

BURLINGTON CANAL BRIDGE

SKEW CONTROL, PLC, UPS AND AUXILIARY

DRIVE CONTROL MODIFICATIONS AND

UPGRADES

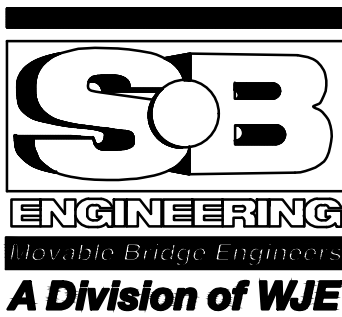


LIST OF DRAWINGS	
DRAWING NUMBER	DRAWING TITLE
G01	COVER SHEET
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E02	ELECTRICAL PLAN AND ELEVATION
E03	NORTH TOWER MACHINERY ROOM ELECTRICAL LAYOUT
E04	SOUTH TOWER MACHINERY ROOM ELECTRICAL LAYOUT
E05	AUXILIARY DRIVE CONTROL MODIFICATION
E06	AUXILIARY DRIVE CONTROL CONSOLE DETAILS
E07	AUXILIARY DRIVE CONTROL CONSOLE MOUNTING DETAILS
M01	ABSOLUTE ENCODER INSTALLATION ASSEMBLY AND DETAILS
M02	ABSOLUTE ENCODER INSTALLATION DETAILS

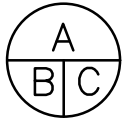
 Public Works and Government Services Canada
Architectural and Engineering Services
Ontario Region

Travaux publics et Services gouvernementaux Canada
Services d'architecture et de génie
Région de l'Ontario

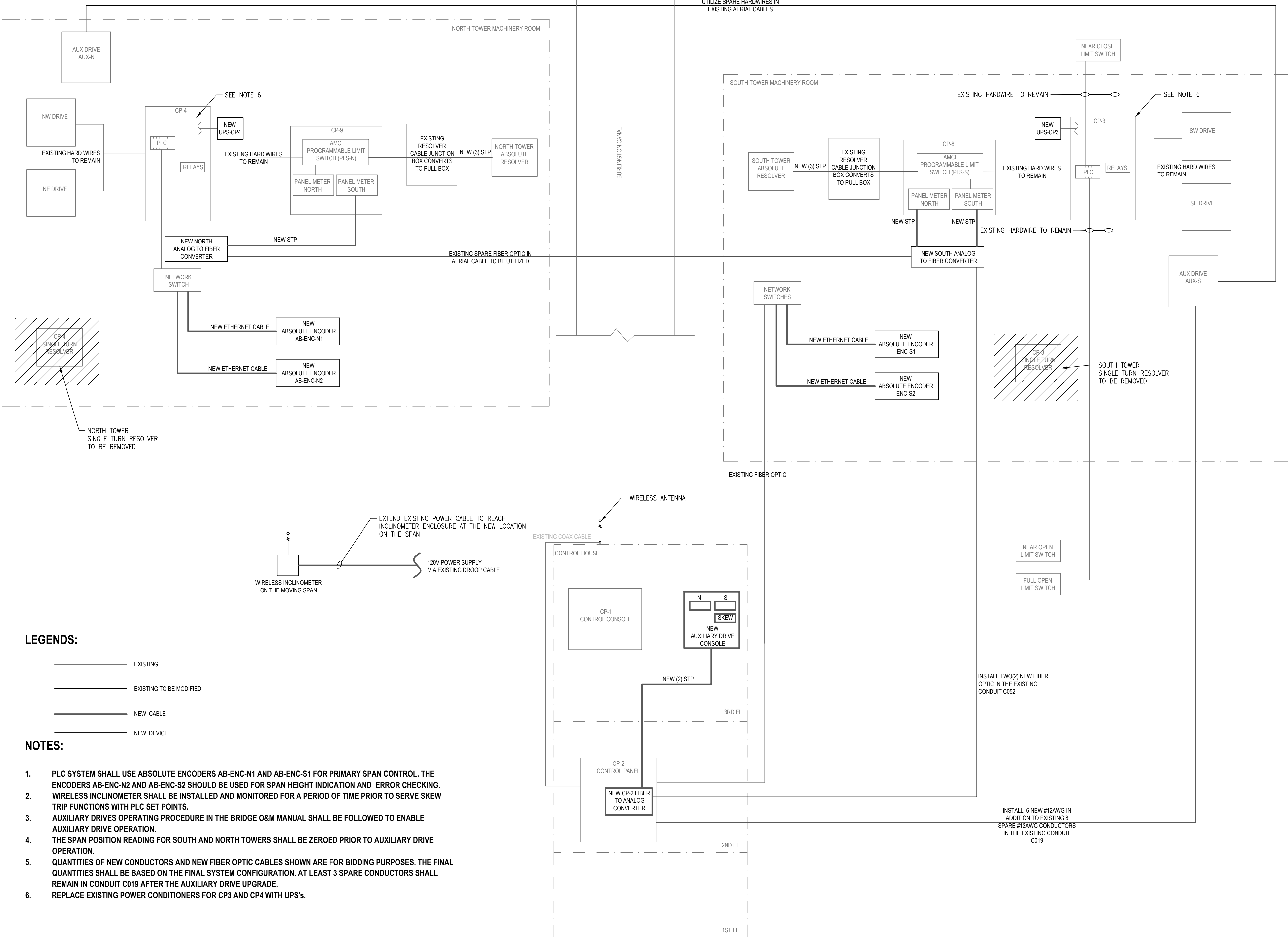
PARSONS



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	A	Detail No.
	B	No. du détail
	C	drawing no. — where detail required dessin no. — où détail exigé
		drawing no. — where detailed dessin no. — où détaillé

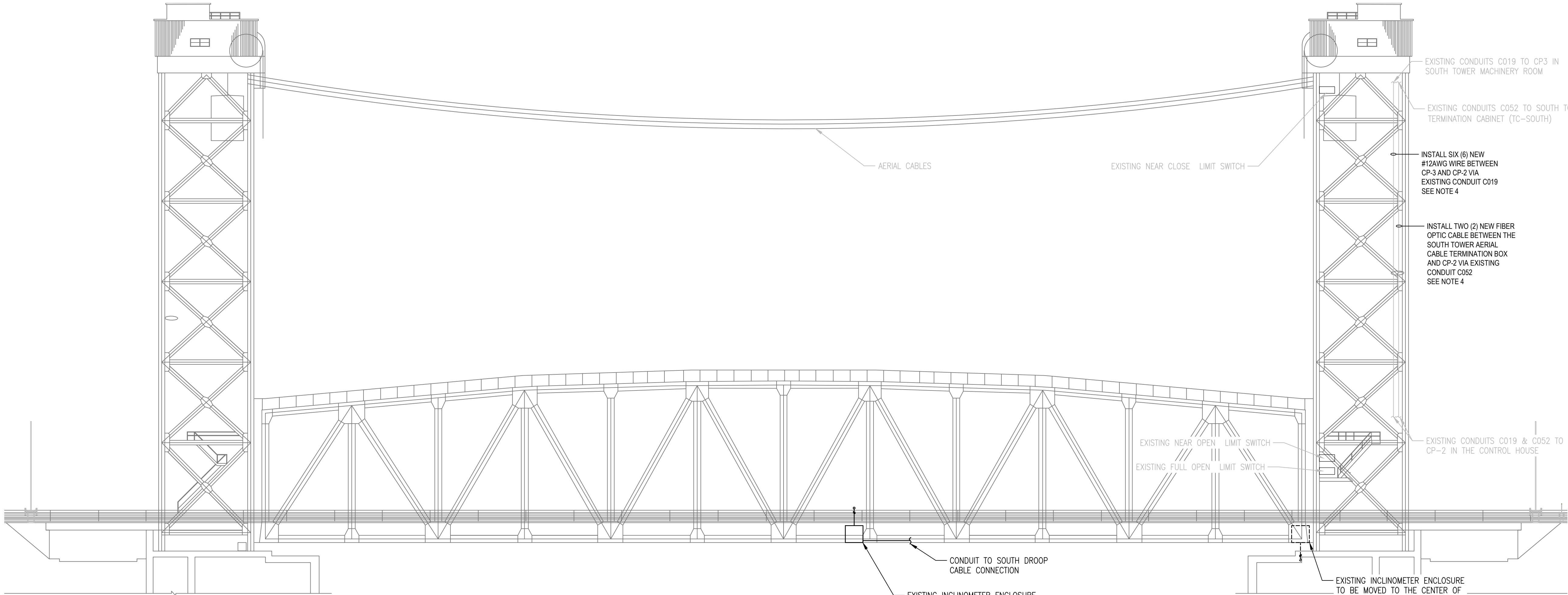
project title titre du projet	HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE	ONTARIO
drawing title titre du dessin	COVER SHEET	
drawn by dessiné par	LQX	
designed by conc. par	LQX	
approved by approuvé par	GTR	
bid soumission	project manager administrateur de projets	
project date date du projet	2020-12-09	
project no. no. du projet	R.109141.001	
drawing no. dessiné no.	G01	



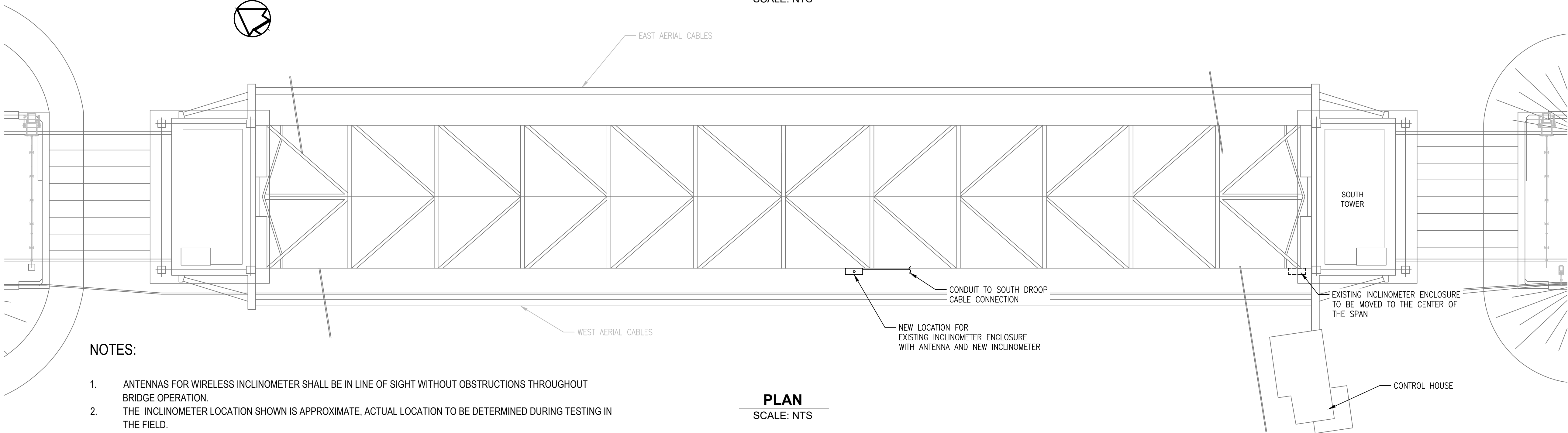
0	ISSUED FOR TENDER	12/09/2020
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	drawing no. — where detailed dessin no. — où détaillé

project title titre du projet	HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE	ONTARIO
drawing title titre du dessin	SKEW CONTROL AND AUXILIARY DRIVE CONTROL BLOCK DIAGRAM	
drawn by dessiné par	LQX	
designed by conc par	LQX	
approved by approuvé par	GTR	
bid soumission		project manager administrateur de projets
project date date du projet	2020-12-09	
project no. no. du projet	R.109141.001	
drawing no. dessiné no.	E01	



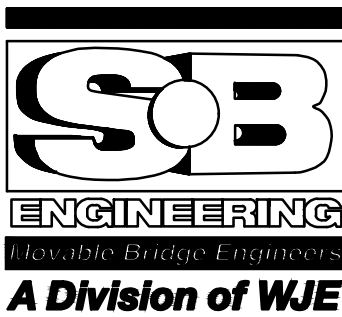
ELEVATION
SCALE: NTS




NOTES:

1. ANTENNAS FOR WIRELESS INCLINOMETER SHALL BE IN LINE OF SIGHT WITHOUT OBSTRUCTIONS THROUGHOUT BRIDGE OPERATION.
2. THE INCLINOMETER LOCATION SHOWN IS APPROXIMATE, ACTUAL LOCATION TO BE DETERMINED DURING TESTING IN THE FIELD.
3. THE WIRELESS INCLINOMETER SIGNAL TO BE MONITORED BY BRIDGE PLC FOR A PERIOD OF TIME TO ENSURE STABILITY AND RELIABILITY PRIOR TO BE USED FOR TRIP FUNCTIONS. THE INCLINOMETER SIGNAL WILL BE UTILIZED FOR BRIDGE ULTIMATE SKEW TRIP.
4. THE FINAL NEW CONDUCTORS AND FIBER OPTIC CABLES TO BE INSTALLED SHALL BE BASED ON THE FINAL APPROVED SYSTEM CONFIGURATION AND SHOP DRAWINGS.

