



Environment and
Climate Change Canada

NHRC CAPACITOR BANK REPLACEMENT

AT

**NATIONAL HYDROLOGY RESEARCH
CENTRE (NHRC)**

DRAWINGS

**REAL PROPERTY MANAGEMENT, TECHNICAL SERVICES
2645 DOLLARTON HWY.
NORTH VANCOUVER, BC V7H 1B1**

**PROJECT: NHRC-021
DATE: DECEMBER 12, 2016
ISSUED FOR TENDER**

Plotted by: Keagan Dec 12, 2016 - 11:36am

PWGSC A1 (841x594)

NOTE:
ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE DISCONNECTION AND REMOVAL OF ALL COMPONENTS RELATED TO THE EXISTING CAPACITOR BANK FROM SITE AND SHALL PROPERLY DISPOSE OF THEM.
CONFIRM ALLOWABLE SHUT DOWN TIME AND DURATION WITH NHRG - BLAINE UNGER.

BUILDING AUTOMATION SYSTEM (BAS) NOTES:
ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING SERVICES FROM JOHNSON CONTROLS FOR UPDATING THE BAS CONTROL AND GRAPHIC CHANGES TO SUIT THE NEW CAPACITOR BANK. ALLOW FOR 2 DAYS OF PROGRAMING ON SITE. COORDINATE WORK WITH:
GABRIEL BENOIT @ JOHNSON CONTROLS (306) 227-6099
ELECTRICAL CONTRACTOR SHALL PROVIDE, INSTALL, AND TERMINATE ALL COMMUNICATION CABLES/CONDUIT.
BELOW IS A LIST OF ITEMS THAT SHALL BE MONITORED WITH THE BAS:
1. POWER FACTOR (PF %)
2. ACTIVE POWER (KW)
3. APPARENT POWER (KVA)
4. REACTIVE POWER (KVAR)
5. PEAK-TO-PEAK VOLTAGE (V)
6. PEAK-TO-NEUTRAL VOLTAGE (V)
7. CURRENT (A)
8. AMBIENT TEMPERATURE (°C)
9. POWER FACTOR CORRECTION ON/OFF
10. CABINET OVER TEMP ALARM
11. STEP FAILURE ALARM
12. NO CURRENT ALARM (CT FAILURE)
13. COMPENSATION ALARM (CANNOT REACH TARGET PF)

RE-USE AN EXISTING 15A, 1P BREAKER FOR ROPE CT AMPLIFIER MODULE, 120VAC POWER, 2-#12, #12 GND, 21mm EMT, TO MECH. ROOM 2620 PANEL "RP-BR" CT 6 OR 8 (DISCONNECT AND REMOVE EXISTING CONDUIT/CONDUCTORS/ETC. TO ALLOW RE-USE OF AN ABANDONED BREAKER. VISIT SITE TO DETERMINE EXTENT OF WORK.

MOUNT CONDUIT WITH STRUTS AND P-CLAMPS TO PROVIDE ENOUGH OFFSET TO ROUTE CONDUITS AROUND COLUMN.

DISCONNECT AND REMOVE EXISTING CAPACITOR BANK. DISCONNECT AND RECONNECT EXISTING SMOKE/HEAT DETECTOR LOCATED INSIDE CAPACITOR BANK BY NEW CAPACITOR BANK.

STRUTS AND P-CLAMPS TO PROVIDE ENOUGH OFFSET TO ROUTE CONDUITS AROUND COLUMN.

EXISTING TRANSFORMER (150KVA)

CT CABLE CONNECTION

POWER FACTOR CONTROLLER AND SEPARATE 120V CONTROLS ACCESS COMPARTMENT.

NEW 76mm CONCRETE HOUSEKEEPING PAD. PAINT YELLOW WITH BLACK STRIPES.

EXISTING ELECTRICAL ROOM - CAP BANK ELEVATION
N.T.S. - MODIFICATIONS IN BOLD
-DIMENSIONS SHOWN ARE MEASUREMENTS TAKEN. ALL OTHER ROOM DIMENSIONS ARE ROUGH ESTIMATES.

