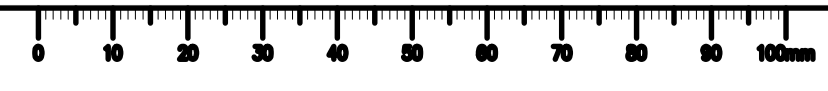
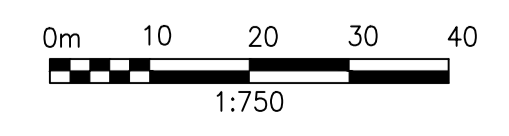


DETAIL 3 120V CONTROL



DETAIL 4 120V & 24V CONTROL

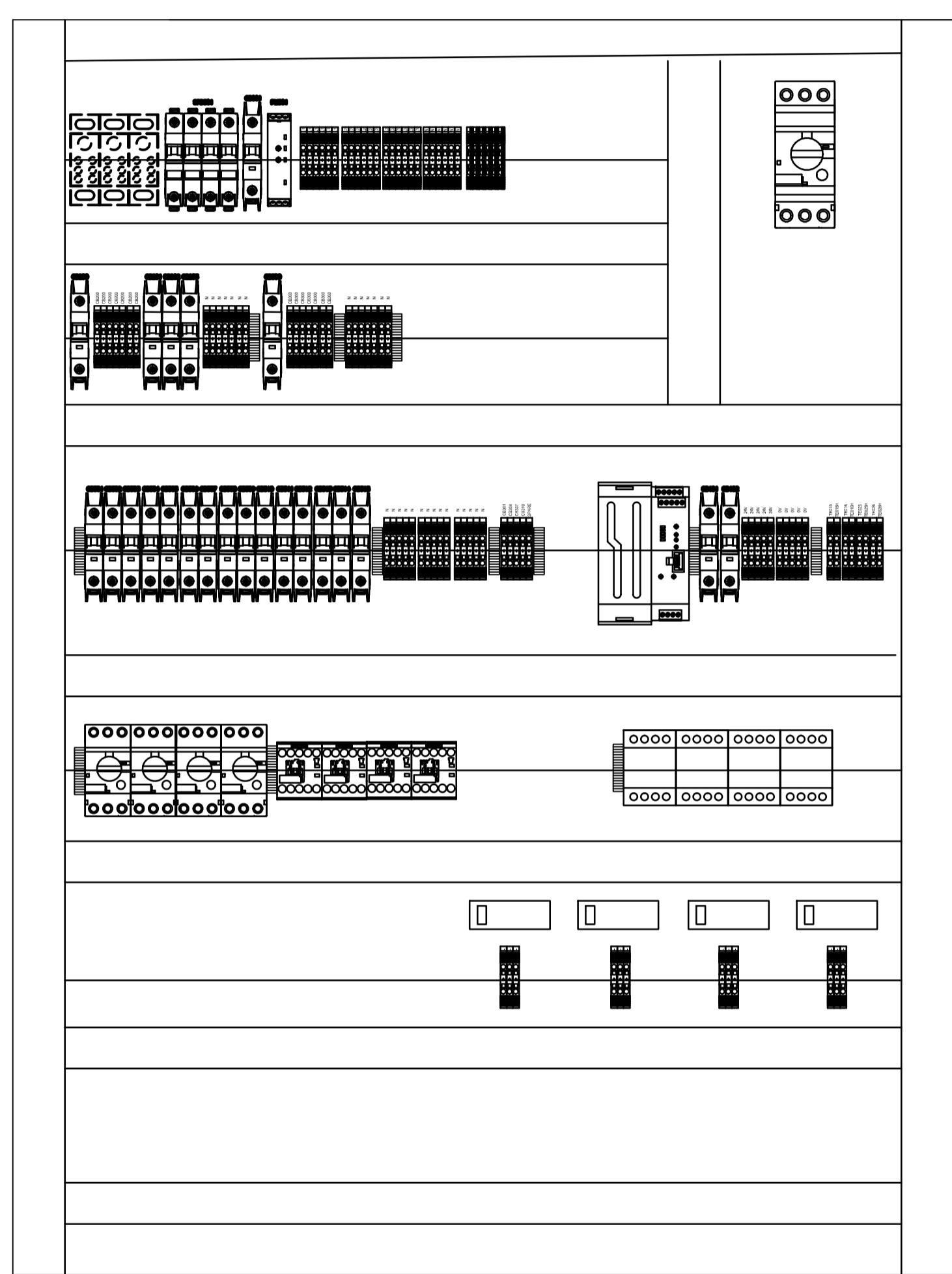
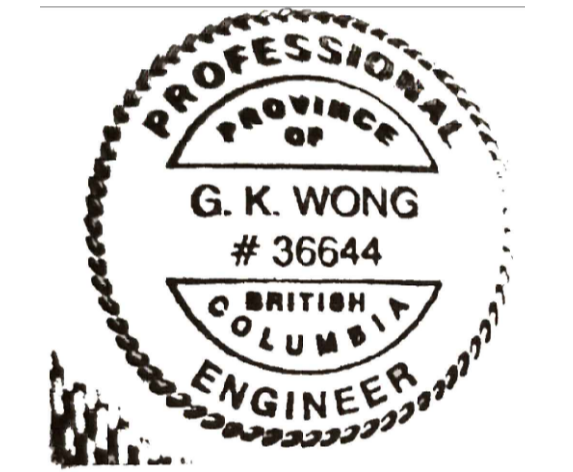
- NOTES:
1. ALL PANEL NEEDS TO BE CERTIFIED TO CSA22.2 OR SPE1000.
 2. ALL PANEL NEEDS TO BE FUNCTIONAL TEST AND SET UP PRIOR TO SHIPPING.
 3. ALL WIRE AND TERMINALS MUST BE CLEARLY LABEL AND FERRULE CRIMPED.
 4. COORDINATE WITH OWNER FOR ALL WORK REQUIRED PRIOR TO SHIPPING TO SITE.
 5. ALL WORKS TO BE COMPLETED PER CAPITAL REGIONAL DISTRICT STANDARDS UNLESS NOTED OTHERWISE.
 6. ALL DIMENSIONS ARE FOR REFERENCE ONLY. CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD.
 7. SITE WORK PERFORMED NEEDS TO SPE1000 CERTIFIED AND CONFORMED TO CSA22.1.
 8. QUOTATION FOR SITE WORK NEEDS TO INCLUDE ALL MATERIAL, MACHINERY, TOOLS, PERMIT AND LABOUR COST.