PLAN
SCALE: NTS



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project title
titre du projet

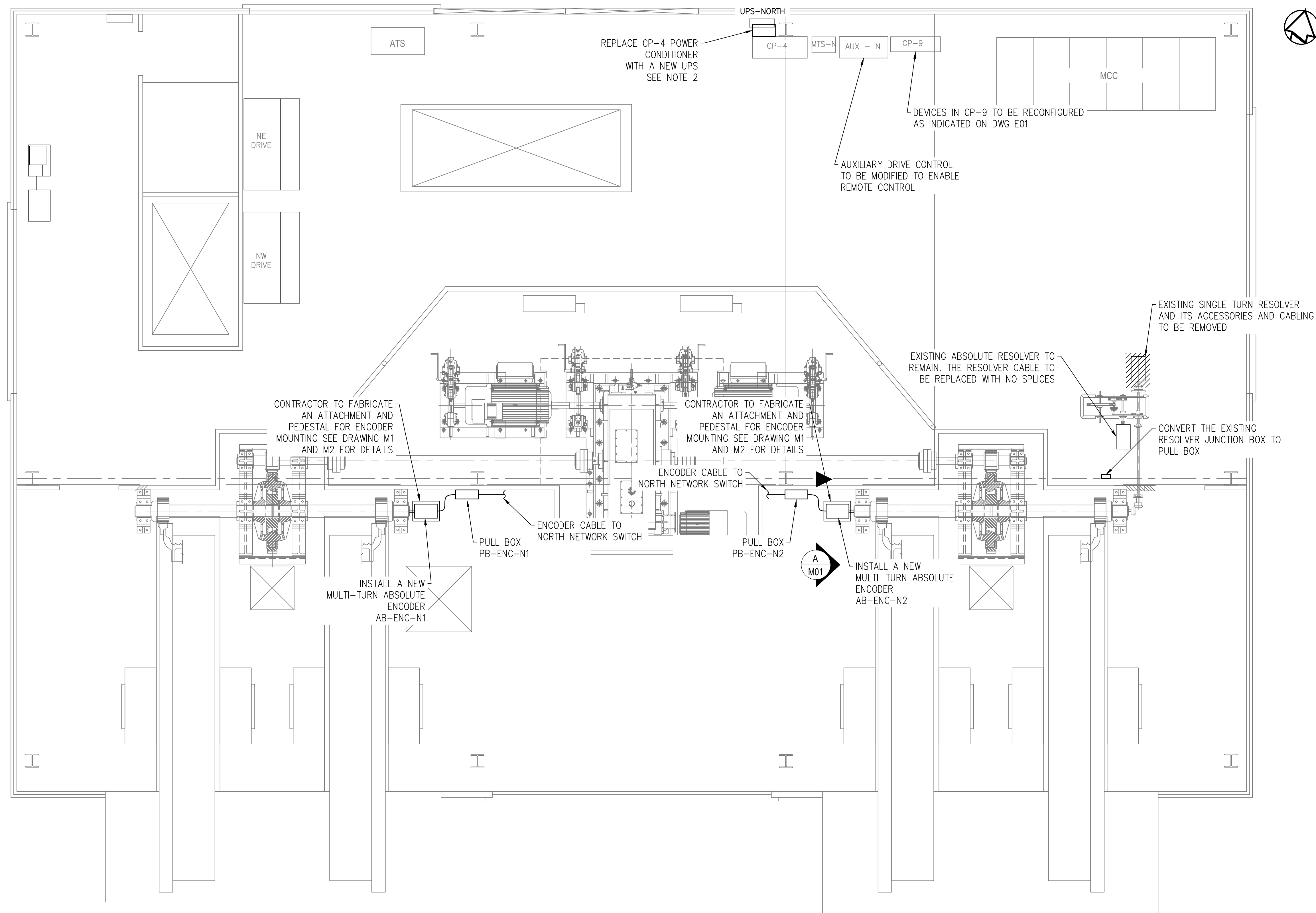
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE ONTARIO

SKEW CONTROL AND ELECTRICAL UPGRADES

drawing title
titre du dessin

ELECTRICAL PLAN AND ELEVATION

drawn by dessiné par	LQX
designed by conc par	LQX
approved by approuvé par	GTR
bid soumission	project manager administrateur de projets
project date date du projet	2020-12-09
project no. no. du projet	R.109141.001
drawing no. dessiné no.	E02



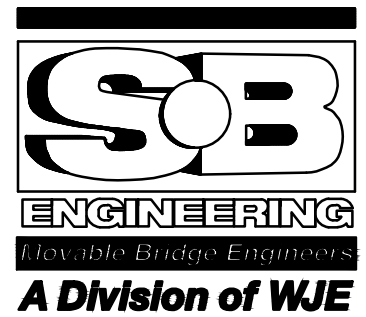
NOTES:

1. THE NEW MULTI-TURN ABSOLUTE ENCODER SHOULD BE SICK MANUFACTURER, THEIR AFM60 PROFINET ABSOLUTE ENCODER OR ENGINEER APPROVED EQUAL. FOR REFERENCE PURPOSES, THE TOTAL NUMBER OF TURNS AT THE PINION SHAFT FROM BRIDGE SEATED TO FULL OPEN POSITION IS 34.4, ACTUAL TOTAL ENCODER TURNS SHALL BE VERIFIED IN FIELD.
2. THE NEW UPS SHALL BE HARDWIRED.



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project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE ONTARIO
SKEW CONTROL AND ELECTRICAL UPGRADES

drawing title
titre du dessin
**NORTH TOWER MACHINERY ROOM
ELECTRICAL LAYOUT**

drawn by
dessiné par
LQX

designed by
conç par
LQX

approved by
approuvé par
GTR

bid
soumission

project manager
administrateur de projets

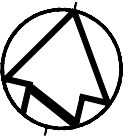
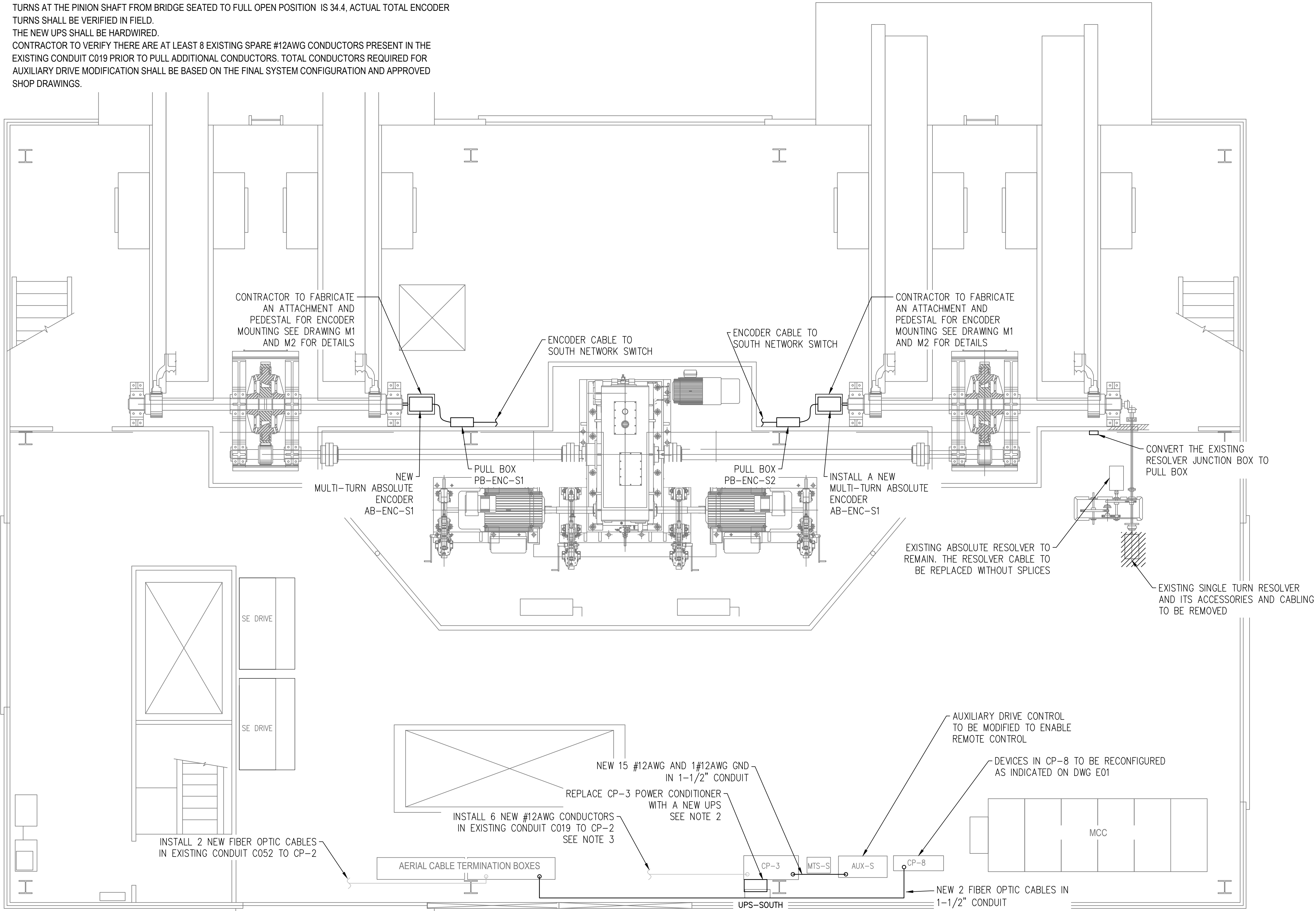
project date
date du projet
2020-12-09

project no.
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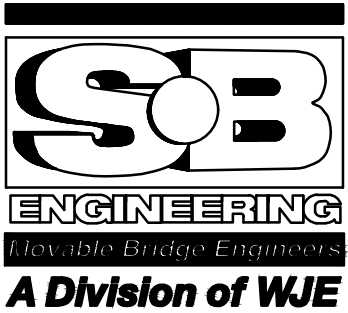
drawing no.
dessiné no.
E03

NOTES:

1. THE NEW MULTI-TURN ABSOLUTE ENCODER SHOULD BE SICK MANUFACTURER, THEIR AFM60 PROFINET ABSOLUTE ENCODER OR ENGINEER APPROVED EQUAL. FOR REFERENCE PURPOSES, THE TOTAL NUMBER OF TURNS AT THE PINION SHAFT FROM BRIDGE SEATED TO FULL OPEN POSITION IS 34.4, ACTUAL TOTAL ENCODER TURNS SHALL BE VERIFIED IN FIELD.
2. THE NEW UPS SHALL BE HARDWIRED.
3. CONTRACTOR TO VERIFY THERE ARE AT LEAST 8 EXISTING SPARE #12AWG CONDUCTORS PRESENT IN THE EXISTING CONDUIT C019 PRIOR TO PULL ADDITIONAL CONDUCTORS. TOTAL CONDUCTORS REQUIRED FOR AUXILIARY DRIVE MODIFICATION SHALL BE BASED ON THE FINAL SYSTEM CONFIGURATION AND APPROVED SHOP DRAWINGS.