EXISTING MAIN FLOOR PLAN
1:400

NEATLY SAWCUT AND REMOVE CONCRETE HOUSEKEEPING PAD TO THE EXTENT SHOWN (HATCHED AREA PLUS AREA UNDER EXISTING CAPACITOR BANK). GRIND EXISTING FLOOR SLAB SMOOTH WHERE PAD IS REMOVED AND PROVIDE MATCHING FLOOR FINISH. IF DOWELED TO FLOOR SLAB, CUT DOWELS FLUSH WITH SLAB SURFACE AND GRIND SMOOTH. WHERE CONDUIT/CABLE THROUGH FLOOR IS REMOVED, FILL OPENING(S) WITH CONCRETE OR NON-SHRINK GROUT TO FULL DEPTH OF EXISTING SLAB. TROWEL TOP SURFACE SMOOTH TO MATCH FLOOR ELEVATION AND PROVIDE MATCHING FLOOR FINISH.

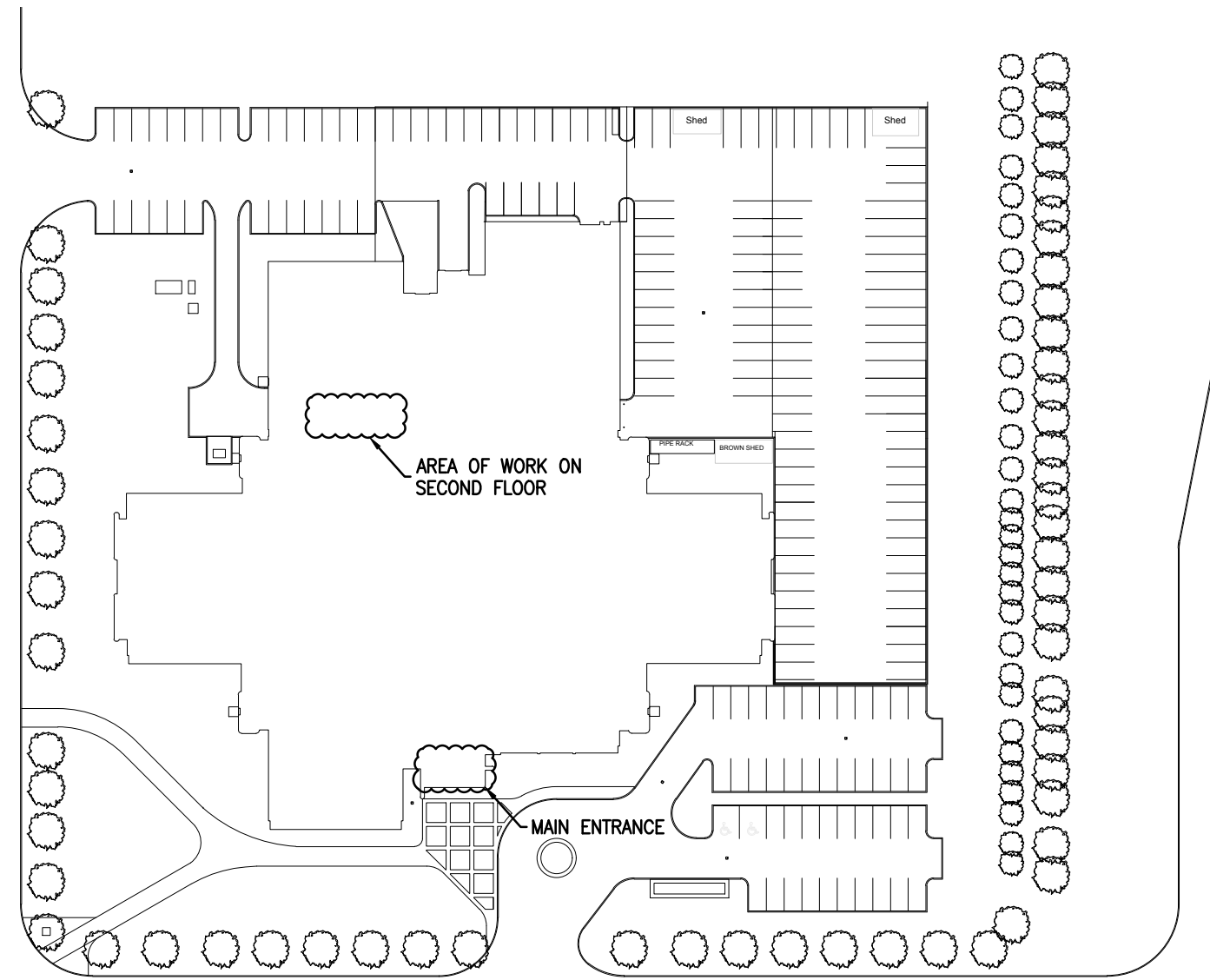
EXISTING IN-FLOOR CONDUIT AND CONDUCTORS

REMOVE EXISTING SPARE CAPACITOR STEP
DISCONNECT EXISTING SMOKE/HEAT DETECTOR LOCATED INSIDE TOP OF CAPACITOR BANK AND RELOCATE TO NEW CAPACITOR BANK LOCATION.