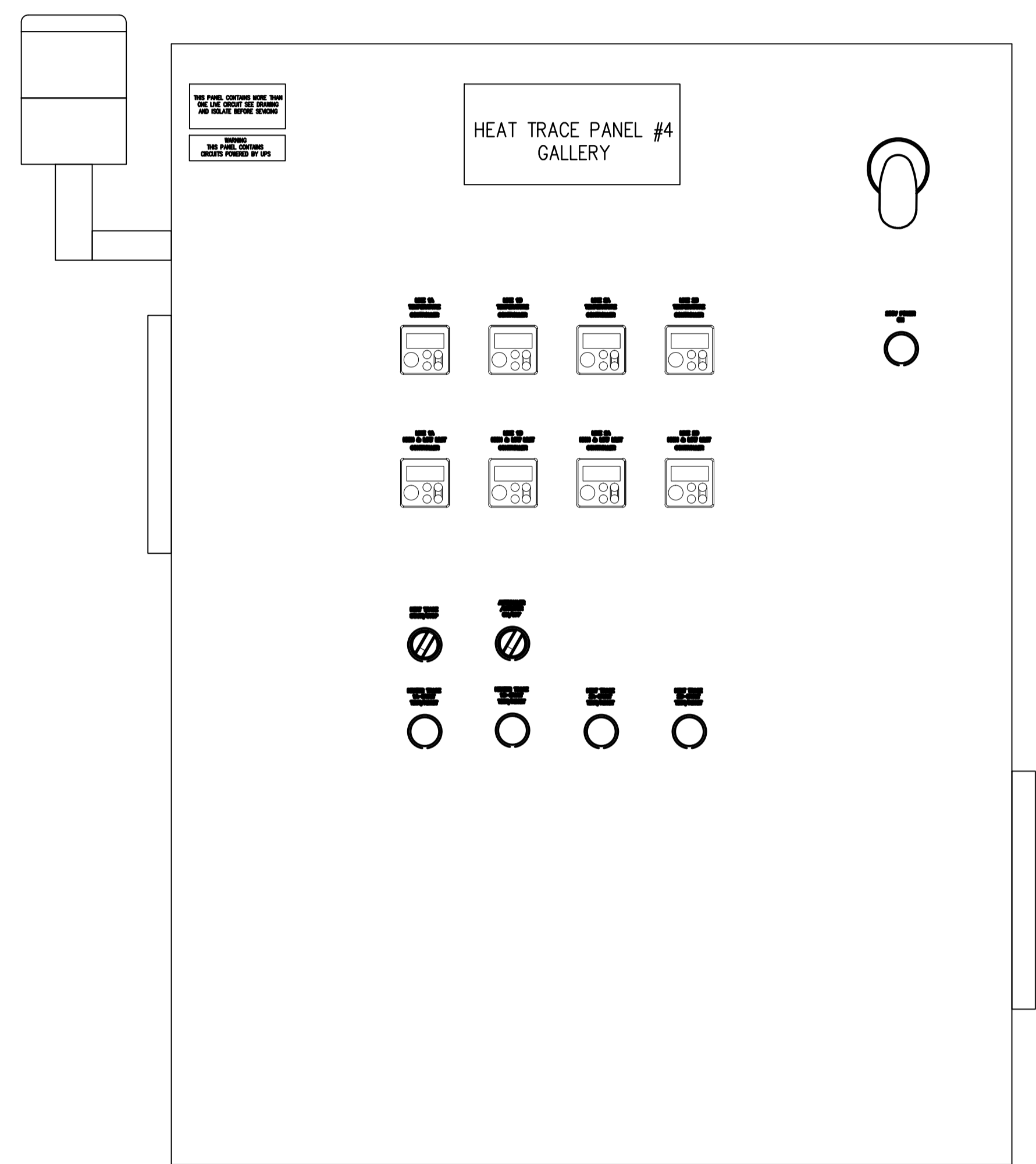
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PWSC - A1 - 841X594