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	A	Detail No.
		No. du détail
	B	drawing no. — where detail required
		dessin no. — où détail exigé
	C	drawing no. — where detailed
		dessin no. — où détaillé

project title
titre du projet

HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE ONTARIO

SKEW CONTROL AND ELECTRICAL UPGRADES

drawing title
titre du dessin

SOUTH TOWER MACHINERY ROOM ELECTRICAL LAYOUT

drawn by
dessiné par

LQX

designed by
conc par

LQX

approved by
approuvé par

GTR

bid
soumission

project manager
administrateur de projets

project date
date du projet

2020-12-09

project no.
no. du projet

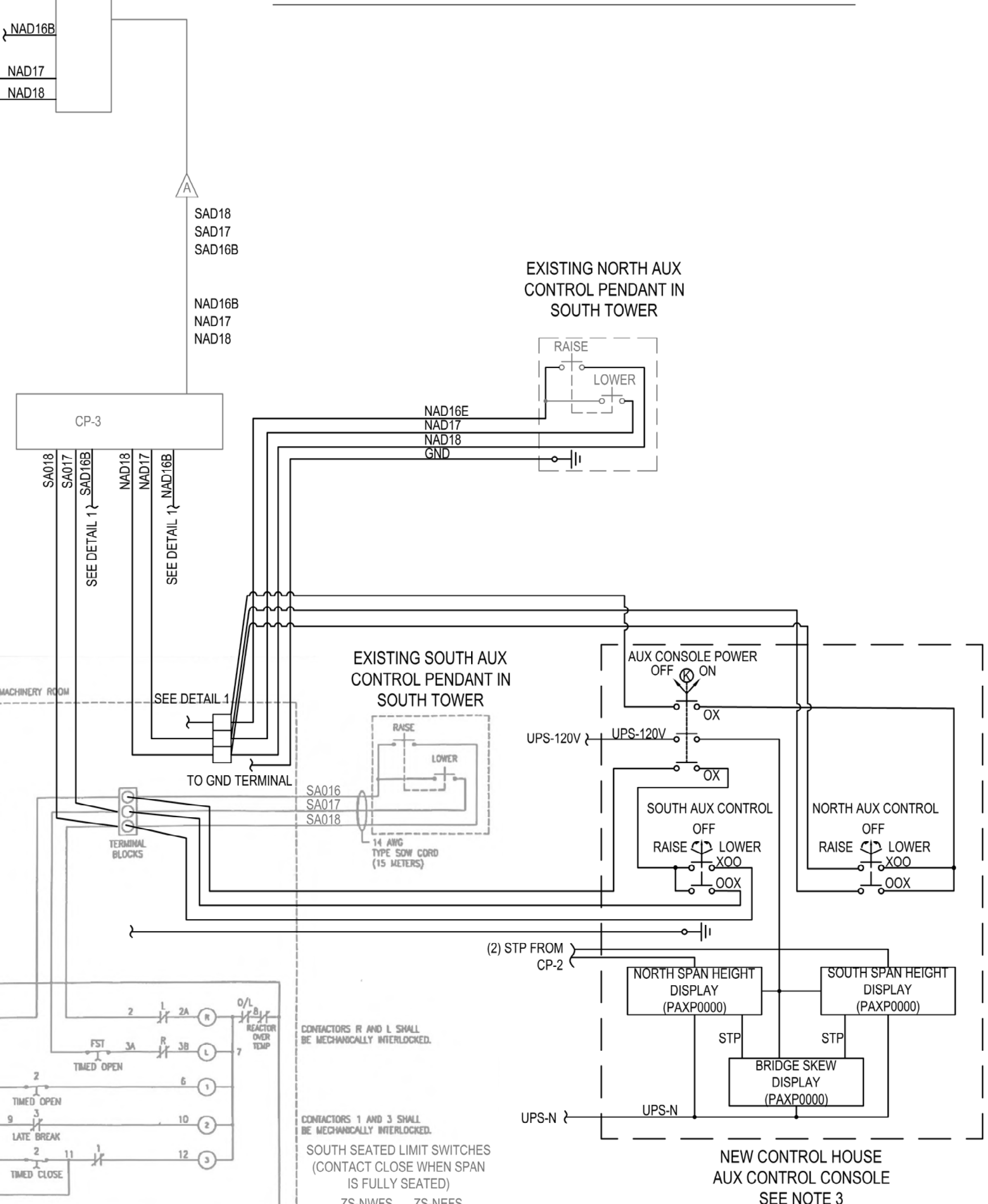
R.109141.001

drawing no.
dessiné no.

E04



1. SOUTH TOWER AUX DRIVE CONTROL PENDANT IN NORTH TOWER AND NORTH TOWER AUX DRIVE CONTROL PENDENT IN SOUTH TOWER WERE INSTALLED BUT NEVER PLACED IN SERVICE. CONTRACTOR TO VERIFY THE WIRING AND RECONNECT THESE PENDANTS TO ENABLE THE REMOTE CONTROL AS DESCRIBED.
2. REFER TO PANATROL BRIDGE CONTROL AS-BUILT DRAWINGS FOR THE LIMIT SWITCHES AND RELAY CONTACT NUMBERS SHOWN ON THIS DRAWING.
3. AUX CONTROL WIRES IN THE AERIAL CABLES SHOULD BE CONFIGURED AS REDUNDANT FOR EAST AERIAL AND WEST AERIAL CABLES AND BE CONNECTED TO THE AERIAL CABLE SELECTOR SWITCHES LOCATED IN CP-3 AND CP-4.
4. SPAN HEIGHT AND SKEW DISPLAY SHALL BE RED LION PANEL METER PAXP0000 OR ENGINEER APPROVED EQUAL.
5. SEE DWG E06 FOR AUX CONTROL CONSOLE DETAILS.




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No. du détail

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dessin no. — où détail exigé

C drawing no. — where detailed
dessin no. — où détaillé

project title titre du projet	HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE	ONTARIO
	SKEW CONTROL AND ELECTRICAL UPGRADES	

drawing title	
titre du dessin	

AUXILIARY DRIVE CONTROL MODIFICATION

drawn by
dessine par

designed by
conc par

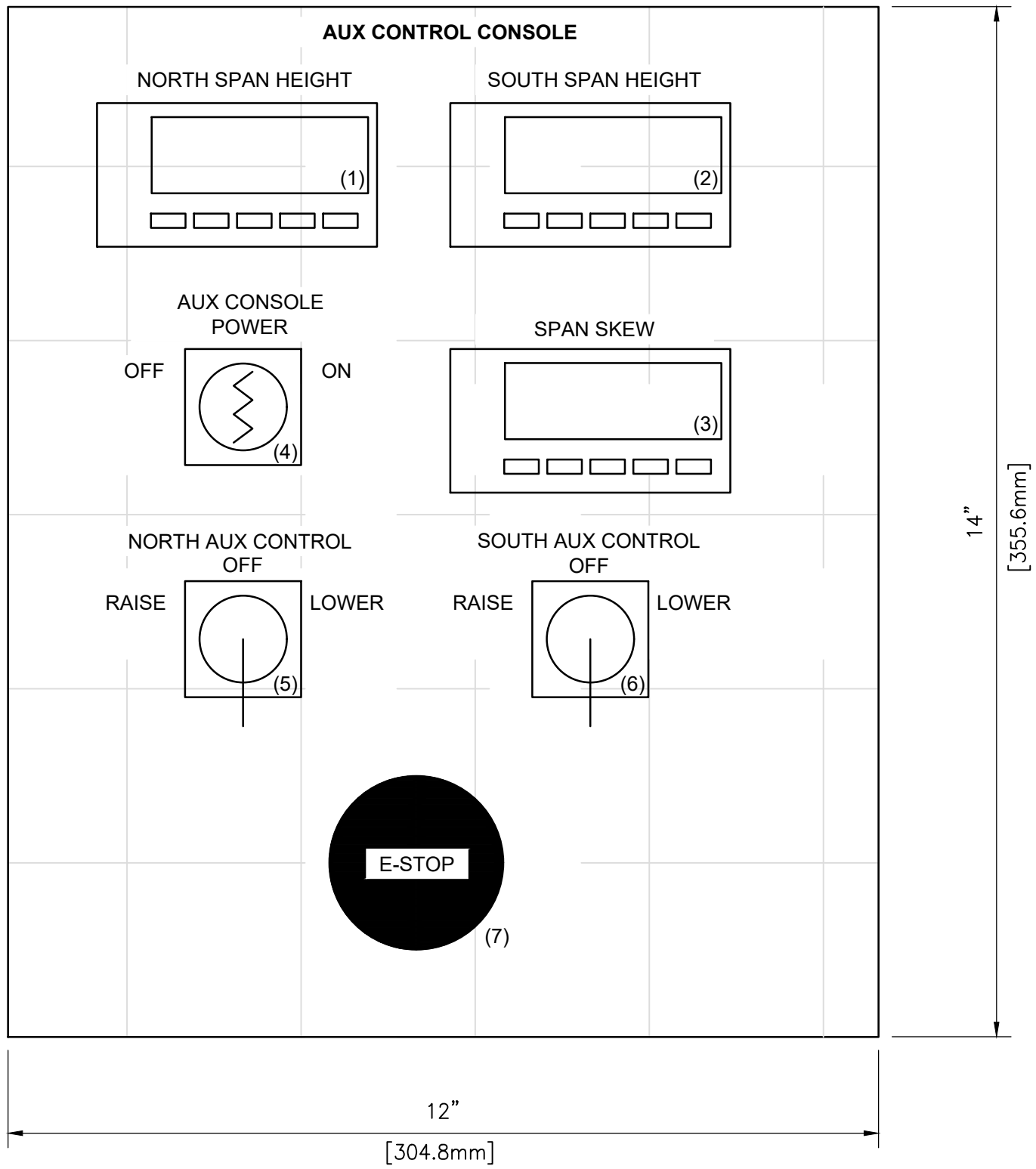
approved by
approuvé par

bid	project manager
soumission	administrateur de projet

project date date du projet	2020-12-09
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project no. no. du projet	R.109141.001
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drawing no.
dessine no. E05



AUXILIARY CONTROL CONSOLE
(12”X14”X6” OR 304.8mmX355.6mmX406.4mm)

NOTES:

1. AUX CONTROL CONSOLE SHALL BE OF NEMA 4X ENCLOSURE WITH DIMENSIONS OF 12”X14”X6” OR LARGER.

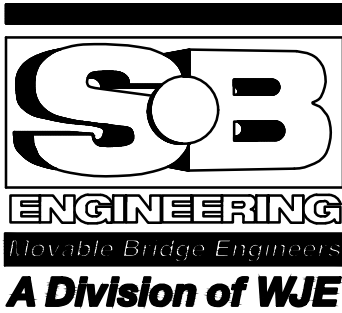
AUX CONTROL CONSOLE DEVICE SCHEDULE

ITEM NO	DEVICE	ENGRAVING
1	REDLION PANEL METER	NORTH SPAN HEIGHT
2	REDLION PANEL METER	SOUTH SPAN HEIGHT
3	REDLION PANEL METER	SPAN SKEW
4	KEYED SWITCH (2-POSITION MAINTAINED)	AUX CONSOLE POWER (OFF-ON)
5	SELECTOR SWITCH (3-POSITION SPRING RETURN)	NORTH AUX CONTROL
6	SELECTOR SWITCH (3-POSITION SPRING RETURN)	SOUTH AUX CONTROL
7	PUSHBUTTON (PUSH TO MAINTAIN, MUSHROOM TYPE, WITH RED ILLUMINATED INDICATOR)	EMERGENCY STOP

BILL OF MATERIAL FOR NEW EQUIPMENT REQUIRED FOR
SKEW CONTROL AND AUX DRIVE MODIFICATION

ITEM NO	QUANTITY	EQUIPMENT NAMES
1	4	ABSOLUTE ENCODER
2	3	REDLION PANEL METER
3	3	ANALOG AND FIBER OPTIC CONVERTER
4	1	AUX DRIVE CONTROL CONSOLE (CONSOLE DEVICES AS INDICATED ABOVE)
5	2	UPS
6	1	INCLINOMETER

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- A

B

C

A

B

C

A

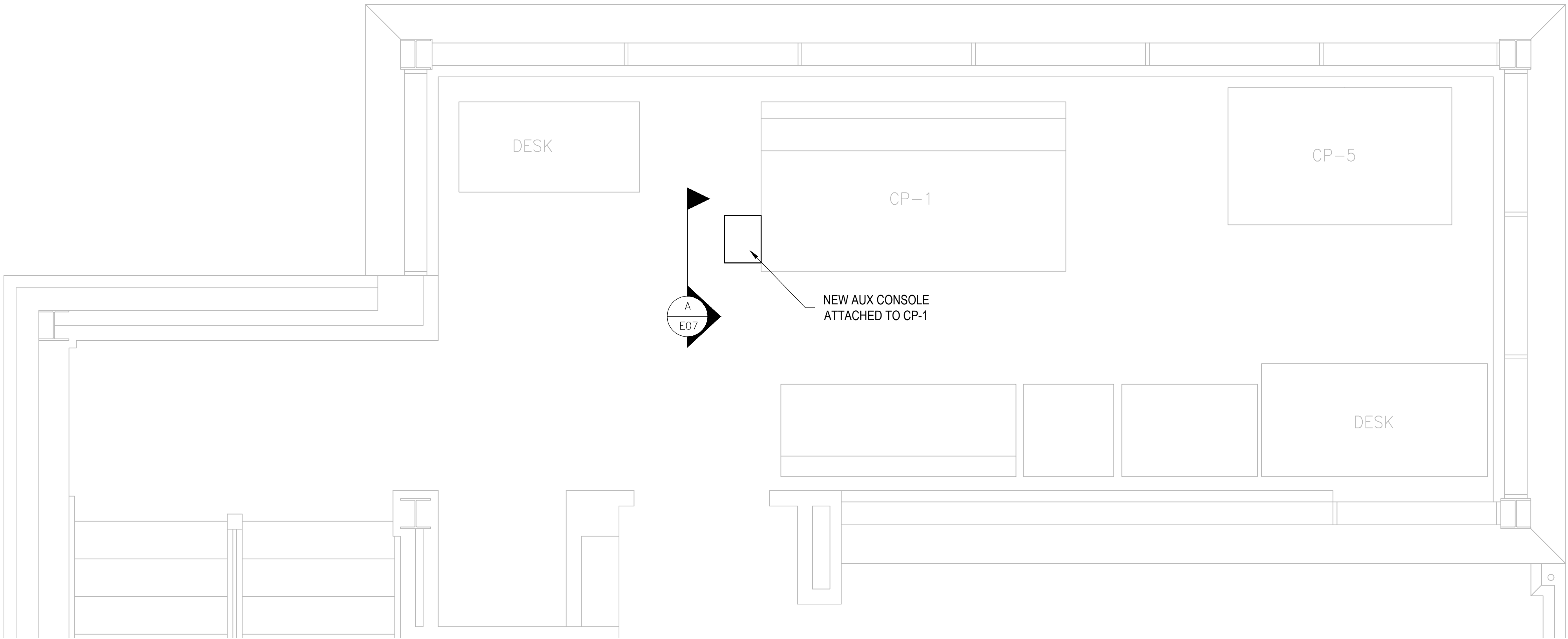
B

C
- Detail No.
No. du détail

drawing no. — where detail required
dessin no. — où détail exigé

drawing no. — where detailed
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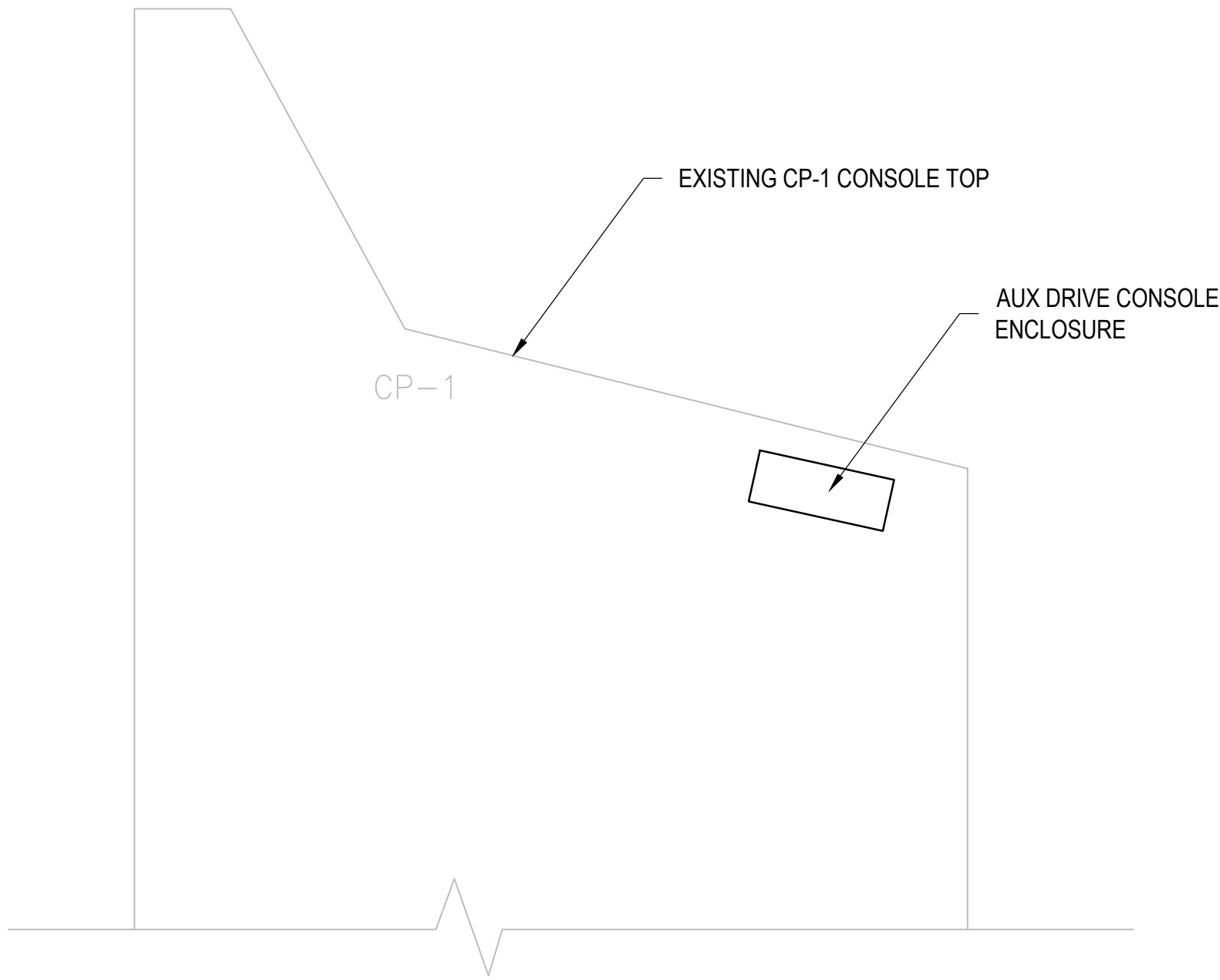
project title titre du projet	HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE SKEW CONTROL AND ELECTRICAL UPGRADES	ONTARIO
drawing title titre du dessin	AUXILIARY DRIVE CONTROL CONSOLE DETAILS	
drawn by dessiné par	LQX	
designed by conc. par	LQX	
approved by approuvé par	GTR	
bid soumission		project manager administrateur de projets
project date date du projet	2020-12-09	
project no. no. du projet	R.109141.001	
drawing no. dessiné no.	E06	



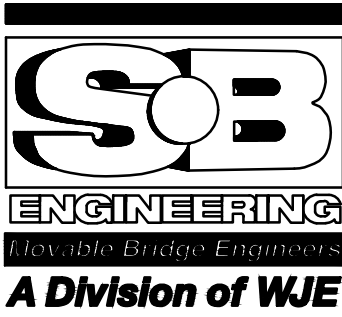
OPERATORS ROOM LAYOUT
SCALE: NTS

NOTES:

1. AUX CONTROL CONSOLE SHALL BE OF NEMA 4X ENCLOSURE WITH DIMENSIONS (12"X14"X6").
2. AUX CONTROL CONSOLE TO BE IN THE SAME SLOPE AS THE CP-1 CONSOLE TOP. THE MOUNTING OF THE AUX CONSOLE SHALL NOT INTERFERE WITH THE CP-1 CONSOLE TOP OPENING AND DEVICE OPERATION.