RELOCATE EXISTING SMOKE/HEAT DETECTOR LOCATED ABOVE NEW CAPACITOR BANK LOCATION. PROVIDE INSTALLATION AND RE-VERIFICATION AS PER CAN/ULC-5537

NEW CONCRETE HOUSEKEEPING PAD (610 DEEP, 1321 WIDE, 76 HIGH)

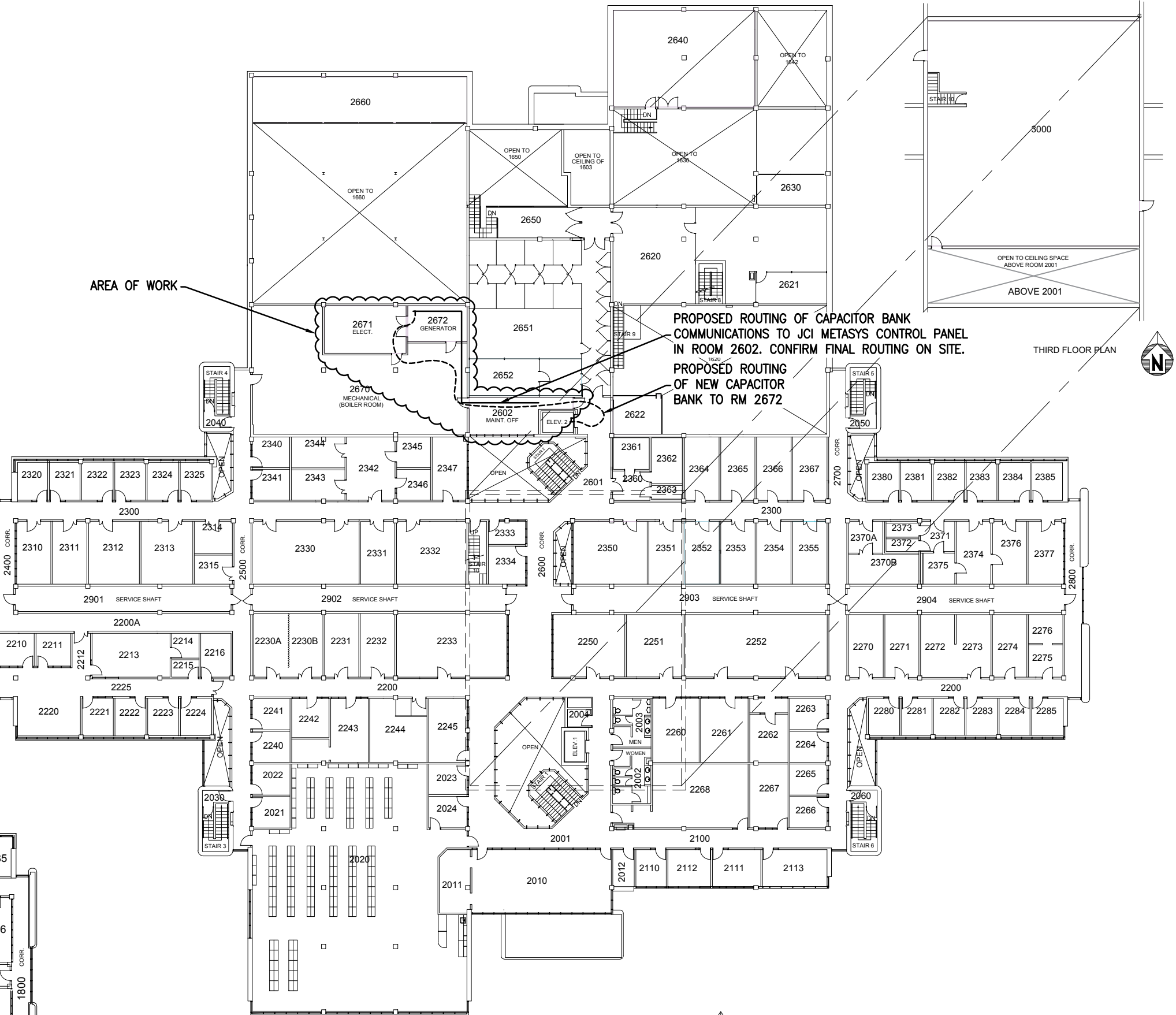
EXISTING ELECTRICAL ROOM - CAP BANK DIMENSIONING
N.T.S. - MODIFICATIONS IN BOLD
- CONFIRM CAPACITOR BANK DIMENSIONS WITH FINAL APPROVED SHOP DRAWINGS.
- DIMENSIONS SHOWN ARE MEASUREMENTS TAKEN. ALL OTHER ROOM DIMENSIONS ARE ROUGH ESTIMATES. CONFIRM ALL DIMENSIONS.