Mangat Environmental Solution Inc.
 2995, 140 Str. Surrey BC, V4P 2C3



HEAT TRACE PANEL#4 (INTERNAL)
 (36X48X16) SS



HEAT TRACE PANEL#4 (FRONT)
 (36X48X16) SS

NOTES:

1. ALL PANEL NEEDS TO BE CERTIFIED TO CSA22.2 OR SPE1000.
2. ALL PANEL NEEDS TO BE FUNCTIONAL TEST AND SET UP PRIOR TO SHIPPING.
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1	ISSUED FOR TENDER	20/09/20
0	ISSUED FOR 75% REVIEW	19/08/19
Revision/Revision	Description/Description	Date/Date

Client/client
FISHERIES AND OCEANS

Project title/Titre du projet
**INSTITUTE OF OCEAN SCIENCES (IOS)
 MARINE FACILITY WATER
 HEAT TRACE PANEL #04
 PHASE 2**

Consultant Signature Only
 -
 Designed by/Concept par
 GUAN WONG / SEPT 06, 2020
 Drawn by/Dessiné par
 GUAN WONG / SEPT 06, 2020
 DFO Project Manager/Administrateur de Projets TPSC
 MICHAEL LIANG
 Regional Manager, Architectural and Engineering Services
 Gestionnaire régional, Services d'architecture et de génie, TPSC

Drawing title/Titre du dessin
**BURIED PIPE HEAT TRACE PANEL LAYOUT
 PROPOSED UPGRADES**

Project No./No. du projet DFO: F1700 - 195247	Sheet/Feuille E-005 02 OF 02	Revision no./La Révision no. 1
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