AUX CONTROL CONSOLE MOUNTING DETAILS
SCALE: NTS



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- A

B

C

A Detail No.
No. du détail

B drawing no. — where detail required
dessin no. — où détail exigé

C drawing no. — where detailed
dessin no. — où détaillé

project title
titre du projet

HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE SKEW CONTROL AND ELECTRICAL UPGRADES

ONTARIO

drawing title
titre du dessin

AUXILIARY DRIVE CONTROL CONSOLE MOUNTING DETAILS

drawn by
dessine par

LQX

designed by
conc. par

LQX

approved by
approuve par

GTR

bid
soumission

project manager
administrateur de projets

project date
date du projet

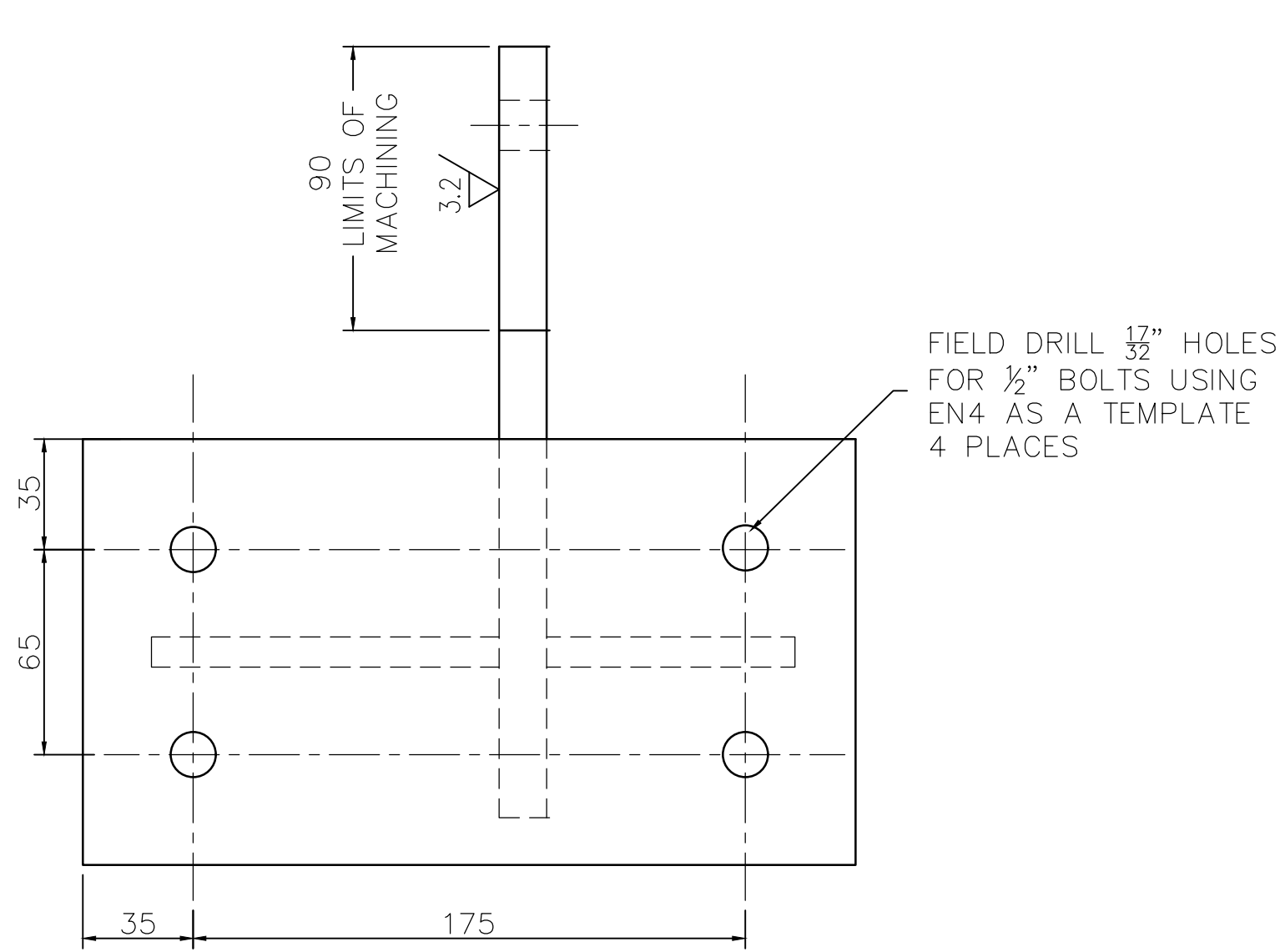
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project no.
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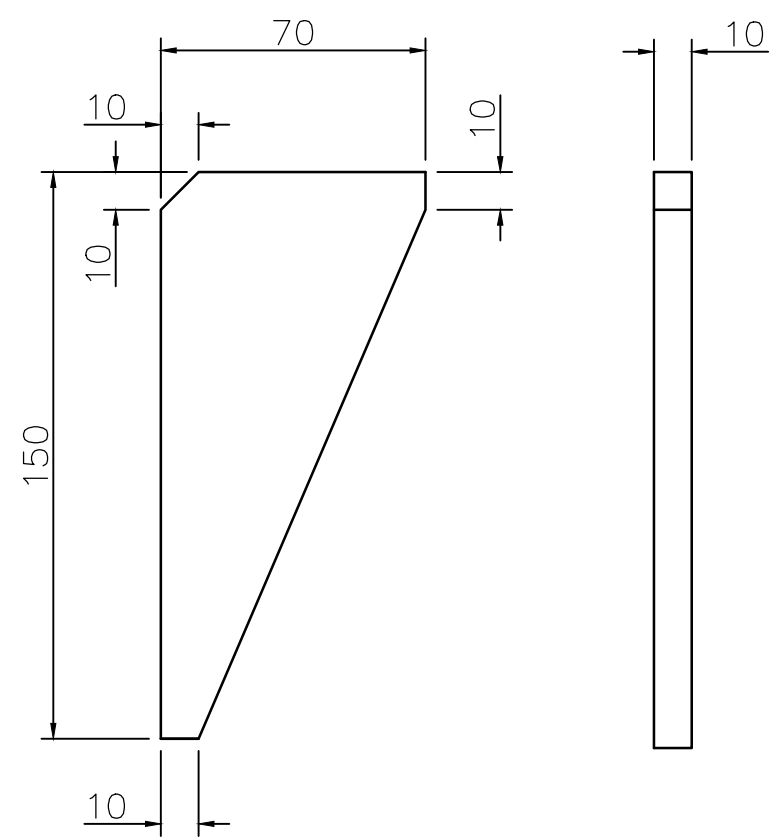
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drawing no.
dessine no.

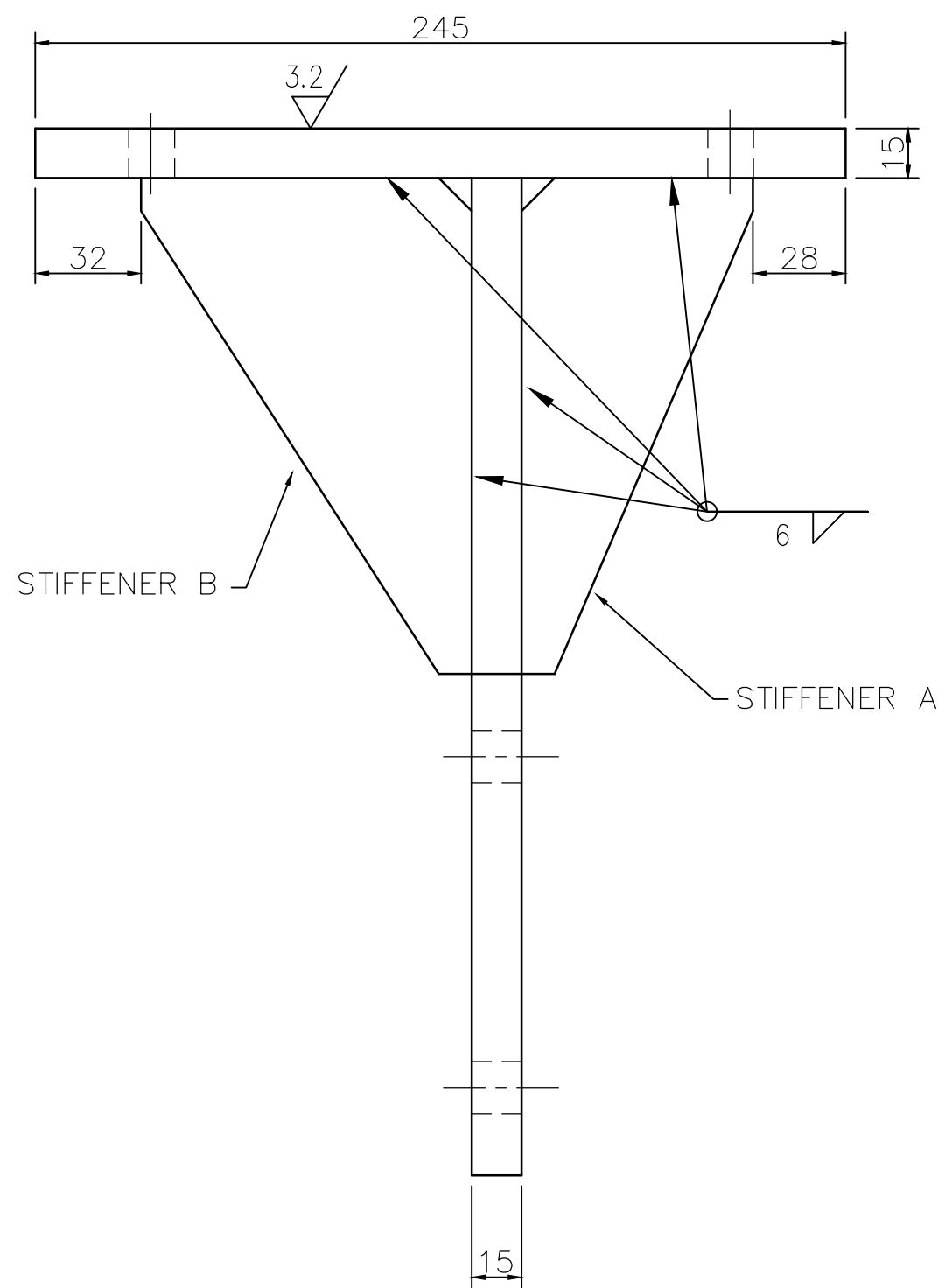
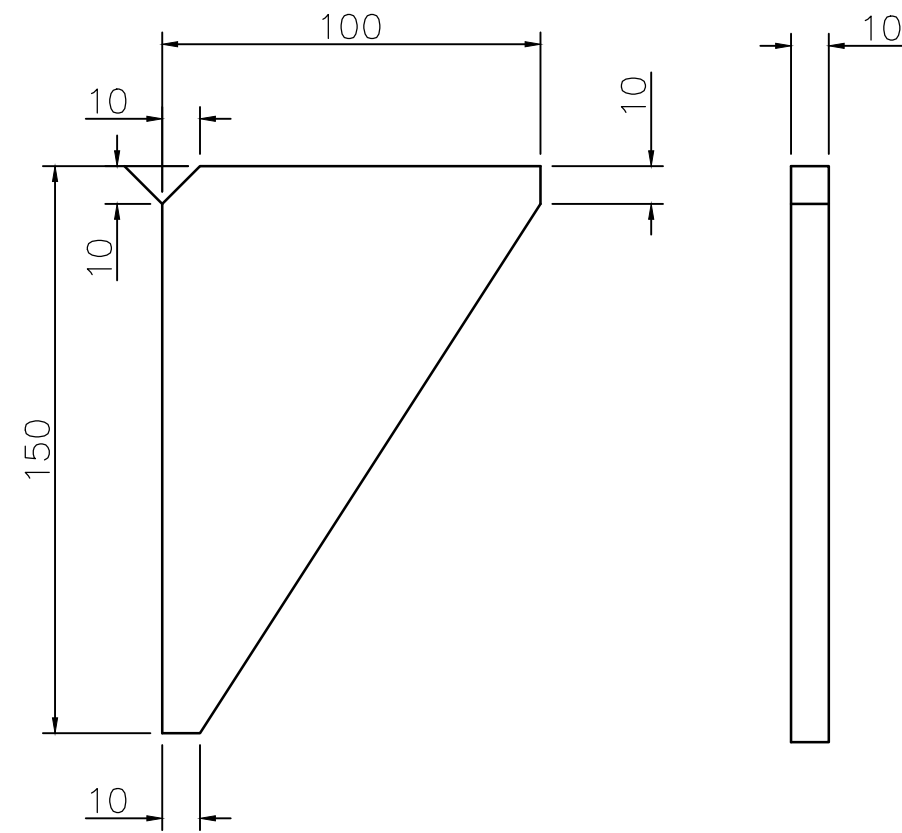
E07