LOCATION PLAN
1:1,000 - AREA OF WORK IN BOLD



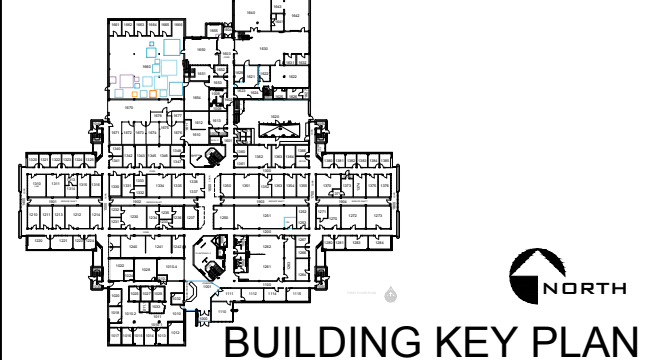
EXISTING SECOND FLOOR PLAN
1:400



Environment Canada
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Real Property Management Division
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Division Gestion des biens immobiliers
Services Techniques



ASSOCIATION OF PROFESSIONAL ENGINEERS & GEOSCIENTISTS OF SASKATCHEWAN
CERTIFICATE OF AUTHORIZATION

WILLMS ENGINEERING LTD.

NUMBER C1309
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REV	Description	Date
A	detail no. no. du detail	A
B	location drawing no. sur dessin no.	B
C	drawing no. dessin no.	C

project

CAPACITOR BANK REPLACEMENT

NATIONAL HYDROLOGY RESEARCH CENTRE
11 INNOVATION BLVD.
SASKATOON SK, S7N 3H5

drawing

ELECTRICAL No. 1

Designed By K.G. JOHNSON, E.I.T. Conçu par
Date 2016/12/12 (yyyy/mm/dd)

Drawn By K.G. JOHNSON, E.I.T. Dessiné par
Date 2016/12/12 (yyyy/mm/dd)

Reviewed By K.J. WILLMS, P. ENG. Examiné par
Date 2016/12/12 (yyyy/mm/dd)

Approved By K.J. WILLMS, P. ENG. Approuvé par
Date 2016/12/12 (yyyy/mm/dd)

Tender Soumission

Project Manager Administrateur de projets
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Drawing no. No. du dessin

E1


Plotted by: Kaagan Dec 12, 2016 - 11:38am

PWGSC A1 (841x594)