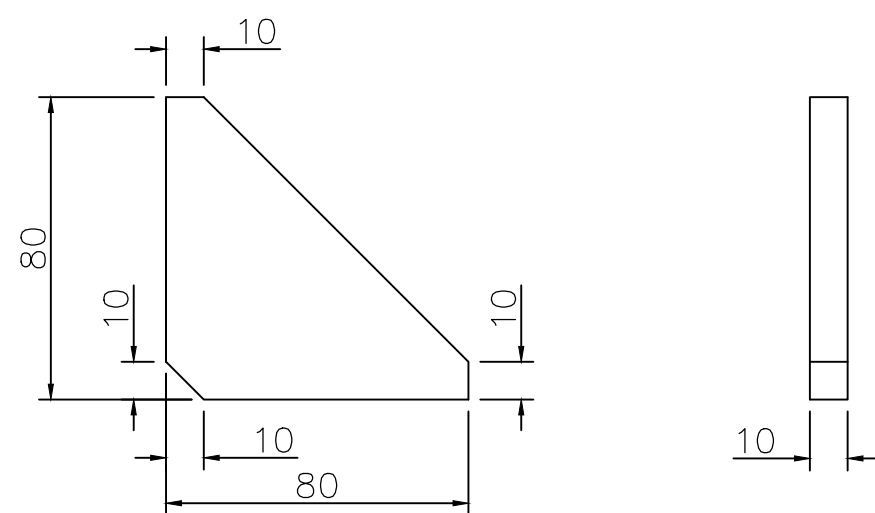
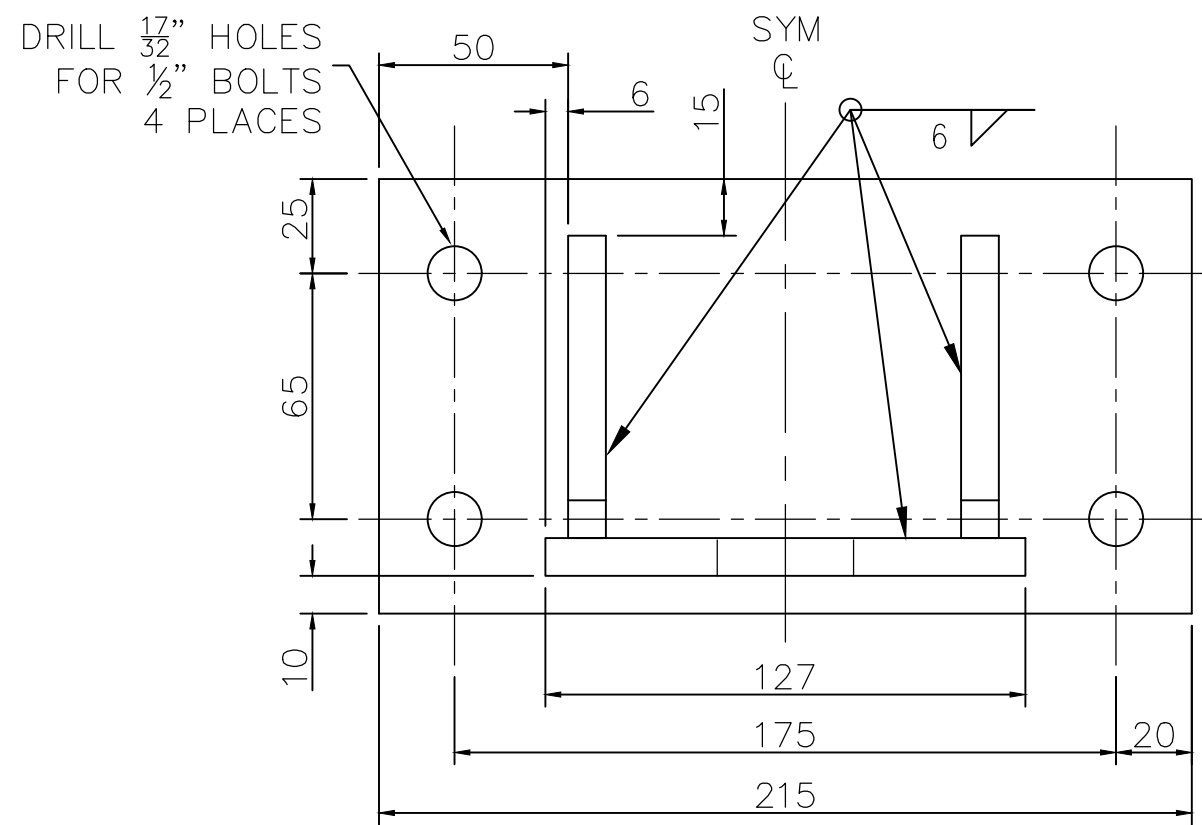
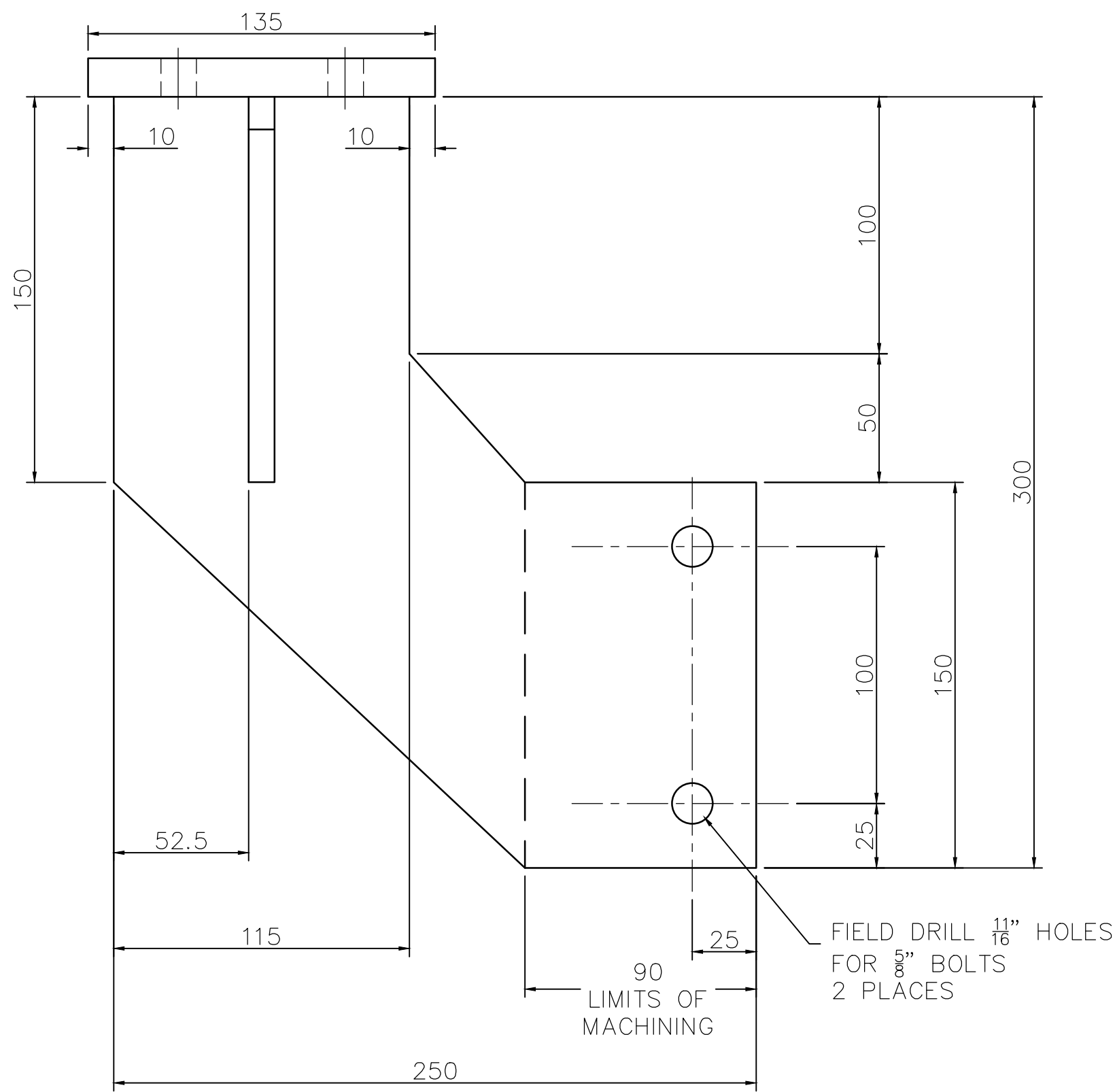
A ENCODER SUPPORT STIFFENER "A"
SCALE: 1:2
MATERIAL: CSA G40.21 GRADE 300W



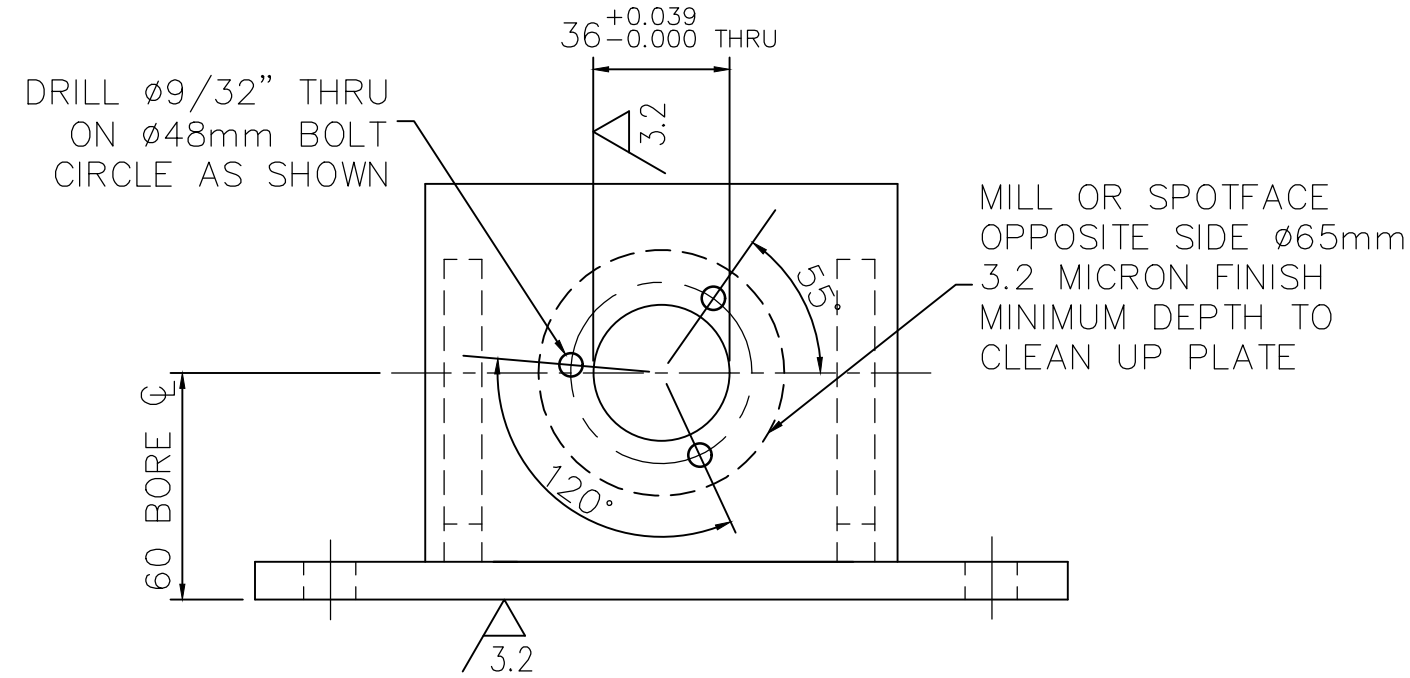
B ENCODER SUPPORT STIFFENER "B"
SCALE: 1:2
MATERIAL: CSA G40.21 GRADE 300W



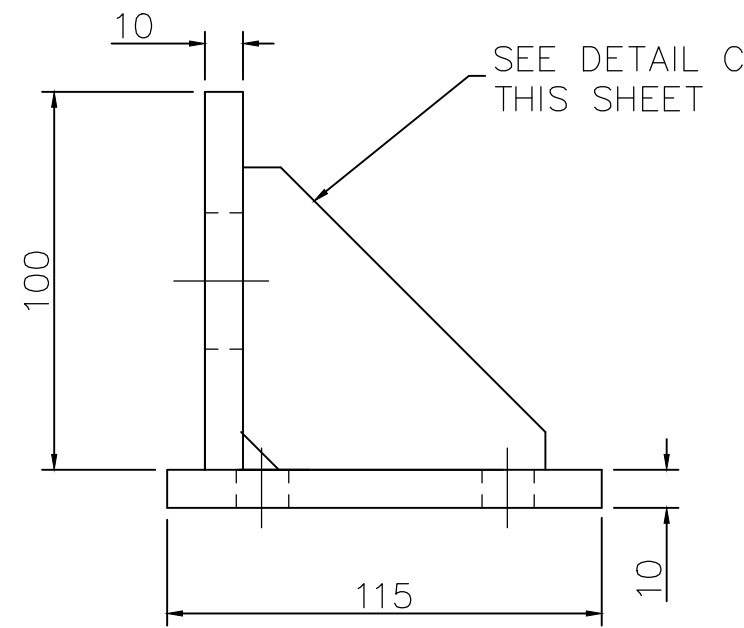
EN3 ENCODER SUPPORT
SCALE: 1:2
MATERIAL: CSA G40.21 GRADE 300W



C ENCODER MOUNT STIFFENER
SCALE: 1:2
MATERIAL: CSA G40.21 GRADE 300W



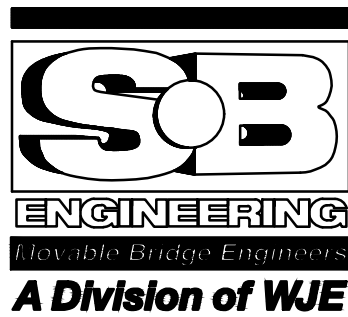
EN4 ENCODER MOUNT
SCALE: 1:2
MATERIAL: CSA G40.21 GRADE 300W



NOTES

1. SEE M1 FOR GENERAL NOTES.
2. PERFORM WELDING PER CSA W59.
3. ALL MACHINING WORK TO BE PERFORMED FOLLOWING WELDING AND HEAT TREATMENT.
4. ALL DIMENSIONS ARE FINAL DIMENSIONS AFTER MACHINING. ADD STOCK AS REQUIRED.

PARSONS



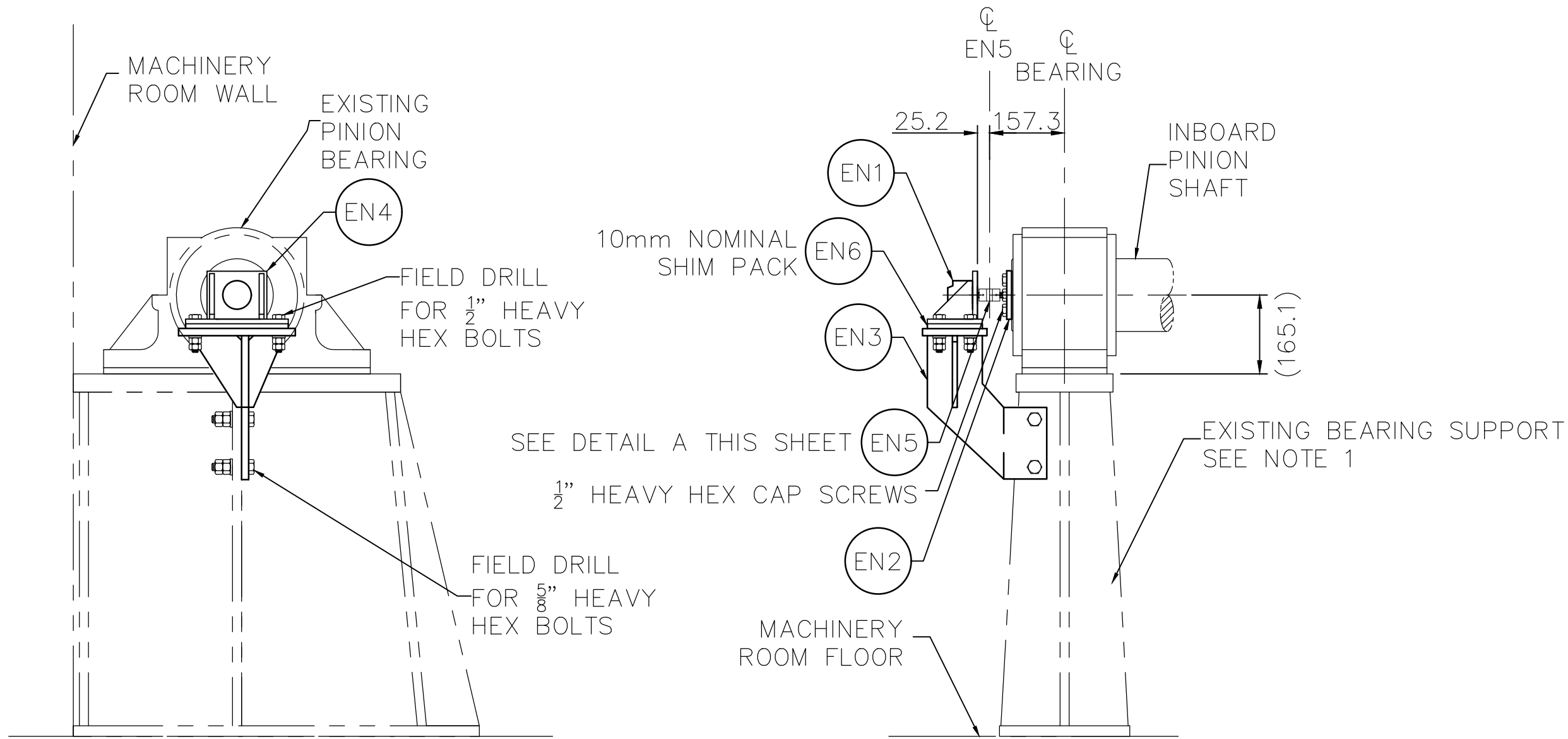
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SKEW CONTROL AND ELECTRICAL UPGRADES

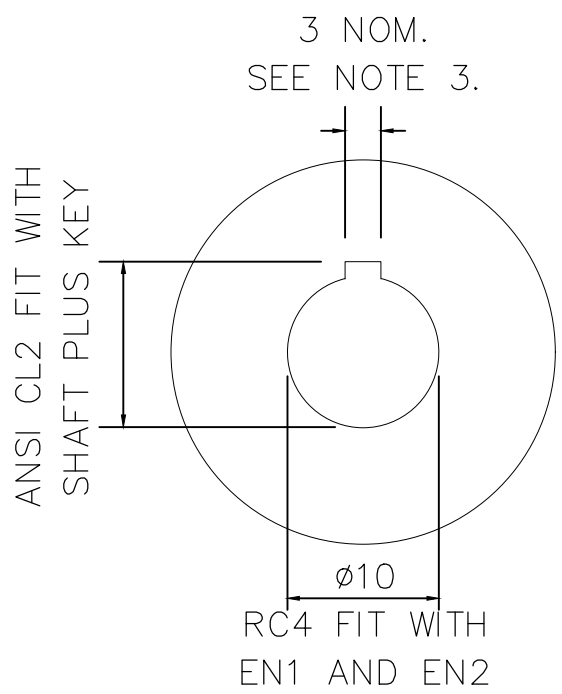
drawing title
titre du dessin
ABSOLUTE ENCODER INSTALLATION DETAILS

drawn by dessiné par	ABM
designed by conc par	ABM
approved by approuvé par	RGG
bid soumission	project manager administrateur de projets
project date date du projet	2020-05-19
project no. no. du projet	R.109141.001
drawing no. dessiné no.	M02



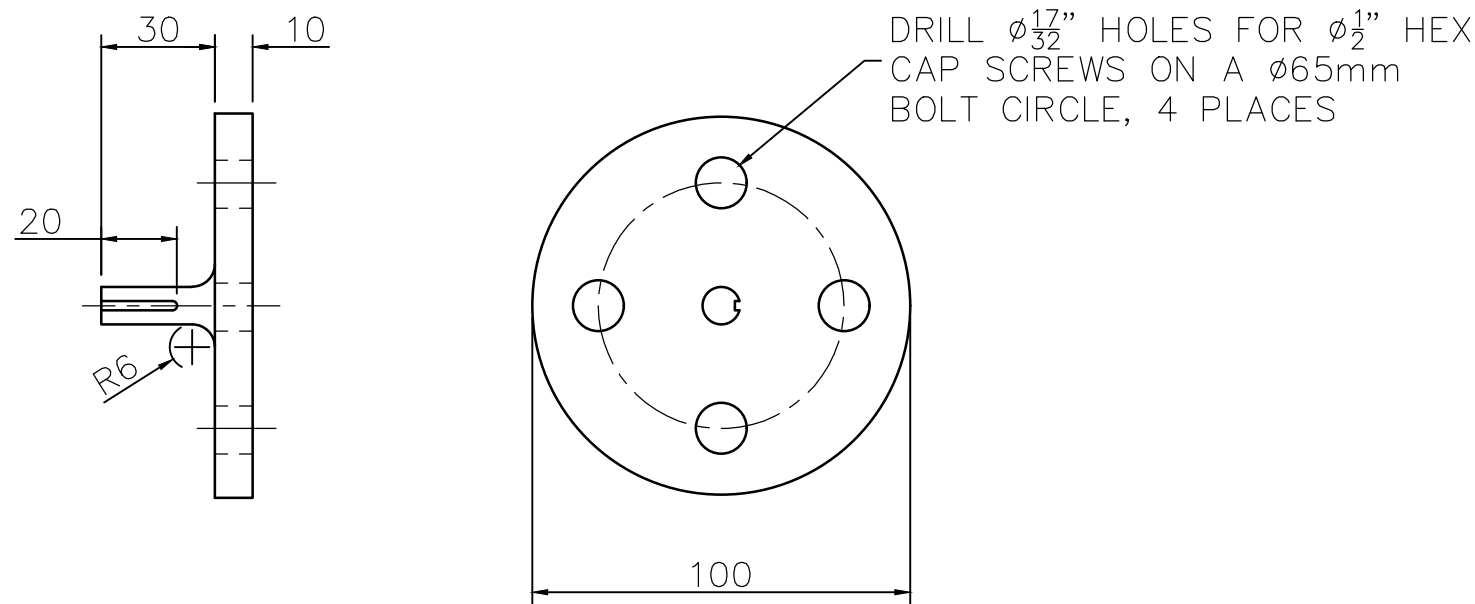
A
E03

ENCODER AND SUPPORT ASSEMBLY
ELEVATION VIEW
TYPICAL, TWO LOCATIONS PER TOWER, FOUR LOCATIONS TOTAL
AB-ENC-N2 SHOWN, OTHERS SIMILAR
SCALE: 1:10