TECHNICAL SPECIFICATION FOR 600V FILTERED AUTOMATIC POWER FACTOR CORRECTION BANKS

1. **EQUIPMENT SIZE / RATINGS:**
A. SYSTEM OPERATING VOLTAGE (LINE-TO-LINE): 600V, 3 PHASE, 60HZ. CAPACITORS SHALL BE RATED MINIMUM 690V TO PROTECT AGAINST CURRENT AND VOLTAGE OVERLOAD DUE TO HARMONIC DISTORTION.
B. NEW CAPACITOR BANK IS A 525 KVAR UNIT.
C. TOTAL KVAR REQUIRED AT SYSTEM VOLTAGE AT PRESENT: 525
D. TOTAL KVAR REQUIRED AT SYSTEM VOLTAGE FOR FUTURE: 500
E. TOTAL BANK TO BE SWITCHED IN 7*75 KVAR STEPS (8*75 FUTURE).
2. **CAPACITORS:**
A. INDIVIDUAL CAPACITORS SHALL BE CSA AND UL APPROVED, 3 PHASE, GAS OR OIL FILLED UNDER VACUUM, AND OF A SELF-HEALING DESIGN UTILIZING A LOW LOSS METALLIZED POLYPROPYLENE FILM DIELECTRIC SYSTEM WITH A PRESSURE SENSITIVE CIRCUIT INTERRUPTER.
B. CAPACITOR CASING SHALL BE OF A SEAMLESS ALUMINUM DESIGN. ELECTRICAL LOSSES SHALL BE LESS THAN 0.25W/KVAR. DIELECTRIC FLUID SHALL BE HIGH FLASH POINT, BIODEGRADABLE, NON-TOXIC AND CONTAIN NO PCB'S. CAPACITORS SHALL INCLUDE INTERNAL FUSING FOR SHORT CIRCUIT PROTECTION TO 10KA, AND INCLUDE A GROUNDING / MOUNTING STUD AT THE BOTTOM OF THE CAPACITOR CELL FOR EASY REPLACEMENT.
C. CAPACITORS SHALL BE RATED FOR A MINIMUM OF 130% CONTINUOUS CURRENT OVERLOAD AND 110% CONTINUOUS VOLTAGE OVERLOAD BASED ON THE 690 VOLT RATING OF THE CAPACITORS. INDIVIDUAL CAPACITOR CELLS SHALL NOT EXCEED 25 KVAR AT THE SYSTEM VOLTAGE TO KEEP REPLACEMENT COSTS AT A MINIMUM.
D. CAPACITORS SHALL BE SUITABLE FOR -40°C TO +60°C AMBIENT TEMPERATURE.
E. METALLIZED PAPER CAPACITORS AND SINGLE PHASE CAPACITORS ARE NOT ACCEPTABLE.
F. DRY TYPE CAPACITORS, RESIN FILLED CAPACITORS AND/OR CAPACITORS WITHOUT A PRESSURE SENSITIVE CIRCUIT INTERRUPTER ARE NOT ACCEPTABLE.
G. CAPACITORS WITH A NAMEPLATE VOLTAGE OF LESS THAN 690V SHALL NOT BE ACCEPTABLE.
3. **DISCHARGE RESISTORS:**
A. ADEQUATE DISCHARGE RESISTORS SHALL BE PROVIDED FOR EACH CAPACITOR CELL TO REDUCE THE VOLTAGE TO 50 VOLTS OR LESS IN ONE MINUTE AFTER DISCONNECTION OF SUPPLY VOLTAGE.
4. **HARMONIC FILTERING REACTORS:**
A. INITIAL FILTER TUNING FREQUENCY SETTING SHALL BE 4.5 X 60 HZ (270 HZ).
B. HARMONIC FILTERING REACTORS SHALL BE THREE PHASE IRON CORE COMPLETE WITH ONE "+" TAP AND ONE "-" TAP PER PHASE FOR FIELD ADJUSTMENT OF REACTANCE. REACTOR INSULATION SHALL BE RATED AT 220°C. THE MAXIMUM TEMPERATURE OF THE REACTOR AT MAXIMUM CONTINUOUS RMS AMPERAGE SHALL BE NO HIGHER THAN 145°C WITH A 45°C AMBIENT. REACTOR MAXIMUM CONTINUOUS RMS AMPERAGE SHALL BE SIZED TO MATCH THE MAXIMUM CONTINUOUS RMS AMPERAGE OF THE CAPACITORS. THE MINIMUM REACTOR Q FACTOR SHALL BE 90.
C. REACTORS SHALL BE EQUIPPED WITH SNAP ACTION THERMOSTATS WHICH TRIP AT 145°C AND ARE WIRED TO A MONITORING SYSTEM WHICH SWITCHES OFF AND LOCKS OUT THE ASSOCIATED CONTACTOR FOR THE OVERHEATED REACTOR. AN LED SHALL INDICATE WHICH STEP HAS THE OVERHEATED REACTOR. A PUSHBUTTON RESET LOCATED ON THE DOOR SHALL RESET THE ALARM.
D. IN NO CASE SHALL THE HARMONIC FILTERING REACTOR SIZE EXCEED 75 KVAR AT THE SYSTEM VOLTAGE TO ALLOW FOR EASE OF REPLACEMENT.
5. **CONTACTORS:**
A. CONTACTORS SHALL BE 3 PHASE, IEC RATED, AND RATED FOR CAPACITOR SWITCHING DUTY. CONTACTORS MUST BE CAPABLE OF SWITCHING 135% OF THE NOMINAL AMPERAGE OF THE CAPACITORS BEING SWITCHED. THE CONTACTORS SHALL BE CAPABLE OF SWITCHING THE MAXIMUM CONTINUOUS RMS AMPERAGE RATING OF THE CAPACITORS. CONTACTOR COILS SHALL BE 120 VOLT, 60 HZ.