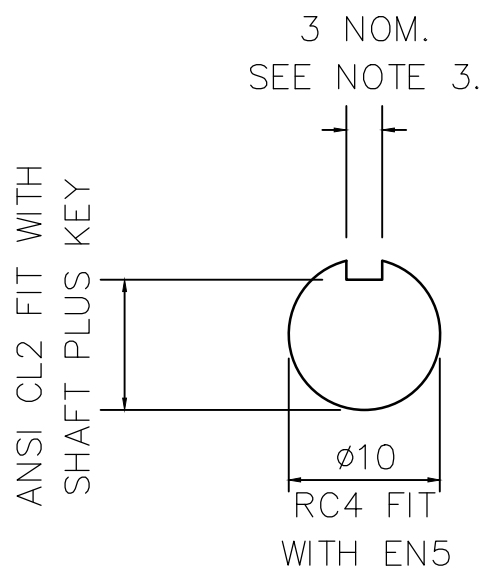
A

COUPLING HUB DETAIL
SCALE: 2:1



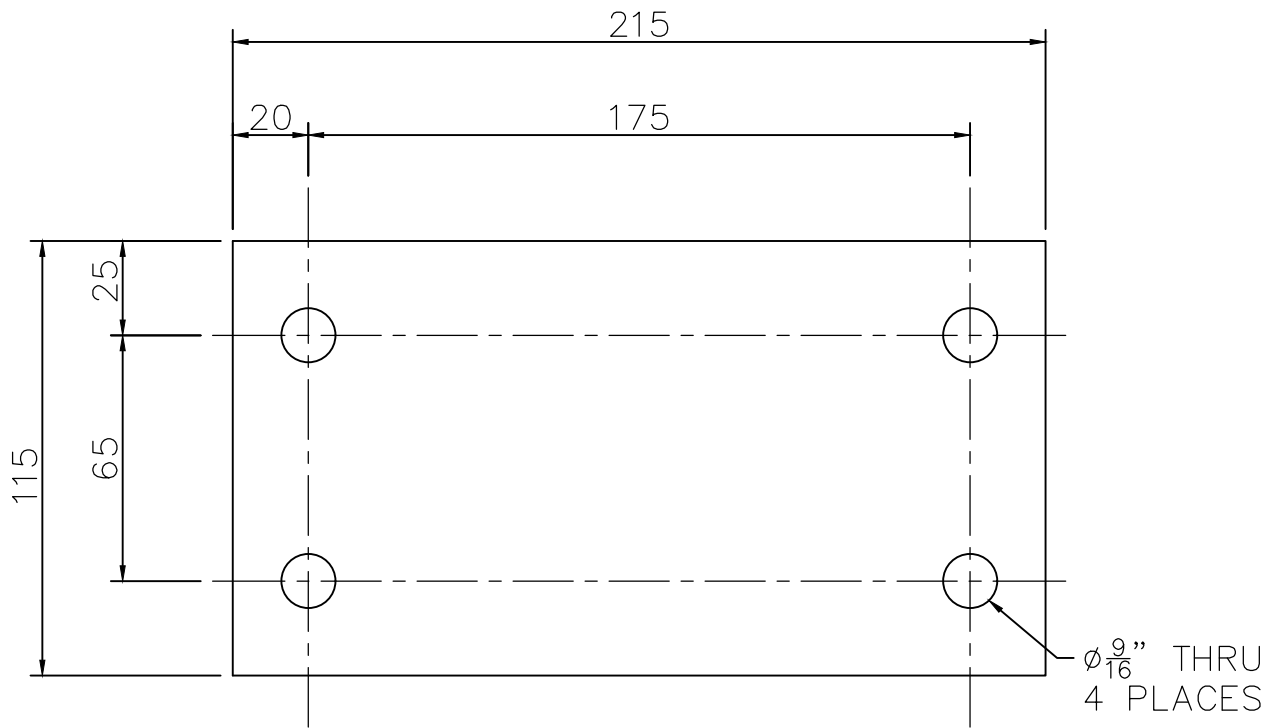
EN2

SHAFT ADAPTOR
SCALE: 1:2
MATERIAL: CSA G40.21 GRADE 300W
PROVIDE 3.2 MICRON FINISH U.O.N.
SEE DETAIL B AND C THIS SHEET



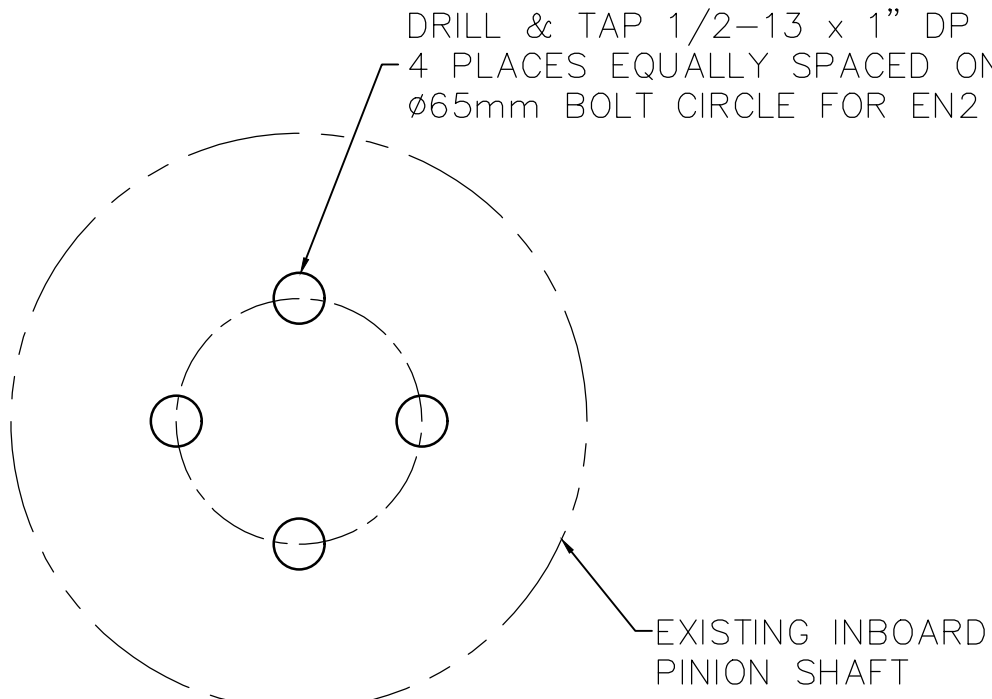
B

SHAFT ADAPTOR DETAIL
SCALE: 2:1



EN6

SHIM PACK
SCALE: 1:2
MATERIAL: STAINLESS STEEL
QUANTITY PER LOCATION:
1 – 10mm THICK
1 – 5mm THICK
2 – 1mm THICK
4 – 0.5mm THICK
4 – 0.25mm THICK
3 – 0.1mm THICK



C

PINION SHAFT DETAIL
SCALE: 1:2

BILL OF MATERIALS			
MARK NO.	QTY	COMPONENT	DESCRIPTION
EN1	4	ENCODER	SICK AFM60 PROFINET ABSOLUTE ENCODER (WITH SOLID SHAFT, FACE MOUNT FLANGE, Ø10mm, LENGTH 19mm)
EN2	4	SHAFT ADAPTOR	MACHINE FROM CSA G40.21 GRADE 300W
EN3	4	ENCODER SUPPORT	STEEL PLATE WELDMNT, CSA G40.21 GRADE 300W
EN4	4	ENCODER MOUNT	STEEL PLATE WELDMNT, CSA G40.21 GRADE 300W
EN5	4	COUPLING	LOVEJOY L050 JAW COUPLING WITH NBR SPIDER OR EQUAL
EN6	4	SHIM PACK	STAINLESS STEEL

- NOTES
- CONTRACTOR TO HAND DRESS EXISTING BEARING SUPPORT STIFFENER SURFACE TO PROVIDE SUITABLE MOUNTING SURFACE.
 - LOCATION OF HOLES IN ENCODER SUPPORT AND EXISTING BEARING SUPPORT STIFFENER TO BE DETERMINED IN THE FIELD. THE FOLLOWING PROCEDURE IS RECOMMENDED:
 - INSTALL THE SHAFT ADAPTOR ON THE PINION SHAFT.
 - SECURE NEW ENCODER SUPPORT TO THE EXISTING BEARING SUPPORT STIFFENER WITH BRIDGE CLAMPS TO THE APPROXIMATE FINAL LOCATION.
 - INSTALL ONE COUPLING HUB TO THE SHAFT ADAPTOR.
 - INSTALL THE ENCODER TO THE ENCODER MOUNT.
 - INSTALL ONE COUPLING HUB TO THE ENCODER SHAFT.
 - CLAMP THE ENCODER MOUNT ONTO THE ENCODER SUPPORT TO THE APPROXIMATE FINAL LOCATION. ADJUST THE LOCATION OF THE ENCODER SUPPORT AS NEEDED TO ACHIEVE PROPER COUPLING ALIGNMENT.
 - MARK THE HOLES ON THE ENCODER SUPPORT TOP PLATE USING THE ENCODER MOUNT AS A TEMPLATE.
 - REMOVE THE ENCODER MOUNT, DRILL THE ENCODER SUPPORT TOP PLATE.
 - INSTALL THE ENCODER MOUNT WITH FINAL MOUNTING BOLTS AND COUPLING WITH COUPLING INSERT.
 - ADJUST THE SHIMS AND THE LOCATION OF THE ENCODER SUPPORT AS NECESSARY IN ORDER TO PROPERLY ALIGN THE COUPLING PER THE MANUFACTURER'S RECOMMENDATIONS.
 - DRILL FOR, AND INSTALL, THE ENCODER SUPPORT LOWER MOUNTING BOLTS BEFORE REMOVAL OF TEMPORARY BRIDGE CLAMPS.
 - CONFIRM PROPER ALIGNMENT OF COUPLING AND PROVIDE SHIM ADJUSTMENTS IF NECESSARY.
 - KEYS AND SET SCREWS TO BE PROVIDED WITH THE COUPLING. PROVIDE ANSI CL2 FIT AT ALL KEYS AND KEYWAYS.
 - ALL BOLTS TO BE HIGH STRENGTH HEAVY HEX ASTM F3125 GRADE A325 BOLTS WITH HEAVY HEX ASTM A563 DOUBLE NUTS, AND ASTM F436 WASHERS.
 - THE ENCODER MOUNTING FASTENERS SHALL BE TYPE 316 STAINLESS STEEL HEX HEAD SCREWS WITH TYPE 316 STAINLESS STEEL SPLIT LOCK WASHERS.
 - ALL DIMENSIONS ARE FINAL DIMENSIONS AFTER MACHINING. ADD STOCK AS REQUIRED.

0	ISSUED FOR TENDER	12/01/2020
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

A	Detail No.
B	No. du détail
C	drawing no. – where detail required dessin no. – où détail exigé
C	drawing no. – where detailed dessin no. – où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE ONTARIO
SKEW CONTROL AND ELECTRICAL UPGRADES

drawing title
titre du dessin
ABSOLUTE ENCODER INSTALLATION ASSEMBLY AND DETAILS

drawn by
dessine par
ABM

designed by
conc par
ABM

approved by
approuve par
RGG

bid
soumission

project manager
administrateur de projets

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