6. **HRC FUSING:**
A. 3 HRC FUSES SHALL BE INCLUDED FOR EACH CONTACTOR. HRC FUSES SHALL HAVE A MINIMUM INTERRUPTING RATING OF 200 KA. FAST ACTING FUSES SHALL BE SIZED FOR AT LEAST 180% OF THE NOMINAL AMPERAGE OF THE CAPACITORS TO PREVENT CLEARING ON INRUSH. TIME DELAY / DUAL ELEMENT FUSES SHALL BE SIZED FOR A MINIMUM 140% OF THE NOMINAL AMPERAGE OF THE CAPACITORS.
7. **DIGITAL MICROPROCESSOR CONTROLLER:**
THE DIGITAL MICROPROCESSOR CONTROLLER SHALL BE A MINIMUM 12 STEP CONTROLLER, WHICH INCLUDES THE FOLLOWING FEATURES:
A. ADJUSTABLE TARGET POWER FACTOR FROM 0.85 LAGGING TO -0.95 LEADING
B. CIRCULAR OR LINEAR SWITCHING MODES
C. AUTOMATIC OR MANUAL SWITCHING OF STEPS
D. SWITCHING RATIOS OF 1:1:1:1; 1:1:2:2; 1:1:2:2:4; 1:1:2:3:3; 1:1:2:4:4; 1:1:2:4:8; 1:2:2:2:2; 1:2:3:3:3; 1:2:3:4:4; 1:2:3:6:6; 1:2:4:4:4; 1:2:4:8:8
E. SWITCHES UP TO 12 STEPS FOR EACH SWITCHING RATIO
F. OPTION OF SELECTING SWITCHED STEPS AS FIXED STEPS
G. ADJUSTABLE CAPACITOR CURRENT TO CURRENT TRANSFORMER RATIO (C/K VALUE OR SENSITIVITY) FROM 0.025A TO 1.5A.
H. SELECTABLE SWITCHING ON AND OFF DELAYS OF 10, 30, 60, 120, 180, 300, AND 500 SECONDS AND AN OPTION TO HAVE THE CONTROLLER AUTOMATICALLY ADJUST THE SWITCHING ON AND OFF DELAY BETWEEN 2-500 SECONDS AS A FUNCTION OF REACTIVE LOAD.
I. SELECTABLE RESWITCHING BLOCKING DELAY OF 20, 60, 180, AND 300 SECONDS
J. CHOICE OF AUTOMATIC, SEMI AUTOMATIC, OR MANUAL DETERMINATION OF CT RATIO AND POSITION, C/K RATIO, STEP SWITCHING RATIO, AND STEP QUANTITY.
K. MEMORIZATION OF CT POSITION AFTER THE FIRST STARTUP IN AUTOMATIC STARTUP MODE.
L. MEASURING VOLTAGE RANGE OF 58 - 690 VOLT WITHOUT POTENTIAL TRANSFORMER
M. DISPLAYS CAPACITOR STEP CURRENT BASED ON CT RATIO WITHOUT HAVING TO USE MULTIPLIERS
N. DISPLAYS FUNDAMENTAL AND RMS CURRENT ON THE MAIN BUS BAR WITHOUT HAVING TO USE MULTIPLIERS
O. DISPLAYS INDIVIDUAL HARMONIC CURRENT DISTORTION ON THE MAIN BUS BAR FOR THE 3RD, 5TH, 7TH, 11TH, 13TH, AND 17TH HARMONICS
P. TEMPERATURE SENSOR ADJUSTABLE FROM 25°C TO 50°C.
Q. ALARM RELAY FOR TEMPERATURE ABOVE SET POINT, INDIVIDUAL HARMONIC CURRENT DISTORTION ABOVE SET POINT, TOTAL HARMONIC CURRENT DISTORTION ABOVE SET POINT, POWER FACTOR BELOW TARGET SET POINT, MEASURING VOLTAGE MISSING, EXCESSIVE CT SECONDARY CURRENT, CT SECONDARY CURRENT TOO LOW.
R. SELECTABLE STEP SWITCHING FEATURE IN ALARM CONDITIONS WHICH PROVIDES ANTI-RESONANCE FEATURES
S. SELECTION OF ACTIVATION OR DEACTIVATION OF INDIVIDUAL ALARMS.
T. DISPLAY SHOWS SYMBOLS FOR ALARMS WHEN IN ALARM STATUS AND DRY ALARM CONTACT CLOSURES IN ALARM CONDITION
U. NO VOLTAGE RELEASE SWITCHES OUT ALL CAPACITORS IN CASE OF INTERRUPTION OF SUPPLY VOLTAGE
V. MONITORS AND DISPLAYS QUANTITY OF INDIVIDUAL STEP OPERATIONS FOR DETERMINING CONTACTOR WEAR.
W. DISPLAYS A FAULT WHEN ANY STEP CURRENT IS REDUCED TO ZERO INDICATING FAULTY STEP COMPONENTS.
X. COMMUNICATIONS RS485 MODBUS COMMUNICATION TYPE REQUIRED. SUPPLY RS485 TO BACnet CONVERTER MANUFACTURED BY BABLEBUSTER. SUPPLY MUST INCLUDE THE PROGRAMMING OF THE CONVERTER.
Y. KEY BOARD LOCKING FEATURE TO PREVENT UNAUTHORIZED TAMPERING
Z. WATCHDOG CONTINUOUSLY MONITORS PROCESSOR AND INDICATES A FAULT IF THE PROCESSOR MALFUNCTIONS.
8. **ROPE TYPE CURRENT TRANSFORMER:**
A. SEE E2 FOR WORDING.
9. **TERMINATION:**
A. A SUITABLY SIZED THREE PHASE TERMINAL BLOCK SHALL BE PROVIDED FOR FEEDER TERMINATION. GROUND TERMINALS SHALL BE PROVIDED FOR GROUND WIRE TERMINATION.
B. FEEDER CABLE ENTRY LOCATION: TOP
C. FEEDER CABLE SIZE: 2*500MCM PER PHASE
10. **ENCLOSURE:** (SEE DRAWINGS FOR APPROXIMATE DIMENSIONS)
A. ENCLOSURES SHALL BE OF AT LEAST THE MINIMUM GAUGE STEEL AS REQUIRED BY CODE. ENCLOSURES SHALL SUITABLE FOR THE INSTALLATION LOCATION. NEMA 1 ENCLOSURES SHALL BE EASILY FIELD CHANGEABLE TO NEMA 2, NEMA 3R, AND NEMA 12. THERMOSTATICALLY CONTROLLED VENTILATION SHALL BE SIZED TO MAINTAIN A MAXIMUM TEMPERATURE OF 45°C INSIDE THE ENCLOSURE AT THE EXTREME HIGH AMBIENT TEMPERATURE.
B. NEMA 3R ENCLOSURES SHALL INCLUDE THERMOSTATICALLY CONTROLLED ANTI-CONDENSATION HEATERS TO MAINTAIN AT LEAST -20°C INSIDE THE ENCLOSURE BASED ON THE EXTREME LOW AMBIENT TEMPERATURE. DRIPSHIELDS, AIR FILTERS FOR DUST, MOISTURE, AND VERMIN SHALL ALSO BE INCLUDED FOR NEMA 3R ENCLOSURES. DRIPSHIELDS AND AIR FILTERS FOR DUST SHALL BE INCLUDED FOR NEMA 12 ENCLOSURES. DRIPSHIELDS SHALL BE INCLUDED FOR NEMA 2 ENCLOSURES. THE CONTROLLER SHALL BE SEMI-FLUSH MOUNTED ON THE DOOR FOR NEMA 1 APPLICATIONS. THE CONTROLLER SHALL BE MOUNTED BEHIND SAFETY GLASS AND THE DISPLAY VISIBLE FOR NEMA 2, NEMA 3R AND NEMA 12 APPLICATIONS.
C. ADEQUATELY SIZED CONTROL TRANSFORMER AND CONTROL FUSES SHALL BE PROVIDED FOR ALL CONTROLS INCLUDING HEATING AND COOLING. NOTE: PROVIDE ALL CONTROLS IN A SEPARATELY ACCESSIBLE LOCKABLE CONTROL SECTION SO THAT IT CAN BE WORKED ON WITHOUT ACCESSING THE 600 VOLT COMPARTMENT.
D. ALL COMPONENTS MUST BE SUITABLY MOUNTED TO PROVIDE EASE OF REPLACEMENT WITH FRONT ACCESS ONLY. ALL ENCLOSURE MOUNTING HARDWARE AND FRAMEWORK SHALL BE EITHER GALVANIZED STEEL OR ZINC PLATED STEEL FOR GROUNDING CONTINUITY. PAINTED MOUNTING HARDWARE AND FRAMEWORK WITH PAINT REMOVED FOR GROUNDING IS NOT ACCEPTABLE. ALL ENCLOSURE PARTS OTHER THAN MOUNTING HARDWARE AND FRAMEWORK SHALL BE POWDER COATED ASA 61 GREY.
E. THE ENCLOSURE DOOR SHALL HAVE A LOCKABLE HANDLE.
F. ENCLOSURE RATING REQUIRED: NEMA 1
G. MINIMUM AMBIENT TEMPERATURE: 10°C
H. MAXIMUM AMBIENT TEMPERATURE: 35°C
I. PROVIDE INSULATING HEAT SHRINK OVER ALL 600V CONNECTIONS + PLEXIGLASS COVERS OVER 600V EQUIPMENT TO MAKE SAFE WHEN OPENING ENCLOSURE.
11. **LABELING:**
A. A "WAIT ONE MINUTE AFTER DISCONNECTION FROM SUPPLY" LABEL SHALL BE LOCATED ON THE ENCLOSURE DOOR. A "WAIT FIVE MINUTES AFTER DISCONNECTION FROM SUPPLY" LABEL SHALL BE PROVIDED LOOSE FOR THE DISCONNECTING DEVICE. BOTH LABELS SHALL BE WORDED AS PER CODE REQUIREMENTS.
12. **TESTING:**
A. TESTING SHALL BE PERFORMED AS PER CSA AND UL STANDARDS. ALL ASSEMBLIES MUST BE BEAR A CERTIFICATION LABEL FOR BOTH CANADIAN AND USA STANDARDS. FOR FILTERED UNITS A CONFIRMATION OF THE FILTER TUNING FREQUENCIES MUST BE PERFORMED PRIOR TO SHIPMENT.
13. **APPROVED MANUFACTURERS:**
A. ELECTROTEK LTD. OR APPROVED EQUAL.
14. **COMMISSIONING: PROVIDE ONE COMPLETE DAY OF ON-SITE COMMISSIONING FOR THE CAPACITOR BANK.**
A. INCLUDE BEFORE AND AFTER POWER FACTOR RESULTS AT FULL LOAD.
B. PROVIDE BEFORE AND AFTER HARMONIC SPECTRUM RESULTS AND THD VOLTAGE AND CURRENT. ALLOW TO ADJUST TAPS TO BE MORE AGGRESSIVE IN TUNING WITHOUT OVERLOADING CAPACITORS. DETERMINE AT SITE.
C. PROVIDE COMPLETE OWNER INSTRUCTION AT COMMISSIONING.

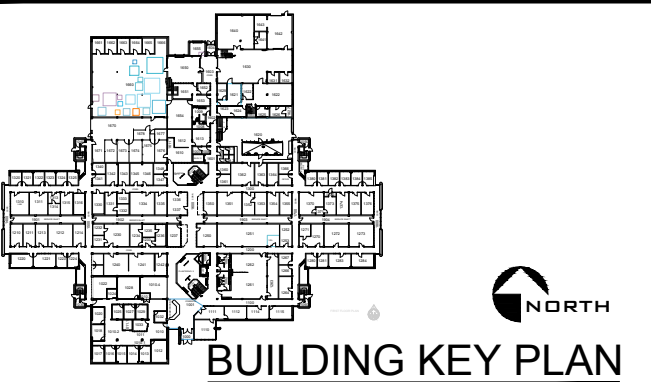
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Environment Canada
Environnement Canada

Real Property
Management Division
Technical Services

Division Gestion
des biens immobilier
Services Techniques



BUILDING KEY PLAN



ASSOCIATION OF PROFESSIONAL ENGINEERS
& GEOSCIENTISTS OF SASKATCHEWAN
CERTIFICATE OF AUTHORIZATION

WILLMS ENGINEERING LTD.

NUMBER C1309

PERMISSION TO CONSULT HELD BY:


DISCIPLINE

SASK. REG. No.

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ELECTRICAL

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WEL702

0	ISSUED FOR TENDER	12-DEC-2016
REV	Description	Date
A	detail no. no. du detail	A
B	location drawing no. sur dessin no.	B
C	drawing no. dessin no.	C

project

project

CAPACITOR BANK
REPLACEMENT

NATIONAL HYDROLOGY RESEARCH CENTRE
11 INNOVATION BLVD.
SASKATOON SK. S7N 3H5

drawing

dessin

ELECTRICAL No. 3

Designed By	K.G. JOHNSON, E.I.T.	Conçu par
Date	2016/12/12	(yyyy/mm/dd)
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Date	2016/12/12	(yyyy/mm/dd)
Tender	Soumission	
Project Manager	Administrateur de projets	
EC PMDI Proj no.	Consultant Proj no.	
Drawing no.	No. du dessin	

E3